Index of /ds/BC/

Name	Last modified	Size	Description
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BC237_238_239.pdf	17-Apr-99 00:00	70K	
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BC239.pdf	22-Dec-99 00:02	70K	
BC307.pdf	22-Dec-99 00:02	69K	
BC307_308_309.pdf	17-Apr-99 00:00	69K	
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BC309.pdf	22-Dec-99 00:02	69K	
BC327.pdf	22-Dec-99 00:02	92K	
BC327_BC328.pdf	17-Apr-99 00:00	92K	
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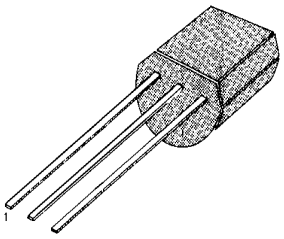
BCX71H.pdf	22-Dec-99 00:02	31K
BCX71J.pdf	22-Dec-99 00:02	31K
BCX71K.pdf	22-Dec-99 00:02	31K
BCX79.pdf	22-Dec-99 00:02	23K

BC237/238/239 NPN EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- LOW NOISE: BC239

TO-92



1. Collector 2. Base 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CES}		V
: BC237		50	V
: BC238/239		30	
Collector-Emitter Voltage	V_{CEO}		
: BC237		45	V
: BC238/239		25	V
Emitter-Base Voltage	V_{EBO}		
: BC237		6	V
: BC238/239		5	V
Collector Current (DC)	I_C	100	mA
Collector Dissipation	P_C	500	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2mA, I_B=0				
:BC237			45			V
: BC238/239			25			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=1μA, I_C=0				
: BC237			6			V
: BC238/239			5			V
Collector Cut-off Current	I_{CES}					
: BC237		V_{CE}=50V, I_B=0		0.2	15	nA
: BC238/239		V_{CE}=30V, I_B=0		0.2	15	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=2mA	120		800	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.5mA		0.07	0.2	V
		I_C=100mA, I_B=5mA		0.2	0.6	V
Collector Base Saturation Voltage	V_{BE} (sat)	I_C=10mA, I_B=0.5mA		0.73	0.83	V
		I_C=100mA, I_B=5mA		0.87	1.05	V
Base Emitter On Voltage	V_{BE} (on)	V_{CE}=5V, I_C=2mA	0.55	0.62	0.7	V
Current Gain Bandwidth Product	f_T	V_{CE}=3V, I_C=0.5mA		85		MHz
		V_{CE}=5V, I_C=10mA	150	250		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}=10V, f=1MHz		3.5	6	pF
Emitter Base Capacitance	C_{EBO}	V_{EB}=0.5V, f=1MHz		8		pF
Noise Figure : BC237/238	NF	V_{CE}=5V, I_C=0.2mA,		2	10	dB
: BC239		f=1KHz R_G=2kohm			4	dB
: BC239	NF	V_{CE}=5V, I_C=0.2mA			4	dB
		R_G=2kohm, f=30~15KHz				

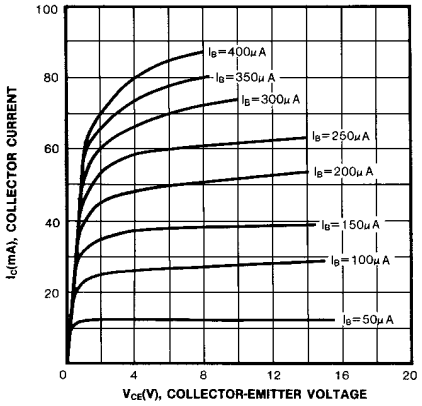
h_{FE} CLASSIFICATION

Classification	A	B	C
h_{FE}	120-220	180-460	380-800

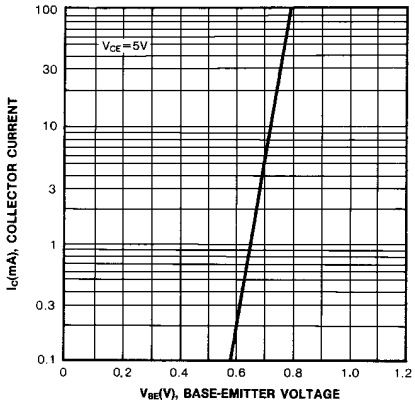
Rev. B

FAIRCHILD SEMICONDUCTOR TM

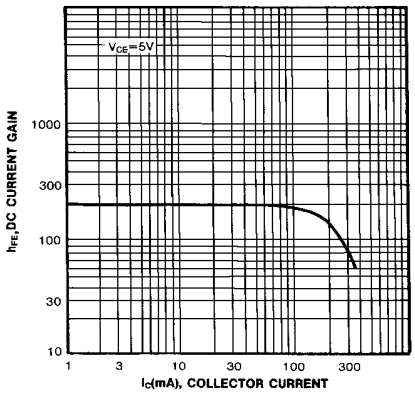
STATIC CHARACTERISTIC



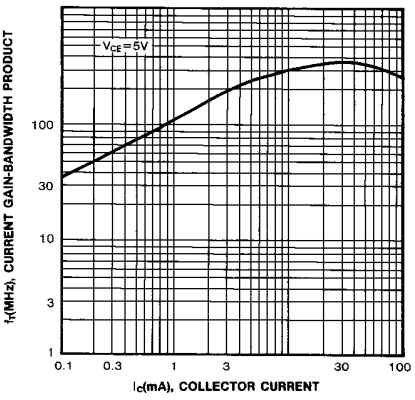
TRANSFER CHARACTERISTIC



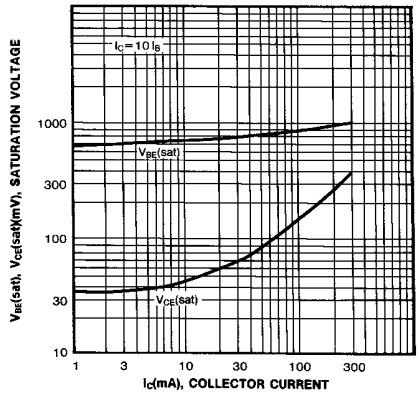
DC CURRENT GAIN



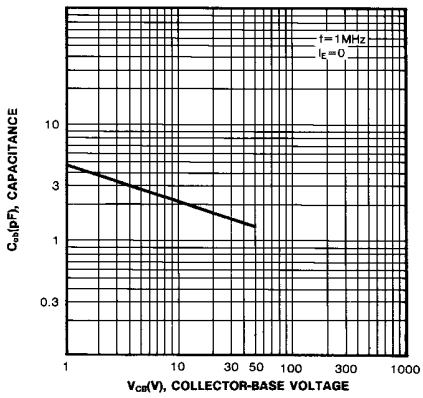
CURRENT GAIN BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



OUTPUT CAPACITANCE



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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

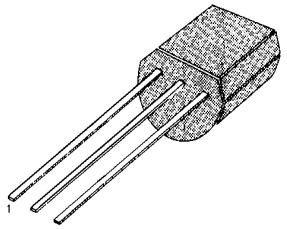
Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

BC307/308/309 PNP EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

• LOW NOISE: BC309

TO-92



ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CES}		
: BC307		-50	V
: BC308/309		-30	V
Collector-Emitter Voltage	V_{CEO}		
: BC307		-45	V
: BC308/309		-25	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current (DC)	I_C	-100	mA
Collector Dissipation	P_C	500	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C= -2mA, I_B=0				
: BC307			-45			V
: BC308/309			-25			V
Collector Emitter Breakdown Voltage	BV_{CES}	I_C= -10μA, I_B=0				
: BC307			-50			V
: BC308/309			-30			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E= -10μA, I_B=0	-5			V
Collector Cut-off Current	I_{CES}					
: BC307		V_{CE}= -45V, I_B=0		-2	-15	nA
: BC238/239		V_{CE}= -25V, I_B=0		-2	-15	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C= -2mA	120		800	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.5mA			-0.3	V
		I_C= -100mA, I_B= -5mA		-0.5		V
Collector Base Saturation Voltage	V_{BE} (sat)	I_C= -10mA, I_B= -0.5mA		-0.7		V
		I_C= -100mA, I_B= -5mA		-0.85		V
Base Emitter On Voltage	V_{BE} (on)	V_{CE}= -5V, I_C= -2mA	-0.55	-0.62	-0.7	V
Current Gain Bandwidth Product	f_T	V_{CE}= -5V, I_C= -10mA		130		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}= -10V, f=1MHz			6	pF
Emitter Base Capacitance	C_{EBO}	V_{EB}= -0.5V, f=1MHz		12		pF
Noise Figure : BC237/238	NF	V_{CE}= -5V, I_C= -0.2mA,			10	dB
: BC239		R_G=2KΩ, f=1KHz			4	dB
: BC239	NF	V_{CE}= -5V, I_C= -0.2mA		2	4	dB
		R_G=2KΩ, f=30~15KHz				

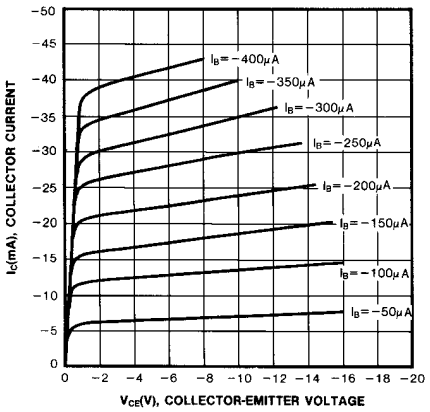
h_{FE} CLASSIFICATION

Classification	A	B	C
h_{FE}	120-220	180-460	380-800

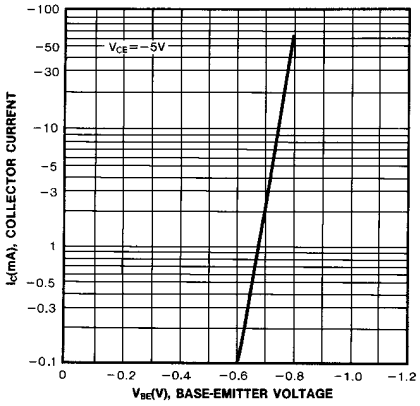
Rev. B

FAIRCHILD SEMICONDUCTOR TM

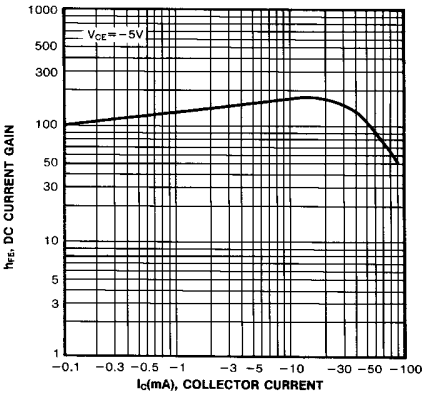
STATIC CHARACTERISTIC



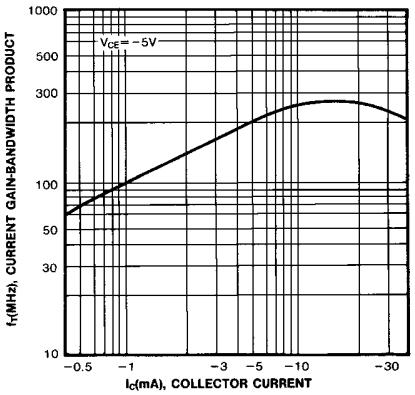
BASE-EMITTER ON VOLTAGE



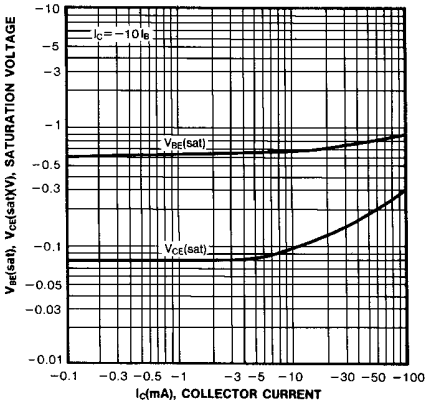
DC CURRENT GAIN



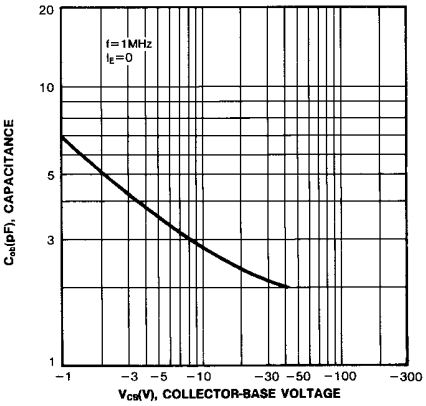
CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



COLLECTOR OUTPUT CAPACITANCE



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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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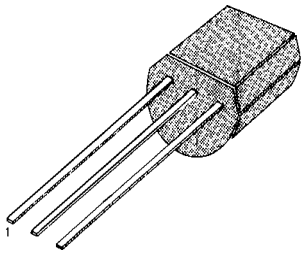
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.

BC327/328 PNP EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- Suitable for AF-Driver stages and low power output stages
- Complement to BC337/BC338

TO-92



1. Collector 2. Base 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CES}		
: BC327		-50	V
: BC328		-30	V
Collector-Emitter Voltage	V_{CEO}		
: BC327		-45	V
: BC328		-25	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current (DC)	I_C	-800	mA
Collector Dissipation	P_C	625	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

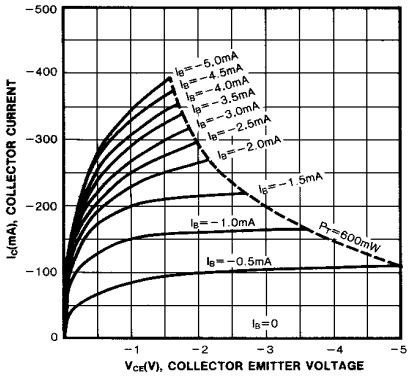
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C= -10mA, I_B=0				
: BC327			-45			V
: BC328			-25			V
Collector Emitter Breakdown Voltage	BV_{CES}	I_C= -0.1mA, I_B=0				
: BC327			-50			V
: BC328			-30			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E= -10mA, I_C=0	-5			V
Collector Cut-off Current	I_{CES}					
: BC307		V_{CE}= -45V, I_B=0		-2	-100	nA
: BC338		V_{CE}= -25V, I_B=0		-2	-100	nA
DC Current Gain	h_{FE}	V_{CE}= -1V, I_C= -100mA	100		630	
	h_{FE}2	V_{CE}= -1V, I_C= -30mA	60			
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -500mA, I_B= -50mA			-0.7	V
Base Emitter On Voltage	V_{BE} (on)	V_{CE}= -1V, I_C= -300mA			-1.2	V
Current Gain Bandwidth Product	f_T	V_{CE}= -5V, I_C= -10mA		100		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}= -10V, f=1MHz		12		pF

h_{FE} CLASSIFICATION

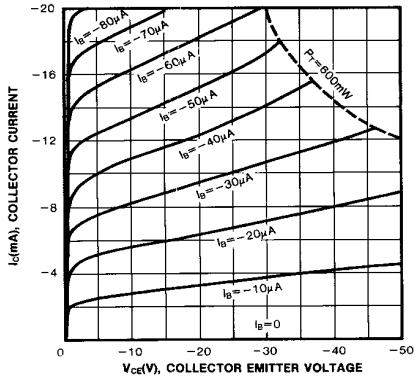
Classification	A	B	C
h_{FE}	100-250	160-400	250-630
h_{FE2}	60-	100-	170-

FAIRCHILD SEMICONDUCTOR TM

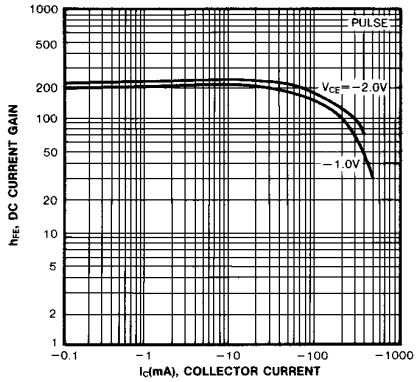
COLLECTOR CURRENT vs.
COLLECTOR EMITTER VOLTAGE



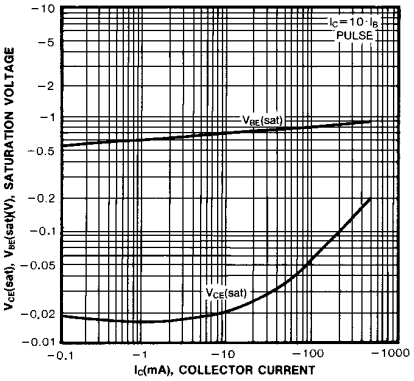
COLLECTOR CURRENT vs.
COLLECTOR EMITTER VOLTAGE



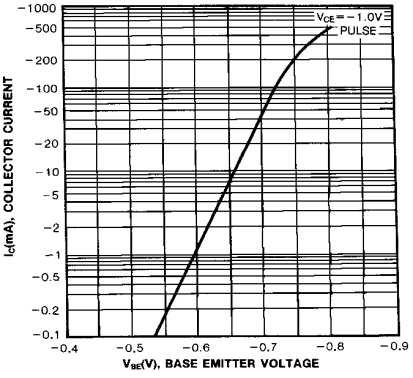
DC CURRENT GAIN vs.
COLLECTOR CURRENT



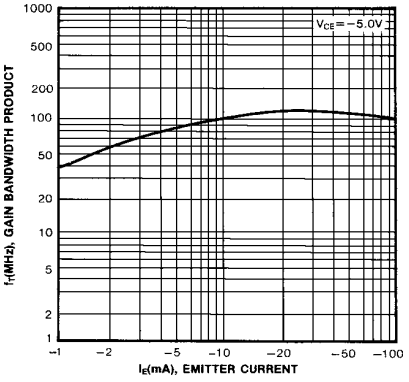
BASE AND COLLECTOR SATURATION
VOLTAGE vs. COLLECTOR CURRENT



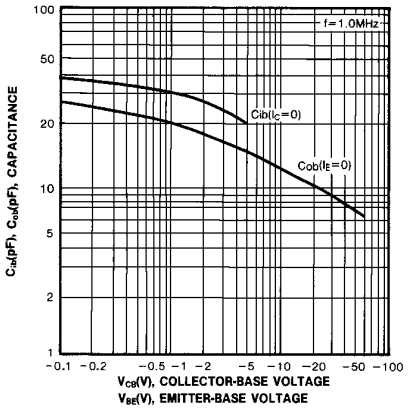
COLLECTOR CURRENT vs.
BASE EMITTER VOLTAGE



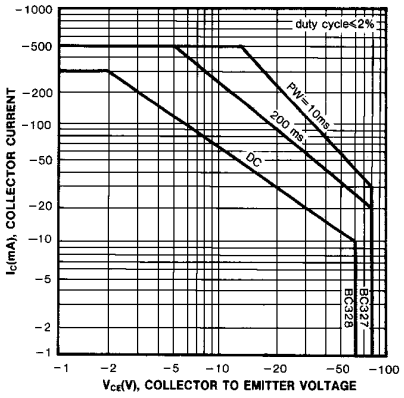
GAIN BANDWIDTH PRODUCT vs.
EMITTER CURRENT



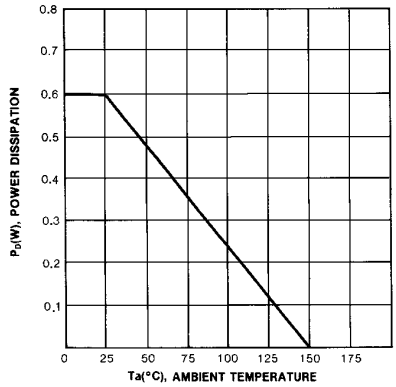
INPUT AND OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



SAFE OPERATING AREA



POWER DERATING



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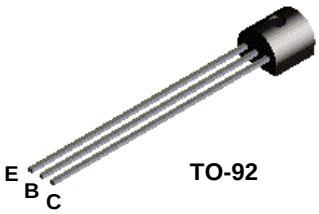
FAIRCHILD SEMICONDUCTOR™

Discrete POWER & Signal Technologies

BC337-16
BC337-25



TO-92

NPN General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 500 mA. Sourced from Process 12. See TN3019A for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CES}	Collector-Base Voltage	50	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	1.0	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		BC337-16 / BC337-25	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	°C/W

NPN General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

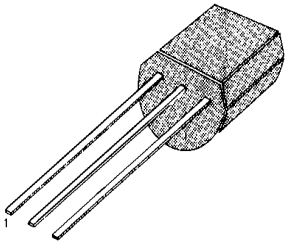
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0	50		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 100 µA, I_C = 0	5.0		V
I_{CBO}	Collector Cutoff Current	V_{CB} = 20 V, I_E = 0, T_A = +25 °C V_{CB} = 20 V, I_E = 0, T_A = +150 °C		100 5.0	nA µA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 5.0 V, I_C = 0		10	µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	V_{CE} = 1.0 V, I_C = 100 mA **337-16** **337-25** V_{CE} = 1.0 V, I_C = 500 mA	 100 160 40	 250 400	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		0.7	V
$V_{BE(on)}$	Base-Emitter On Voltage	V_{CE} = 1.0 V, I_C = 500 mA		1.2	V

BC337/338 NPN EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- Suitable for AF-Driver stages and low power output stages
- Complement to BC337/BC328

TO-92



1. Collector 2. Base 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CES}		
: BC337		50	V
: BC338		30	V
Collector-Emitter Voltage	V_{CEO}		
: BC337		45	V
: BC338		25	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current (DC)	I_C	800	mA
Collector Dissipation	P_C	625	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-55 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	BV_{CEO}	I_C=10mA, I_B=0				
: BC337			45			V
: BC338			25			V
Collector Emitter Breakdown Voltage	BV_{CES}	I_C=0.1mA, I_B=0				
: BC337			50			V
: BC338			30			V
Emitter Base Breakdown Voltage	BV_{EBO}	I_E=0.1mA, I_C=0	-5			V
Collector Cut-off Current	I_{CES}					
: BC337		V_{CE}=45V, I_B=0		2	100	nA
: BC338		V_{CE}=25V, I_B=0		2	100	nA
DC Current Gain	$h_{FE}1$	V_{CE}=1V, I_C=100mA	100		630	
	$h_{FE}2$	V_{CE}=1V, I_C=300mA	60			
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=500mA, I_B=50mA			0.7	V
Base Emitter On Voltage	V_{BE} (on)	V_{CE}=1V, I_C=300mA			1.2	V
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA		100		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}=10V, f=1MHz		12		pF

h_{FE} CLASSIFICATION

Classification	16	25	40
h_{FE}	100-250	160-400	250-630
h_{FE2}	60-	100-	170-

Rev. B

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SuperSOT™-8
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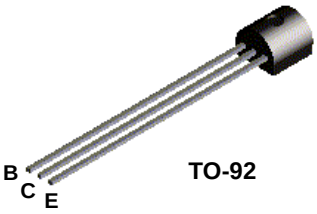
FAIRCHILD
SEMICONDUCTOR TM

BC368



TO-92

NPN General Purpose Amplifier

This device is designed for general purpose medium power amplifiers and switches requiring collector currents to 1.5 A. Sourced from Process 37.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	20	V
V_{CES}	Collector-Base Voltage	25	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	2.0	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		BC368	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	°C/W

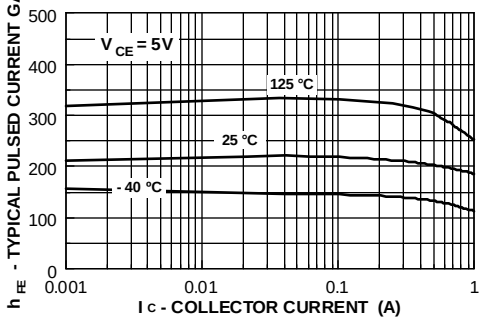
NPN General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

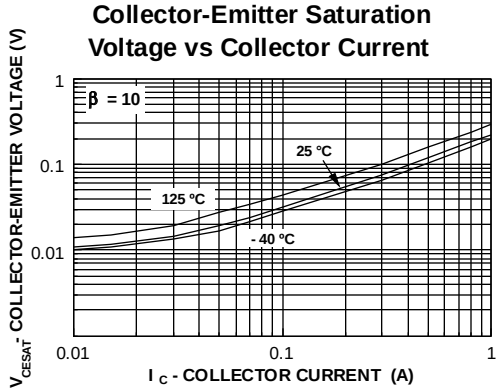
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	20		V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0	25		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 25 V, I_E = 0 V_{CB} = 25 V, I_E = 0, T_A = 150°C		10 1.0	µA mA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 5.0 V, I_C = 0		10	µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 5.0 mA, V_{CE} = 10 V I_C = 0.5 A, V_{CE} = 1.0 V I_C = 1.0 A, V_{CE} = 1.0 V	50 85 60	 375 	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 1.0 A, I_B = 100 mA		0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 1.0 A, V_{CE} = 1.0 V		1.0	V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 10 mA, V_{CE} = 5.0 V, f = 35 MHz	45		MHz

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

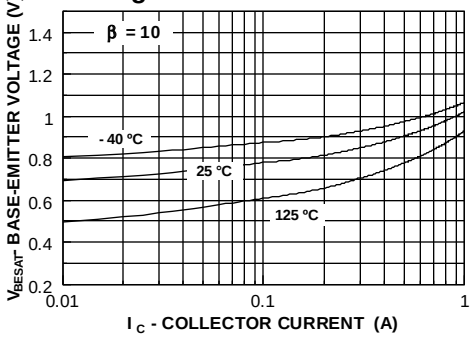


Collector-Emitter Saturation Voltage vs Collector Current

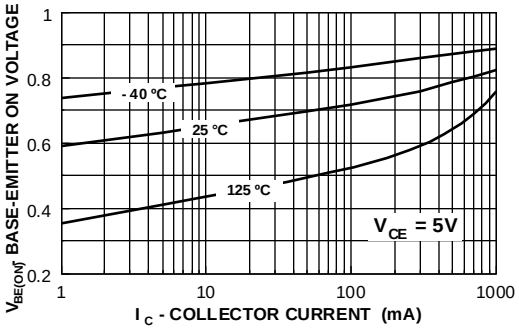


Typical Characteristics (continued)

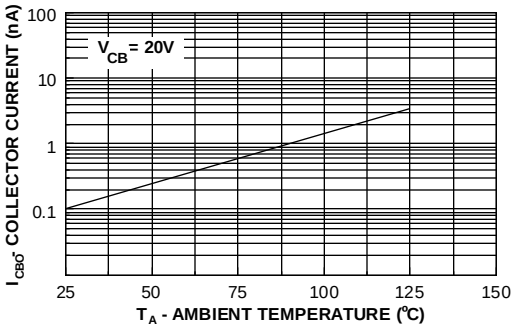
Base-Emitter Saturation Voltage vs Collector Current



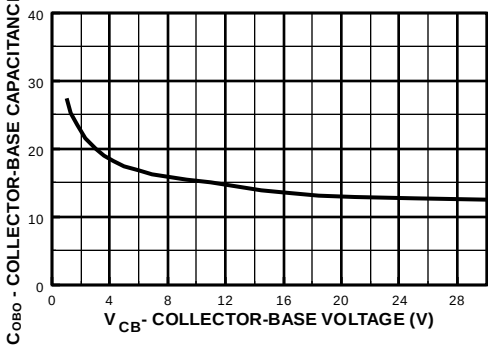
Base-Emitter ON Voltage vs Collector Current



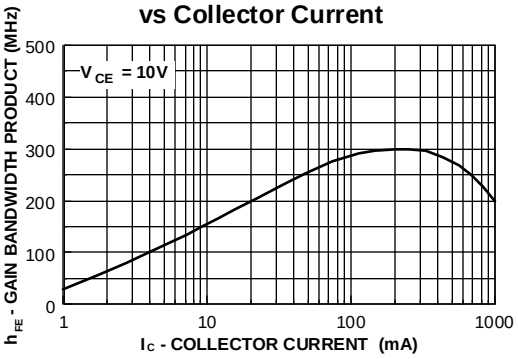
Collector-Cutoff Current vs Ambient Temperature



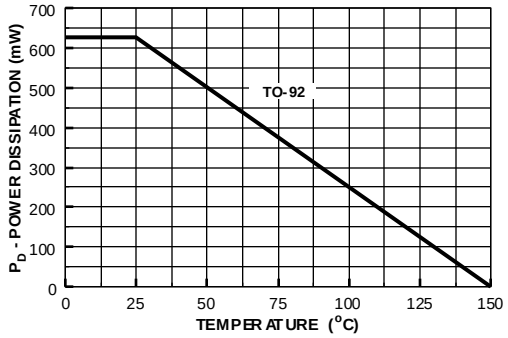
Collector-Base Capacitance vs Collector-Base Voltage



Gain Bandwidth Product vs Collector Current



Power Dissipation vs Ambient Temperature



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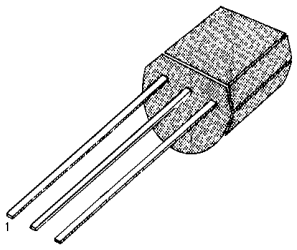
BC546/547/548/549/550

NPN EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER

- HIGH VOLTAGE: BC546, V_{CEO}=65V
- LOW NOISE: BC549, BC550
- Complement to BC556 ... BC560

TO-92



1. Collector 2. Base 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector Base Voltage	V_{CBO}		
: BC546		80	V
: BC547/550		50	V
: BC548/549		30	V
Collector-Emitter Voltage	V_{CEO}		
: BC546		65	V
: BC547/550		45	V
: BC548/549/550		30	V
Emitter-Base Voltage	V_{EBO}		V
: BC546/547		6	V
: BC548/549/550		5	V
Collector Current (DC)	I_C	100	mA
Collector Dissipation	P_C	500	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}=30V, I_E=0			15	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=2mA	110		800	
Collector Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.5mA		90	250	mA
		I_C=100mA, I_B=5mA		200	600	mA
Collector Base Saturation Voltage	V_{BE} (on)	I_C=10mA, I_B=0.5mA		700		mA
		I_C=100mA, I_B=5mA		900		mA
Base Emitter On Voltage	V_{BE} (on)	V_{CE}=5V, I_C=2mA	580	660	700	mA
		V_{CE}=5V, I_C=10mA			720	mA
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA		300		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}=10V, f=1MHz		3.5	6	pF
Emitter Base Capacitance	C_{EBO}	V_{EB}=0.5V, f=1MHz		9		pF
Noise Figure : BC546/547/548	NF	V_{CE}=5V, I_C=200μA		2	10	dB
: BC549/550		f=1KHz, R_G=2KΩ		1.2	4	dB
: BC549	NF	V_{CE}=5V, I_C=200μA		1.4	4	dB
: BC550		R_G=2KΩ, f=30~15000MHz		1.4	3	dB

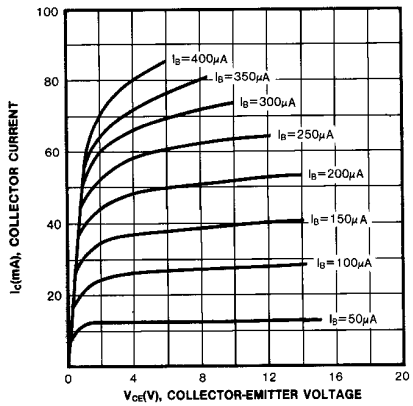
h_{FE} CLASSIFICATION

Classification	A	B	C
h_{FE}	110-220	200-450	420-800

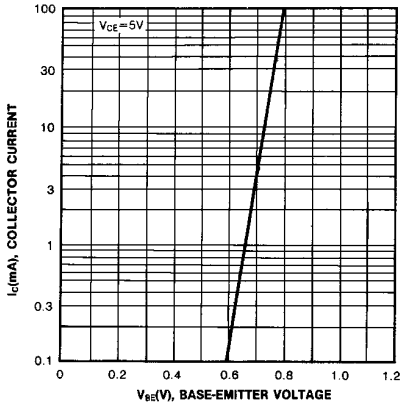
FAIRCHILD SEMICONDUCTOR TM

Rev. B

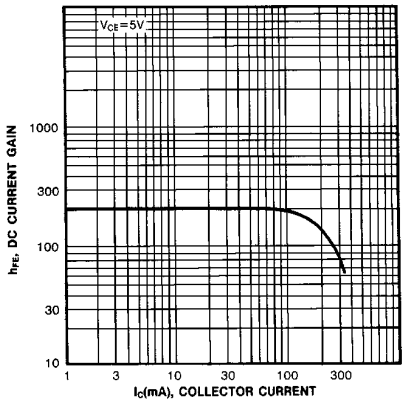
STATIC CHARACTERISTIC



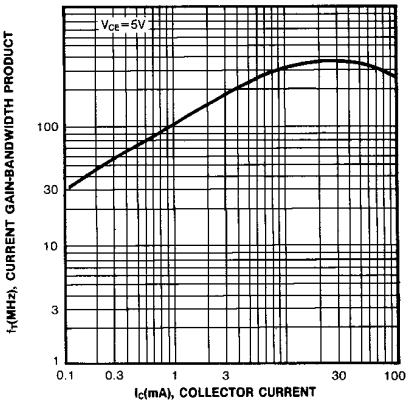
TRANSFER CHARACTERISTIC



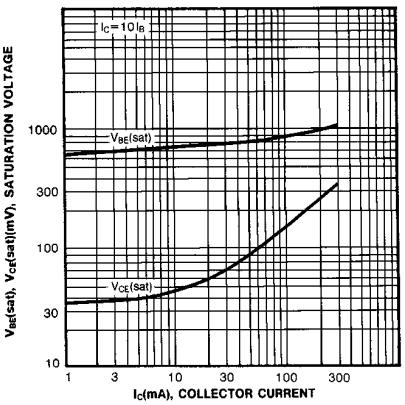
DC CURRENT GAIN



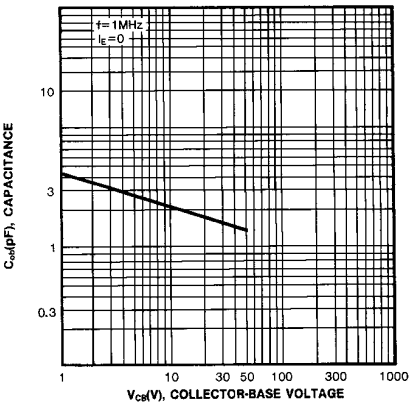
CURRENT GAIN BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



OUTPUT CAPACITANCE



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SuperSOT™-6
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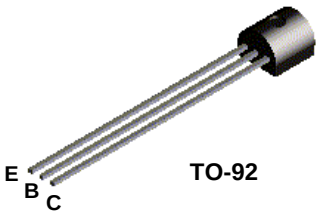
FAIRCHILD SEMICONDUCTOR™

Discrete POWER & Signal Technologies

BC548
BC548A
BC548B
BC548C



TO-92

NPN General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 300 mA. Sourced from Process 10. See PN100A for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	30	V
V_{CES}	Collector-Base Voltage	30	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	500	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		BC548 / A / B / C	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	°C/W

NPN General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions		Min	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0		30		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0		30		V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0		30		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0		5.0		V
I_{CBO}	Collector Cutoff Current	V_{CB} = 30 V, I_E = 0 V_{CB} = 30 V, I_E = 0, T_A = +150 °C			15 5.0	nA µA
ON CHARACTERISTICS						
h_{FE}	DC Current Gain	V_{CE} = 5.0 V, I_C = 2.0 mA	**548** **548A** **548B** **548C**	110 110 200 420	800 220 450 800	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 0.5 mA I_C = 100 mA, I_B = 5.0 mA			0.25 0.60	V V
$V_{BE(on)}$	Base-Emitter On Voltage	V_{CE} = 5.0 V, I_C = 2.0 mA V_{CE} = 5.0 V, I_C = 10 mA		0.58	0.70 0.77	V V
SMALL SIGNAL CHARACTERISTICS						
h_{fe}	Small-Signal Current Gain	I_C = 2.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz		125	900	
NF	Noise Figure	V_{CE} = 5.0 V, I_C = 200 µA, R_S = 2.0 kΩ, f = 1.0 kHz, B_W = 200 Hz			10	dB

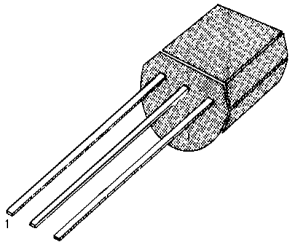
BC556/557/558/559/560

PNP EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER

- HIGH VOLTAGE: BC556, V_{CEO}= -65V
- LOW NOISE: BC559, BC560
- Complement to BC546 ... BC 550

TO-92



1. Collector 2. Base 3. Emitter

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Capacitance	V_{CBO}		
: BC556		-80	V
: BC557/560		-50	V
: BC558/559		-30	V
Collector-Emitter Voltage	V_{CEO}		
: BC556		-65	V
: BC557/560		-45	V
: BC558/559		-30	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current (DC)	I_C	-100	mA
Collector Dissipation	P_C	500	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}= -30V, I_E=0			-15	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C=2mA	110		800	
Collector Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.5mA		-90	-300	mV
		I_C= -100mA, I_B= -5mA		-250	-650	mV
Collector Base Saturation Voltage	V_{BE} (on)	I_C= -10mA, I_B= -0.5mA		-700		mV
		I_C= -100mA, I_B= -5mA		-900		mV
Base Emitter On Voltage	V_{BE} (on)	V_{CE}= -5V, I_C= -2mA	-600	-660	-750	mV
		V_{CE}= -5V, I_C= -10mA			-800	mV
Current Gain Bandwidth Product	f_T	V_{CE}= -5V, I_C= -10mA		150		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}= -10V, f=1MHz			6	pF
Noise Figure : BC556/557/558	NF	V_{CE}= -5V, I_C= -200μA		2	10	dB
: BC559/560		f=1KHz, R_G=2KΩ		1	4	dB
: BC559	NF	V_{CE}= -5V, I_C= -200μA		1.2	4	dB
: BC560		R_G=2KΩ f=30~15000MHz		1.2	2	dB

h_{FE} CLASSIFICATION

Classification	A	B	C
h_{FE}	110-220	200-450	420-800

Rev. B

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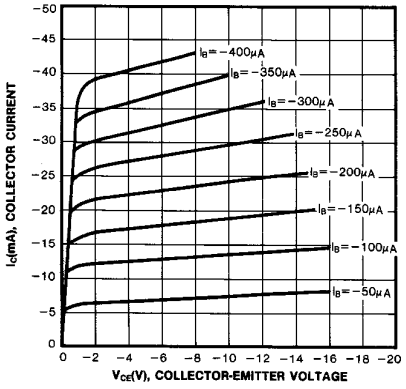
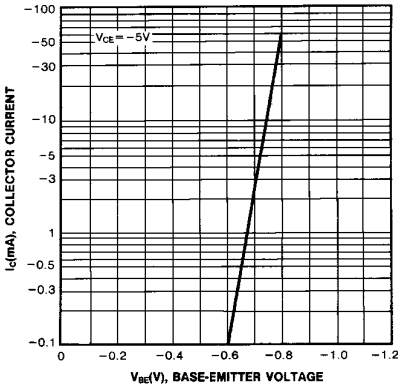
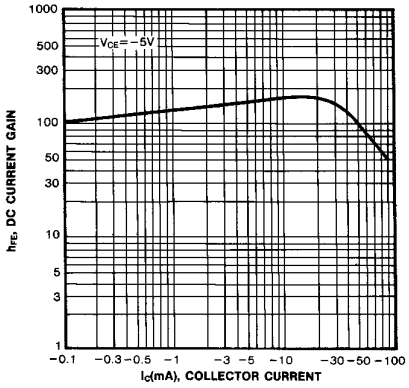
STATIC CHARACTERISTIC



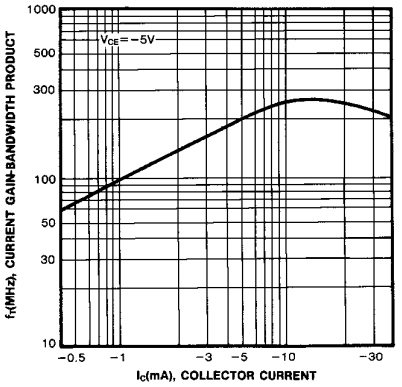
BASE-EMITTER VOLTAGE



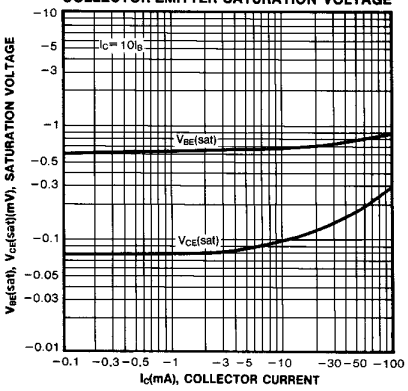
DC CURRENT GAIN



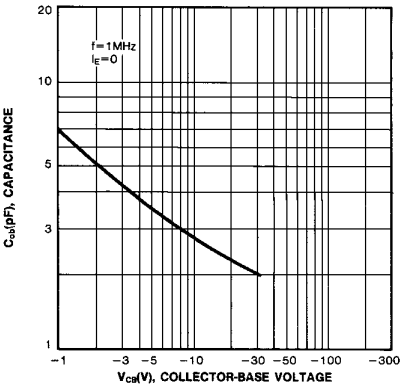
CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



COLLECTOR OUTPUT CAPACITANCE



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ISOPLANAR™
MICROWIRE™
POP™
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QS™
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SuperSOT™-3
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BC635/637/639 NPN EPITAXIAL SILICON TRANSISTOR

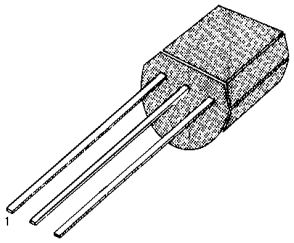
SWITCHING AND AMPLIFIER APPLICATIONS

- Complement to BC635/638/640

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic		Symbol	Rating	Unit
Collector Emitter Voltage	: BC635	V_{CER}	45	V
at R_{BE}=1Kohm	: BC637		60	V
	: BC639		100	V
Collector Emitter Voltage	: BC635	V_{CES}	45	V
	: BC637		60	V
	: BC639		100	V
Collector Emitter Voltage	: BC635	V_{CEO}	45	V
	: BC637		60	V
	: BC639		80	V
Emitter Base Voltage		V_{EBO}	5	V
Collector Current		I_C	1	A
Peak Collector Current		I_{CP}	1.5	A
Base Current		I_B	100	mA
Collector Dissipation		P_C	1	W
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-65 ~ 150	°C

TO-92



1. Emitter 2. Collector 3. Base

- PW=5ms, Duty Cycle=10%

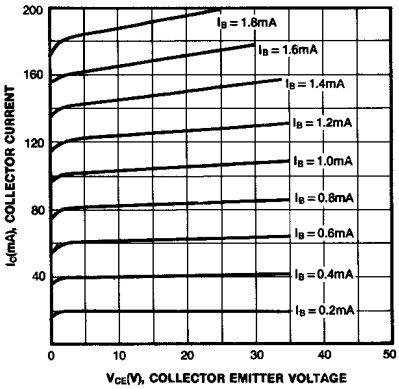
ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=10mA, I_B=0				
: BC635			45			V
: BC736			60			V
: BC639			80			V
Collector Cut-off Current	I_{CBO}	V_{CB}=30V, I_E=0			0.1	μA
Emitter Cut-off Current	I_{EBO}	V_{EB}=5V, I_C=0			0.1	μA
DC Current Gain	h_{FE}	V_{CE}=2V, I_C=5mA	25			
:BC635		V_{CE}=2V, I_C=150mA	40		250	
: BC637/BC639			40		160	
		V_{CE}=2V, I_C=500mA	25			
Collector Emitter Saturation Voltage	V_{CE}(sat)	I_C=500mA, I_B=50mA			0.5	V
Base Emitter On Voltage	V_{BE}(on)	V_{CE}=2V, I_C=500mA			1	V
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA, f=50MHz		100		MHz

Rev. B

FAIRCHILD SEMICONDUCTOR TM

STATIC CHARACTERISTIC



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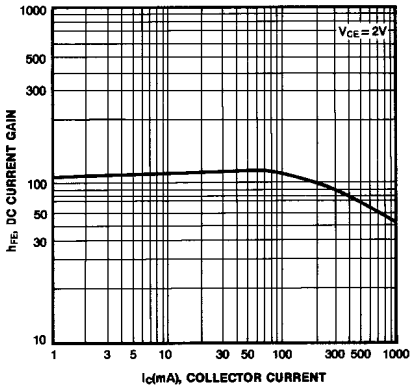

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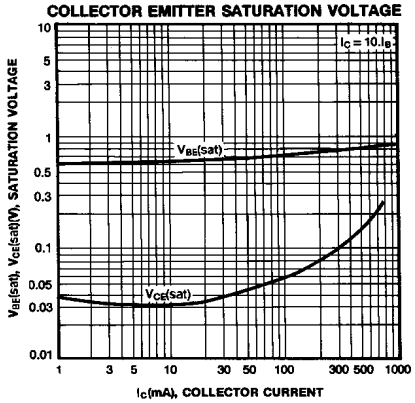
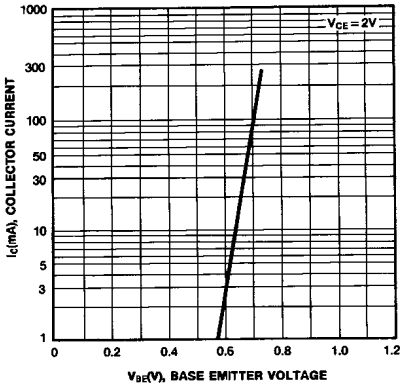
COLLECTOR EMITTER SATURATION VOLTAGE



BASE EMITTER ON VOLTAGE



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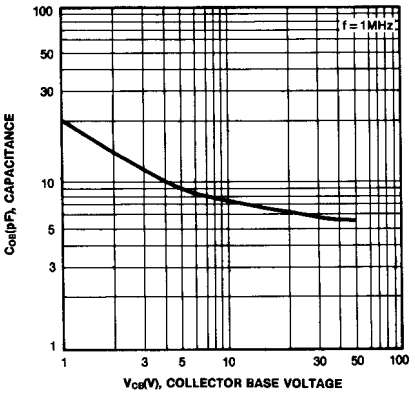

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BC636/638/640 PNP EPITAXIAL SILICON TRANSISTOR

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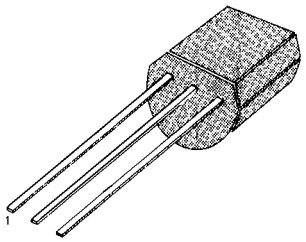
- Complement to BC635/637/639

TO-92



1. Emitter 2. Collector 3. Base

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

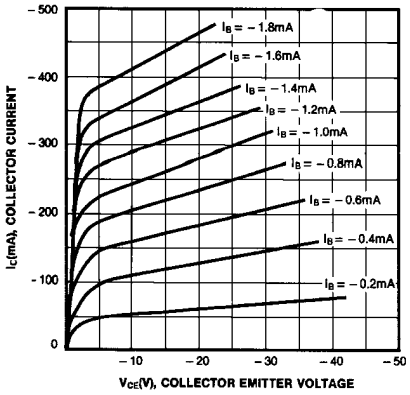
Characteristic		Symbol	Rating	Unit
Collector Emitter Voltage	: BC636	V_{CER}	-45	V
at R_{BE}=1Kohm	: BC638		-60	V
	: BC640		-100	V
Collector Emitter Voltage	: BC636	V_{CES}	-45	V
	: BC638		-60	V
	: BC640		-100	V
Collector Emitter Voltage	: BC636	V_{CEO}	-45	V
	: BC638		-60	V
	: BC640		-80	V
Emitter Base Voltage		V_{EBO}	-5	V
Collector Current		I_C	-1	A
Peak Collector Current		I_{CP}	-1.5	A
Base Current		I_B	-100	mA
Collector Dissipation		P_C	1	W
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

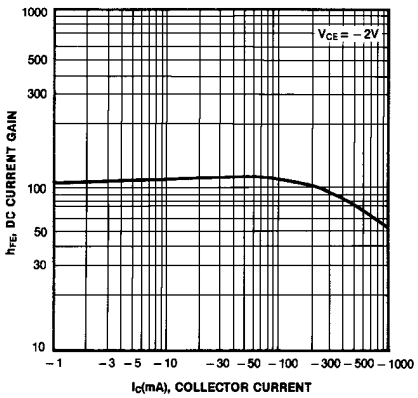
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -10mA, I_B=0				
: BC636			-45			V
: BC638			-60			V
: BC640			-80			V
Collector Cut-off Current	I_{CBO}	V_{CB}= -30V, I_E=0			-0.1	µA
Emitter Cut-off Current	I_{EBO}	V_{EB}= -5V, I_C=0			-0.1	µA
DC Current Gain	h_{FE}	V_{CE}= -2V, I_C= -5mA	25			
: BC635		V_{CE}= -2V, I_C= -150mA	40		250	
: BC637/BC639			40		160	
		V_{CE}= -2V, I_C= -500mA	25			
Collector Emitter Saturation Voltage	V_{CE} (sat)	I_C= -500mA, I_B= -50mA			-0.5	V
Base Emitter On Voltage	V_{BE} (on)	V_{CE}= -2V, I_C= -500mA			-1	V
Current Gain Bandwidth Product	f_T	V_{CE}= -5V, I_C= -10mA, f=50MHz		100		MHz

FAIRCHILD SEMICONDUCTOR TM

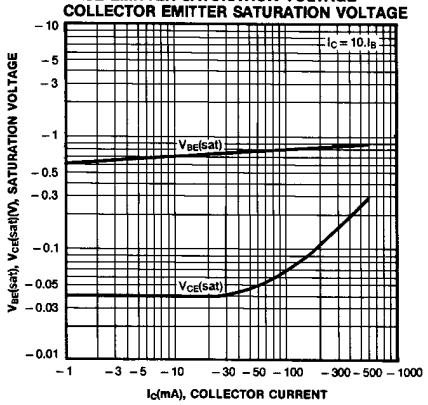
STATIC CHARACTERISTIC



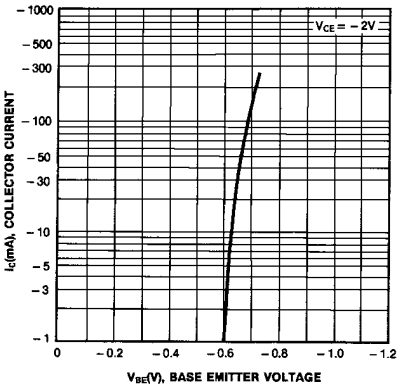
DC CURRENT GAIN



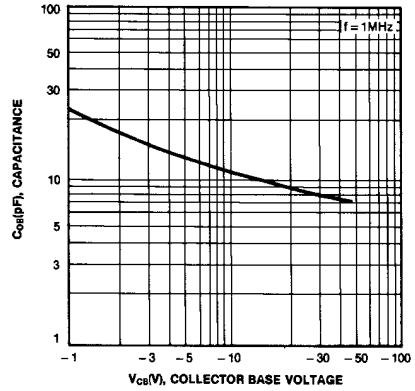
BASE EMITTER SATURATION VOLTAGE
COLLECTOR EMITTER SATURATION VOLTAGE



BASE EMITTER ON VOLTAGE



COLLECTOR OUTPUT CAPACITANCE



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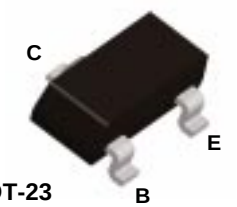
FAIRCHILD SEMICONDUCTOR TM

Discrete POWER & Signal Technologies

BC807-16
BC807-25
BC807-40



SOT-23
Mark: 5A. / 5B. / 5C.

PNP General Purpose Amplifier

This device is designed for general purpose amplifier and switching applications at currents to 1.0 A. Sourced from Process 78.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CES}	Collector-Base Voltage	50	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	1.2	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		***BC807-16 / -25 / -40**	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

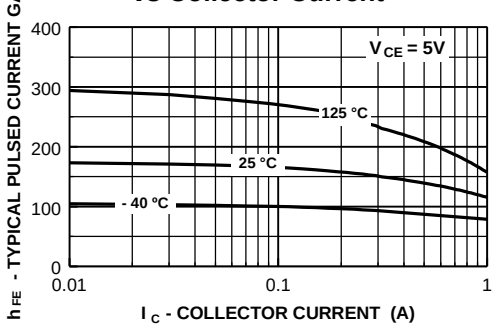
PNP General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

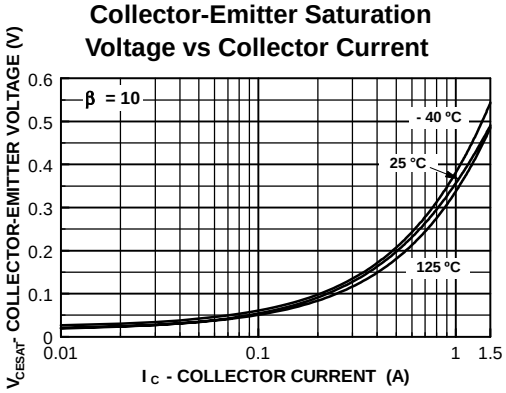
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0	50		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 20 V V_{CB} = 20 V, T_A = 150°C		100 5.0	nA µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 100 mA, V_{CE} = 1.0 V **- 16** **- 25** **- 40** I_C = 500 mA, V_{CE} = 1.0 V	100 160 250 40	250 400 600	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		0.7	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 500 mA, V_{CE} = 1.0 V		1.2	V

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

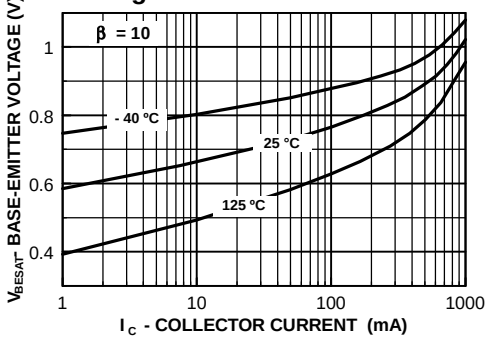


Collector-Emitter Saturation Voltage vs Collector Current

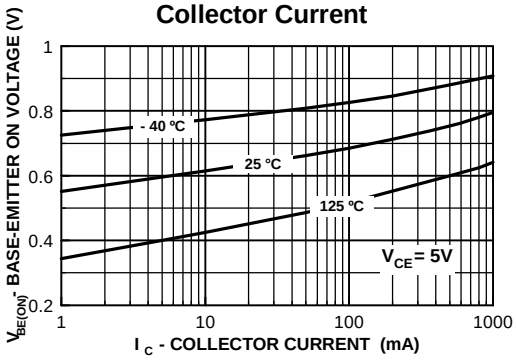


Typical Characteristics (continued)

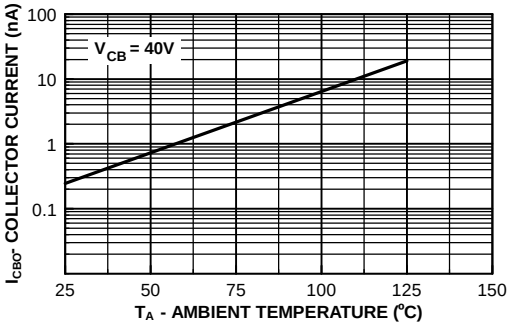
Base-Emitter Saturation Voltage vs Collector Current



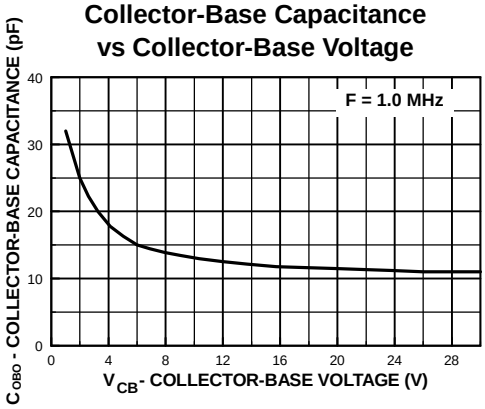
Base-Emitter ON Voltage vs Collector Current



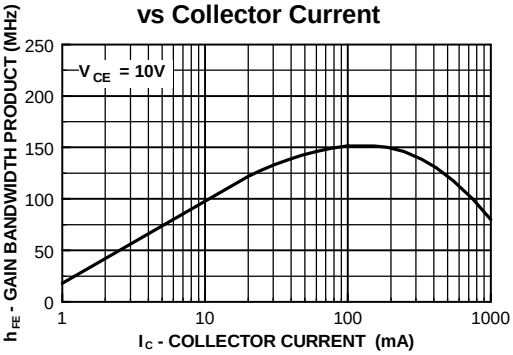
Collector-Cutoff Current vs Ambient Temperature



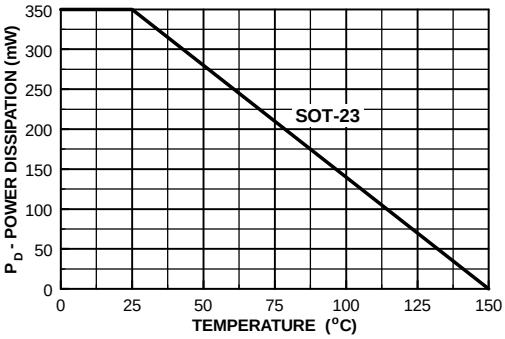
Collector-Base Capacitance vs Collector-Base Voltage



Gain Bandwidth Product vs Collector Current



Power Dissipation vs Ambient Temperature



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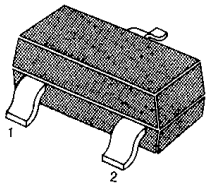
BC807/BC808 PNP EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- Suitable for AF-Driver stages and low power output stages
- Complement to BC817/BC818

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic		Symbol	Rating	Unit
Collector Emitter Voltage	: BC807	V_{CES}	-50	V
	: BC808		-30	V
Collector Emitter Voltage	: BC807	V_{CEO}	-45	V
	: BC808		-25	V
Emitter-Base Voltage		V_{EBO}	-5	V
Collector Current (DC)		I_C	-800	mA
Collector Dissipation		P_C	-310	mW
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -10mA, I_B=0				
: BC807			-45			V
: BC808			-25			V
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C= -0.1mA, I_B=0				
: BC807			-50			V
: BC808			-30			V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= -0.1mA, I_C=0	-5			V
Collector Cut-off Current	I_{CES}	V_{CE}= -25V, I_B=0			-100	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}= -4V, I_C=0			-100	nA
DC Current Gain	$h_{FE}1$	V_{CE}= -1V, I_C= -100mA	100		630	
	$h_{FE}2$	V_{CE}= -1V, I_C= -300mA	60			
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -500mA, I_B= -50mA			-0.7	V
Base-Emitter On Voltage	V_{BE} (on)	V_{CE}= -1V, I_C= -300mA			-1.2	V
Current Gain Bandwidth Product	f_T	V_{CE}= -5V, I_C= -10mA f=50MHz		100		MHz
Collector-Base Capacitance	C_{CBO}	V_{CB}= -10V, f=1MHz			12	pF

h_{FE} CLASSIFICATION

Classification	16	25	40
$h_{FE}1$	100-250	160-400	250-630
$h_{FE}2$	60-	100-	170-

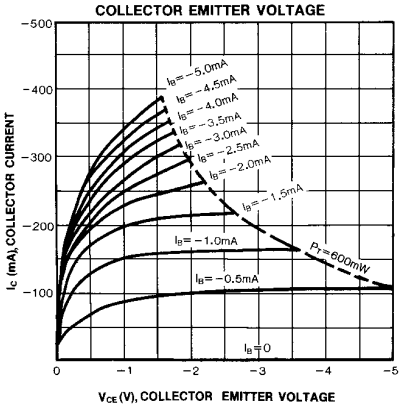
MARKING CODE

TYPE	807-16	807-25	807-40	808-16	808-25	808-40
MARKING	9FA	9FB	9FC	9GA	9GB	9GC

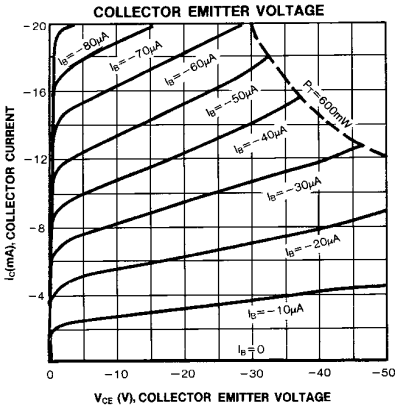
Rev. B

FAIRCHILD SEMICONDUCTOR TM

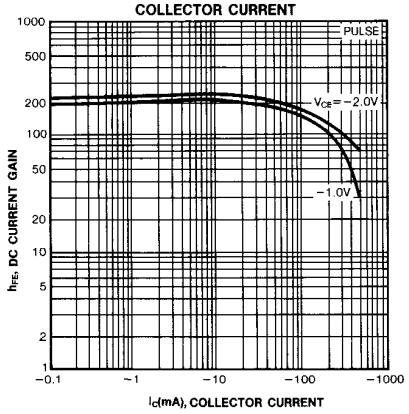
COLLECTOR CURRENT vs.
COLLECTOR EMITTER VOLTAGE



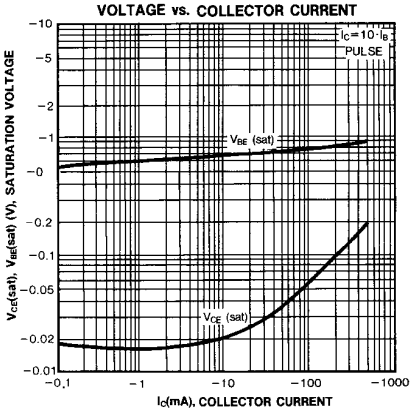
COLLECTOR CURRENT vs.
COLLECTOR EMITTER VOLTAGE



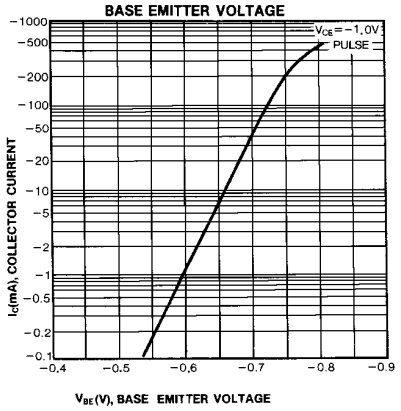
DC CURRENT GAIN vs.
COLLECTOR CURRENT



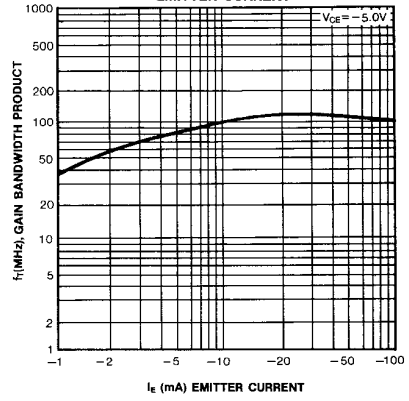
BASE AND COLLECTOR SATURATION
VOLTAGE vs. COLLECTOR CURRENT

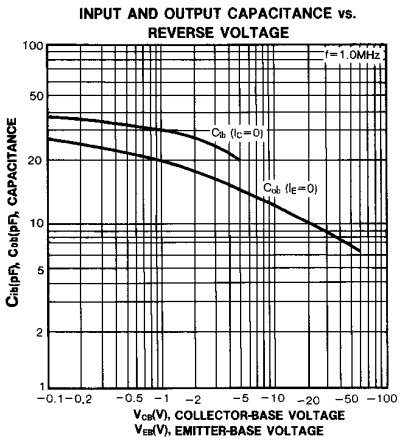


COLLECTOR CURRENT vs.
BASE EMITTER VOLTAGE



GAIN BANDWIDTH PRODUCT vs.
EMITTER CURRENT




INPUT AND OUTPUT CAPACITANCE vs.
REVERSE VOLTAGE
f=1.0MHz
C_{ib} (I_C=0)
C_{ob} (I_E=0)
C_{ib}(pF), C_{ob}(pF), CAPACITANCE
100
50
20
10
5
2
1
−0.1−0.2
−0.5
−1
−2
−5
−10
−20
−50
−100
V_{CB}(V), COLLECTOR-BASE VOLTAGE
V_{EB}(V), EMITTER-BASE VOLTAGE

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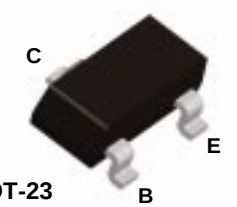
FAIRCHILD SEMICONDUCTOR TM

Discrete POWER & Signal Technologies

BC817-25
BC817-40



SOT-23
Mark: 6B. / 6C.

NPN General Purpose Amplifier

This device is designed for general purpose medium power amplifiers and switches requiring collector currents to 1.2 A. Sourced from Process 38.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CES}	Collector-Base Voltage	50	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	1.5	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		***BC817-25 / BC817-40**	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

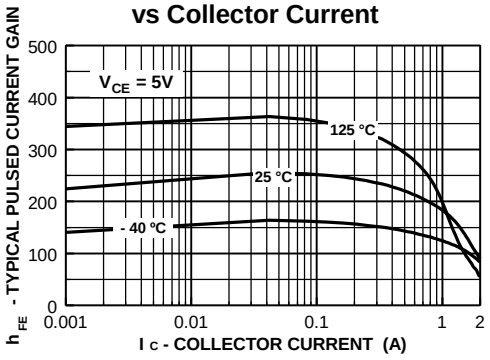
NPN General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

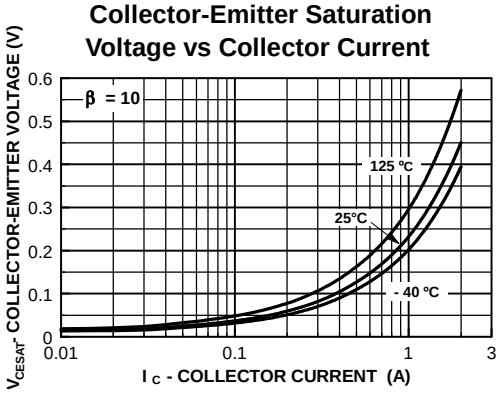
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0	50		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 20 V V_{CB} = 20 V, T_A = 150°C		100 5.0	nA µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 100 mA, V_{CE} = 1.0 V **- 25** **- 40** I_C = 500 mA, V_{CE} = 1.0 V	160 250 40	400 600	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		0.7	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 500 mA, V_{CE} = 1.0 V		1.2	V

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

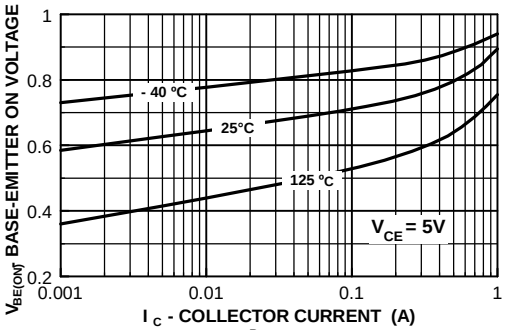


Collector-Emitter Saturation Voltage vs Collector Current

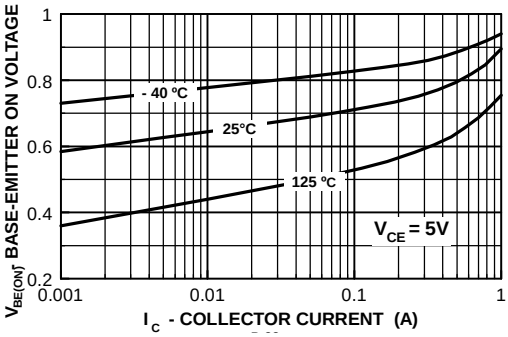


Typical Characteristics (continued)

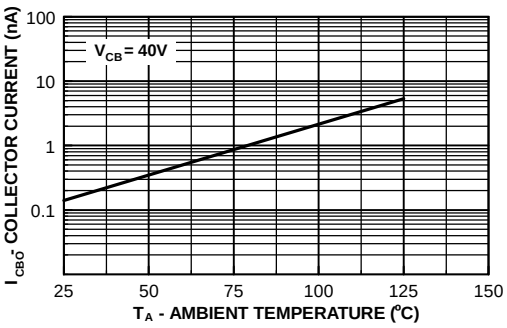
Base-Emitter ON Voltage vs Collector Current



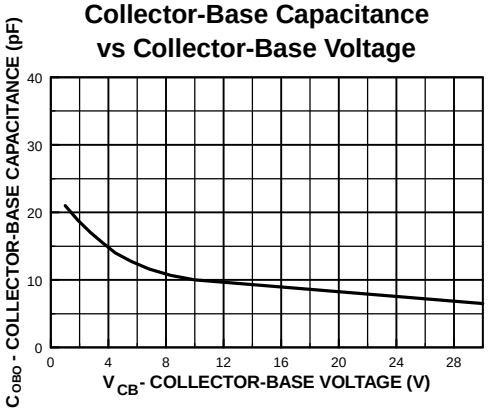
Base-Emitter ON Voltage vs Collector Current



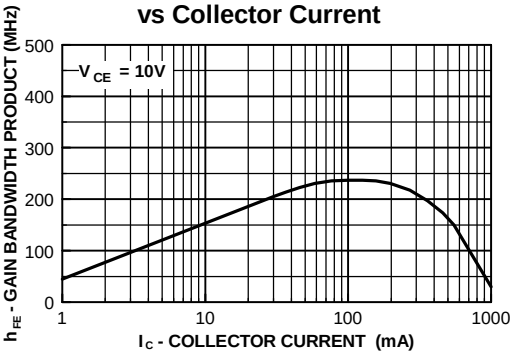
Collector-Cutoff Current vs Ambient Temperature



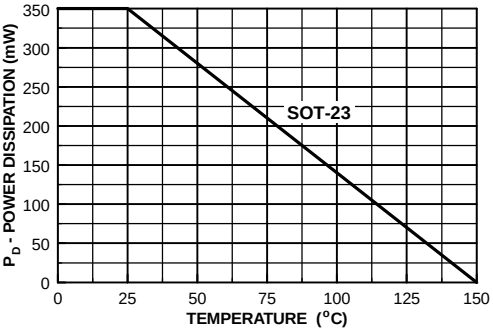
Collector-Base Capacitance vs Collector-Base Voltage



Gain Bandwidth Product vs Collector Current



Power Dissipation vs Ambient Temperature



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QS™
Quiet Series™
SuperSOT™-3
SuperSOT™-6
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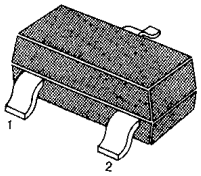
BC817/BC818 NPN EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- Suitable for AF-Driver stages and low power output stages
- Complement to BC807/BC808

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector Emitter Voltage : BC817	V_{CES}	50	V
: BC818		30	V
Collector Emitter Voltage : BC817	V_{CEO}	45	V
: BC818		25	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current (DC)	I_C	800	mA
Collector Dissipation	P_C	310	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=10mA, I_B=0				
: BC817			45			V
: BC818			25			V
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=0.1mA, I_B=0				
: BC817			50			V
: BC818			30			V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=0.1mA, I_C=0	5			V
Collector Cut-off Current	I_{CES}	V_{CE}=25V, I_B=0			100	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}=4V, I_C=0			100	nA
DC Current Gain	$h_{FE}1$	V_{CE}=1V, I_C=100mA	100		630	
	$h_{FE}2$	V_{CE}=1V, I_C=300mA	60			
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=500mA, I_B=50mA			0.7	V
Base-Emitter On Voltage	V_{BE} (on)	V_{CE}=1V, I_C=300mA			1.2	V
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA f=50MHz		100		MHz
Collector-Base Capacitance	C_{CBO}	V_{CB}=10V, f=1MHz			12	pF

h_{FE} CLASSIFICATION

Classification	16	25	40
$h_{FE}1$	100-250	160-400	250-630
$h_{FE}2$	60-	100-	170-

MARKING CODE

TYPE	817-16	817-25	817-40	818-16	818-25	818-40
MARKING	8FA	8FB	8FC	8GA	8GB	8GC

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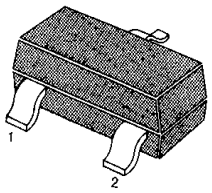
BC846/847/848/849/850

NPN EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- Suitable for automatic insertion in thick and thin-film circuits
- LOW NOISE: BC849, BC850
- Complement to BC856 ... BC860

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector Base Voltage	V_{CBO}		
: BC846		80	V
: BC847/850		50	V
: BC848/849		30	V
Collector Emitter Voltage	V_{CEO}		
: BC846		65	V
: BC847/850		45	V
: BC848/849		30	V
Emitter-Base Voltage	V_{EBO}		
: BC846/847		6	V
: BC848/849/850		5	V
Collector Current (DC)	I_C	100	mA
Collector Dissipation	P_C	310	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}=30V, I_E=0			15	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=2mA	110		800	
Collector Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.5mA		90	250	mV
		I_C=100mA, I_B=5mA		200	600	mV
Collector Base Saturation Voltage	V_{BE} (sat)	I_C=10mA, I_B=0.5mA		700		mV
		I_C=100mA, I_B=5mA		900		mV
Base Emitter On Voltage	V_{BE} (on)	V_{CE}=5V, I_C=2mA	580	660	700	mV
		V_{CE}=5V, I_C=10mA			720	mV
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA f=100MHz		300		MHz
Collector Base Capacitance	C_{CBO}	V_{CB}=10V, f=1MHz		3.5	6	pF
Emitter Base Capacitance	C_{EBO}	V_{EB}=0.5V, f=1MHz		9		pF
Noise Figure : BC846/847/848	NF	V_{CE}=5V, I_C=200μA		2	10	dB
: BC849/850		f=1KHz, R_G=2KΩ		1.2	4	dB
: BC849	NF	V_{CE}=5V, I_C=200μA		1.4	4	dB
: BC850		R_G=2KΩ f=30~15000Hz		1.4	3	dB

h_{FE} CLASSIFICATION

Classification	A	B	C
h_{FE}	110-220	200-450	420-800

MARKING CODE

TYPE	846A	846B	846C	847A	847B	847C	848A	848B	848C	849A	849B	849C	850A	850B	850C
MARK	8AA	8AB	8AC	8BA	8BB	8BC	8CA	8CB	8CC	8DA	8DB	8DC	8EA	8EB	8EC

Rev. B

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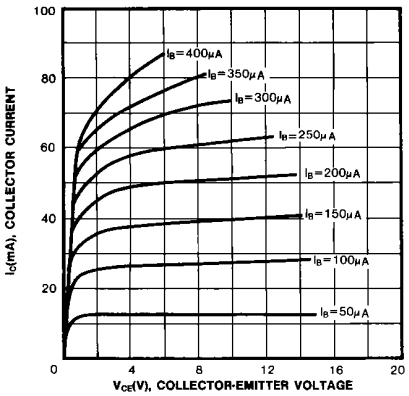
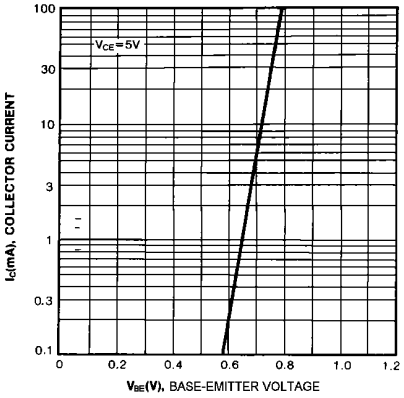
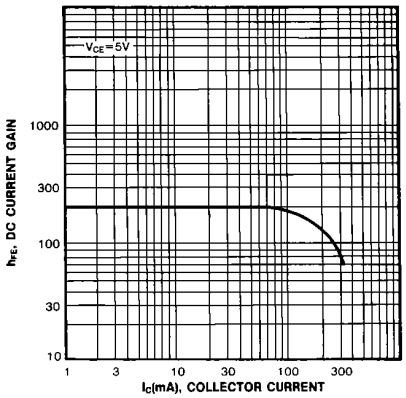
STATIC CHARACTERISTIC



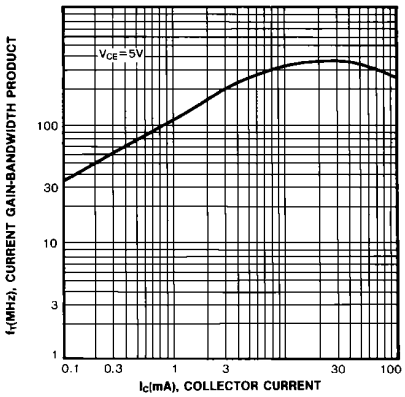
TRANSFER CHARACTERISTIC



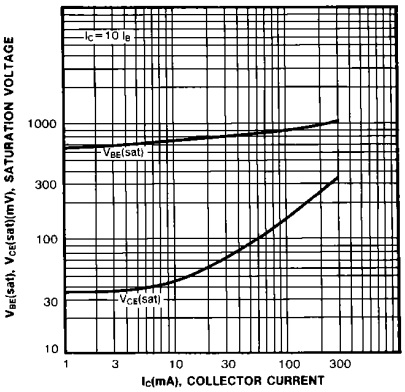
DC CURRENT GAIN



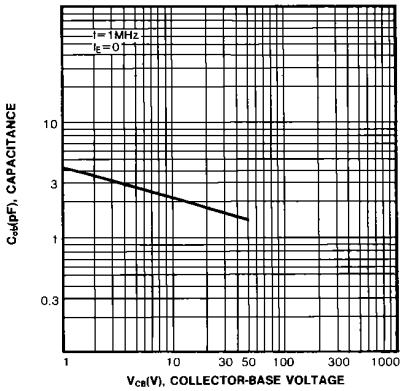
CURRENT GAIN BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



OUTPUT CAPACITANCE



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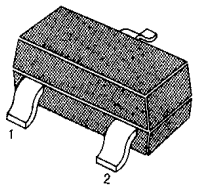
BC856/857/858/859/860

PNP EPITAXIAL SILICON TRANSISTOR

SWITCHING AND AMPLIFIER APPLICATIONS

- Suitable for automatic insertion in thick and thin-film circuits
- LOW NOISE: BC859, BC860
- Complement to BC846 ... BC850

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}		
: BC856		-80	V
: BC857/860		-50	V
: BC858/859		-30	V
Collector-Emitter Voltage	V_{CEO}		
: BC856		-65	V
: BC857/860		-45	V
: BC858/859		-30	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current (DC)	I_C	-100	mA
Collector Dissipation	P_C	310	mW
Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 ~ 150	°C

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Cut-off Current	I_{CBO}	V_{CB}= -30V, I_E=0			-15	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C= -2mA	110		800	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.5mA		-90	-300	mV
		I_C= -100mA, I_B= -5mA		-250	-650	mV
Collector-Base Saturation Voltage	V_{BE} (sat)	I_C= -10mA, I_B= -0.5mA		-700		mV
		I_C= -100mA, I_B= -5mA		-900		mV
Base-Emitter On Voltage	V_{BE} (on)	V_{CE}= -5V, I_C= -2mA	-600	-660	-750	mV
		V_{CE}= -5V, I_C= -10mA			-800	mV
Current Gain Bandwidth Product	f_T	V_{CE}= -5V, I_C= -10mA f=100MHz		150		MHz
Collector-Base Capacitance	C_{CBO}	V_{CB}= -10V, f=1MHz			6	pF
Noise Figure : BC856/857/858	NF	V_{CE}= -5V, I_C= -200μA		2	10	dB
: BC859/860		f=1KHz, R_G=2KΩ		1	4	dB
: BC859	NF	V_{CE}= -5V, I_C= -200μA		1.2	4	dB
: BC860		R_G=2KΩ f=30~15000Hz		1.2	2	dB

h_{FE} CLASSIFICATION

Classification	A	B	C
h_{FE}	110-220	200-450	420-800

MARKING CODE

TYPE	856A	856B	856C	857A	857B	857C	858A	858B	858C	859A	859B	859C	860A	860B	860C
MARK	9AA	9AB	9AC	9BA	9BB	9BC	9CA	9CB	9CC	9DA	9DB	9DC	9EA	9EB	9EC

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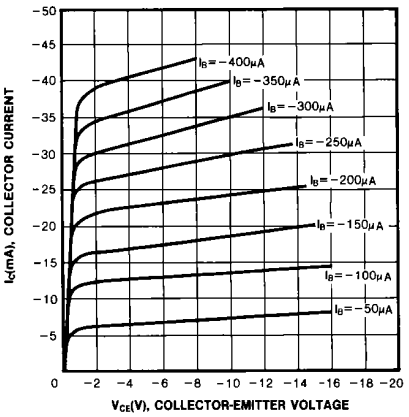
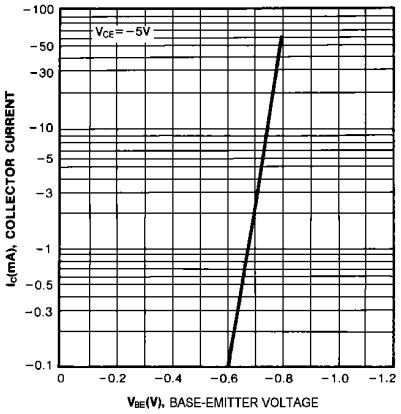
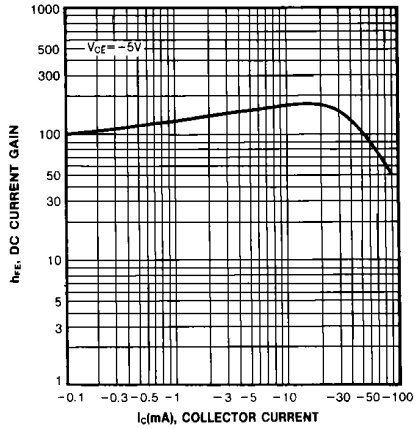
STATIC CHARACTERISTIC



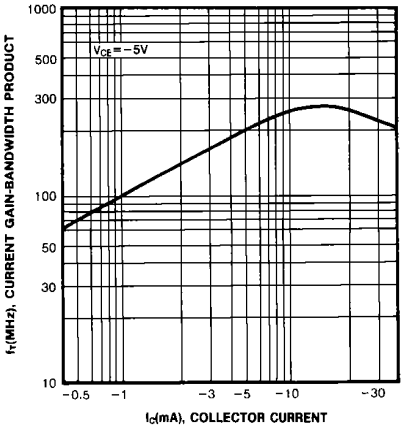
BASE-EMITTER VOLTAGE



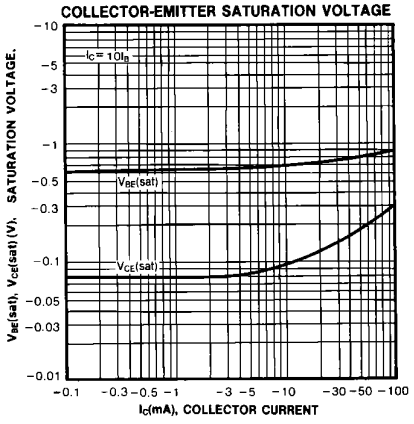
DC CURRENT GAIN



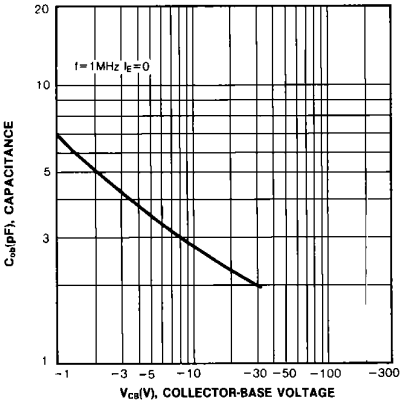
CURRENT GAIN-BANDWIDTH PRODUCT



BASE-EMITTER SATURATION VOLTAGE
COLLECTOR-EMITTER SATURATION VOLTAGE



COLLECTOR OUTPUT CAPACITANCE



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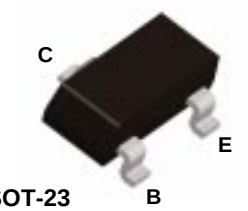
BC857A
BC857B
BC857C



SOT-23
Mark: 3E / 3F / 3G

PNP General Purpose Amplifier

This device is designed for general purpose amplifier applications at collector currents to 300 mA. Sourced from Process 68.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CBO}	Collector-Base Voltage	50	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	500	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		***BC857A / B / C**	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

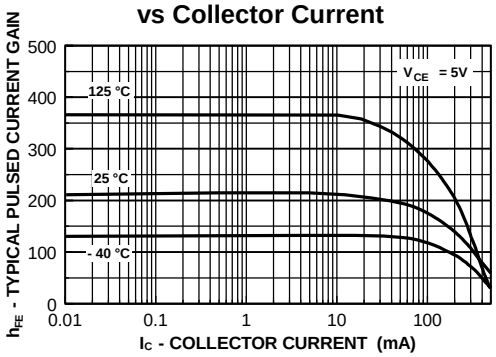
PNP General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

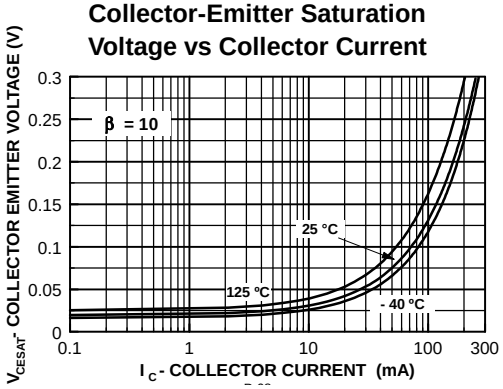
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0	50		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 1.0 µA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 30 V V_{CB} = 30 V, T_A = 150°C		15 4.0	nA µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 2.0 mA, V_{CE} = 5.0 V **BC857A** **BC857B** **BC857C**	 125 220 420	 250 475 800	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 0.5 mA I_C = 100 mA, I_B = 5.0 mA		0.3 0.65	V V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 2.0 mA, V_{CE} = 5.0 V I_C = 10 mA, V_{CE} = 5.0 V	0.6	0.75 0.82	V V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 10 mA, V_{CE} = 5.0, f = 100 mHz	100		MHz
C_{obo}	Output Capacitance	V_{CB} = 10 V, f = 1.0 MHz		4.5	pF
NF	Noise Figure	I_C = 0.2 mA, V_{CE} = 5.0, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz		10	dB

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

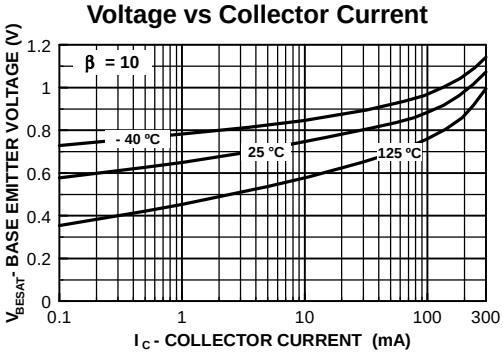


Collector-Emitter Saturation Voltage vs Collector Current

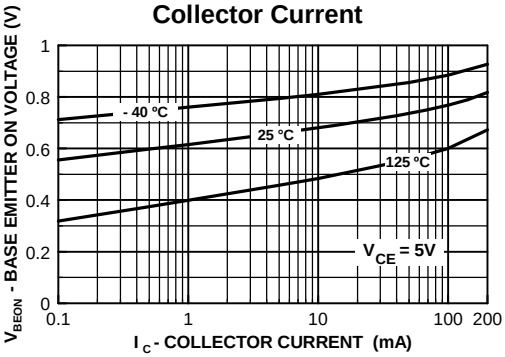


Typical Characteristics (continued)

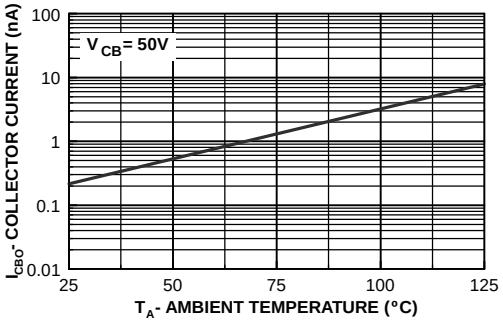
Base-Emitter Saturation Voltage vs Collector Current



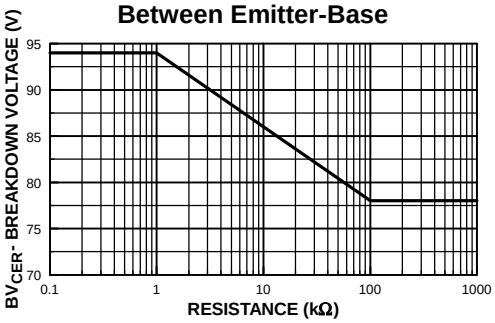
Base Emitter ON Voltage vs Collector Current



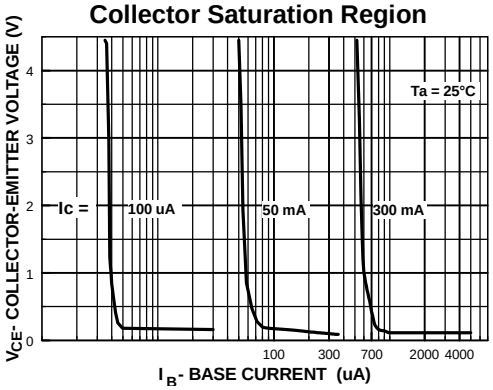
Collector-Cutoff Current vs. Ambient Temperature



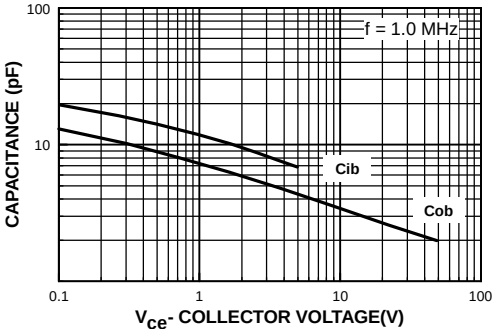
Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base



Collector Saturation Region

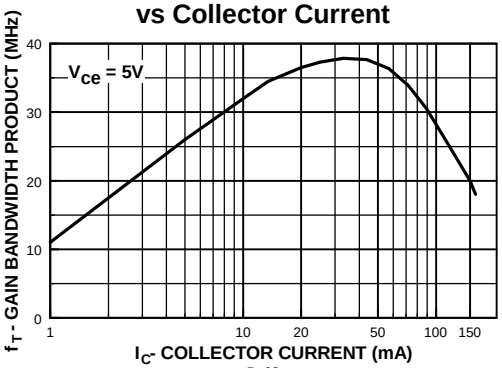


Input and Output Capacitance vs Reverse Voltage

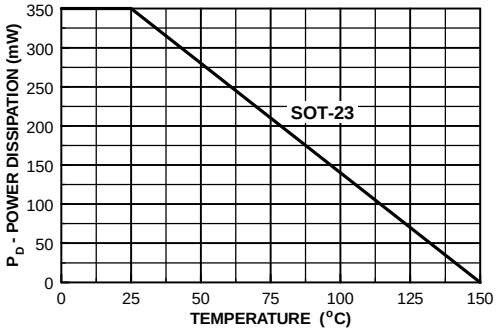


Typical Characteristics (continued)

Gain Bandwidth Product vs Collector Current



Power Dissipation vs Ambient Temperature



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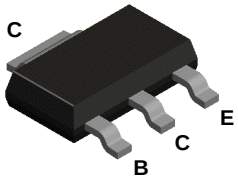
BCP52



SOT-223

PNP General Purpose Amplifier

This device is designed for general purpose medium power amplifiers and switching circuits requiring collector currents to 1.0 A. Sourced from Process 78.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	60	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	1.2	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		BCP52	
P_D	Total Device Dissipation Derate above 25°C	1.5 12	W mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	83.3	°C/W

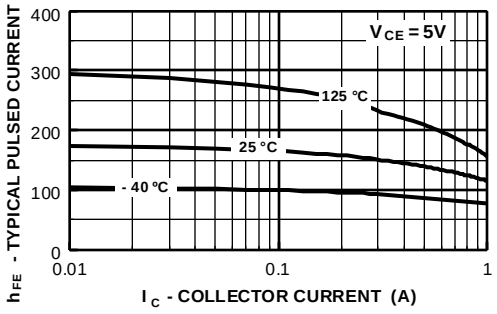
PNP General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

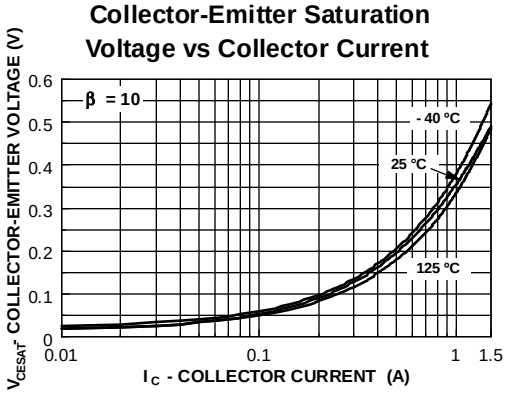
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	60		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0	60		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 30 V, I_E = 0 V_{CB} = 30 V, I_E = 0, T_A = 125°C		100 10	nA µA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 5.0 V, I_C = 0		10	µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 5.0 mA, V_{CE} = 2.0 V I_C = 150 mA, V_{CE} = 2.0 V I_C = 500 mA, V_{CE} = 2.0 V	25 40 25	 250 	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 500 mA, V_{CE} = 2.0 V		1.0	V

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

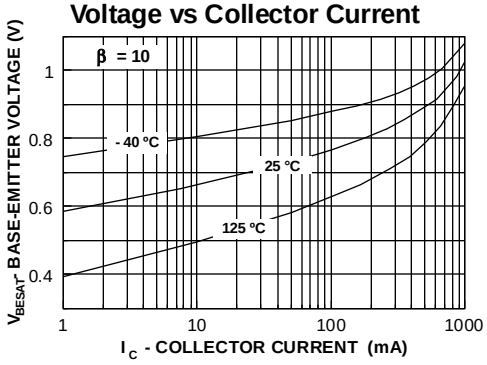


Collector-Emitter Saturation Voltage vs Collector Current

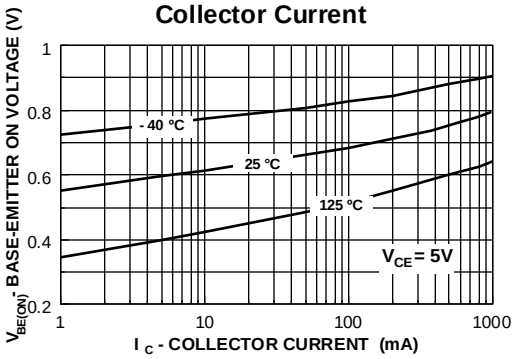


Typical Characteristics (continued)

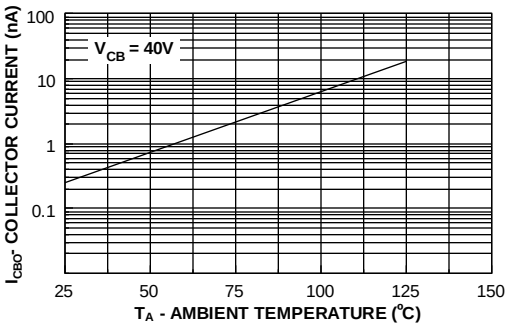
Base-Emitter Saturation Voltage vs Collector Current



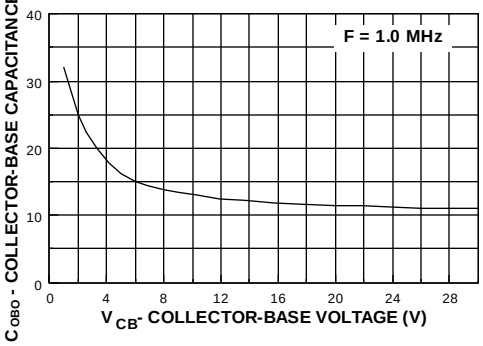
Base-Emitter ON Voltage vs Collector Current



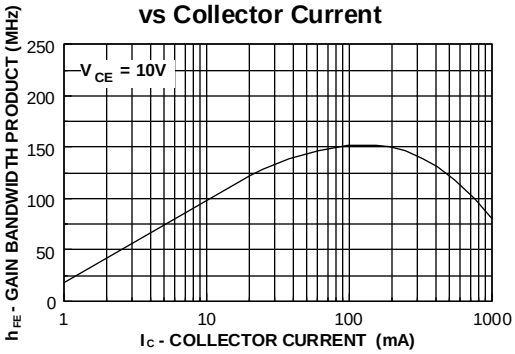
Collector-Cutoff Current vs Ambient Temperature



Collector-Base Capacitance vs Collector-Base Voltage



Gain Bandwidth Product vs Collector Current



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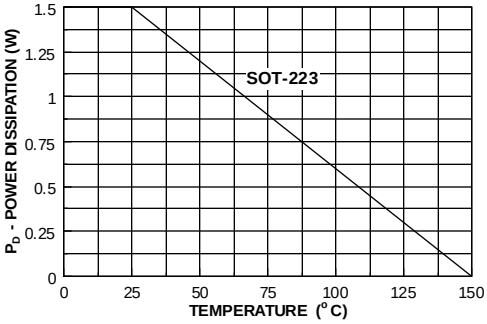

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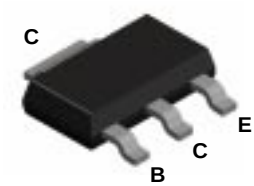
BCP54



SOT-223

NPN General Purpose Amplifier

This device is designed for general purpose medium power amplifiers and switching circuits requiring collector currents to 1.2 A. Sourced from Process 38.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CBO}	Collector-Base Voltage	45	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	1.5	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		BCP54	
P_D	Total Device Dissipation Derate above 25°C	1.5 12	W mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	83.3	°C/W

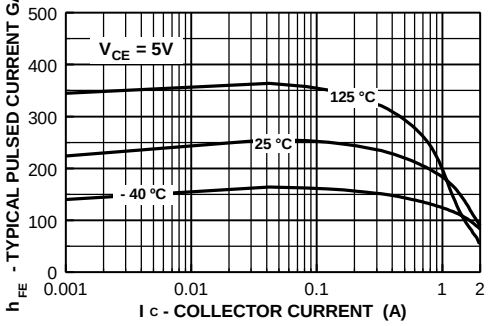
Electrical Characteristics

TA = 25°C unless otherwise noted

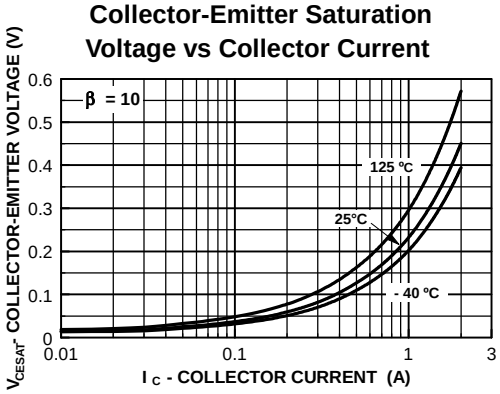
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 μA, I_E = 0	45		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 30 V, I_E = 0 V_{CB} = 30 V, I_E = 0, T_A = 125°C		100 10	nA μA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 5.0 V, I_C = 0		10	μA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 5.0 mA, V_{CE} = 2.0 V I_C = 150 mA, V_{CE} = 2.0 V I_C = 500 mA, V_{CE} = 2.0 V	25 40 25	250	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 500 mA, V_{CE} = 2.0 V		1.0	V

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

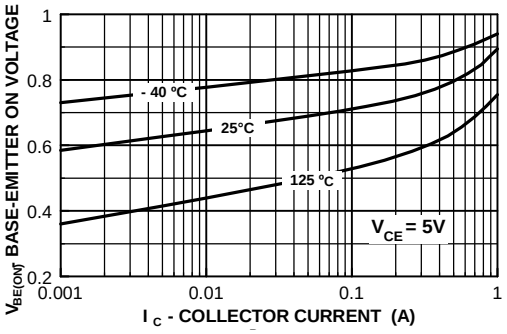


Collector-Emitter Saturation Voltage vs Collector Current

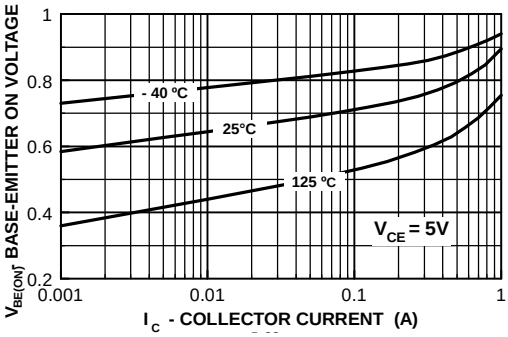


Typical Characteristics (continued)

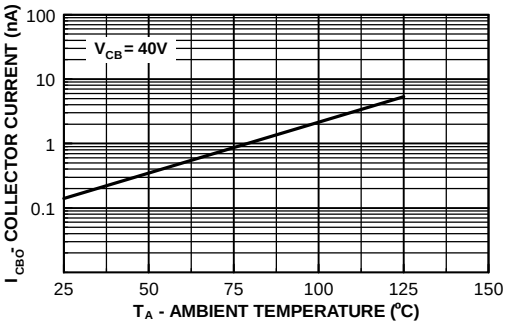
Base-Emitter ON Voltage vs Collector Current



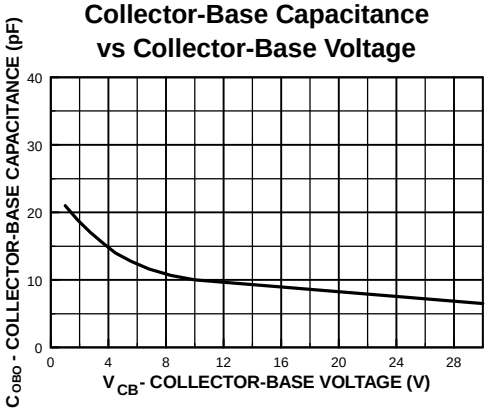
Base-Emitter ON Voltage vs Collector Current



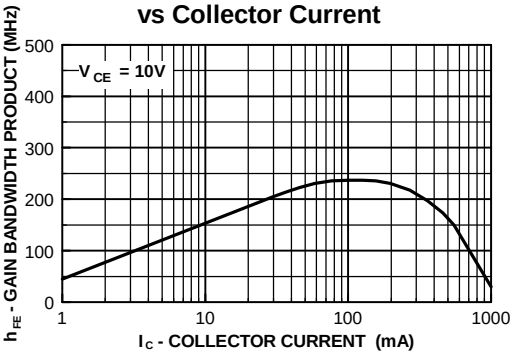
Collector-Cutoff Current vs Ambient Temperature



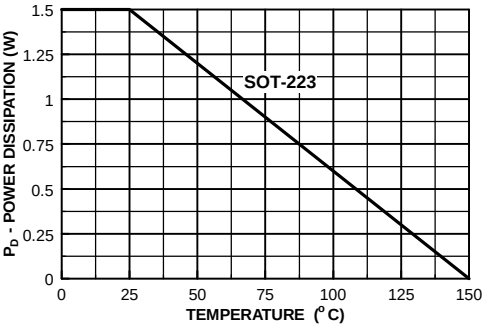
Collector-Base Capacitance vs Collector-Base Voltage



Gain Bandwidth Product vs Collector Current



Power Dissipation vs Ambient Temperature



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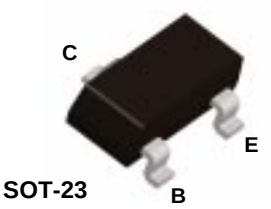
Discrete POWER & Signal Technologies

BCV26



SOT-23
Mark: FD

PNP Darlington Transistor

This device is designed for applications requiring extremely high current gain at currents to 800 mA. Sourced from Process 61.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	30	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	10	V
I_C	Collector Current - Continuous	1.2	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		*BCV26	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

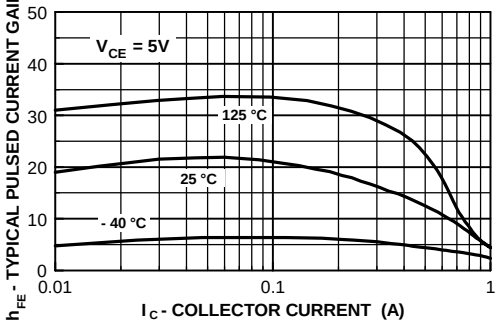
PNP Darlington Transistor
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

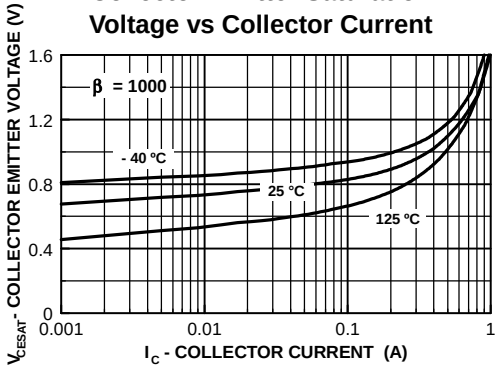
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	30			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0	40			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 100 nA, I_C = 0	10			V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 30 V, I_E = 0			0.1	µA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 10 V, I_C = 0			0.1	µA
ON CHARACTERISTICS						
h_{FE}	DC Current Gain	I_C = 1.0 mA, V_{CE} = 5.0 V I_C = 10 mA, V_{CE} = 5.0 V I_C = 100 mA, V_{CE} = 5.0 V	4,000 10,000 20,000			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100 mA, I_B = 0.1 mA			1.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 100 mA, I_B = 0.1 mA			1.5	V
SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain - Bandwidth Product	I_C = 30 mA, V_{CE} = 5.0 V, f = 100 MHz		220		MHz
C_C	Collector Capacitance	V_{CB} = 30 V, I_E = 0, f = 1.0 MHz		3.5		pF

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

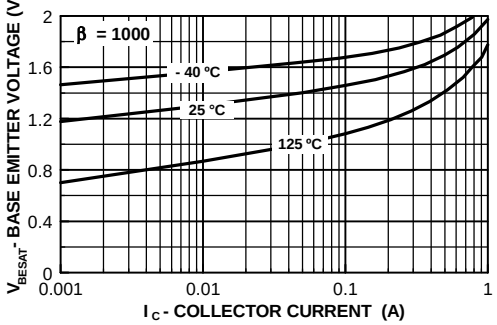


Collector-Emitter Saturation Voltage vs Collector Current

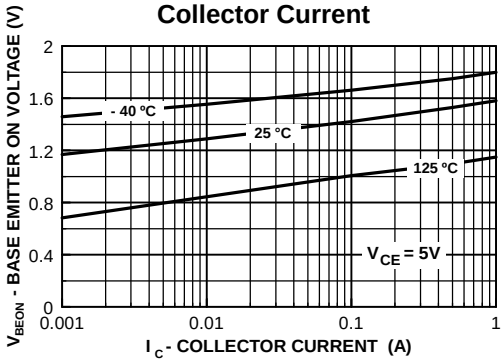


Typical Characteristics (continued)

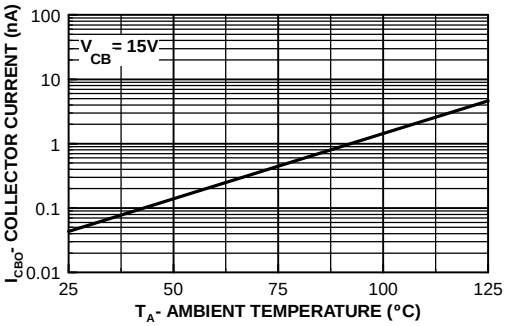
Base-Emitter Saturation Voltage vs Collector Current



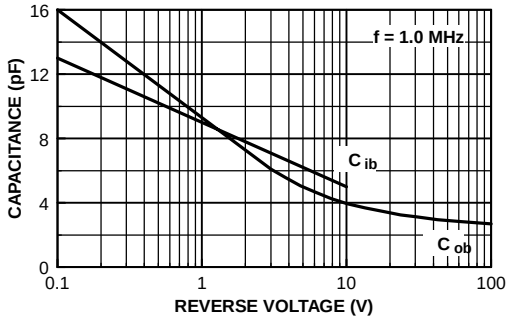
Base Emitter ON Voltage vs Collector Current



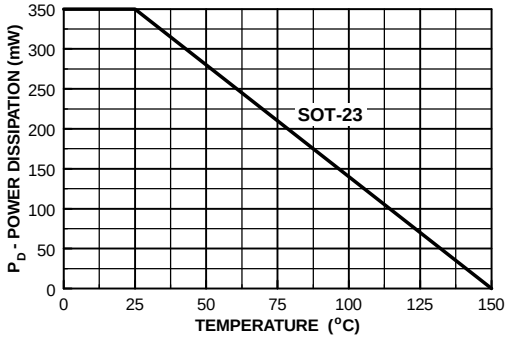
Collector-Cutoff Current vs. Ambient Temperature



Input and Output Capacitance vs Reverse Bias Voltage



Power Dissipation vs Ambient Temperature



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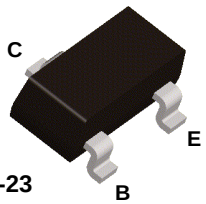
Discrete POWER & Signal Technologies

BCV27



SOT-23
Mark: FF

NPN Darlington Transistor

This device is designed for applications requiring extremely high current gain at collector currents to 1.0 A. Sourced from Process 05.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	30	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	10	V
I_C	Collector Current - Continuous	1.2	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
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Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		*BCV27	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

NPN Darlington Transistor

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	30			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0	40			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 100 nA, I_C = 0	10			V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 30 V, I_E = 0			0.1	µA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 10 V, I_C = 0			0.1	µA
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$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100 mA, I_B = 0.1 mA			1.0	V
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SMALL SIGNAL CHARACTERISTICS						
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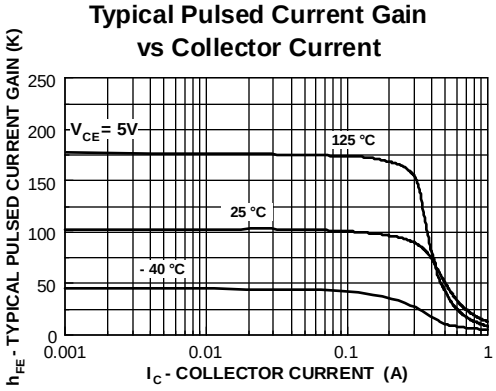
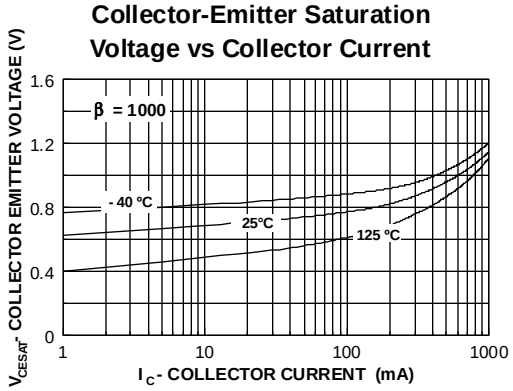
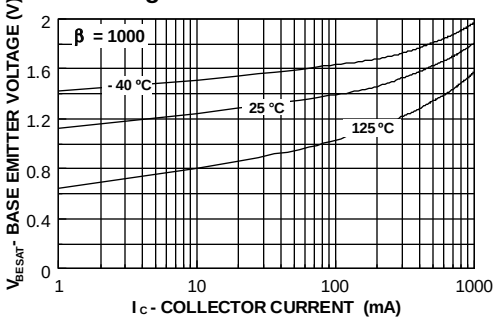


Collector-Emitter Saturation Voltage vs Collector Current

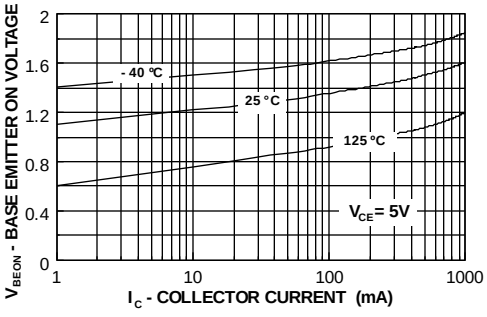


Typical Characteristics (continued)

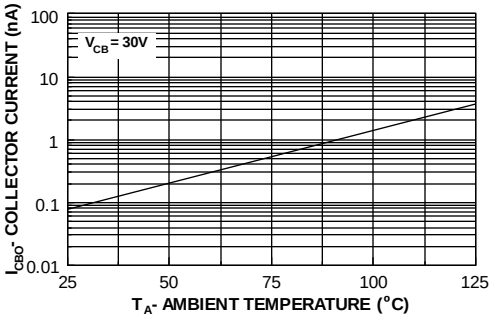
Base-Emitter Saturation Voltage vs Collector Current



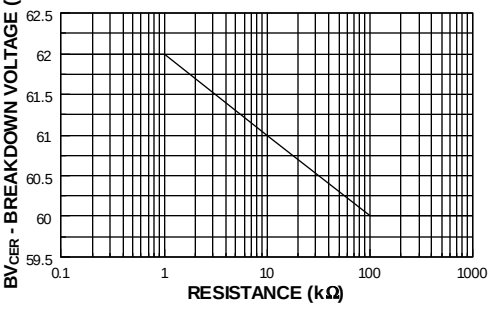
Base Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs Ambient Temperature



Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base



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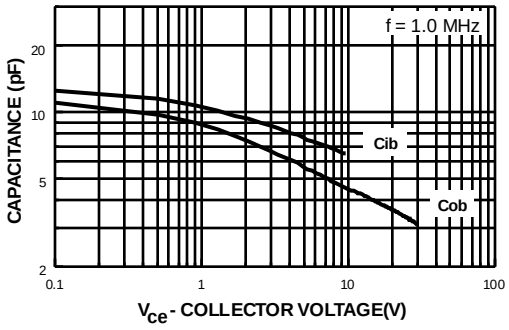

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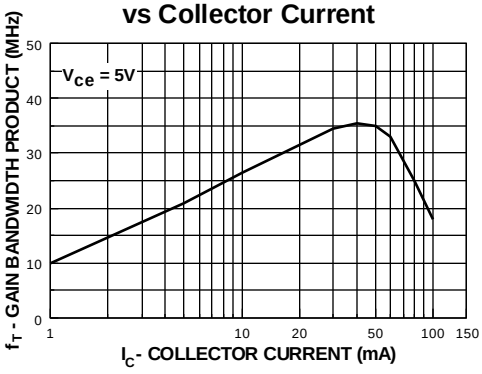

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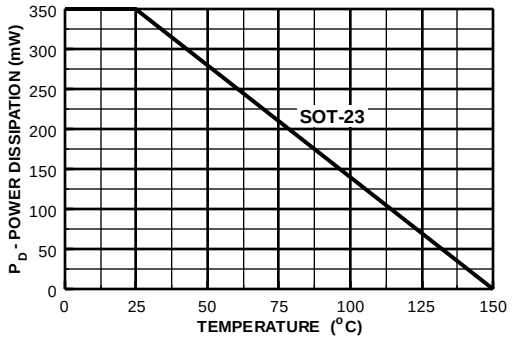
Power Dissipation vs Ambient Temperature



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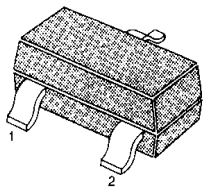
BCW29 PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

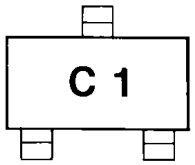
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-30	V
Collector-Emitter Voltage	V_{CEO}	-20	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current	I_C	-100	mA
Junction Temperature	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KST5088 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C= -10μA, I_E=0	-30			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -2mA, I_B=0	-20			V
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C= -100μA, V_{EB}=0	-30			V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= -10μA, I_C=0	-5			V
Collector Cut-off Current	I_{CBO}	V_{CB}= -20V, I_E=0			-100	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C= -2mA	120		260	
Collector-Emitter Saturation Voltage	V_{CE}(sat)	I_C= -10mA, I_B= -0.5mA			-0.3	V
Base-Emitter On Voltage	V_{BE}(sat)	V_{CE}= -5V, I_C= -2mA	-0.6		-0.75	V
Output Capacitance	C_{OB}	V_{CB}= -10V, I_E=0 f=1MHz			7	pF
Noise Figures	NF	V_{CE}= -5V, I_C=0.2mA R_G=2KΩ, f=1KHz			10	dB

Marking



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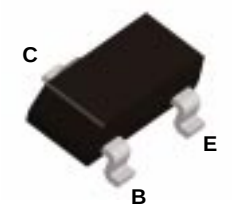
Discrete POWER & Signal Technologies

BCW30



SOT-23
Mark: C2

PNP General Purpose Amplifier

This device is designed for general purpose medium power amplifiers and switches requiring collector currents to 300 mA. Sourced from Process 68. See BC857A for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	32	V
V_{CES}	Collector-Emitter Voltage	32	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	500	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		***BCW30**	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

PNP General Purpose Amplifier
(continued)

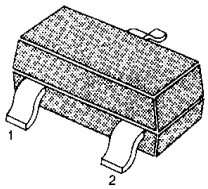
Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 μA, I_E = 0	32		V
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 2.0 mA, I_B = 0	32		V
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	I_C = 10 μA, I_E = 0	32		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	5.0		V
I_{CBO}	Collector-Cutoff Current	V_{CB} = 32 V, I_E = 0 V_{CB} = 32 V, I_E = 0, T_A = +100 °C		100 10	nA μA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	V_{CE} = 5.0 V, I_C = 2.0 mA	215	500	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 0.5 mA		0.30	V
$V_{BE(on)}$	Base-Emitter On Voltage	V_{CE} = 5.0 V, I_C = 2.0 mA	0.60	0.75	V
SMALL SIGNAL CHARACTERISTICS					
NF	Noise Figure	V_{CE} = 5.0 V, I_C = 200 μA, R_S = 2.0 kΩ, f = 1.0 kHz, B_W = 200 Hz		10	dB

BCW31 NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25℃)

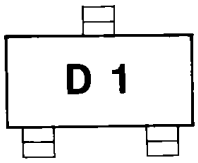
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	30	V
Collector-Emitter Voltage	V_{CEO}	20	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	℃

• Refer to KST5088 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25℃)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=10㎂, I_E=0	30			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2mA, I_B=0	20			V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=10㎂, I_C=0	5			V
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=2mA	110		220	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.5mA			0.25	V
Base-Emitter On Voltage	V_{BE} (on)	V_{CE}=5V, I_C=2mA	0.55		0.7	V
Output Capacitance	C_{OB}	V_{CB}=10V, I_E=0 f=1MHz			4	pF
Noise Figures	NF	V_{CE}=5V, I_C=0.2mA R_G=2kΩ, f=1KHz			10	dB

Marking



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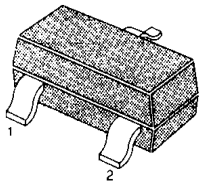
BCW60A/B/C/D NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	32	V
Collector-Emitter Voltage	V_{CEO}	32	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

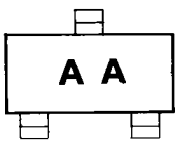
ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2mA, I_B=0	32		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=1μA, I_C=0	5		V
Collector Cut-off Current	I_{CES}	V_{CB}=32V, V_{BE}=0		20	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}=4V, I_C=0		20	nA
DC Current Gain	h_{FE}				
: BCW60B		V_{CE}=5V, I_C=10μA	20		
: BCW60C			40		
: BCW60D			100		
: BCW60A		V_{CE}=5V, I_C=2mA	120	220	
: BCW60B			180	310	
: BCW60C			250	460	
: BCW60D			380	630	
: BCW60A		V_{CE}=1V, I_C=50mA	60		
: BCW60B			70		
: BCW60C			90		
: BCW60D			100		
Collector-Emitter Saturation Voltage	V_{CE}(sat)	I_C=50mA, I_B=1.25mA		0.55	V
		I_C=10mA, I_B=0.25mA		0.35	V
Base-Emitter Saturation Voltage	V_{BE}(sat)	I_C=50mA, I_B=1.25mA	0.7	1.05	V
		I_C=10mA, I_B=0.25mA	0.6	0.85	V
Base-Emitter On Voltage	V_{BE}(sat)	V_{CE}=5V, I_C=2mA	0.55	0.75	V
Output Capacitance	C_{OB}	V_{CB}=10V, I_E=0 f=1MHz		4.5	pF
Current Gain-Bandwidth Product	f_T	I_C=10mA, V_{CE}=5V	125		MHz
Noise Figure	NF	I_C=0.2mA, V_{CE}=5V R_G=2KΩ, f=1KHz		6	dB
Turn On Time	t_{ON}	I_C=10mA, I_B1=1mA		150	ns
Turn Off Time	t_{OFF}	V_{BB}=3.6V, I_B2=1mA R1=R2=5KΩ,R_L=990Ω		800	ns

MARKING CODE

TYPE	BCW60A	BCW60B	BCW60C	BCW60D
MARK.	AA	AB	AC	AD

Marking



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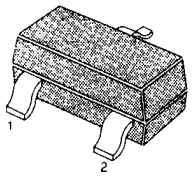
BCW61A/B/C/D PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

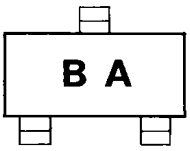
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-32	V
Collector-Emitter Voltage	V_{CEO}	-32	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current	I_C	-100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	-55 ~ 150	°C

• Refer to KS5086 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -2mA, I_B=0	-32		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= -1μA, I_C=0	-5		V
Collector Cut-off Current	I_{CES}	V_{CB}= -32V, V_{BE}=0		-20	nA
DC Current Gain	h_{FE}				
: BCW61B		V_{CE}= -5V, I_C= -10μA	20		
: BCW61C			40		
: BCW61D			100		
: BCW61A		V_{CE}= -5V, I_C= -2mA	120	220	
: BCW61B			140	310	
: BCW61C			250	460	
: BCW61D			380	630	
: BCW61A		V_{CE}= -5V, I_C= -50mA	60		
: BCW61B			80		
: BCW61C			100		
: BCW61D			100		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -50mA, I_B= -1.25mA		-0.55	V
		I_C= -10mA, I_B= -0.25mA		-0.25	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C= -50mA, I_B= -1.25mA	0.68	1.05	V
		I_C= -10mA, I_B= -0.25mA	0.6	0.85	V
Base-Emitter On Voltage	V_{BE} (on)	V_{CE}= -5V, I_C= -2mA	0.6	0.75	V
Output Capacitance	C_{OB}	V_{CB}= -10V, I_E=0 f=1MHz		6	pF
Noise Figure	NF	I_C= -0.2mA, V_{CE}= -5V R_G=20KΩ, f=1KHz		6	dB
Turn On Time	t_{ON}	I_C= -10mA, I_B1= -1mA		150	ns
Turn Off Time	t_{OFF}	V_{BB}= -3.6V, I_B2= -1mA R1=R2=50KΩ, R_L=990Ω		800	ns

Marking



Rev. B

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MARKING CODE

TYPE	BCW61A	BCW61B	BCW61C	BCW61D
MARK.	BA	BB	BC	BD

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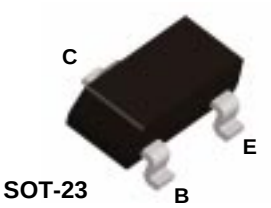
Discrete POWER & Signal Technologies

BCW65C



SOT-23
Mark: ED

NPN General Purpose Amplifier

This device is designed for general purpose amplifier applications at collector currents to 500 mA. Sourced from Process 19.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	32	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	1.0	A
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		***BCW65C**	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

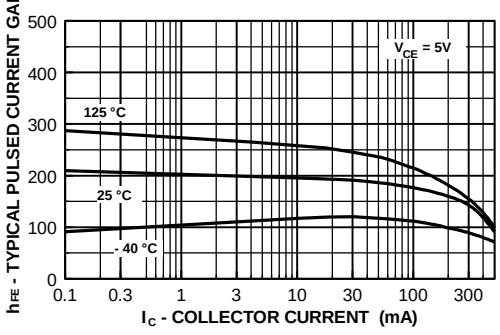
NPN General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

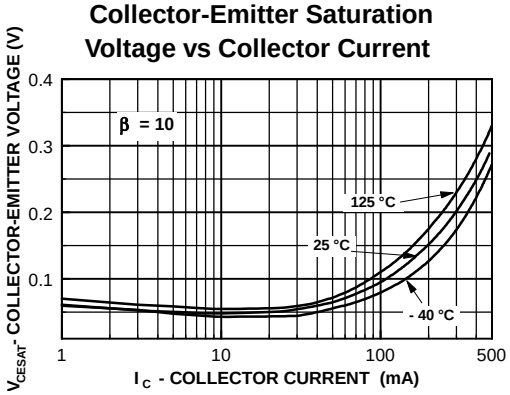
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	32		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 µA, I_E = 0	60		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	5.0		V
I_{CES}	Collector-Cutoff Current	V_{CB} = 32 V, I_E = 0 V_{CB} = 32 V, I_E = 0, T_A = 150°C		20 20	nA µA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 4.0 V, I_C = 0		20	nA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 100 µA, V_{CE} = 10 V I_C = 10 mA, V_{CE} = 1.0 V I_C = 100 mA, V_{CE} = 1.0 V I_C = 500 mA, V_{CE} = 2.0 V	80 180 250 50	 630 	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100 mA, I_B = 10 mA I_C = 500 mA, $_B$ = 50 mA		0.3 0.7	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		2.0	V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz	100		MHz
C_{obo}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz		12	pF
C_{ibo}	Input Capacitance	V_{EB} = 0.5 V, I_C = 0, f = 1.0 MHz		80	pF
NF	Noise Figure	I_C = 0.2 mA, V_{CE} = 5.0, R_S = 1.0 kΩ, f = 1.0 kHz, BW = 200 Hz		10	dB

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

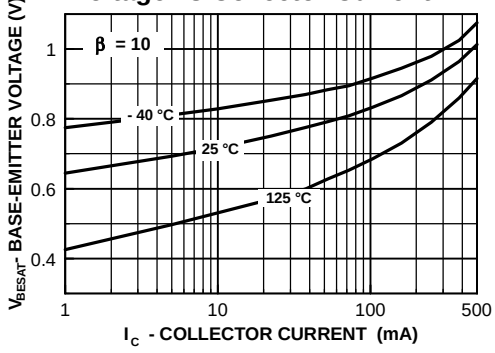


Collector-Emitter Saturation Voltage vs Collector Current

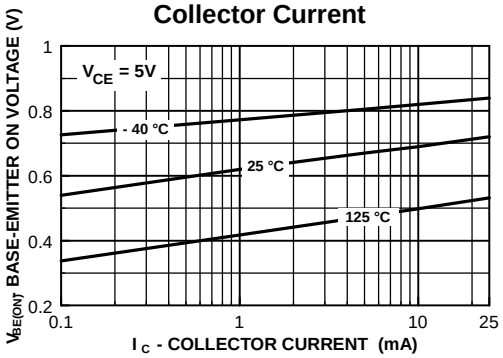


Typical Characteristics

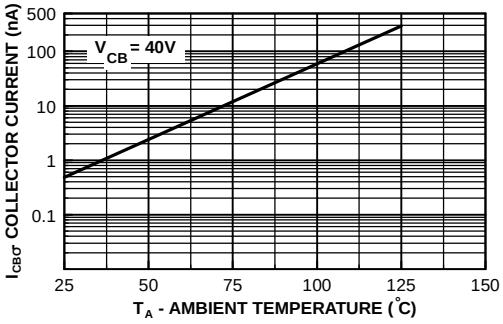
Base-Emitter Saturation Voltage vs Collector Current



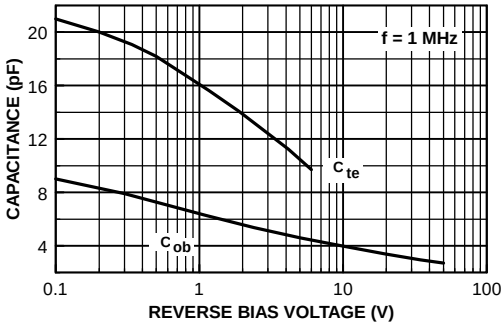
Base-Emitter ON Voltage vs Collector Current



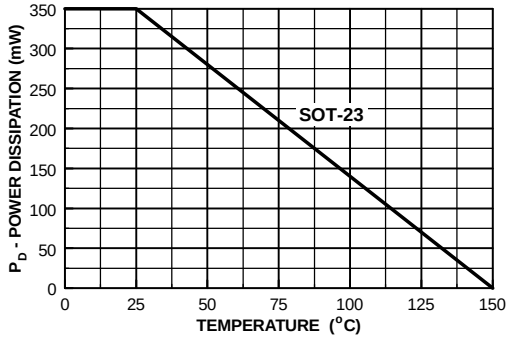
Collector-Cutoff Current vs Ambient Temperature



Emitter Transition and Output Capacitance vs Reverse Bias Voltage



Power Dissipation vs Ambient Temperature



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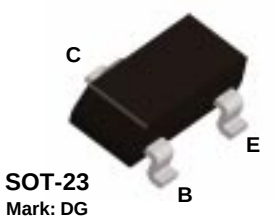
FAIRCHILD SEMICONDUCTOR TM

Discrete POWER & Signal Technologies

BCW68G



SOT-23
Mark: DG

PNP General Purpose Amplifier

This device is designed for general purpose amplifier and switching applications at currents to 500 mA. Sourced from Process 63.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	800	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		*BCW68C	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

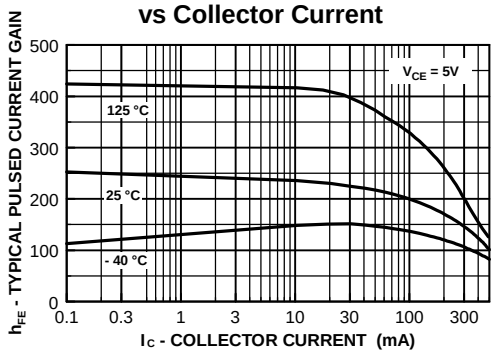
PNP General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

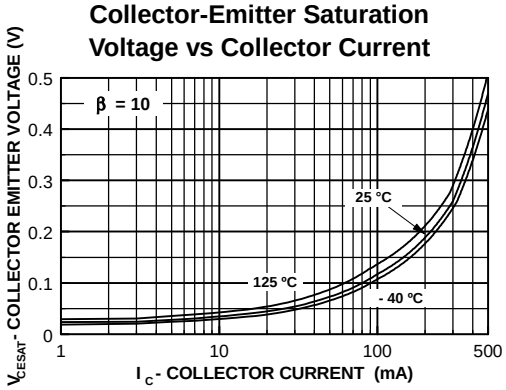
Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0		45	V
$V_{(BR)CES}$	Collector-Base Breakdown Voltage	I_C = 10 µA		60	V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0		60	V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0		5.0	V
I_{CES}	Collector-Cutoff Current	V_{CE} = 45 V V_{CE} = 45 V, T_A = 150 °C		20 10	nA µA
I_{EBO}	Emitter-Cutoff Current	V_{EB} = 4.0 V		20	nA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 10 mA, V_{CE} = 1.0 V I_C = 100 mA, V_{CE} = 1.0 V I_C = 300 mA, V_{CE} = 1.0 V	120 160 60	400	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 300 mA, I_B = 30 mA		1.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 500 mA, I_B = 50 mA		2.0	V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz	100		MHz
C_{obo}	Ouput Capacitance	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz		18	pF
C_{ibo}	Input Capacitance	V_{EB} = 0.5 V, I_E = 0, f = 1.0 MHz		105	pF
NF	Noise Figure	I_C = 0.2 mA V, V_{CE} = 5.0 V, R_S = 1.0 kΩ, f = 1.0 kHz, B_W = 200 Hz		10	dB

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

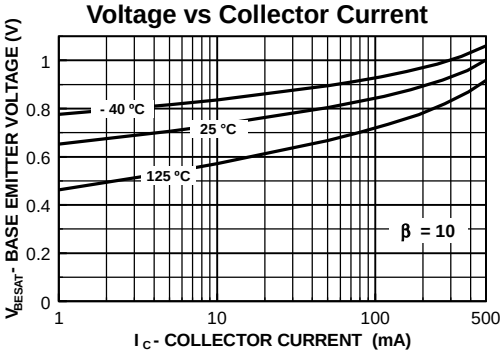


Collector-Emitter Saturation Voltage vs Collector Current

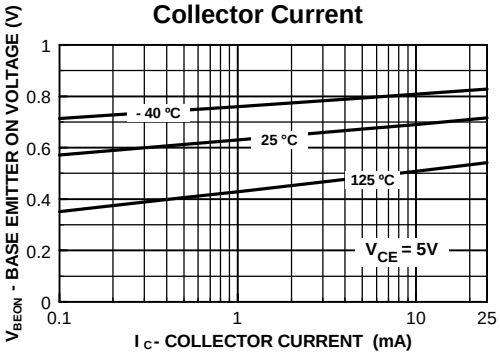


Typical Characteristics (continued)

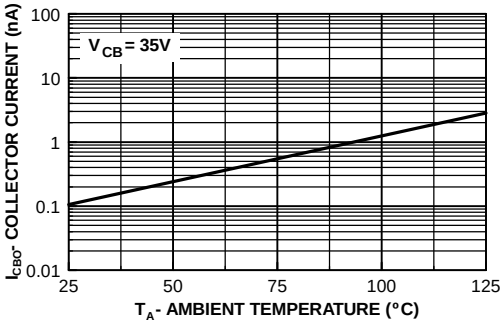
Base-Emitter Saturation Voltage vs Collector Current



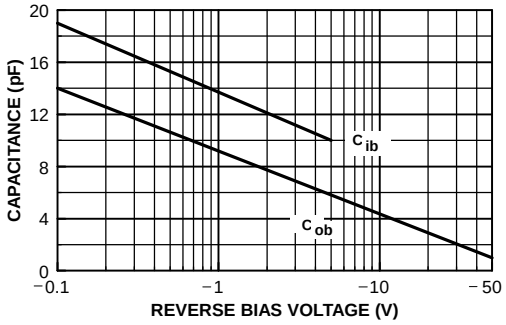
Base Emitter ON Voltage vs Collector Current



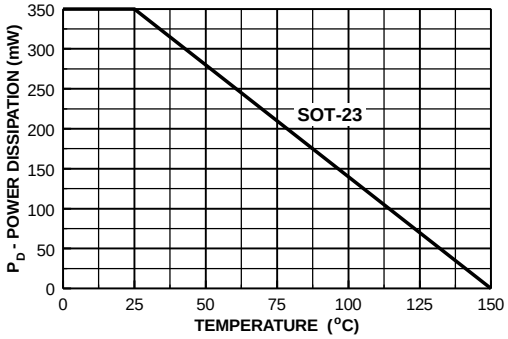
Collector-Cutoff Current vs. Ambient Temperature



Input and Output Capacitance vs Reverse Bias Voltage



Power Dissipation vs Ambient Temperature



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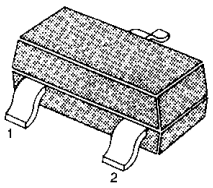
BCW71 NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

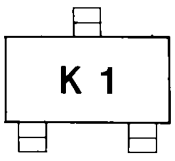
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KST2222 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	BV_{CBO}	I_C=10μA, I_E=0	50			V
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2mA, I_B=0	45			V
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=2mA, V_{EB}=0	45			V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=10μA, I_C=0	5			V
Collector Cut-off Current	I_{CBO}	V_{CB}=20V, I_E=0			100	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=2mA	110		220	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.5mA			0.25	V
		I_C=50mA, I_B=2.5mA		0.21		V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C=50mA, I_B=2.5mA		0.85		V
Base-Emitter On Voltage	V_{BE} (on)	I_C=2mA, V_{CE}=5V	0.6		0.75	V
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA f=35MHz		300		MHz
Output Capacitance	C_{OB}	V_{CB}=10V, I_E=0 f=1MHz			4	pF
Noise Figures	NF	V_{CE}=5V, I_C=2.0mA R_G=2KΩ, f=1KHz			10	dB

Marking



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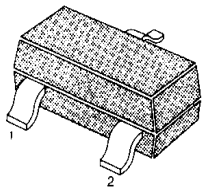
BCX70G NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



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ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

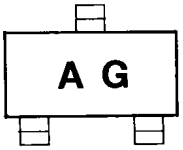
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	200	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS5088 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2mA, I_B=0	45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=1μA, I_C=0	5		V
Collector Cut-off Current	I_{CES}	V_{CE}=32V, V_{BE}=0		20	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}=4V, I_C=0		20	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=2mA	120	220	
		V_{CE}=1V, I_C=50mA	60		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.25mA		0.35	V
		I_C=50mA, I_B=1.25mA		0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C=10mA, I_B=0.25mA	0.6	0.85	V
		I_C=50mA, I_B=1.25mA	0.7	1.05	V
Base-Emitter On Voltage	V_{BE} (on)	I_C=2mA, V_{CE}=5V	0.55	0.75	V
Current Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=10mA	125		MHz
Output Capacitance	C_{OB}	V_{CB}=10V, I_E=0 f=1MHz		4.5	pF
Noise Figure	NF	I_C=0.2mA, V_{CE}=5V f=1KHz, R_S=2KΩ		6	dB
Turn On Time	T_{ON}	I_C=10mA, I_{B1}=1mA		150	ns
Turn Off Time	T_{OFF}	I_{B2}=1mA, V_{BB}=3.6V R_L=990Ω R_1=R_2=5KΩ		800	ns

Marking



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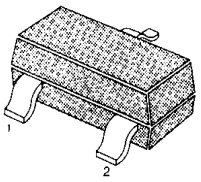
BCX70H NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

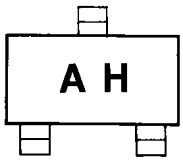
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	200	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS3904 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2.0mA, I_B=0	45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=1.0μA, I_C=0	5		V
Collector Cut-off Current	I_{CES}	V_{CE}=32V, V_{BE}=0		20	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}=4V, I_C=0		20	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=10μA	120		
		V_{CE}=5V, I_C=2.0mA	180	310	
		V_{CE}=1V, I_C=50mA	70		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.25mA		0.35	V
		I_C=50mA, I_B=1.25mA		0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C=10mA, I_B=0.25mA	0.6	0.85	V
		I_C=50mA, I_B=1.25mA	0.7	1.05	V
Base-Emitter On Voltage	V_{BE} (on)	I_C=2.0mA, V_{CE}=5V	0.55	0.75	V
Current Gain Bandwidth Product	f_T	I_C=10mA, V_{CE}=5V	125		MHz
Output Capacitance	C_{OB}	V_{CE}=10V, I_E=0 f=1MHz		4.5	pF
Noise Figure	NF	V_{CE}=5V, I_C=0.2mA R_S=2KΩ, f=1KHz		6	dB
Turn On Time	T_{ON}	I_C=10mA, I_{B1}=1.0mA		150	ns
Turn Off Time	T_{OFF}	V_{BB}=3.6V, I_{B2}=1.0mA R_1=R_2=5KΩ, R_L=990Ω		800	ns

Marking



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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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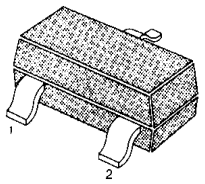
BCX70J NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

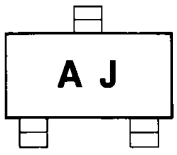
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	200	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS3904 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2.0mA, I_B=0	45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=1.0μA, I_C=0	5		V
Collector Cut-off Current	I_{CES}	V_{CE}=32V, V_{BE}=0		20	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}=4V, I_C=0		20	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=10μA	40		
		V_{CE}=5V, I_C=2.0mA	250	460	
		V_{CE}=1V, I_C=50mA	90		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.25mA		0.35	V
		I_C=50mA, I_B=1.25mA		0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C=10mA, I_B=0.25mA	0.6	0.85	V
		I_C=50mA, I_B=1.25mA	0.7	1.05	V
Base-Emitter On Voltage	V_{BE} (on)	I_C=2.0mA, V_{CE}=5V	0.55	0.75	V
Current Gain Bandwidth Product	f_T	I_C=10mA, V_{CE}=5V	125		MHz
Output Capacitance	C_{OB}	V_{CB}=10V, I_E=0 f=1MHz		4.5	pF
Noise Figure	NF	V_{CE}=5V, I_C=0.2mA R_S=2KΩ, f=1KHz		6	dB
Turn On Time	T_{ON}	I_C=10mA, I_{B1}=1.0mA		150	ns
Turn Off Time	T_{OFF}	V_{BB}=3.6V, I_{B2}=1.0mA R_1=R_2=5KΩ, R_L=990Ω		800	ns

Marking



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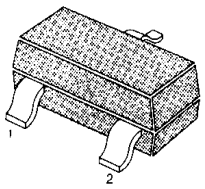
BCX70K NPN EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



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ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

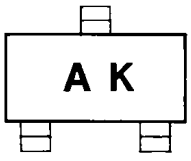
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	45	V
Collector-Emitter Voltage	V_{CEO}	45	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	I_C	200	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS3904 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=2.0mA, I_B=0	45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E=1.0μA, I_C=0	5		V
Collector Cut-off Current	I_{CES}	V_{CE}=32V, V_{BE}=0		20	nA
Emitter Cut-off Current	I_{EBO}	V_{EB}=4V, I_C=0		20	nA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=10μA	100		
		V_{CE}=5V, I_C=2.0mA	380	630	
		V_{CE}=1V, I_C=50mA	100		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C=10mA, I_B=0.25mA		0.35	V
		I_C=50mA, I_B=1.25mA		0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C=10mA, I_B=0.25mA	0.6	0.85	V
		I_C=50mA, I_B=1.25mA	0.7	1.05	V
Base-Emitter On Voltage	V_{BE} (on)	I_C=2.0mA, V_{CE}=5V	0.55	0.75	V
Current Gain Bandwidth Product	f_T	I_C=10mA, V_{CE}=5V	125		MHz
Output Capacitance	C_{OB}	V_{CB}=10V, I_E=0 f=1MHz		4.5	pF
Noise Figure	NF	V_{CE}=5V, I_C=0.2mA R_S=2KΩ, f=1KHz		6	dB
Turn On Time	T_{ON}	I_C=10mA, I_{B1}=1.0mA		150	ns
Turn Off Time	T_{OFF}	V_{BB}=3.6V, I_{B2}=1.0mA R_1=R_2=5KΩ, R_L=990Ω		800	ns

Marking



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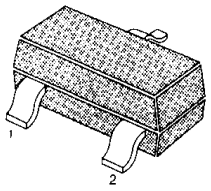
BCX71G PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



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ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

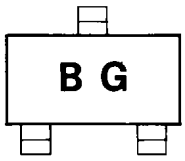
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage	V_{CEO}	-45	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current	I_C	-100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS5086 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -2mA, I_B=0	-45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= -1μA, I_C=0	-5		V
Collector Cut-off Current	I_{CES}	V_{CE}= -32V, V_{BE}=0		-20	nA
DC Current Gain	h_{FE}	V_{EB}= -5V, I_C= -2mA	120	220	
		V_{CE}= -1V, I_C= -50μA	60		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.25mA		-0.25	V
		I_C= -50mA, I_B= -1.25mA		-0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C= -10mA, I_B= -0.25mA	-0.6	-0.85	V
		I_C= -50mA, I_B= -1.25mA	-0.68	-1.05	V
Base-Emitter On Voltage	V_{BE} (on)	I_C= -2mA, V_{CE}= -5V	-0.6	-0.75	V
Current Gain Bandwidth Product	C_{OB}	V_{CB}= -10V, I_E=0 f=1MHz		6	pF
Noise Figure	NF	I_C=0.2mA, V_{CE}=5V R_S=2KΩ, f=1KHz		6	dB
Turn On Time	T_{ON}	I_C= -10mA, I_{B1}= -1mA		150	ns
Turn Off Time	T_{OFF}	I_{B2}= -1mA, V_{BB}=3.6V R_L=990Ω		800	ns

Marking



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BCX71H PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

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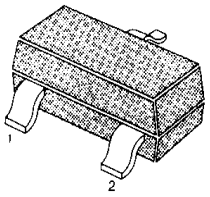

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ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage	V_{CEO}	-45	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS5086 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
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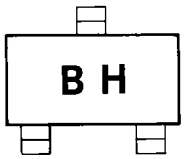
Collector Cut-off Current	I_{CES}	V_{CE}= -32V, V_{BE}=0		-20	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C= -10μA	30		
		V_{CE}= -5V, I_C= -2mA	140	310	
		V_{CE}= -1V, I_C= -50mA	80		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.25mA		-0.25	V
		I_C= -50mA, I_B= -1.25mA		-0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C= -10mA, I_B= -0.25mA	-0.6	-0.85	V
		I_C= -50mA, I_B= -1.25mA	-0.68	-1.05	V
Base-Emitter On Voltage	V_{BE} (on)	I_C= -2mA, V_{CE}= -5V	-0.6	-0.75	V
Current Gain Bandwidth Product	C_{OB}	V_{CB}= -10V, I_E=0 f=1MHz		6	pF
Noise Figure	NF	I_C= -0.2mA, V_{CE}= -5V f=1KHz, R_S=2KΩ		6	dB
Turn On Time	T_{ON}	I_C= -10mA, I_{B1}= -1mA		150	ns
Turn Off Time	T_{OFF}	I_{B2}= -1mA, V_{BB}= -3.6V R_L=990Ω		800	ns

Marking



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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

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Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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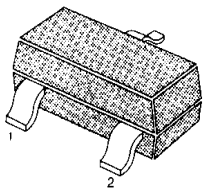
BCX71J PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

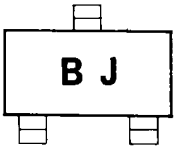
Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage	V_{CEO}	-45	V
Emitter-Base Voltage	V_{EBO}	-5	V
Collector Current	I_C	-100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KS5086 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -2mA, I_B=0	-45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= -1μA, I_C=0	-5		V
Collector Cut-off Current	I_{CES}	V_{CE}= -32V, V_{BE}=0		-20	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C= -10μA	40		
		V_{CE}= -5V, I_C= -2mA	250	460	
		V_{CE}= -1V, I_C= -50mA	100		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.25mA		-0.25	V
		I_C= -50mA, I_B= -1.25mA		-0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C= -10mA, I_B= -0.25mA	-0.6	-0.85	V
		I_C= -50mA, I_B= -1.25mA	-0.68	-1.05	V
Base-Emitter On Voltage	V_{DE} (on)	I_C= -2mA, V_{CE}= -5V	-0.6	-0.75	V
Current Gain Bandwidth Product	C_{OB}	V_{CB}= -10V, I_E=0 f=1MHz		6	pF
Noise Figure	NF	I_C= -0.2mA, V_{CE}= -5V f=1KHz, R_S=2KΩ		6	dB
Turn On Time	T_{ON}	I_C= -10mA, I_{B1}= -1mA		150	ns
Turn Off Time	T_{OFF}	I_{B2}= -1mA, V_{BB}= -3.6V R_L=990Ω		800	ns

Marking



Rev. B

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Quiet Series™
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SuperSOT™-6
SuperSOT™-8
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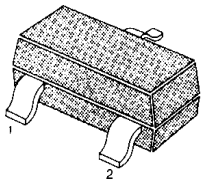
BCX71K PNP EPITAXIAL SILICON TRANSISTOR

GENERAL PURPOSE TRANSISTOR

SOT-23



1. Base 2. Emitter 3. Collector

ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

Characteristic	Symbol	Rating	Unit
Collector-Base Voltage	V_{CBO}	-45	V
Collector-Emitter Voltage	V_{CEO}	-45	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current	I_C	-100	mA
Collector Dissipation	P_C	350	mW
Storage Temperature	T_{STG}	150	°C

• Refer to KST5086 for graphs

ELECTRICAL CHARACTERISTICS (T_A=25°C)

Characteristic	Symbol	Test Conditions	Min	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C= -2mA, I_B=0	-45		V
Emitter-Base Breakdown Voltage	BV_{EBO}	I_E= -1μA, I_C=0	-5		V
Collector Cut-off Current	I_{CES}	V_{CE}= -32V, V_{BE}=0		-20	nA
DC Current Gain	h_{FE}	V_{CE}= -5V, I_C= -10μA	100		
		V_{CE}= -5V, I_C= -2mA	380	630	
		V_{CE}= -1V, I_C= -50mA	110		
Collector-Emitter Saturation Voltage	V_{CE} (sat)	I_C= -10mA, I_B= -0.25mA		-0.25	V
		I_C= -50mA, I_B= -1.25mA		-0.55	V
Base-Emitter Saturation Voltage	V_{BE} (sat)	I_C= -10mA, I_B= -0.25mA	-0.6	-0.85	V
		I_C= -50mA, I_B= -1.25mA	-0.68	-1.05	V
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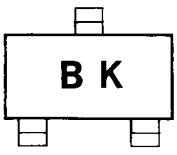
Current Gain Bandwidth Product	C_{OB}	V_{CB}= -10V, I_E=0 f=1MHz		6	pF
Noise Figure	NF	I_C= -0.2mA, V_{CE}= -5V R_S=2KΩ, f=1KHz		6	dB
Turn On Time	T_{ON}	I_C= -10mA, I_{B1}= -1mA		150	ns
Turn Off Time	T_{OFF}	I_{B2}= -1mA, V_{BB}= -3.6V R_L=990Ω		800	ns

Marking



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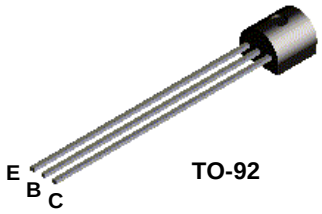
Discrete POWER & Signal Technologies

BCX79



TO-92

PNP General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 300 mA. Sourced from Process 68. See PN200A for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	45	V
V_{CES}	Collector-Base Voltage	45	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	500	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		BCX79	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	°C/W

PNP General Purpose Amplifier
(continued)

Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 1.0 μA, I_C = 0	5.0		V
I_{CEX}	Collector Cutoff Current	V_{CE} = 45 V, V_{BE} = 0.2 V, T_A = +100 °C		20	μA
I_{CES}	Collector Cutoff Current	V_{CE} = 45 V, I_E = 0, V_{CE} = 45 V, I_E = 0, T_A = +125 °C		10 2.5	nA μA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 4.0 V, I_C = 0		20	nA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	V_{CE} = 5.0 V, I_C = 2.0 mA V_{CE} = 1.0 V, I_C = 10 mA V_{CE} = 1.0 V, I_C = 100 mA	120 80 40	630 1,000	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 100 mA, I_B = 2.5 mA		0.6	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 100 mA, I_B = 2.5 mA		1.0	V
$V_{BE(on)}$	Base-Emitter On Voltage	V_{CE} = 5.0 V, I_C = 2.0 mA V_{CE} = 1.0 V, I_C = 100 mA	0.6	0.7 0.9	V V
SMALL SIGNAL CHARACTERISTICS					
C_{cb}	Collector-Base Capacitance	V_{CB} = 10 V, f = 1.0 MHz		4.5	pF
C_{eb}	Emitter-Base Capacitance	V_{EB} = 0.5 V, f = 1.0 MHz		15	pF
h_{ie}	Input Impedance	I_C = 2.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz	1.6	8.5	kΩ
h_{oe}	Output Admittance	I_C = 2.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz		100	μmhos
NF	Noise Figure	V_{CE} = 5.0 V, I_C = 0.2 mA, R_S = 2.0 kΩ, f = 1.0 kHz		6.0	dB
SWITCHING CHARACTERISTICS					
t_{on}	Turn-on Time	V_{CC} = 10 V, I_C = 10 mA, V_{BB} = 3.6 V, I_{B1} = I_{B2} = 1.0 mA		150	ns
t_{on}	Turn-on Time	V_{CC} = 10 V, I_C = 100 mA, V_{BB} = 5.0 V, I_{B1} = I_{B2} = 10 mA		150	ns
t_{off}	Turn-off Time	V_{CC} = 10 V, I_C = 10 mA, V_{BB} = 3.6 V, I_{B1} = I_{B2} = 1.0 mA		800	ns
t_{off}	Turn-off Time	V_{CC} = 10 V, I_C = 100 mA, V_{BB} = 5.0 V, I_{B1} = I_{B2} = 10 mA		800	ns