Ordering number: EN2005A

SANYO

No.2005A

2SA1416/2SC3646

PNP/NPN Epitaxial Planar Silicon Transistors

High-Voltage Switching Applications

Features

- Adoption of FBET, MBIT processes.
- High breakdown voltage and large current capacity.
- Fast switching time.
- Very small size making it easy to provide high-density, small-sized hybrid ICs.

( ): 2SA1416

Absolute Maximum Ratings at Ta=25°C

			unit
Collector to Base Voltage	V_{CBO}	(-)120	V
Collector to Emitter Voltage	V_{CEO}	(-)100	V
Emitter to Base Voltage	V_{EBO}	(-)6	V
Collector Current	I_C	(-)1	A
Collector Current(Pulse)	I_{CP}	(-)2	A
Collector Dissipation	P_C	500	mW
	Mounted on ceramic board (250mm² x 0.8mm)	1.3	W
Junction Temperature	Tj	150	°C
Storage Temperature	Tstg	-55 to +150	°C

Electrical Characteristics at Ta=25°C

			min	typ	max	unit
Collector Cutoff Current	I_{CBO}	V_{CB}=(-)100V, I_E=0			(-)100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(-)4V, I_C=0			(-)100	nA
DC Current Gain	h_{FE}	V_{CE}=(-)5V, I_C=(-)100mA	100*		400*	
Gain-Bandwidth Product	f_T	V_{CE}=(-)10V, I_C=(-)100mA		120		MHz
Output Capacitance	C_{ob}	V_{CB}=(-)10V, f=1MHz		(13)		pF
				8.5		pF
C-E Saturation Voltage	$V_{CE(sat)}$	I_C=(-)400mA, I_B=(-)40mA		(-0.2)	(-0.6)	V
				0.1	0.4	V
B-E Saturation Voltage	$V_{BE(sat)}$	I_C=(-)400mA, I_B=(-)40mA		(-)0.85	(-)1.2	V
C-B Breakdown Voltage	$V_{(BR)CBO}$	I_C=(-)10μA, I_E=0	(-)120			V
C-E Breakdown Voltage	$V_{(BR)CEO}$	I_C=(-)1mA, R_{BE}=∞	(-)100			V
E-B Breakdown Voltage	$V_{(BR)EBO}$	I_E=(-)10μA, I_C=0	(-)6			V

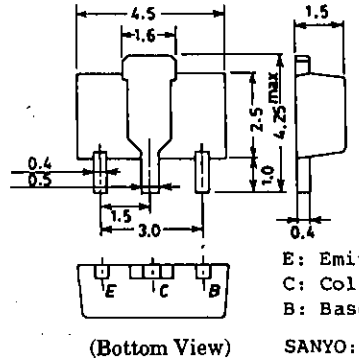
*: The 2SA1416/2SC3646 are classified by 100mA h_{FE} as follows:

100 R 200	140 S 280	200 T 400

Marking 2SA1416: AB
2SC3646: CB
h_{FE} rank: R, S, T

Continued on next page.

Package Dimensions 2038
(unit: mm)



E: Emitter
C: Collector
B: Base

(Bottom View) SANYO: PCP

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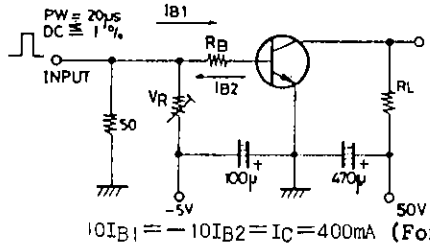
Continued from preceding page.

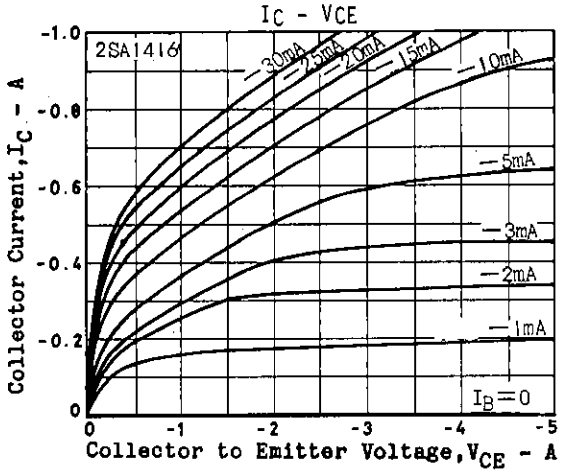
			min	typ	max	unit
Turn-ON Time	t_{on}	See specified Test Circuit.		(80)		ns
		"		80		ns
Storage Time	t_{stg}	"		(700)		ns
		"		850		ns
Fall Time	t_f	"		(40)		ns
		"		50		ns

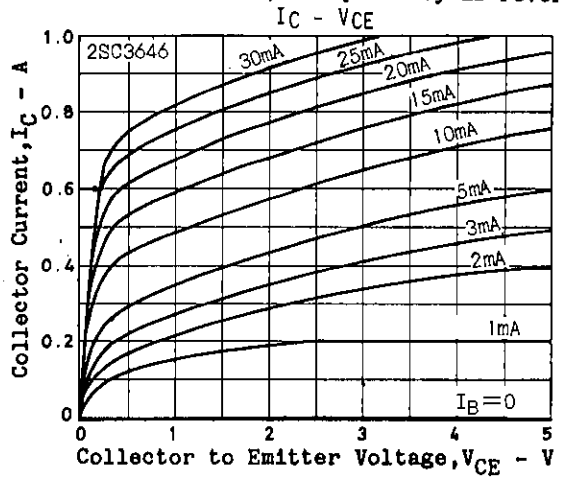
Switching Time Test Circuit

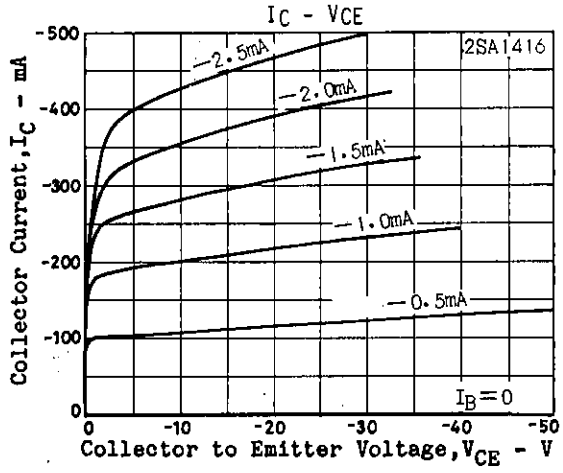


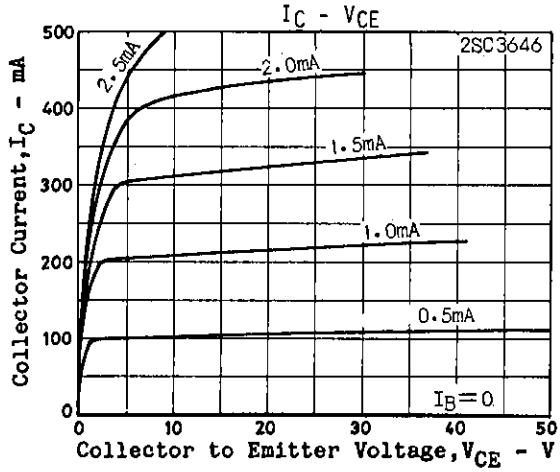
Unit (Resistance : Ω, Capacitance : F)

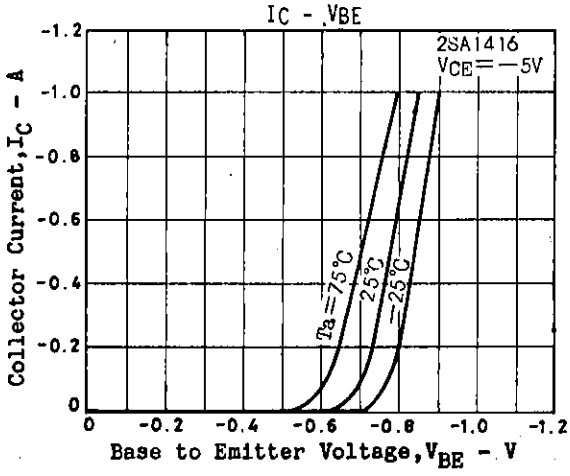
$10I_{B1} = -10I_{B2} = I_C = 400mA$ (For PNP, the polarity is reversed.)

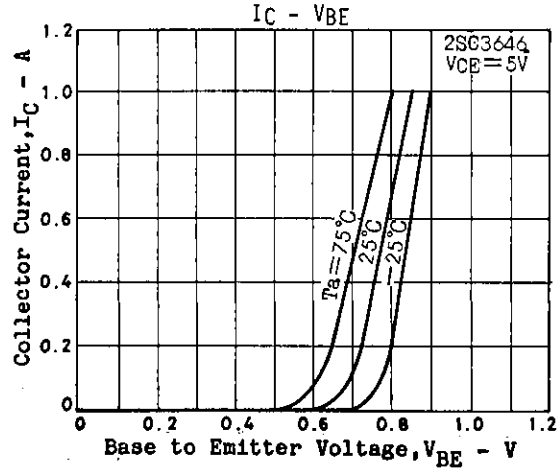


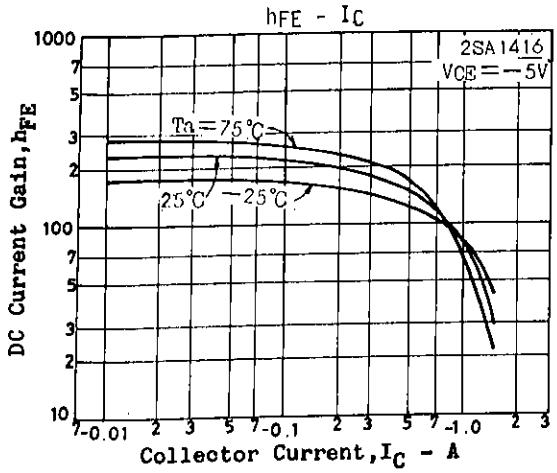


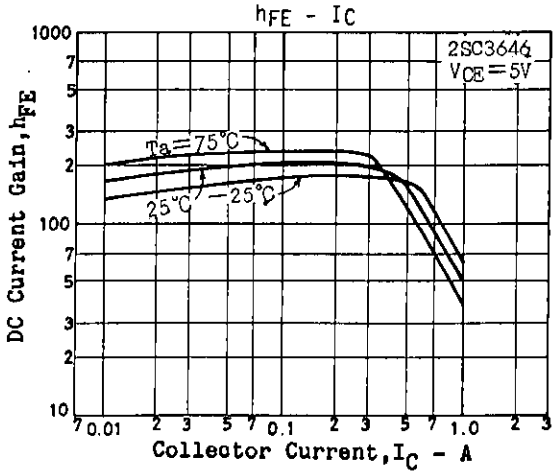


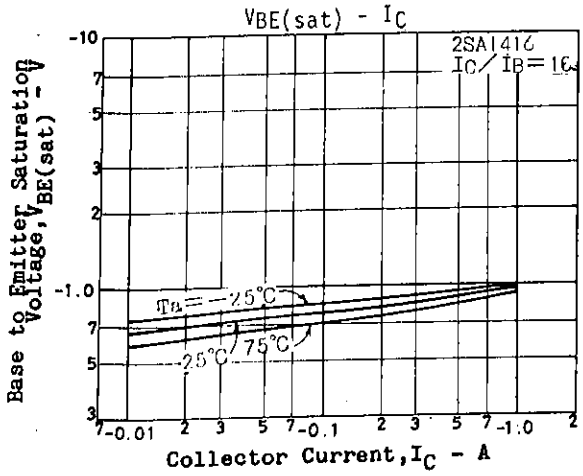


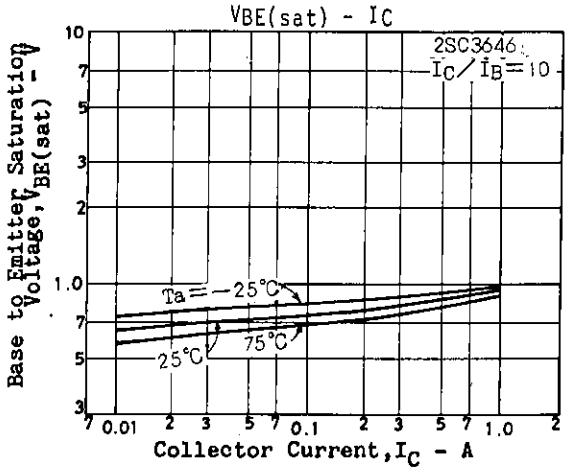


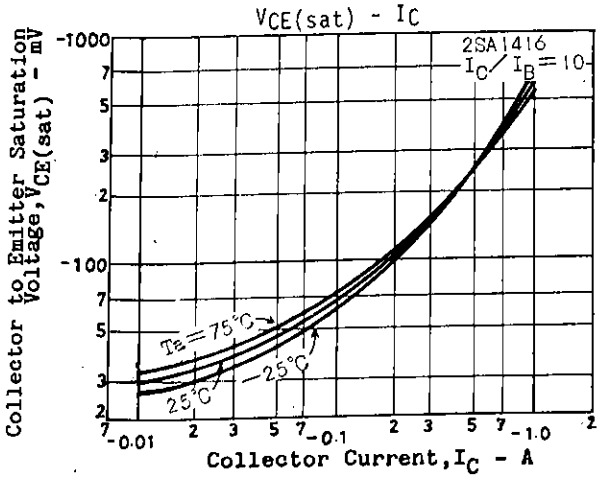


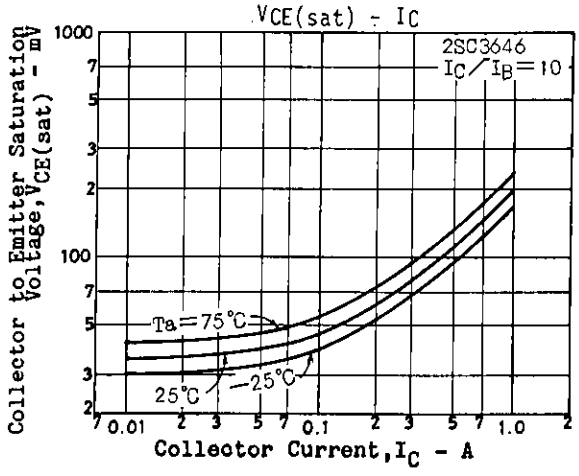

hFE - IC
2SA1416
VCE=−5V
Ta=75°C
25°C
−25°C
DC Current Gain, hFE
Collector Current, IC - A

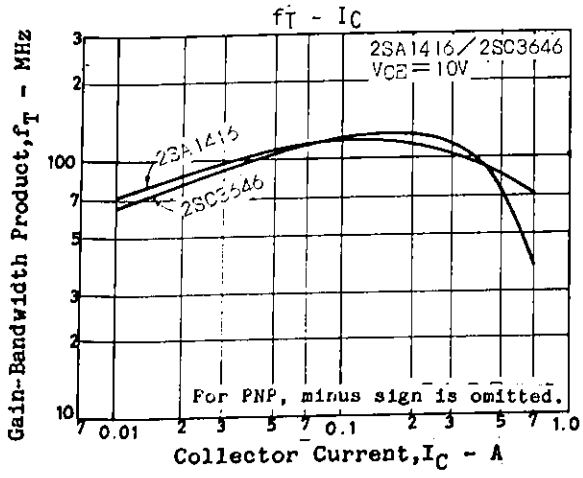

hFE - IC
2SC3646
VCE=5V
Ta=75°C
25°C
−25°C
DC Current Gain, hFE
Collector Current, IC - A

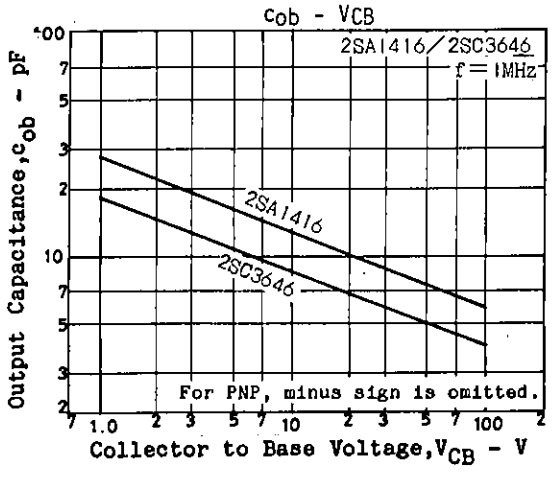

VBE(sat) - IC
2SA1416
IC/IB=10
Ta=−25°C
25°C
75°C
Base to Emitter Saturation Voltage, VBE(sat) - V
Collector Current, IC - A

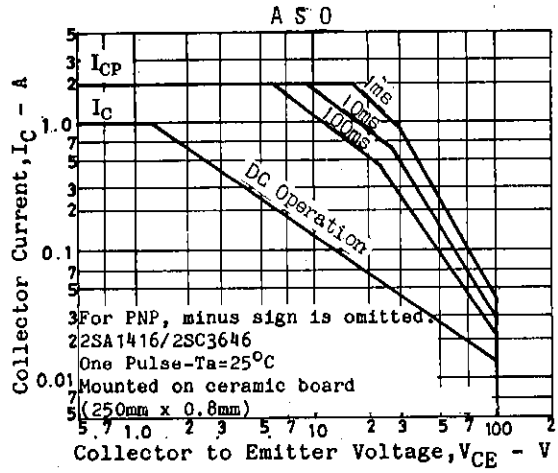

VBE(sat) - IC
2SC3646
IC/IB=10
Ta=−25°C
25°C
75°C
Base to Emitter Saturation Voltage, VBE(sat) - V
Collector Current, IC - A

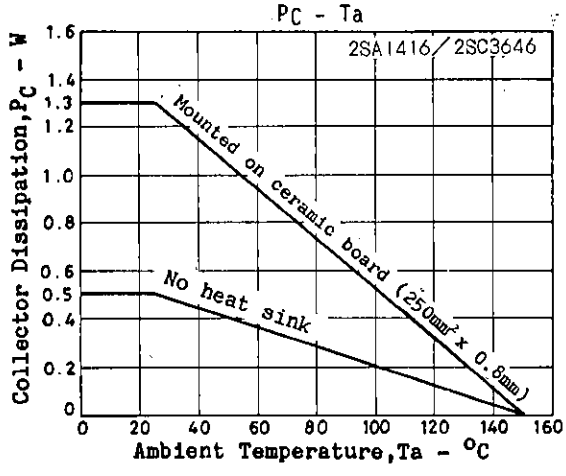

VCE(sat) - IC
2SA1416
IC/IB=10
Ta=75°C
25°C
−25°C
Collector to Emitter Saturation Voltage, VCE(sat) - mV
Collector Current, IC - A


VCE(sat) - IC
2SC3646
IC/IB=10
Ta=75°C
25°C
−25°C
Collector to Emitter Saturation Voltage, VCE(sat) - mV
Collector Current, IC - A


fT - IC
2SA1416/2SC3646
VCE=10V
2SA1416
2SC3646
For PNP, minus sign is omitted.
Gain-Bandwidth Product, fT - MHz
Collector Current, IC - A


Cob - VCB
2SA1416/2SC3646
f=1MHz
2SA1416
2SC3646
For PNP, minus sign is omitted.
Output Capacitance, Cob - pF
Collector to Base Voltage, VCB - V





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