Ordering number:ENN6078A

PNP/NPN Epitaxial Planar Silicon Transistors

CPH3109/CPH3209

DC/DC Converter Applications

Applications

· Relay drivers, lamp drivers, motor drivers, strobes.

Features

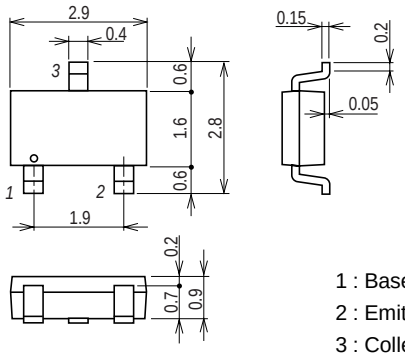
· Adoption of MBIT processes.
· Large current capacitance.
· Low collector-to-emitter saturation voltage.
· High-speed switching.
· Ultrasmall package facilitates miniaturization in end products (mounting height : 0.9mm).
· High allowable power dissipation.

Package Dimensions

unit:mm

2150A

[CPH3109/CPH3209]



1 : Base
2 : Emitter
3 : Collector
SANYO : CPH3

Specifications

( ) : CPH3109

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–30)40	V
Collector-to-Emitter Voltage	V_{CEO}		(–)30	V
Emitter-to-Base Voltage	V_{EBO}		(–)5	V
Collector Current	I_C		(–)3	A
Collector Current (Pulse)	I_{CP}		(–)5	A
Base Current	I_B		(–)600	mA
Collector Dissipation	P_C	Mounted on a ceramic board (600mm²×0.8mm)	0.9	W
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(–)30V, I_E=0			(–)0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–)0.1	μA
DC Current Gain	h_{FE}	V_{CE}=(–)2V, I_C=(–)500mA	200		560	
Gain-Bandwidth Product	f_T	V_{CE}=(–)10V, I_C=(–)500mA		(380)		MHz
				450		MHz
Output Capacitance	Cob	V_{CB}=(–)10V, f=1MHz		(25)20		pF

Marking : CPH3109 : AJ, CPH3209 : CJ

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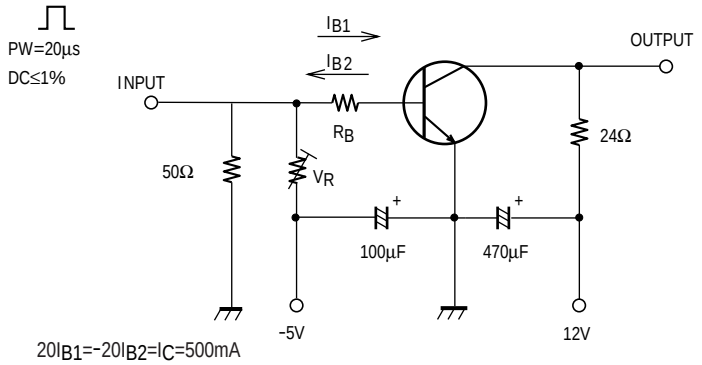
SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

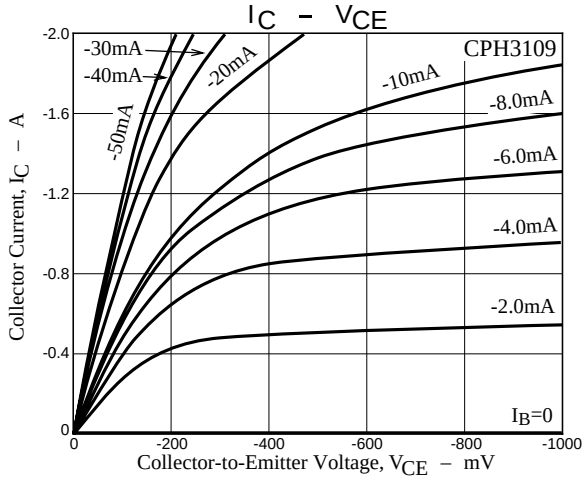
Continued from preceding page.

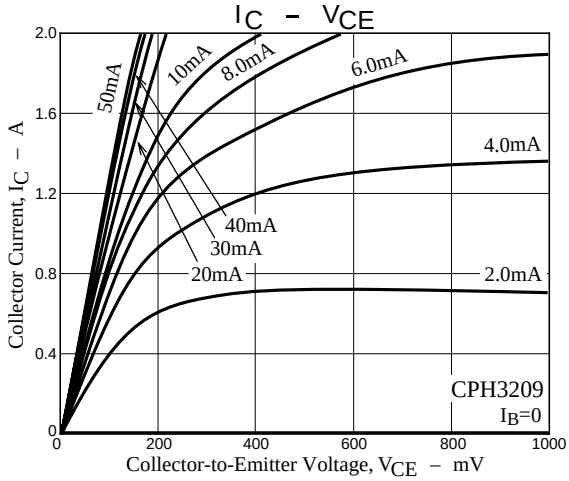
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}1$	I_C=(–)1.5A, I_B=(–)30mA		(–155)	(–230)	mV
				120	180	mV
	$V_{CE(sat)}2$	I_C=(–)1.5A, I_B=(–)75mA		(–)105	(–)155	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=(–)1.5A, I_B=(–)30mA		(–)0.83	(–)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=(–)10μA, I_E=0	(–30)			V
			40			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=(–)1mA, R_{BE}=∞	(–)30			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=(–)10μA, I_C=0	(–)5			V
Turn-ON Time	t_{on}	See specified test circuit.		(50)30		ns
Storage Time	t_{stg}	See specified test circuit.		(270)		ns
				300		ns
Fall Time	t_f	See specified test circuit.		(25)15		ns

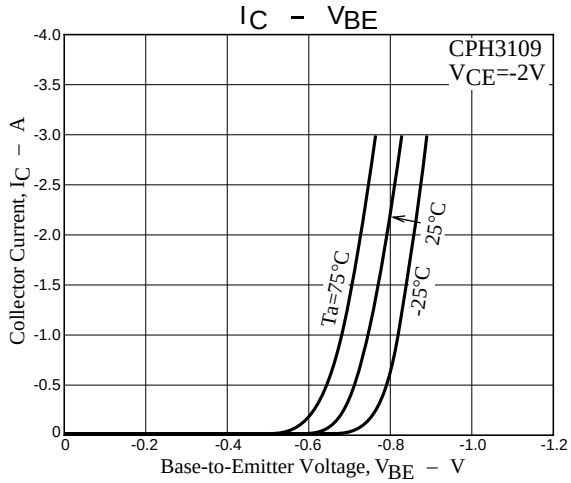
Switching Time Test Circuit

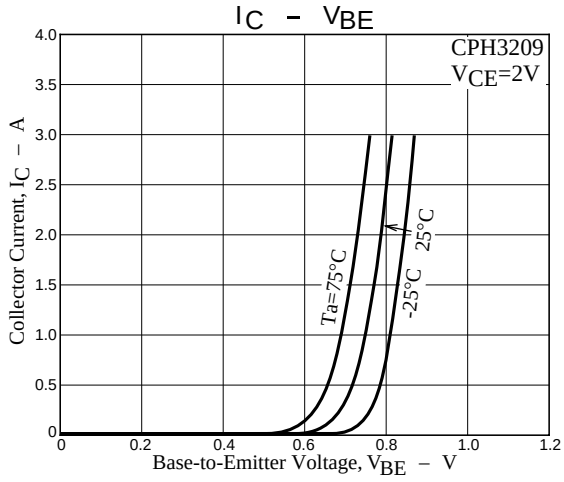


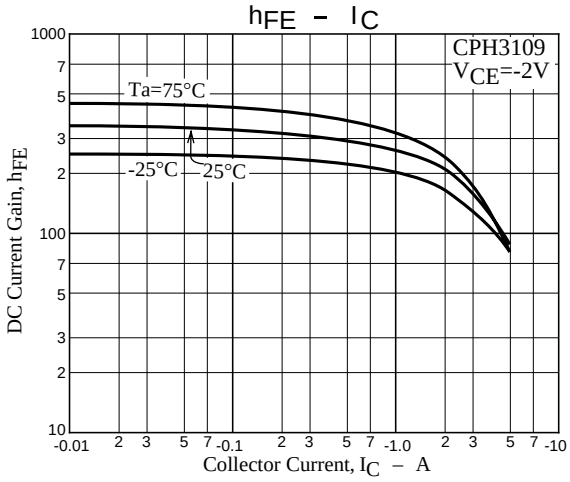
$20I_{B1}=-20I_{B2}=I_C=500mA$
(For PNP, the polarity is reversed.)

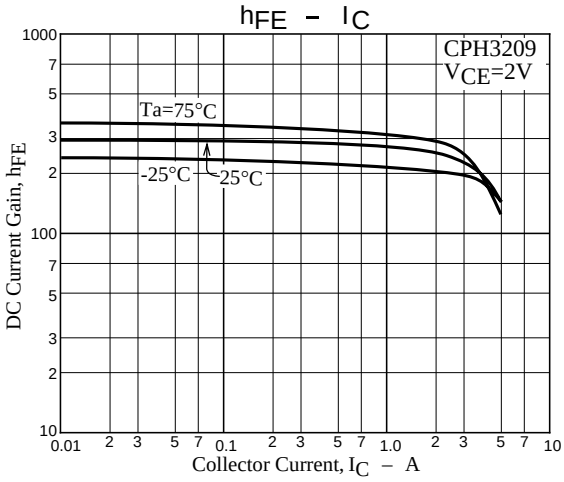


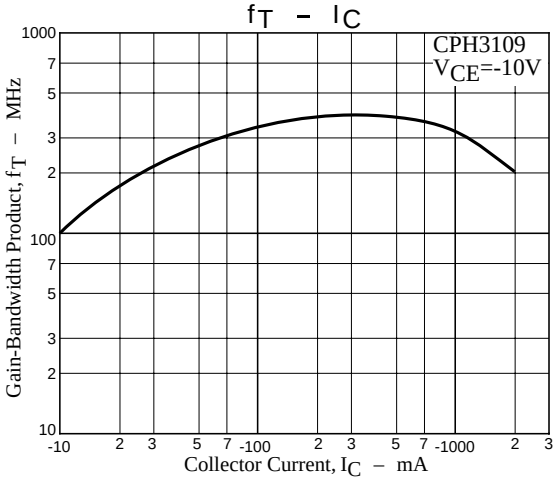


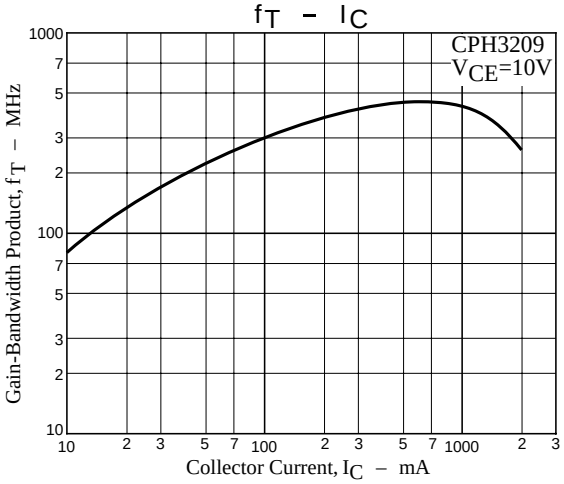


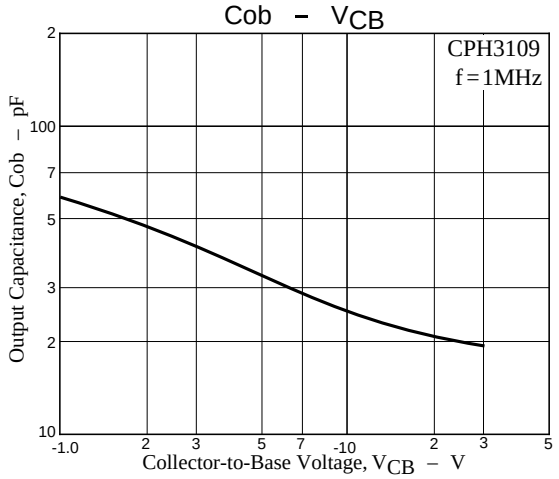


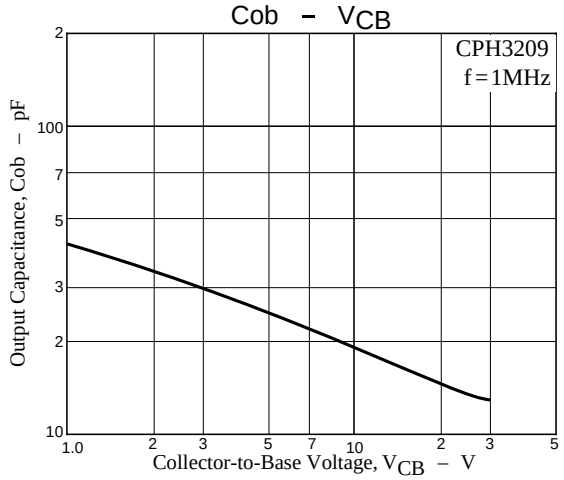

hFE – IC
CPH3109
VCE=-2V
Ta=75°C
-25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A

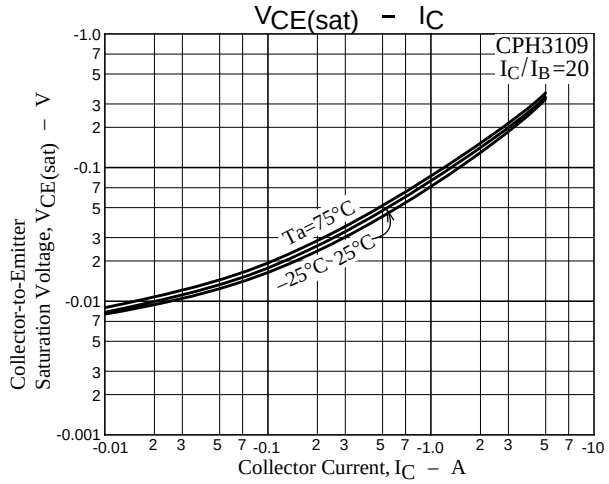

hFE – IC
CPH3209
VCE=2V
Ta=75°C
-25°C
25°C
DC Current Gain, hFE
Collector Current, IC – A

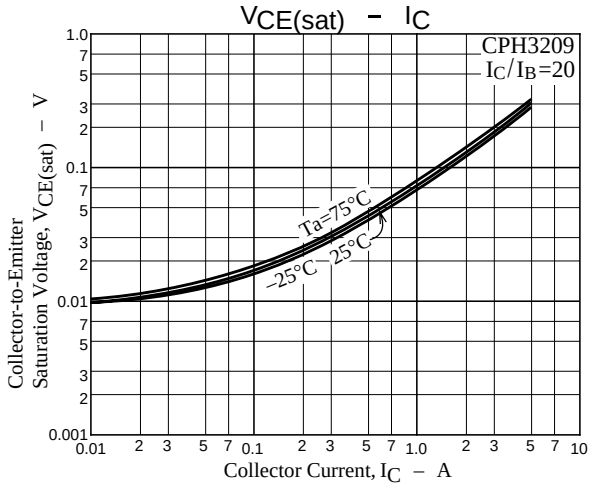

fT – IC
CPH3109
VCE=-10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA

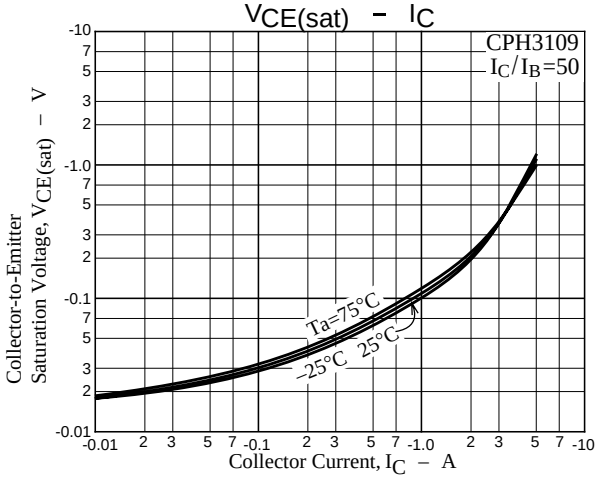

fT – IC
CPH3209
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA

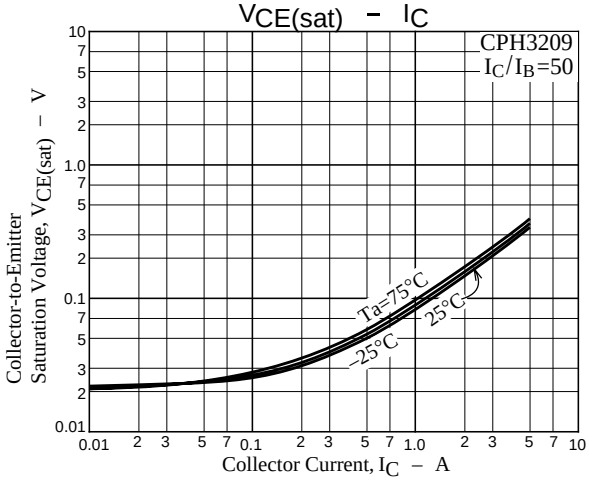

Cob – VCB
CPH3109
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V

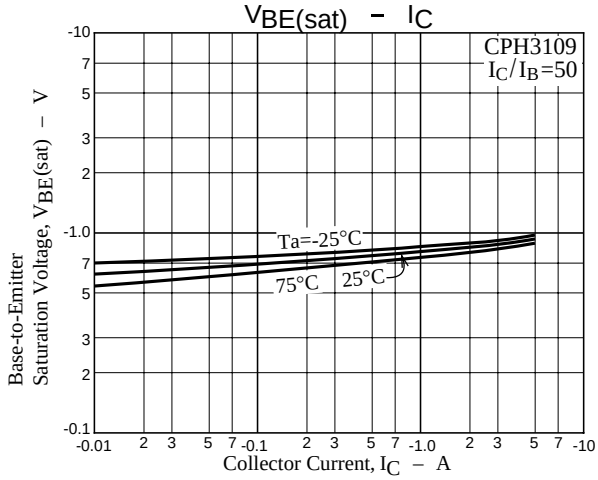

Cob – VCB
CPH3209
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V

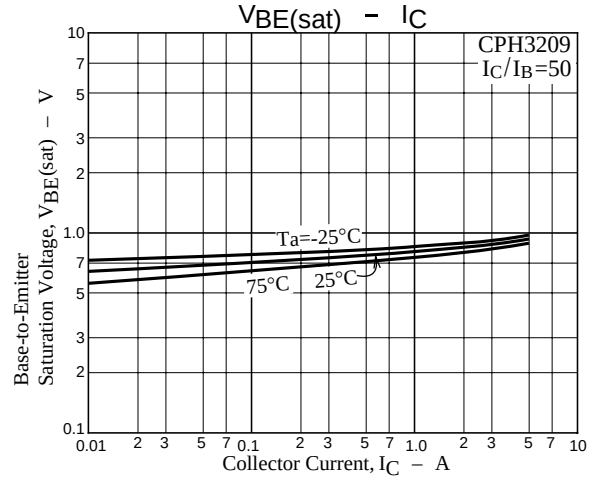

VCE(sat) – IC
CPH3109
IC/IB=20
Ta=75°C
-25°C
25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A

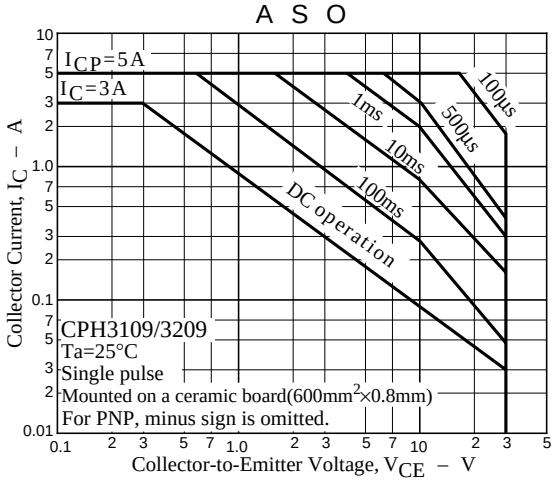

VCE(sat) – IC
CPH3209
IC/IB=20
Ta=75°C
-25°C
25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A

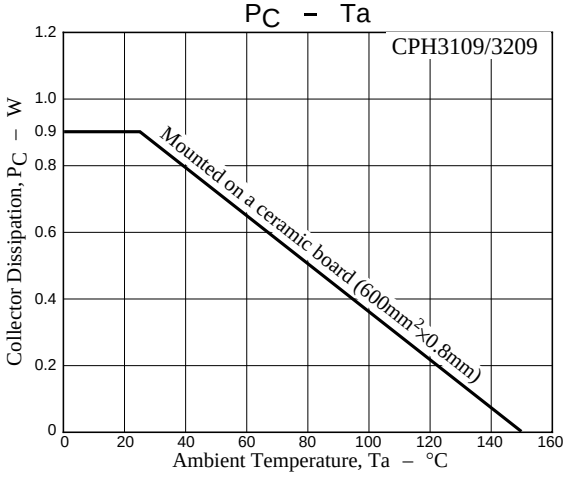

VCE(sat) – IC
CPH3109
IC/IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Ta=75°C
25°C
–25°C
Collector Current, IC – A


VCE(sat) – IC
CPH3209
IC/IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Ta=75°C
25°C
–25°C
Collector Current, IC – A


VBE(sat) – IC
CPH3109
IC/IB=50
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Ta=-25°C
75°C
25°C
Collector Current, IC – A


VBE(sat) – IC
CPH3209
IC/IB=50
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Ta=-25°C
75°C
25°C
Collector Current, IC – A


A S O
ICP=5A
IC=3A
1ms
100µs
500µs
10ms
100ms
DC operation
CPH3109/3209
Ta=25°C
Single pulse
Mounted on a ceramic board(600mm2×0.8mm)
For PNP, minus sign is omitted.
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V


PC – Ta
CPH3109/3209
Mounted on a ceramic board (600mm2×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature, Ta – °C