Ordering number:ENN6091

TR : NPN Silicon Epitaxial Planar Transistor
SBD : Schottky Barrier Diode

CPH5702

DC/DC Converter Applications

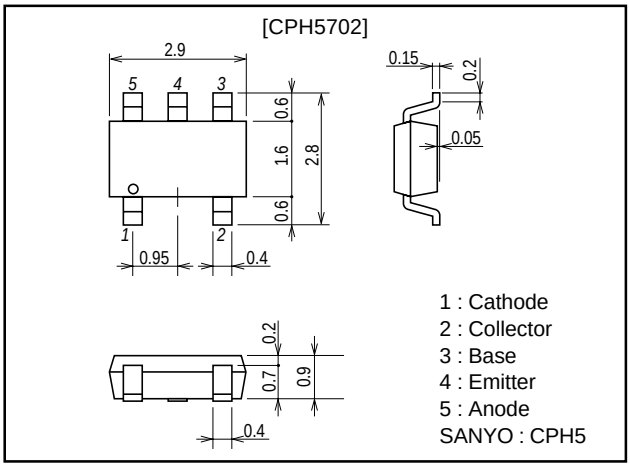
Features

- Composite type with a NPN transistor and a Schottky barrier diode contained in one package facilitating high-density mounting.
- The CPH5702 consists of two chips encapsulated in a package which are equivalent to the CPH3209 and the SB07-03C, respectively.
- Ultrasmall-sized package permitting applied sets to be made small and slim (0.9mm).

Package Dimensions

unit:mm

2156



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
[TR]				
Collector-to-Base Voltage	V_{CBO}		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 +125	˚C
[SBD]				
Repetitive Peak Reverse Voltage	V_{RRM}		30	V
Non-repetitive Peak Reverse Surge Voltage	V_{RSM}		35	V
Average Output Current	I_O		700	mA
Surge Current	I_{FSM}	50Hz sine wave, 1 cycle	5	A
Junction Temperature	Tj		–55 to +125	˚C
Storage Temperature	Tstg		–55 to +125	˚C

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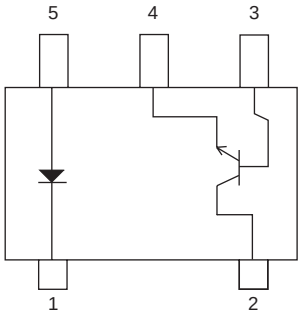
Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	I_{CBO}	V_{CB}=20V, 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		450		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		20		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}1$	I_C=1.5A, I_B=30mA		120	185	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	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=1mA, I_C=0	5			V
Turn-ON Time	t_{on}	See specified Test Circuit.		30		ns
Storage Time	t_{stg}	See specified Test Circuit.		300		ns
Turn-OFF Time	t_f	See specified Test Circuit.		15		ns
[SBD]						
Reverse Voltage	V_R	I_R=300μA	30			V
Forward Voltage	V_F	I_F=700mA			0.55	V
Reverse Current	I_R	V_R=15V			80	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz cycle		28		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA, See specified Test Circuit.			10	ns
Thermal Resistance	Rthj-a	Mounted on a ceramic board (600mm²×0.8mm)		151		˚C/W

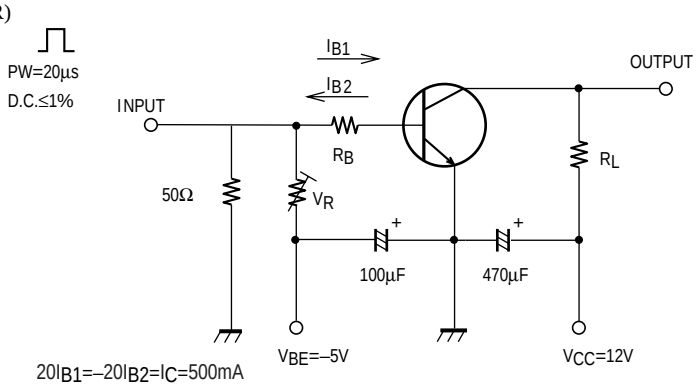
Electrical Connection (Top view)



1 : Cathode
2 : Collector
3 : Base
4 : Emitter
5 : Anode

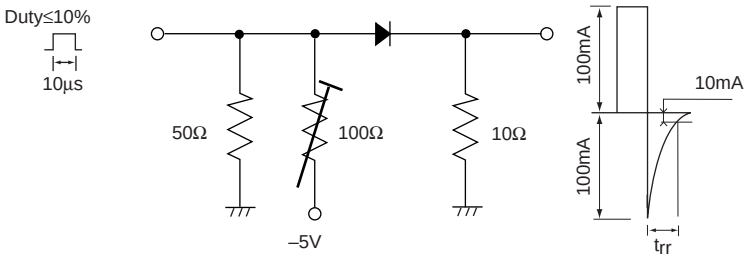
Switching Time Test Circuit

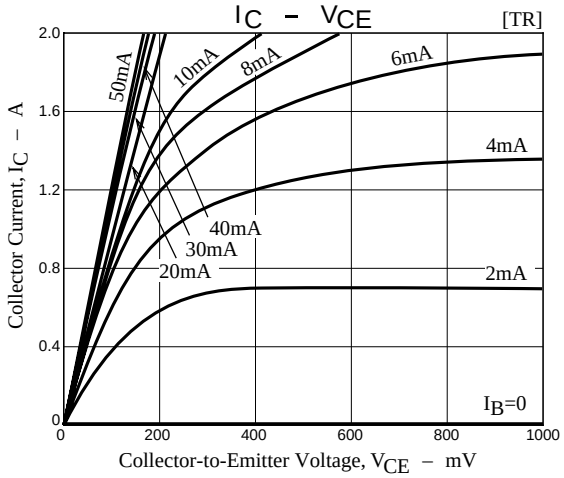
(TR)

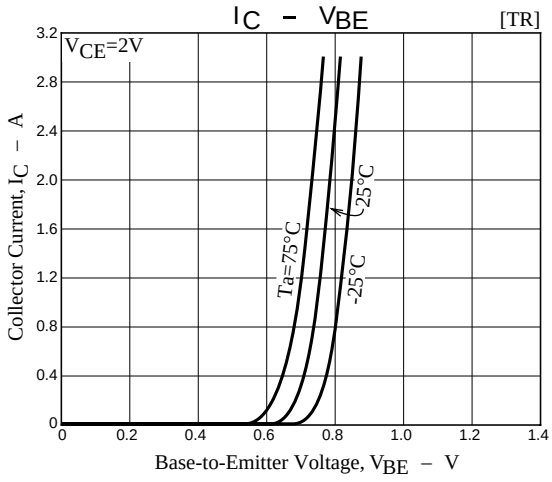


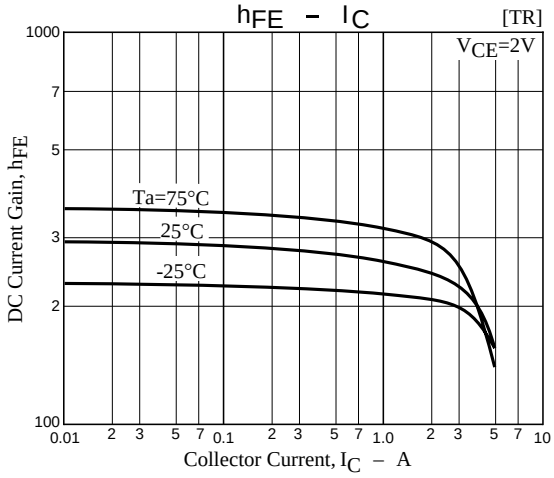
$20I_{B1}$=–$20I_{B2}$=I_C=500mA
(For PNP, the polarity is reversed.)

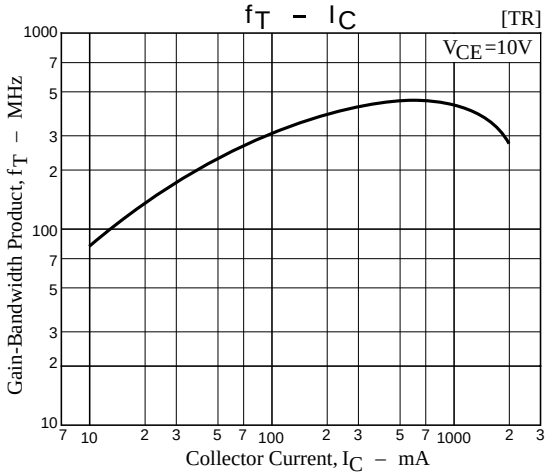
(SBD)

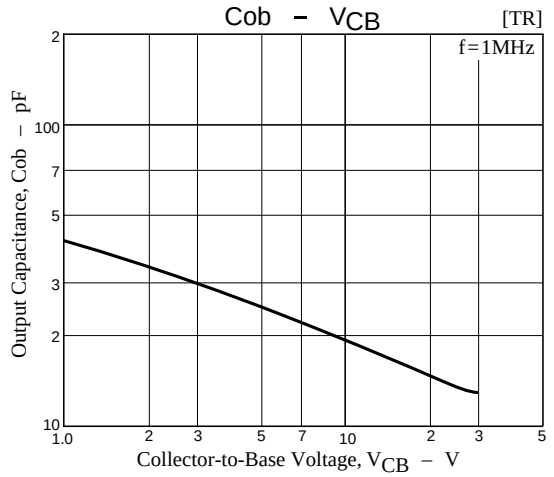


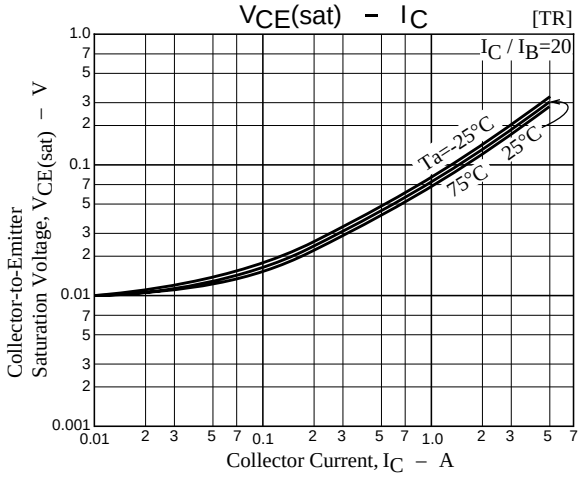

IC – VCE
[TR]
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – mV
50mA
10mA
8mA
6mA
4mA
40mA
30mA
20mA
2mA
IB=0

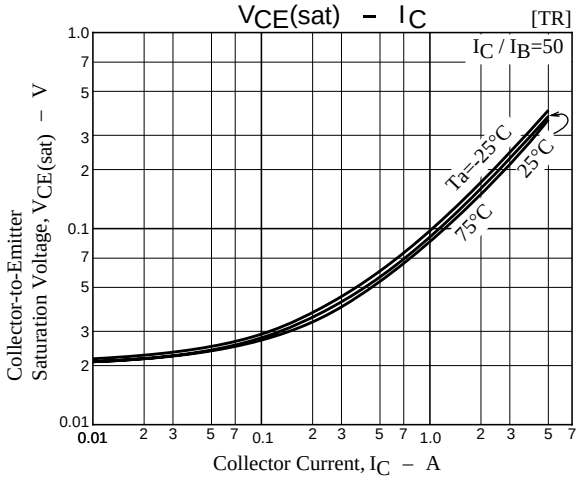

IC – VBE
[TR]
VCE=2V
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V
Ta=75°C
25°C
-25°C

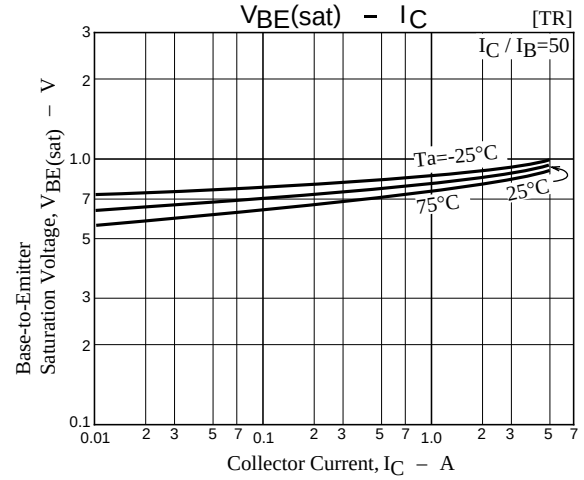

hFE – IC
[TR]
VCE=2V
DC Current Gain, hFE
Collector Current, IC – A
Ta=75°C
25°C
-25°C

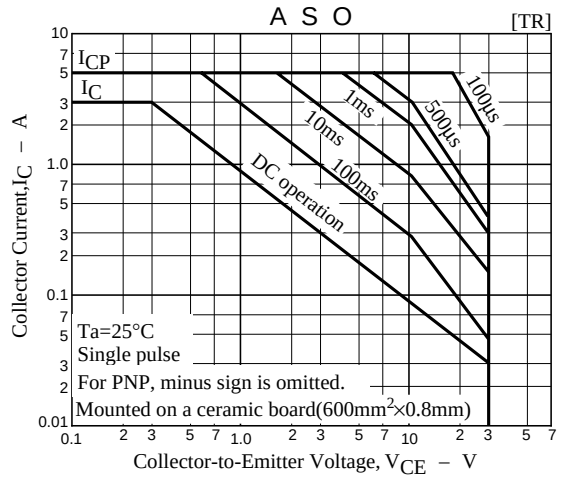

fT – IC
[TR]
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA

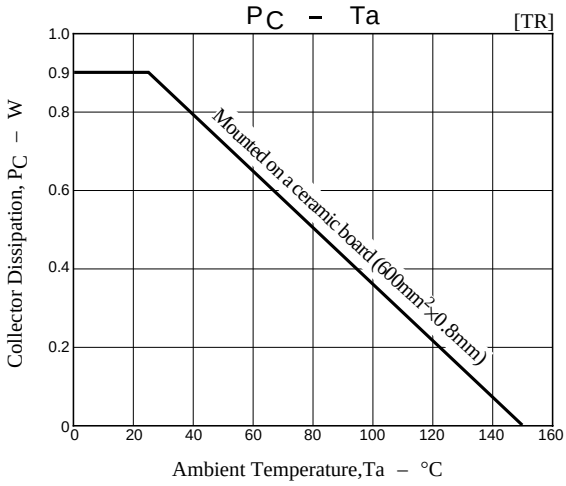

Cob – VCB
[TR]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V

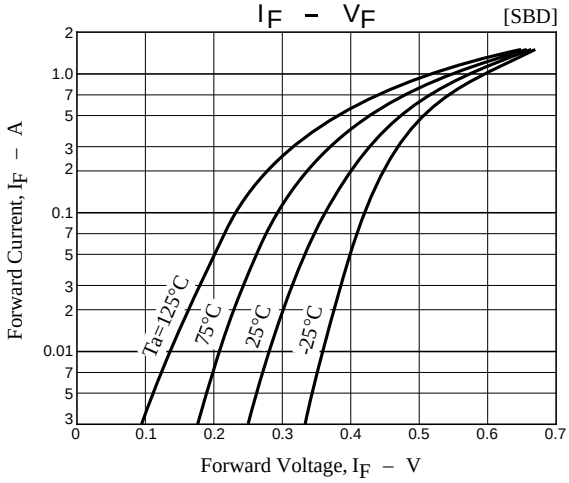

VCE(sat) – IC
[TR]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
Ta=-25°C
25°C
75°C

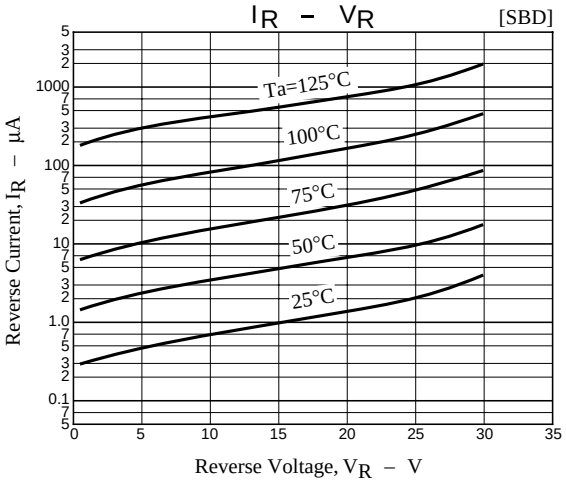

VCE(sat) – IC
[TR]
IC / IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Collector Current, IC – A
Ta=-25°C
25°C
75°C

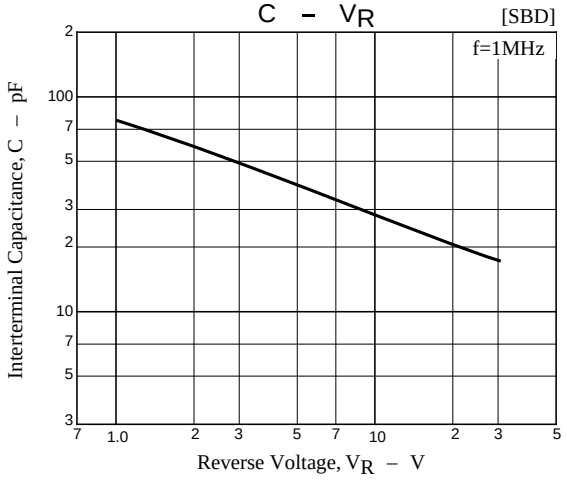

VBE(sat) – IC
[TR]
IC / IB=50
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
Ta=-25°C
75°C
25°C

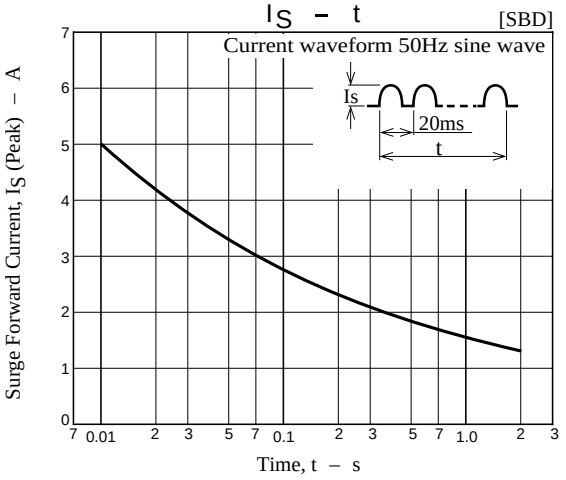

A S O
[TR]
Collector Current,I_C – A
I_CP
I_C
100μs
500μs
1ms
10ms
100ms
DC operation
Ta=25°C
Single pulse
For PNP, minus sign is omitted.
Mounted on a ceramic board(600mm²×0.8mm)
Collector-to-Emitter Voltage, V_CE – V


P_C – Ta
[TR]
Collector Dissipation, P_C – W
Mounted on a ceramic board (600mm²×0.8mm)
Ambient Temperature,Ta – °C


I_F – V_F
[SBD]
Forward Current, I_F – A
Ta=125°C
75°C
25°C
-25°C
Forward Voltage, I_F – V


I_R – V_R
[SBD]
Reverse Current, I_R – μA
Ta=125°C
100°C
75°C
50°C
25°C
Reverse Voltage, V_R – V


C – V_R
[SBD]
f=1MHz
Interterminal Capacitance, C – pF
Reverse Voltage, V_R – V


I_S – t
[SBD]
Current waveform 50Hz sine wave
Is
20ms
t
Surge Forward Current, I_S (Peak) – A
Time, t – s

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