Ordering number:ENN6092

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

CPH5703

DC/DC Converter Applications

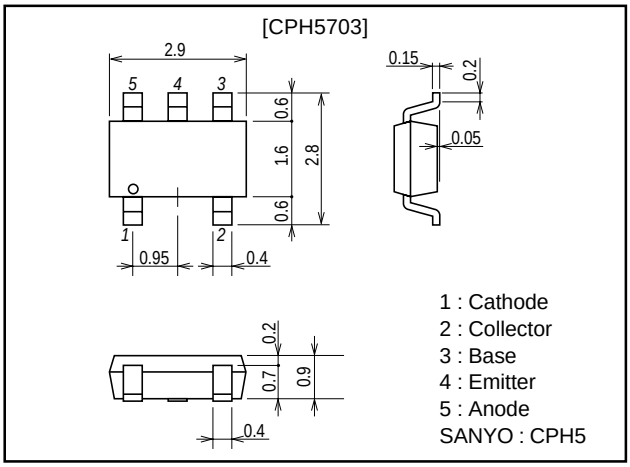
Features

- Composite type with a NPN transistor and a Schottky barrier diode contained in one package facilitating high-density mounting.
- The CPH5703 consists of two chips encapsulated in a package which are equivalent to the CPH3205 and the SB05-05CP, 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}		60	V
Collector-to-Emitter Voltage	V_{CEO}		50	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		3	A
Collector Current (Pulse)	I_{CP}		6	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}		50	V
Non-repetitive Peak Reverse Surge Voltage	V_{RSM}		55	V
Average Output Current	I_O		500	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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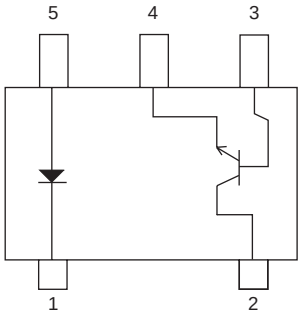
Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	I_{CBO}	V_{CB}=40V, I_E=0			1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0			1	μA
DC Current Gain	h_{FE}	V_{CE}=2V, I_C=100mA	200		560	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=500mA		380		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		13		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}1$	I_C=1.0A, I_B=50mA		80	120	mV
	$V_{CE(sat)}2$	I_C=2.0A, I_B=100mA		140	210	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=1.0A, I_B=50mA		0.9	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0	60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=10μA, I_C=0	6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		35		ns
Storage Time	t_{stg}	See specified Test Circuit.		300		ns
Turn-OFF Time	t_f	See specified Test Circuit.		22		ns
[SBD]						
Reverse Voltage	V_R	I_R=200μA	50			V
Forward Voltage	V_F	I_F=500mA			0.55	V
Reverse Current	I_R	V_R=25V			50	μA
Interterminal Capacitance	C	V_R=10V, f=1MHz		22		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

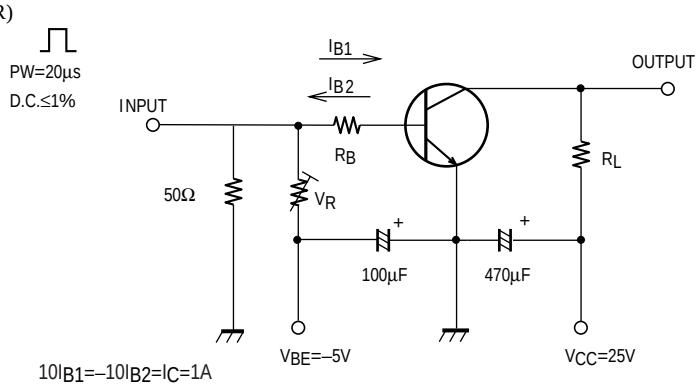
Electrical Connection (Top view)



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

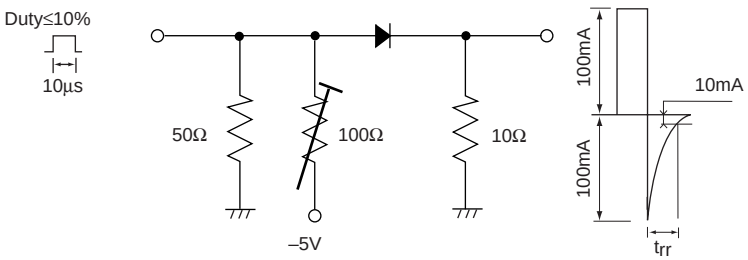
Switching Time Test Circuit

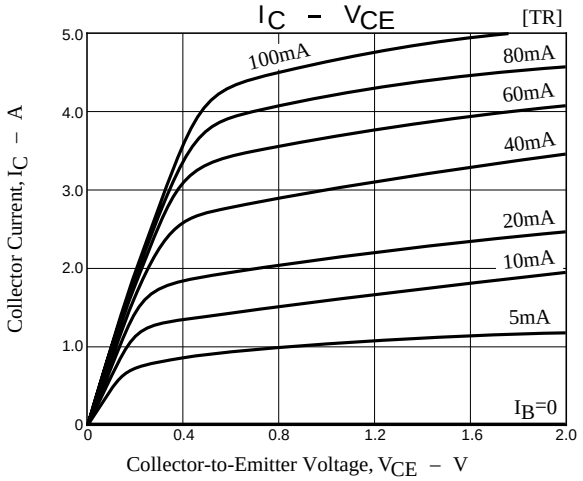
(TR)

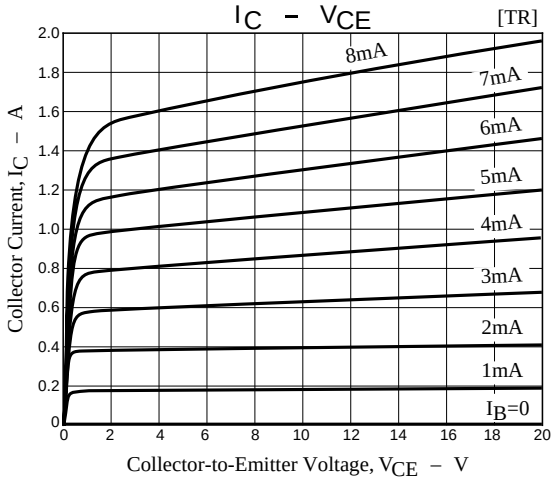


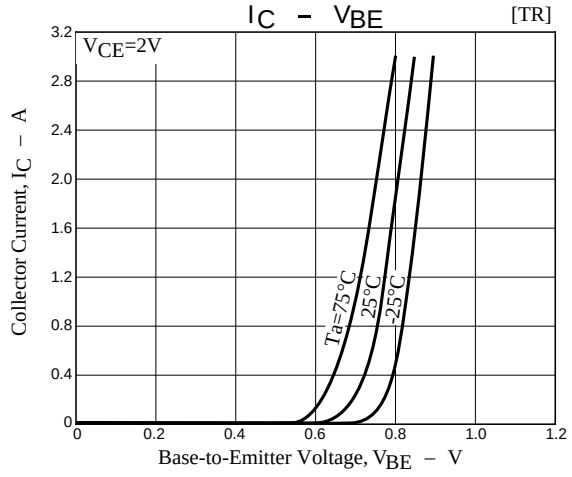
10I_{B1}=–10I_{B2}=I_C=1A
(For PNP, the polarity is reversed.)

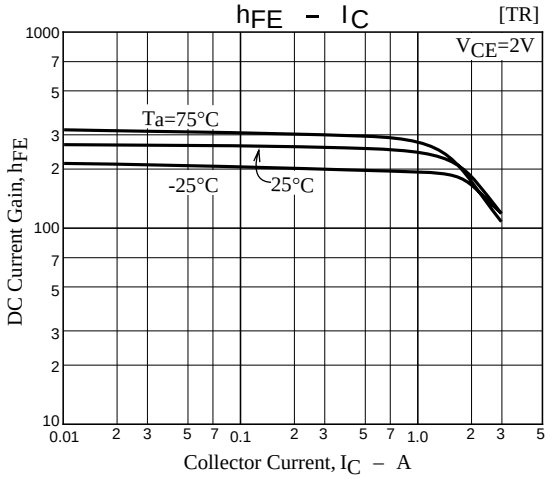
(SBD)

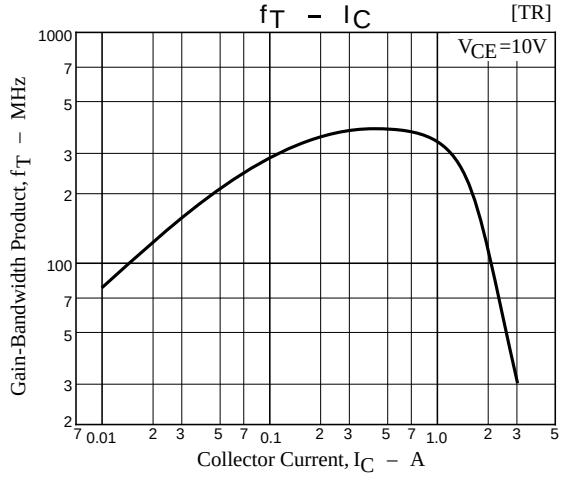


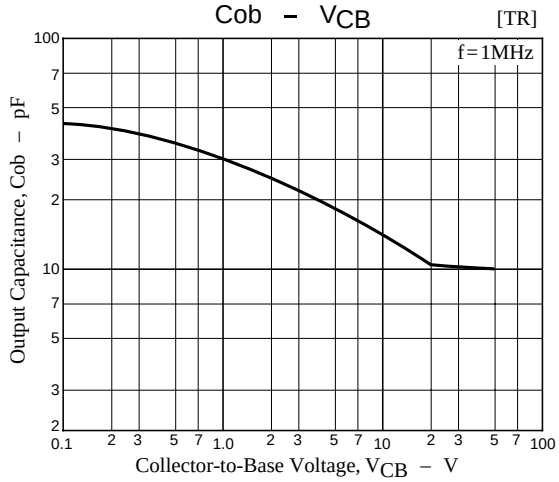

IC – VCE [TR]
100mA
80mA
60mA
40mA
20mA
10mA
5mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V

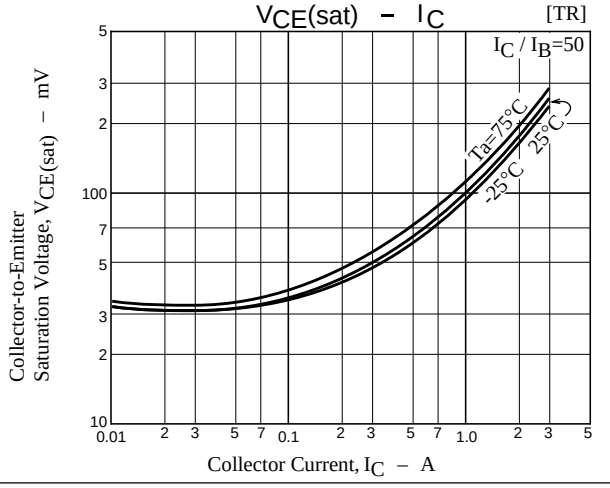

IC – VCE [TR]
8mA
7mA
6mA
5mA
4mA
3mA
2mA
1mA
IB=0
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V

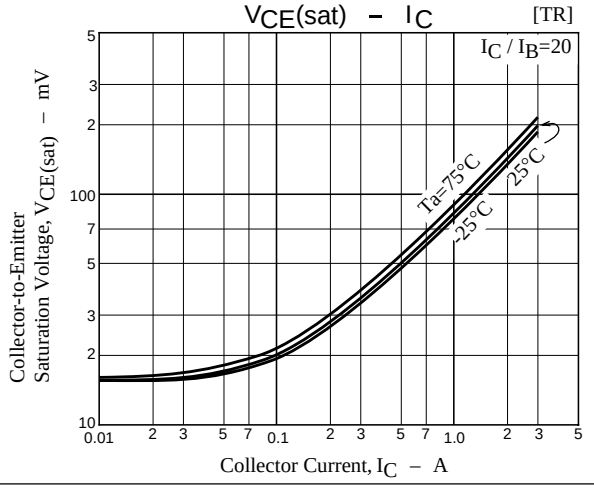

IC – VBE [TR]
VCE=2V
Ta=75°C
25°C
-25°C
Collector Current, IC – A
Base-to-Emitter Voltage, VBE – V

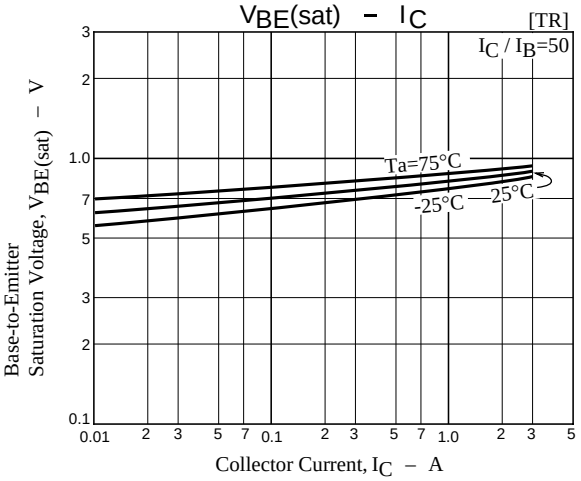

hFE – IC [TR]
VCE=2V
Ta=75°C
25°C
-25°C
DC Current Gain, hFE
Collector Current, IC – A

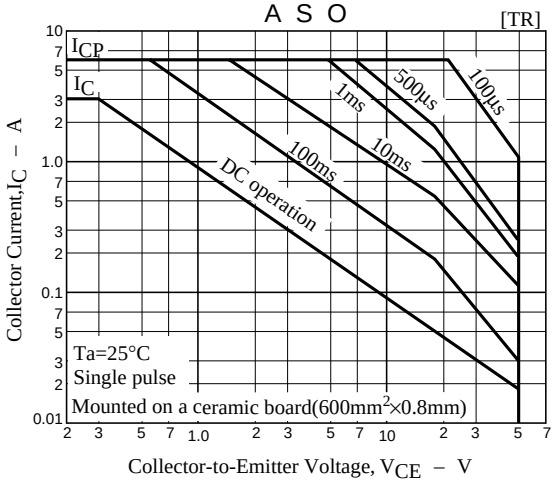

fT – IC [TR]
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – A

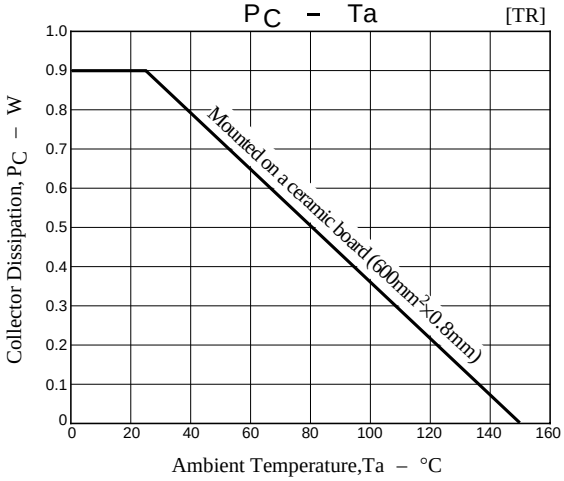

Cob – VCB [TR]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V

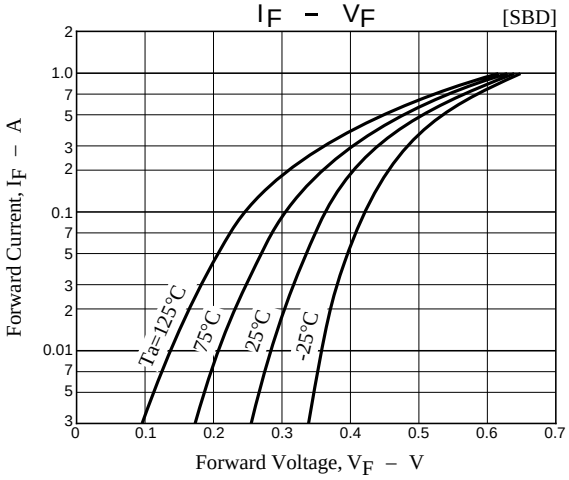

VCE(sat) – IC [TR]
IC / IB=50
Ta=75°C
25°C
-25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A

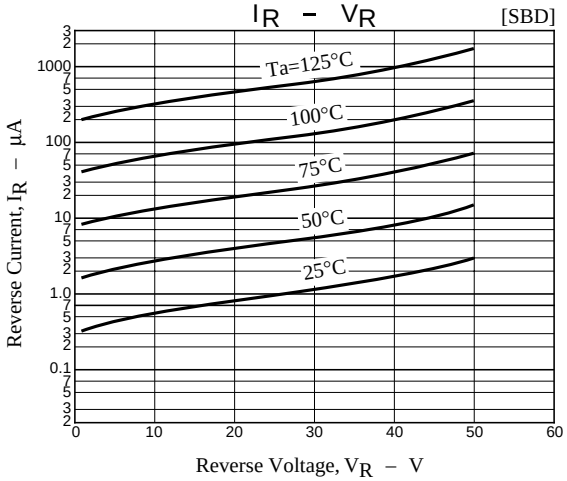

VCE(sat) – IC [TR]
IC / IB=20
Ta=75°C
25°C
-25°C
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Collector Current, IC – A

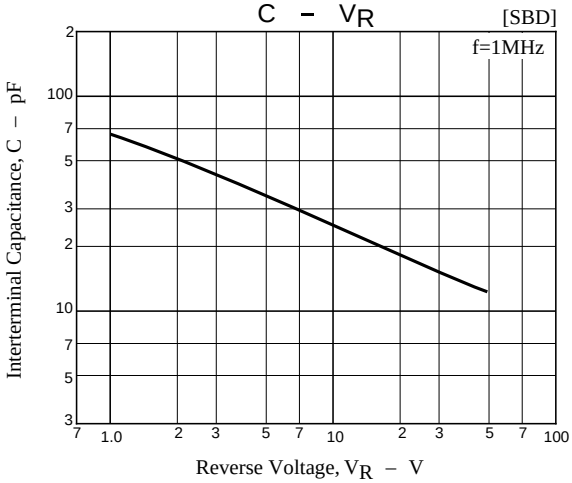

VBE(sat) – IC
[TR]
IC / IB=50
Ta=75°C
25°C
-25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A

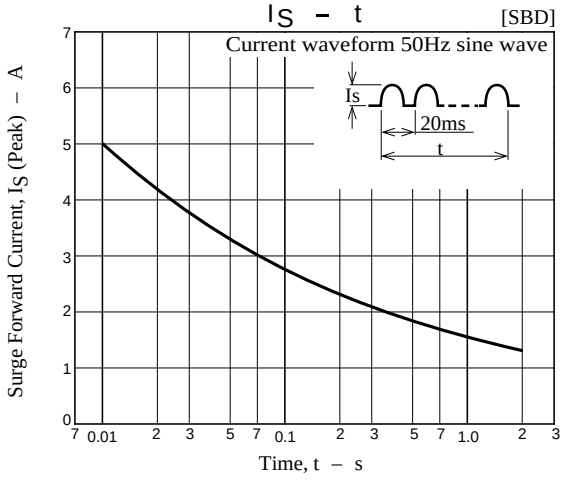

A S O
[TR]
ICP
IC
1ms
500µs
100µs
10ms
100ms
DC operation
Ta=25°C
Single pulse
Mounted on a ceramic board(600mm2×0.8mm)
Collector Current, IC – A
Collector-to-Emitter Voltage, VCE – V


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


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


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


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


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