Ordering number:ENN6320

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

CPH5704

DC/DC Converter Applications

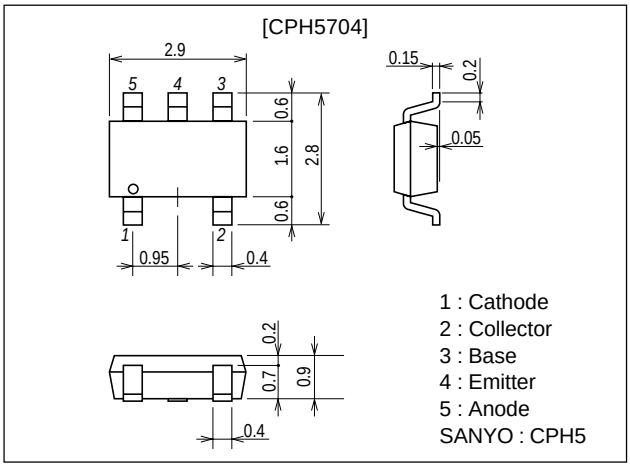
Features

- Composite type with an NPN transistor and a Schottky barrier diode contained in one package facilitating high-density mounting.
- Each device incorporated in the CPH5704 is equivalent to the CPH3206 and to the SBS004, respectively.
- Ultrasmall package facilitates miniaturization in end products.

Package Dimensions

unit:mm

2156



Specifications

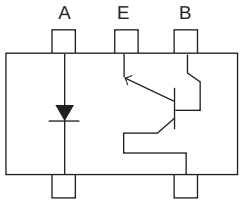
Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
[TR]				
Collector-to-Base Voltage	V_{CBO}		15	V
Collector-to-Emitter Voltage	V_{CEO}		15	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}		15	V
Non-repetitive Peak Reverse Surge Voltage	V_{RSM}		15	V
Average Output Current	I_O		1	A
Surge Current	I_{FSM}	50Hz sine wave, 1 cycle	10	A
Junction Temperature	Tj		–55 to +125	˚C
Storage Temperature	Tstg		–55 to +125	˚C

Electrical Characteristics at Ta = 25˚C

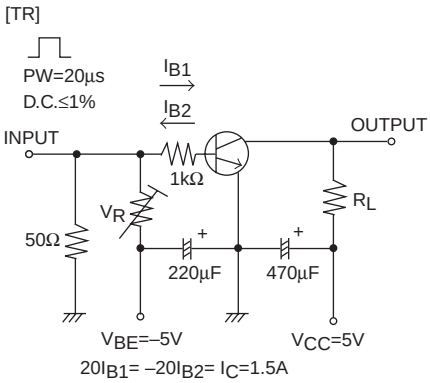
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	I_{CBO}	V_{CB}=12V, I_E=0			0.1	µA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0			0.1	µA
DC Current Gain	h_{FE}	V_{CE}=2V, I_C=0.5A	200		560	
Gain-Bandwidth Product	f_T	V_{CE}=2V, I_C=0.5A		380		MHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		23		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=1.5A, I_B=30mA		100	150	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=1.5A, I_B=30mA		0.85	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10µA, I_E=0	15			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	15			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.		30		ns
Storage Time	t_{stg}	See specified Test Circuit.		210		ns
Fall Time	t_f	See specified Test Circuit.		11		ns
[SBD]						
Reverse Voltage	V_R	I_R=1mA	15			V
Forward Voltage	V_F1	I_F=0.5A		0.30	0.35	V
	V_F2	I_F=1A		0.35	0.40	V
Reverse Current	I_R	V_R=6V			500	µA
Interterminal Capacitance	C	V_R=10V, f=1MHz		42		pF
Reverse Recovery Time	t_{rr}	I_F=I_R=100mA, See specified Test Circuit.			15	ns
Thermal Resistance	Rthj-a	Mounted on a ceramic board (600mm²×0.8mm)		110		˚C/W

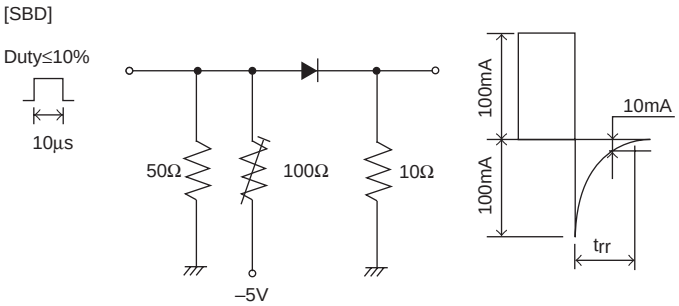
Electrical Connection



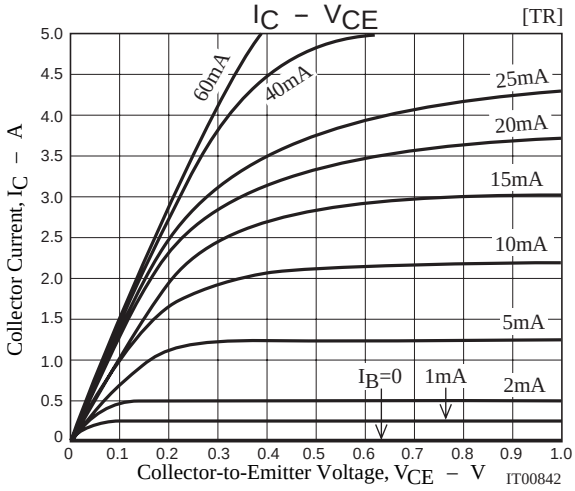
(Top view)

Switching Time Test Circuit

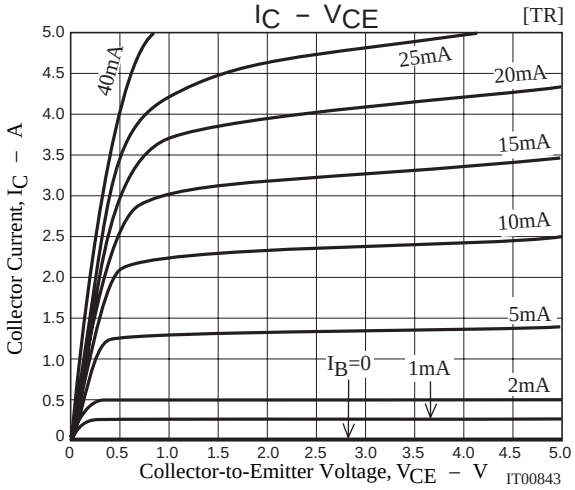




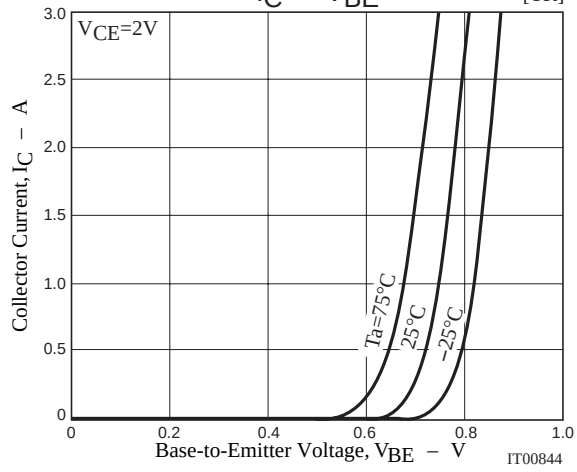
I_C – V_{CE} [TR]



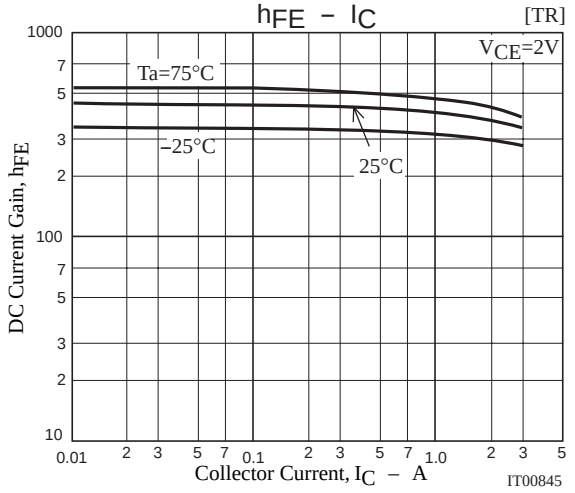
I_C – V_{CE} [TR]



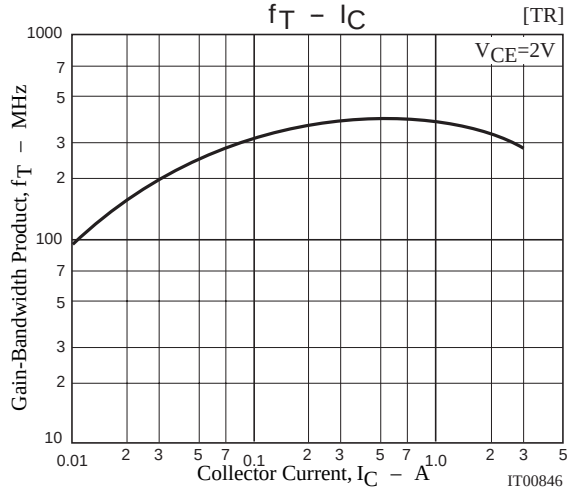
I_C – V_{BE} [TR]



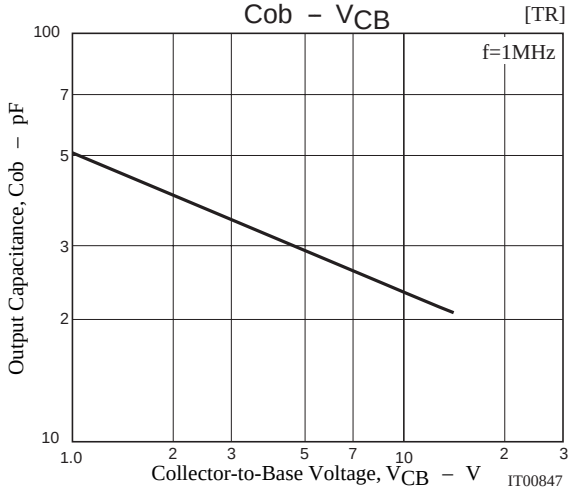
h_{FE} – I_C [TR]



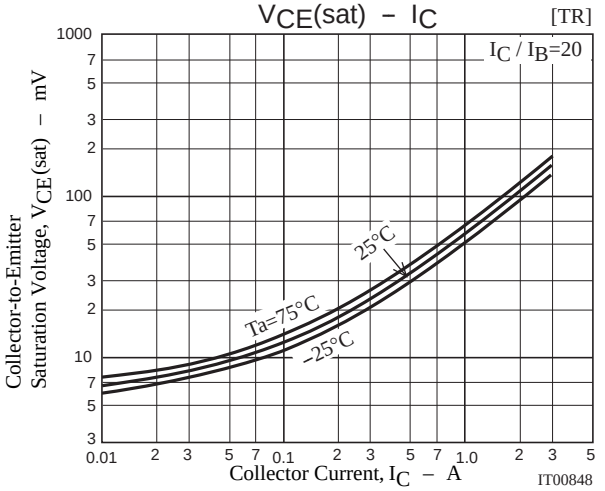
f_T – I_C [TR]



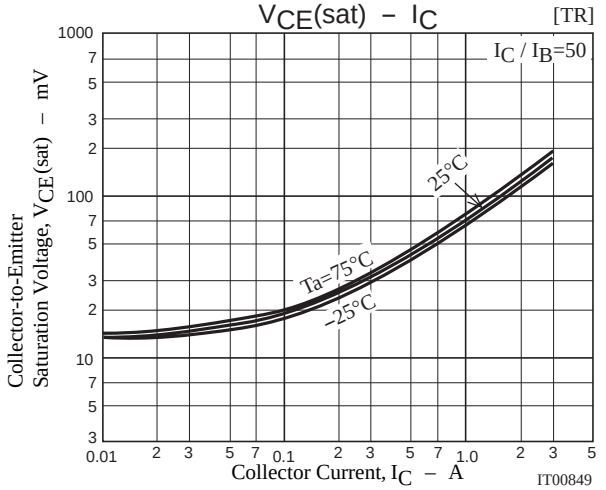
Cob – V_{CB} [TR]

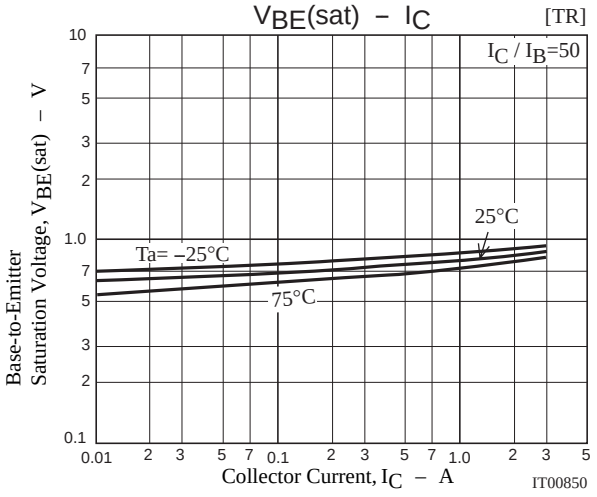


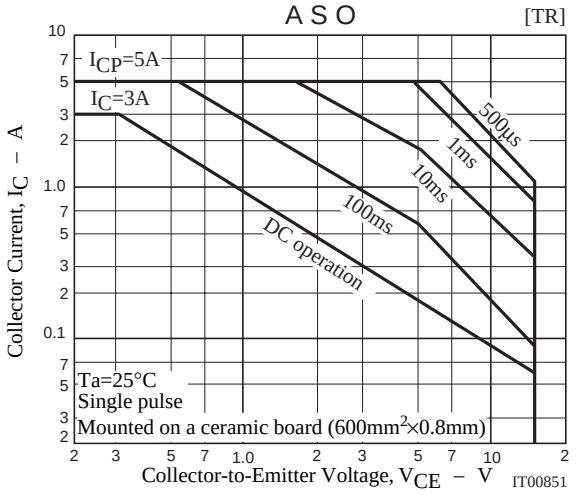
V_{CE}(sat) – I_C [TR]

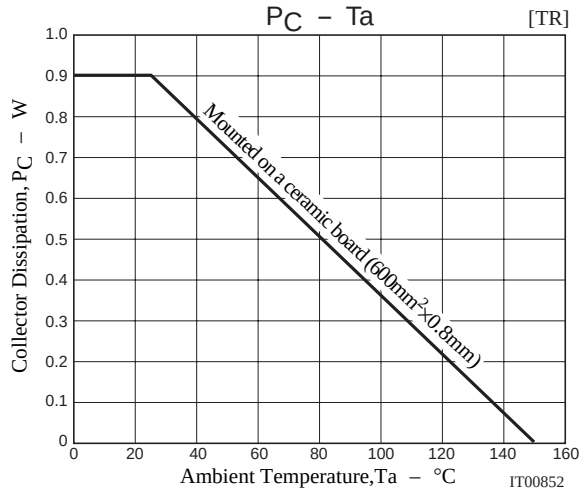


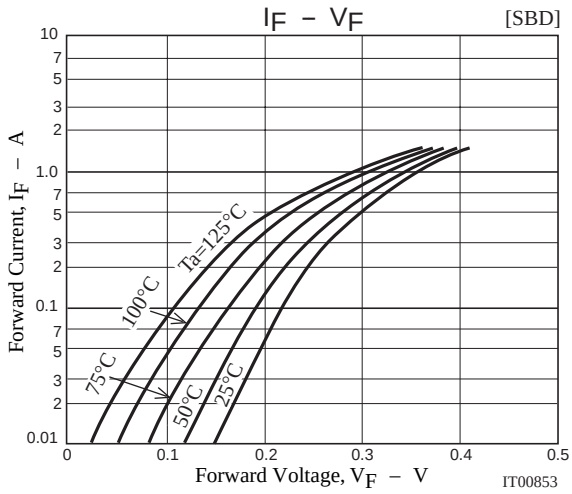
V_{CE}(sat) – I_C [TR]

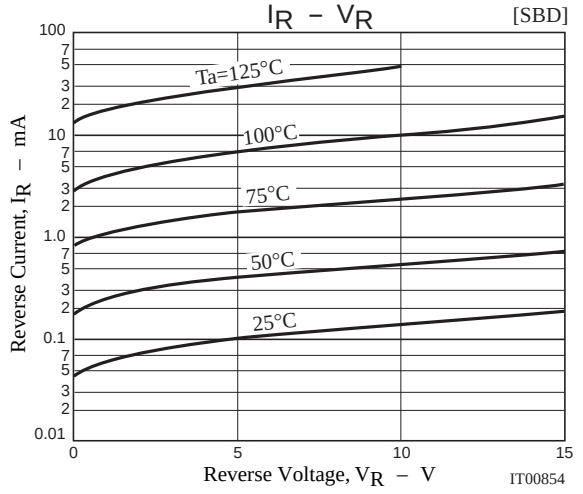


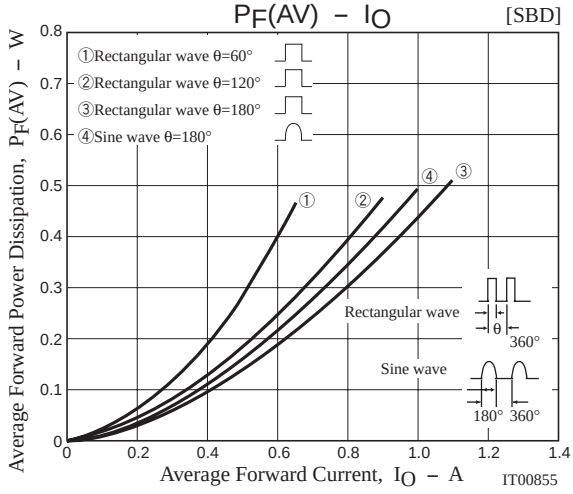

VBE(sat) – IC
[TR]
IC / IB=50
Ta= –25°C
25°C
75°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – A
IT00850


A S O
[TR]
ICP=5A
IC=3A
500µs
1ms
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
IT00851


PC – Ta
[TR]
Mounted on a ceramic board (600mm2×0.8mm)
Collector Dissipation, PC – W
Ambient Temperature,Ta – °C
IT00852


IF – VF
[SBD]
Ta=125°C
100°C
75°C
50°C
25°C
Forward Current, IF – A
Forward Voltage, VF – V
IT00853


IR – VR
[SBD]
Ta=125°C
100°C
75°C
50°C
25°C
Reverse Current, IR – mA
Reverse Voltage, VR – V
IT00854


PF(AV) – IO
[SBD]
①Rectangular wave θ=60°
②Rectangular wave θ=120°
③Rectangular wave θ=180°
④Sine wave θ=180°
Rectangular wave
Sine wave
θ
360°
180°
Average Forward Power Dissipation, PF(AV) – W
Average Forward Current, IO – A
IT00855