

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



# CPH5704

## DC/DC Converter Applications

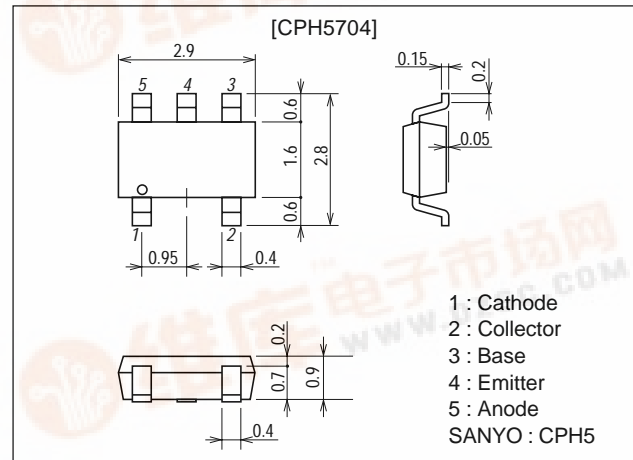
### Features

- 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 <sub>CB0</sub>		15	V
Collector-to-Emitter Voltage	V <sub>CE0</sub>		15	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		5	V
Collector Current	I <sub>C</sub>		3	A
Collector Current (Pulse)	I <sub>CP</sub>		5	A
Base Current	I <sub>B</sub>		600	mA
Collector Dissipation	P <sub>C</sub>	Mounted on a ceramic board (600mm <sup>2</sup> ×0.8mm)	0.9	W
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +125	°C
[SBD]				
Repetitive Peak Reverse Voltage	V <sub>RRM</sub>		15	V
Non-repetitive Peak Reverse Surge Voltage	V <sub>RSM</sub>		15	V
Average Output Current	I <sub>O</sub>		1	A
Surge Current	I <sub>FSM</sub>	50Hz sine wave, 1 cycle	10	A
Junction Temperature	T <sub>J</sub>		-55 to +125	°C
Storage Temperature	T <sub>stg</sub>		-55 to +125	°C

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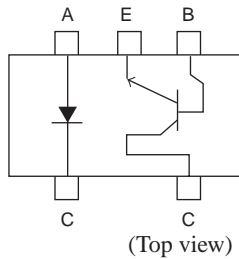


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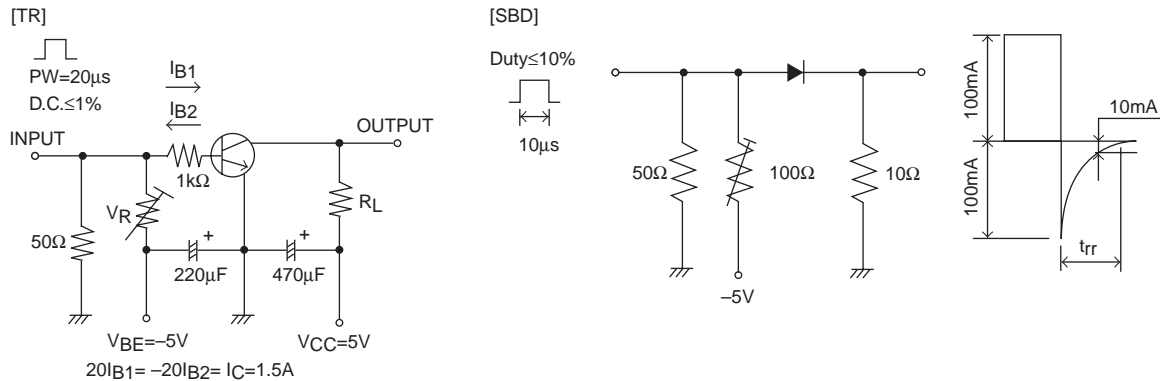
## Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR]						
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=12\text{V}, I_E=0$			0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=4\text{V}, I_C=0$			0.1	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=2\text{V}, I_C=0.5\text{A}$	200		560	
Gain-Bandwidth Product	$f_T$	$V_{CE}=2\text{V}, I_C=0.5\text{A}$		380		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		23		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=1.5\text{A}, I_B=30\text{mA}$		100	150	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=1.5\text{A}, I_B=30\text{mA}$		0.85	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=10\mu\text{A}, I_E=0$	15			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}, R_{BE}=\infty$	15			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=10\mu\text{A}, I_C=0$	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	$V_R$	$I_R=1\text{mA}$	15			V
Forward Voltage	$V_{F1}$	$I_F=0.5\text{A}$		0.30	0.35	V
	$V_{F2}$	$I_F=1\text{A}$		0.35	0.40	V
Reverse Current	$I_R$	$V_R=6\text{V}$			500	$\mu\text{A}$
Interterminal Capacitance	$C$	$V_R=10\text{V}, f=1\text{MHz}$		42		pF
Reverse Recovery Time	$t_{rr}$	$I_F=I_R=100\text{mA}$ , See specified Test Circuit.			15	ns
Thermal Resistance	$R_{thj-a}$	Mounted on a ceramic board (600mm <sup>2</sup> ×0.8mm)		110		$^\circ\text{C/W}$

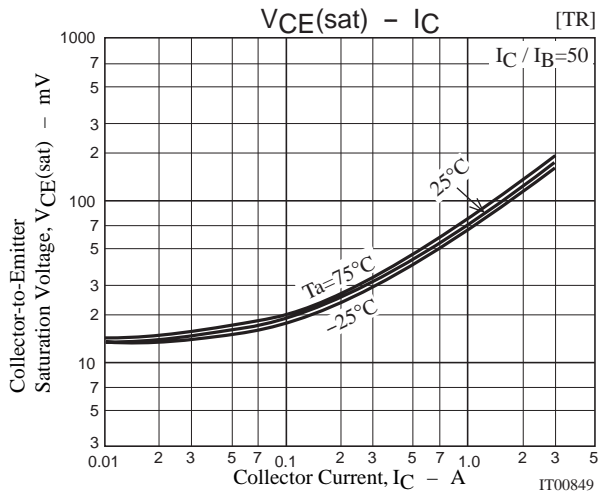
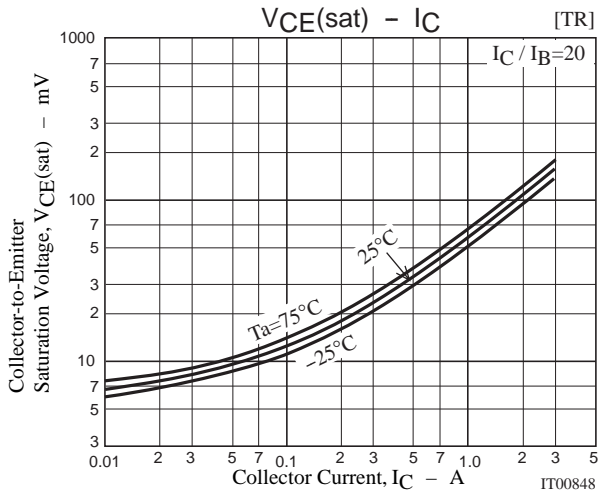
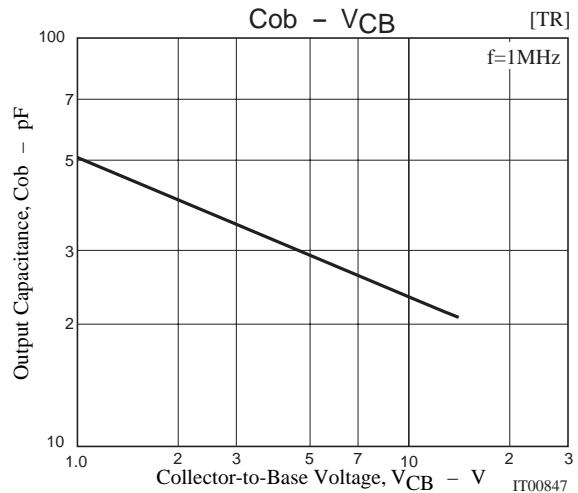
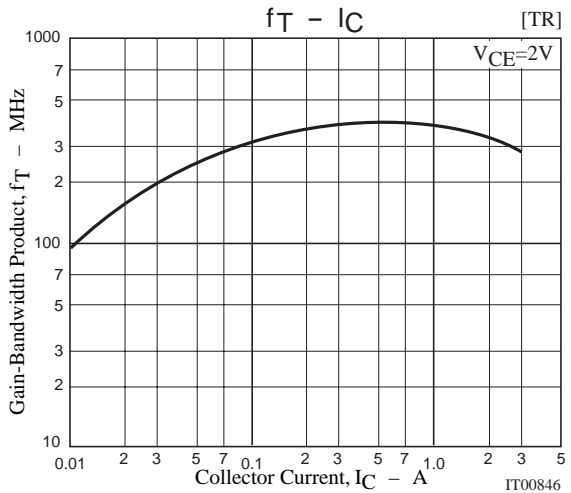
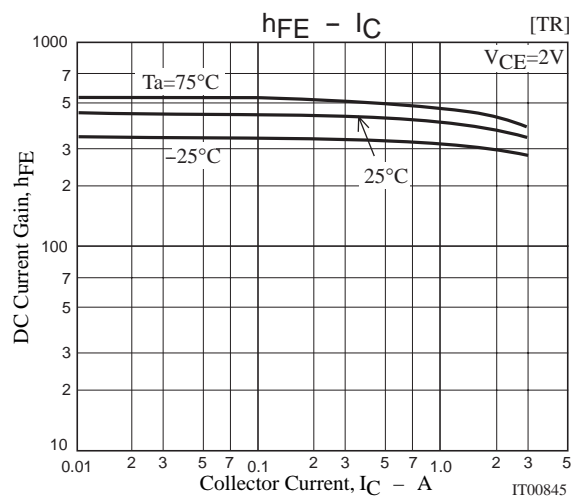
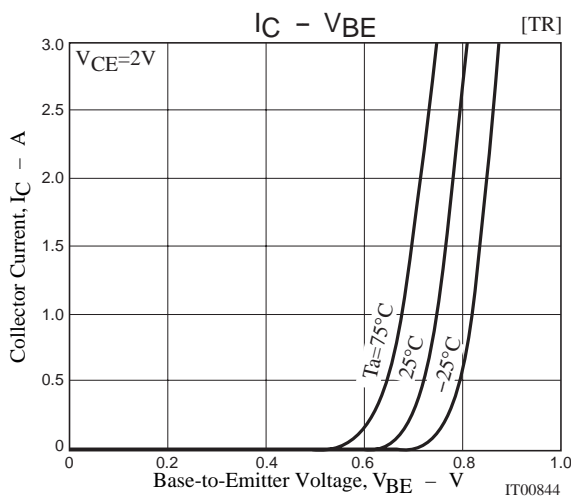
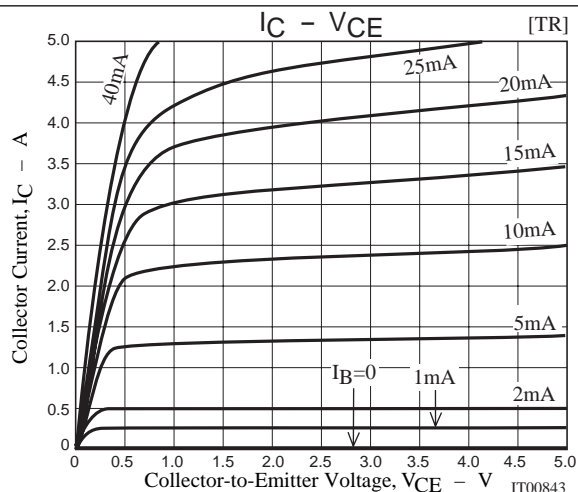
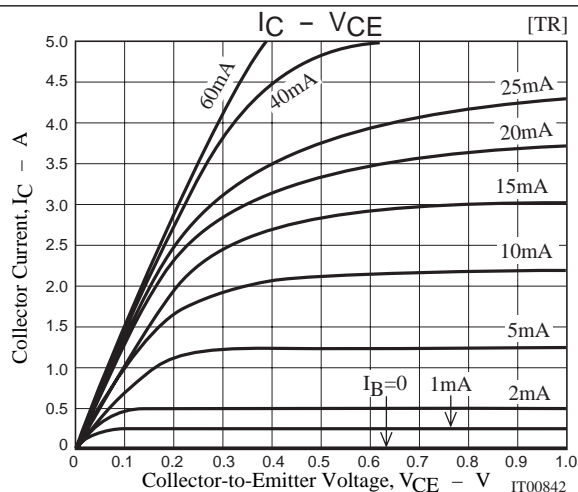
## Electrical Connection



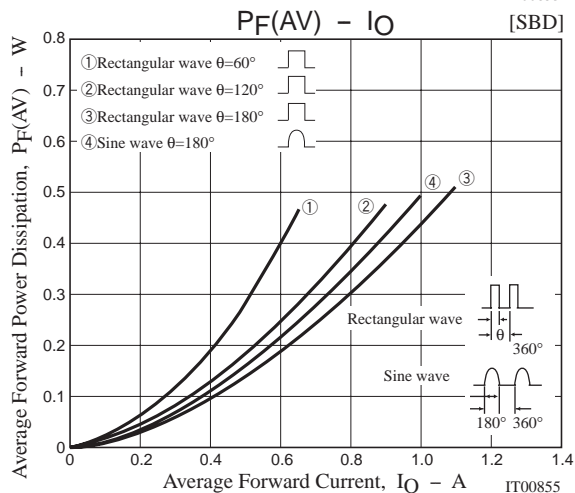
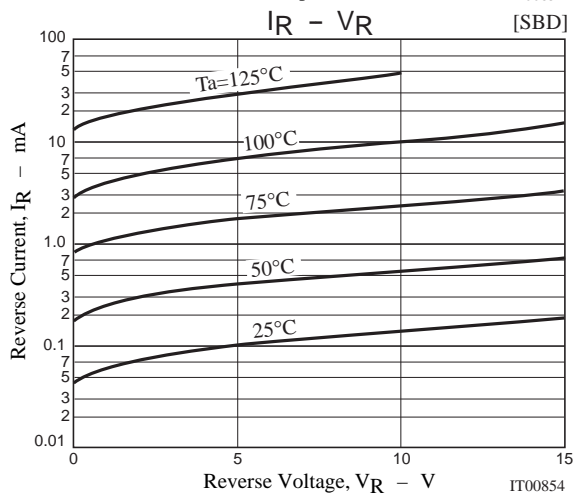
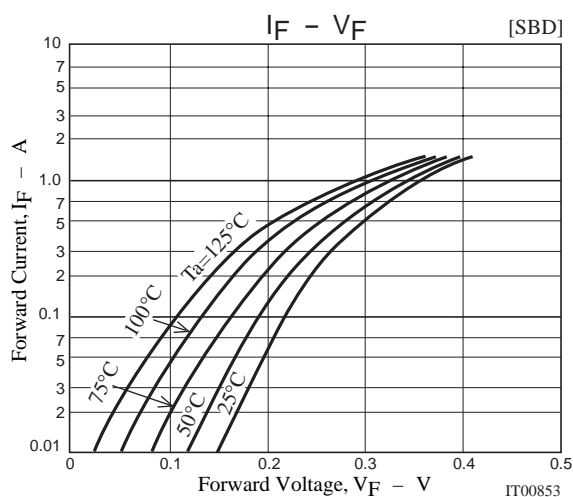
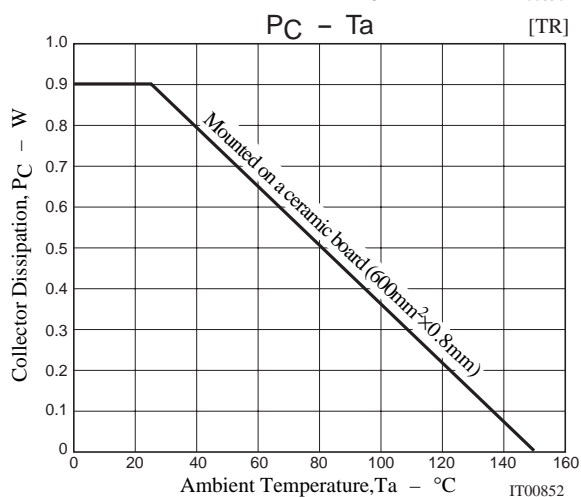
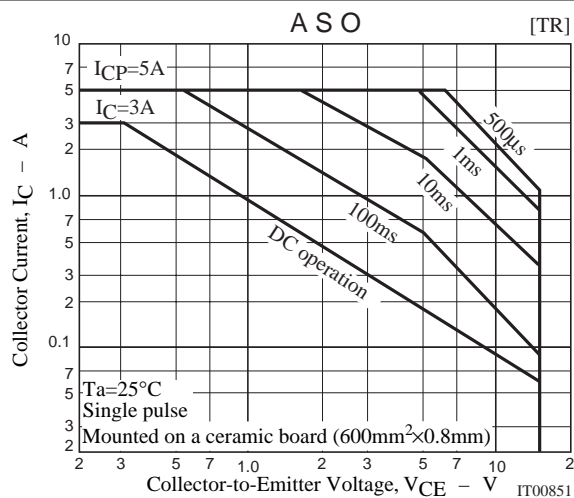
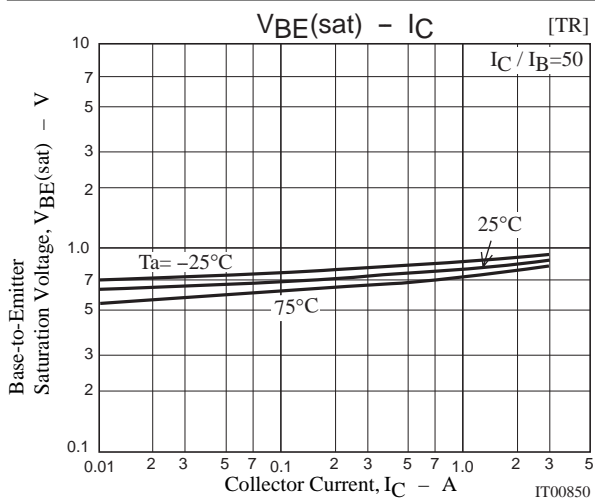
## Switching Time Test Circuit



# CPH5704



# CPH5704



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