



# CPH5501

## DC/DC Converter Applications

### Applications

- Relay drivers, motor drivers, strobes.

### Features

- Composite type with a PNP transistor and a Schottky barrier diode contained in one package facilitating high-density mounting.
- The CPH5501 consists of two chips which are equivalent to the 2SA1338 and the CPH3105, respectively.
- Ultrasmall-sized package permitting applied sets to be made small and slim (mounting height : 0.9mm).

### Specifications

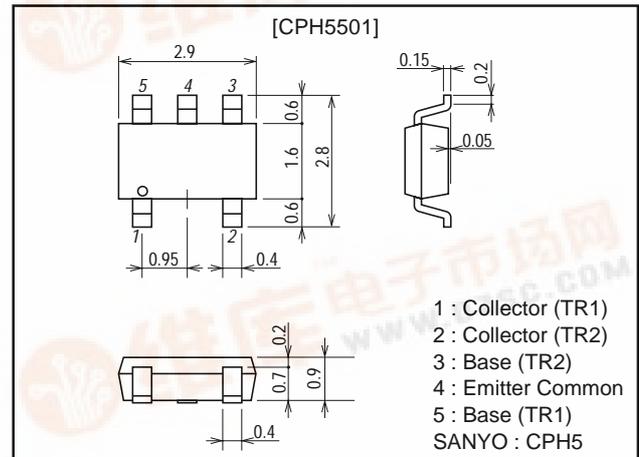
#### Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
<b>[TR1]</b>				
Collector-to-Base Voltage	V <sub>CB0</sub>		-60	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		-50	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		-5	V
Collector Current	I <sub>C</sub>		-500	mA
Collector Current (Pulse)	I <sub>CP</sub>		-800	mA
Collector Dissipation	P <sub>C</sub>		0.2	W
Junction Temperature	T <sub>j</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C
<b>[TR2]</b>				
Collector-to-Base Voltage	V <sub>CB0</sub>		-50	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		-50	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		-6	V
Collector Current	I <sub>C</sub>		-3	A
Collector Current (Pulse)	I <sub>CP</sub>		-6	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 +150	°C

### Package Dimensions

unit:mm

2162



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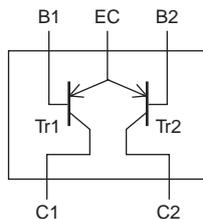


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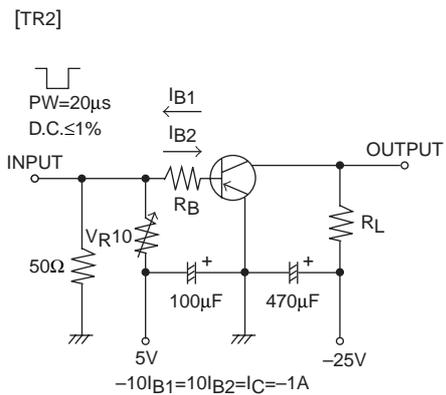
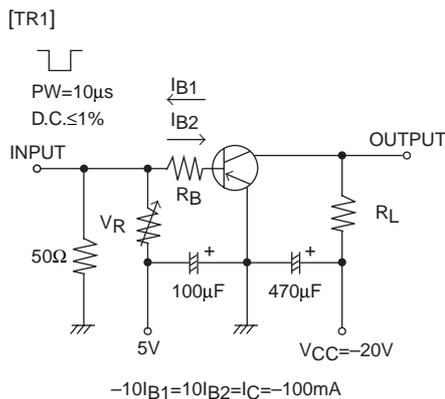
## Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[TR1]						
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=-40\text{V}, I_E=0$			-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	$h_{FE}$	$V_{CE}=-5\text{V}, I_C=-10\text{mA}$	100		560	
Gain-Bandwidth Product	$f_T$	$V_{CE}=-10\text{V}, I_C=-50\text{mA}$		200		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=-10\text{V}, f=1\text{MHz}$		5.6		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=-100\text{mA}, I_B=-10\text{mA}$		0.15	0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=-100\text{mA}, I_B=-10\text{mA}$		0.8	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-10\mu\text{A}, I_E=0$	-60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-100\mu\text{A}, R_{BE}=\infty$	-50			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.		70		ns
Storage Time	$t_{stg}$	See specified Test Circuit.		400		ns
Fall Time	$t_f$	See specified Test Circuit.		50		ns
[TR2]						
Collector Cutoff Current	$I_{CBO}$	$V_{CB}=-40\text{V}, I_E=0$			-1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=-4\text{V}, I_C=0$			-1	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE}=-2\text{V}, I_C=-100\text{mA}$	200		560	
	$h_{FE2}$	$V_{CE}=-2\text{V}, I_C=-3\text{A}$	40			
Gain-Bandwidth Product	$f_T$	$V_{CE}=-10\text{V}, I_C=-500\text{mA}$		360		MHz
Output Capacitance	$C_{ob}$	$V_{CB}=-10\text{V}, f=1\text{MHz}$		24		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C=-1\text{A}, I_B=-50\text{mA}$		-100	-200	mV
	$V_{CE(sat)2}$	$I_C=-2\text{A}, I_B=-100\text{mA}$		-185	-500	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C=-2\text{A}, I_B=-100\text{mA}$		-0.88	-1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-10\mu\text{A}, I_E=0$	-60			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-1\text{mA}, R_{BE}=\infty$	-50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-10\mu\text{A}, I_C=0$	-6			V
Turn-ON Time	$t_{on}$	See specified Test Circuit.		30		ns
Storage Time	$t_{stg}$	See specified Test Circuit.		230		ns
Fall Time	$t_f$	See specified Test Circuit.		15		ns

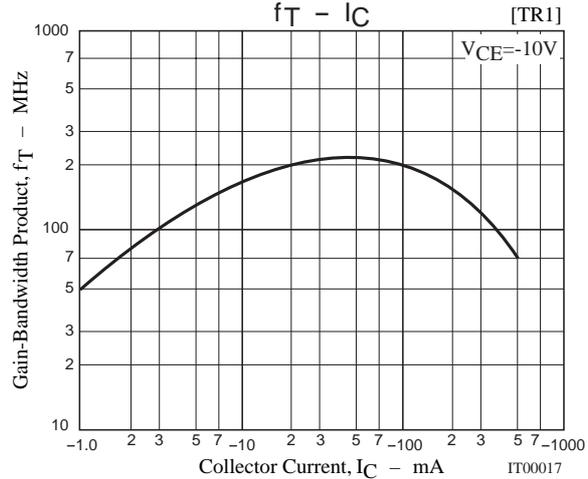
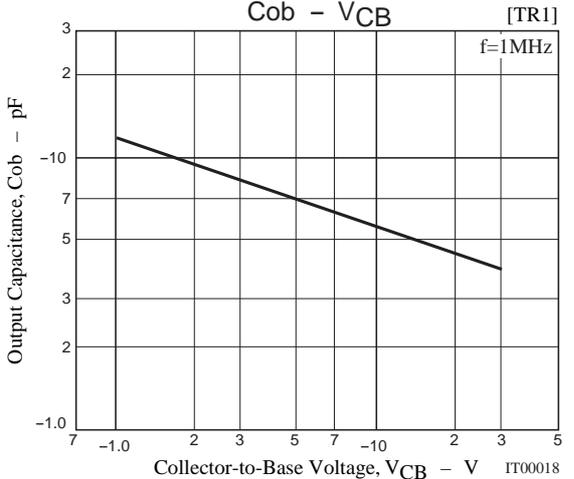
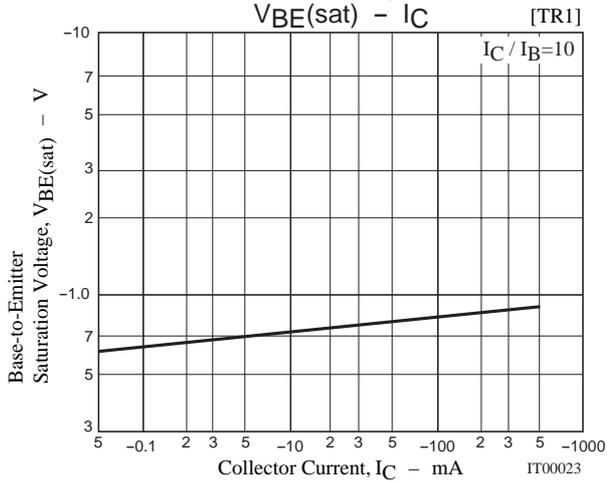
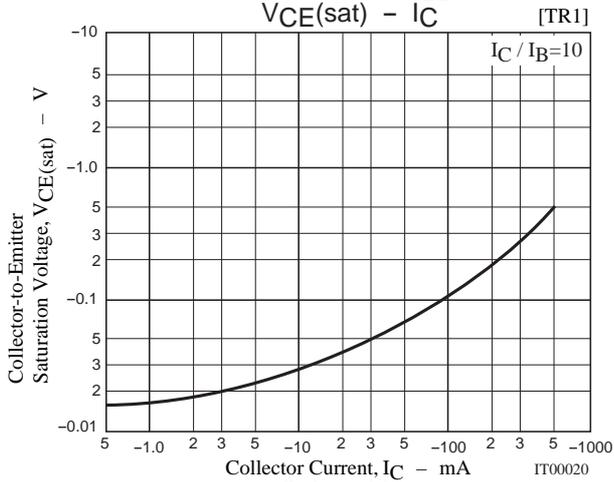
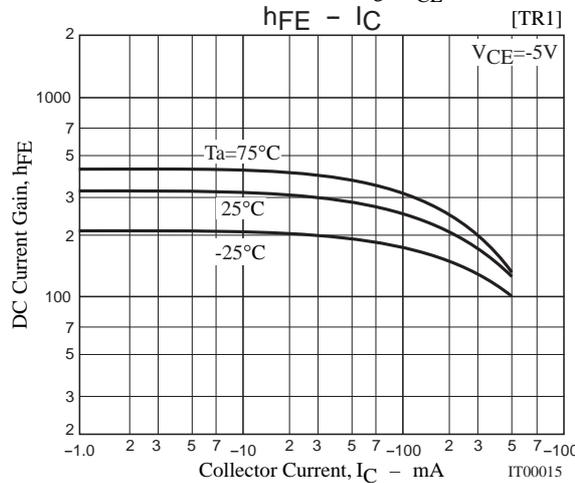
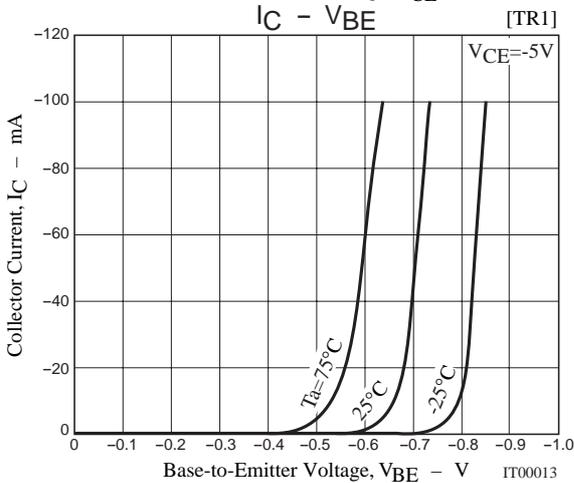
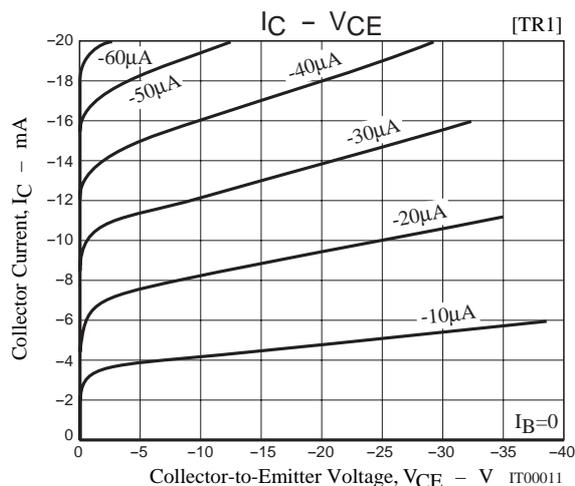
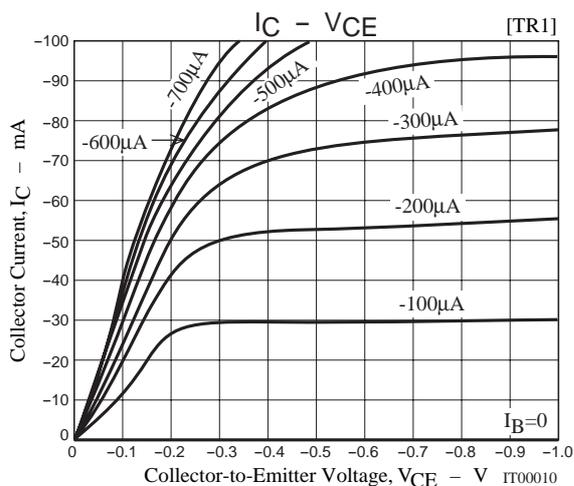
## Electrical Connection



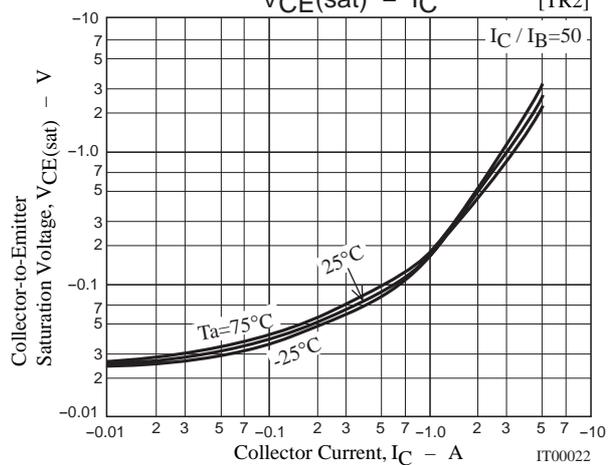
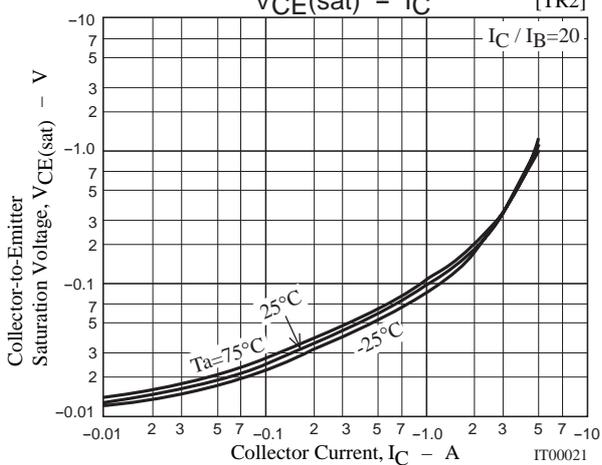
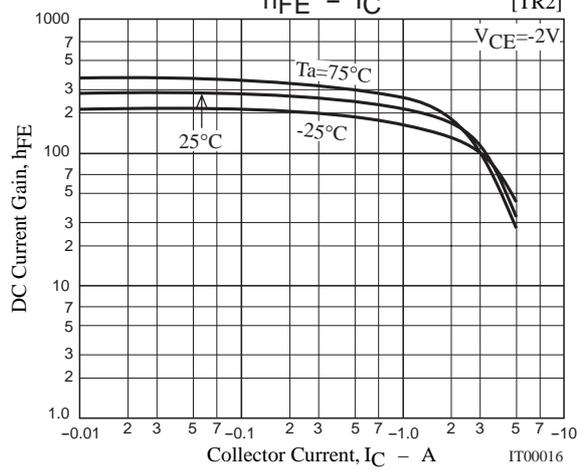
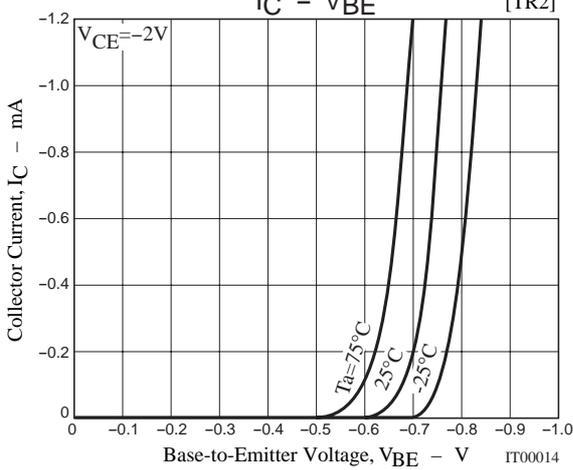
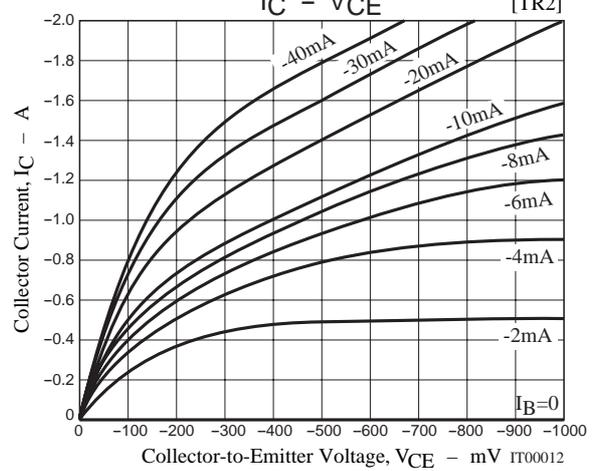
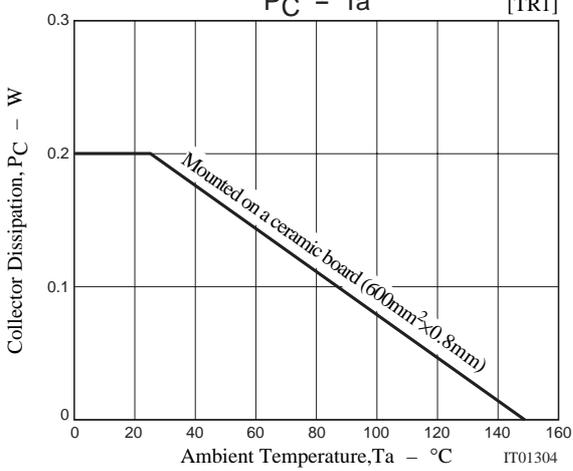
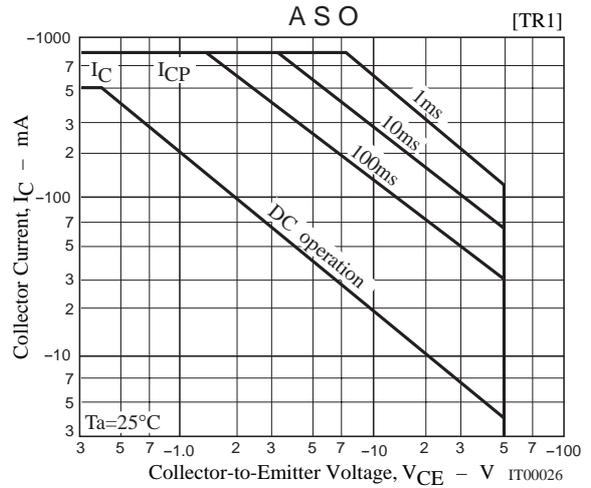
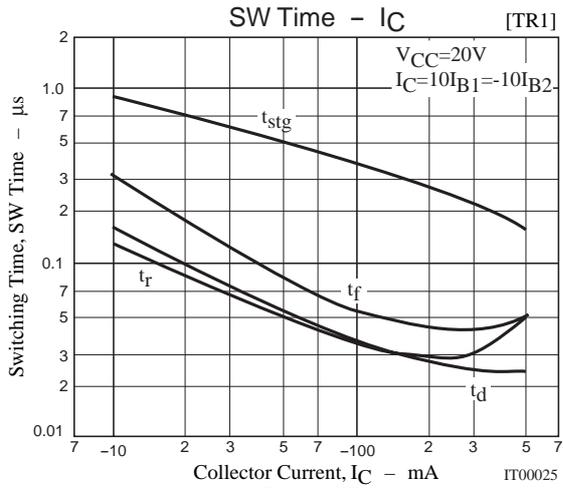
## Switching Time Test Circuit



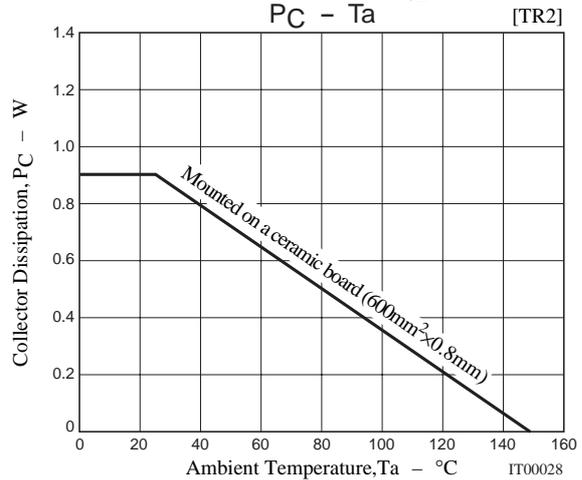
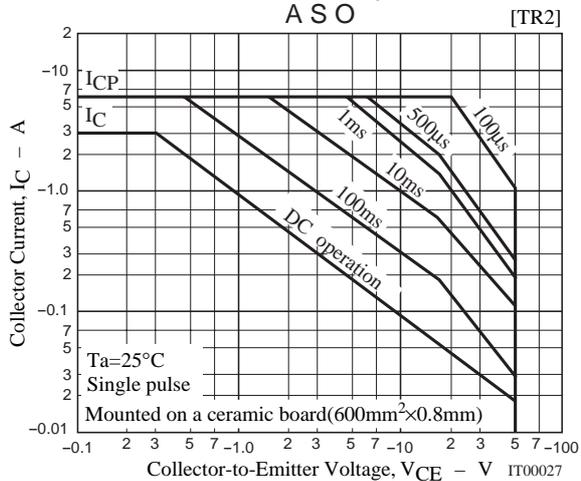
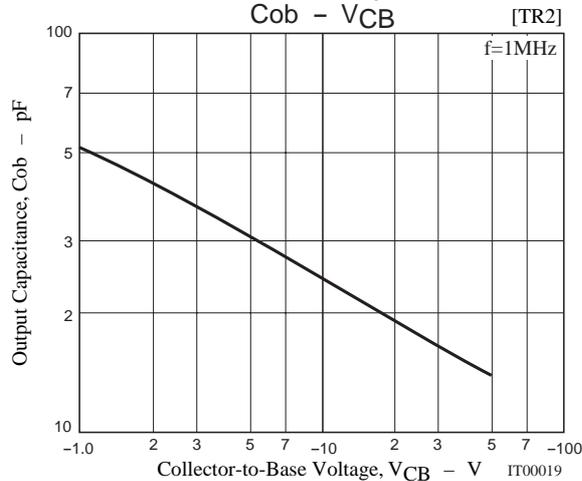
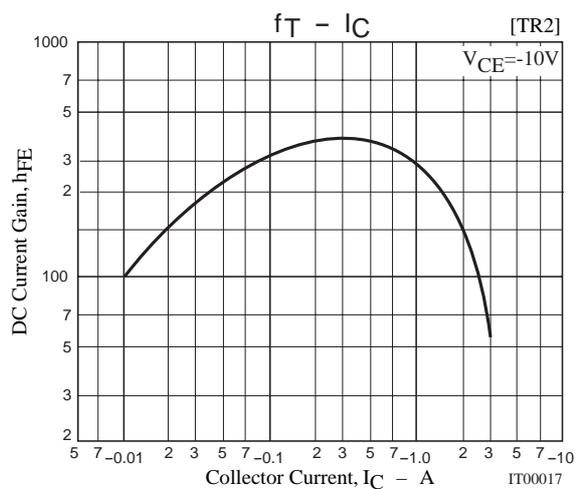
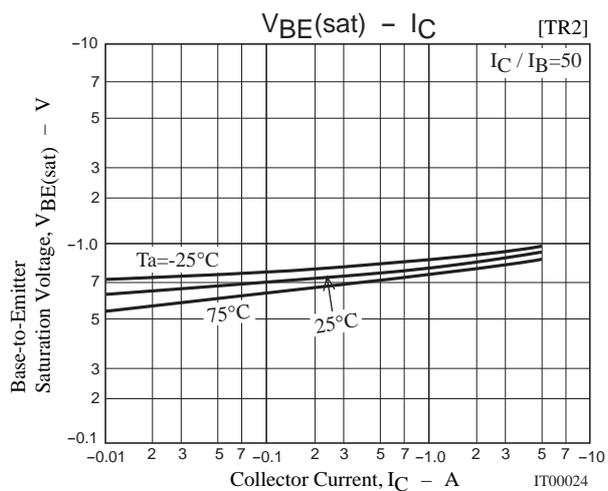
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