

# 2SC4004

## Silicon NPN triple diffusion planar type

For high breakdown voltage high-speed switching

### ■ Features

- High-speed switching
- High collector-base voltage (Emitter open)  $V_{CBO}$
- Wide safe operation area
- Satisfactory linearity of forward current transfer ratio  $h_{FE}$
- Full-pack package which can be installed to the heat sink with one screw

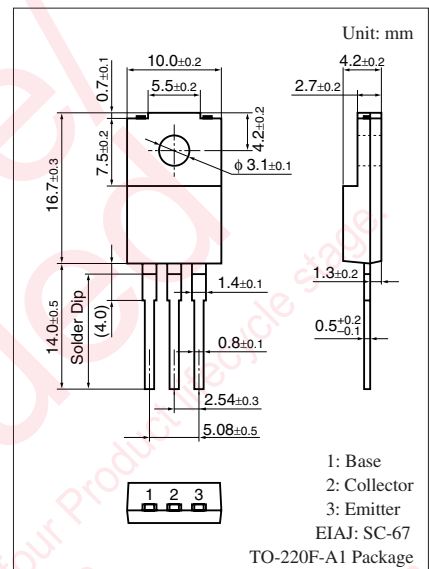
### ■ Absolute Maximum Ratings $T_C = 25^\circ\text{C}$

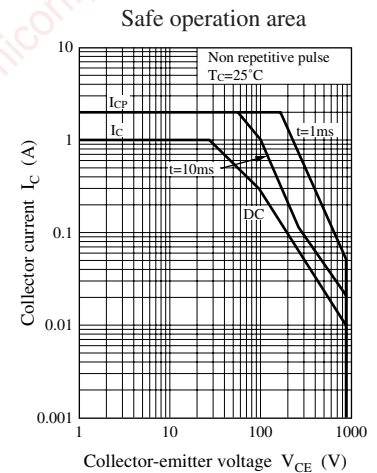
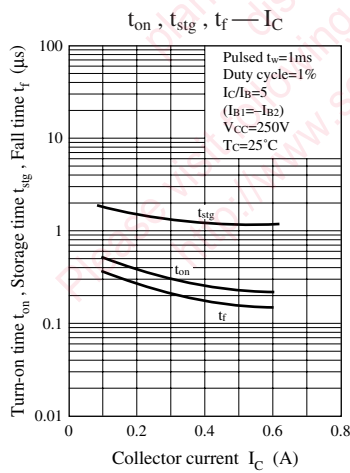
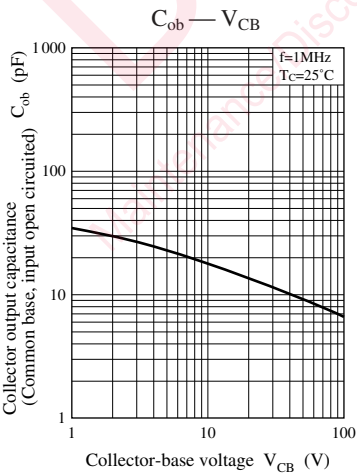
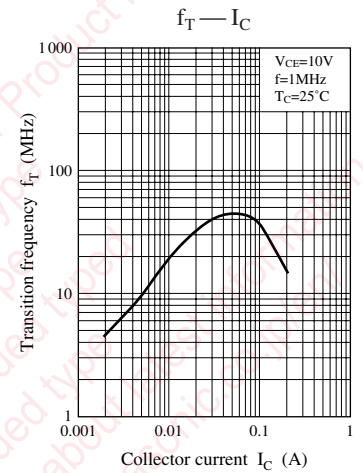
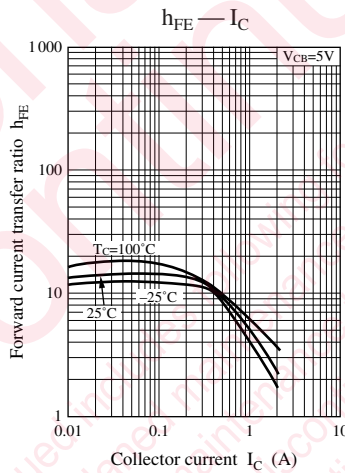
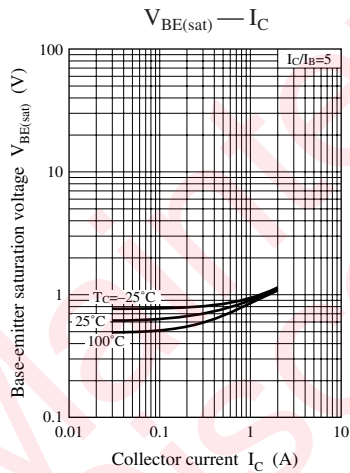
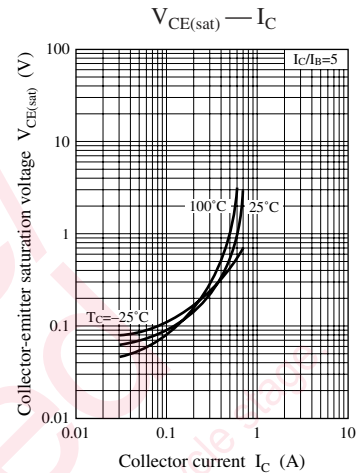
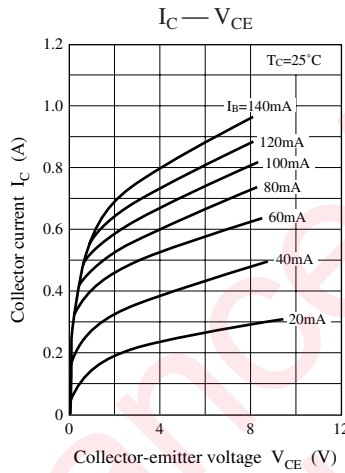
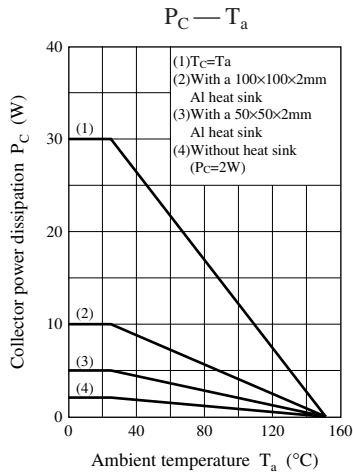
Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	$V_{CBO}$	900	V
Collector-emitter voltage (E-B short)	$V_{CES}$	900	V
Collector-emitter voltage (Base open)	$V_{CEO}$	800	V
Emitter-base voltage (Collector open)	$V_{EBO}$	7	V
Base current	$I_B$	0.3	A
Collector current	$I_C$	1	A
Peak collector current	$I_{CP}$	2	A
Collector power dissipation	$P_C$	30	W
	$T_a = 25^\circ\text{C}$	2.0	
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

### ■ Electrical Characteristics $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

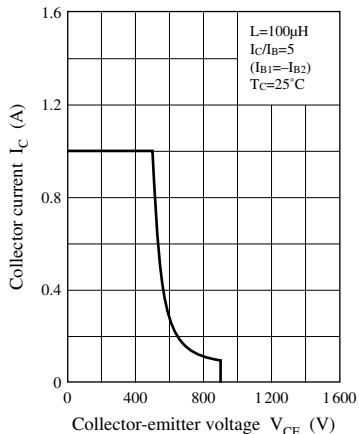
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-emitter voltage (Base open)	$V_{CEO}$	$I_C = 1 \text{ mA}, I_B = 0$	800			V
Collector-base cutoff current (Emitter open)	$I_{CBO}$	$V_{CB} = 900 \text{ V}, I_E = 0$			50	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{EBO}$	$V_{EB} = 7 \text{ V}, I_C = 0$			50	$\mu\text{A}$
Forward current transfer ratio	$h_{FE1}$	$V_{CE} = 5 \text{ V}, I_C = 0.05 \text{ A}$	6			—
	$h_{FE2}$	$V_{CE} = 5 \text{ V}, I_C = 0.5 \text{ A}$	3			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.2 \text{ A}, I_B = 0.04 \text{ A}$			1.5	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.2 \text{ A}, I_B = 0.04 \text{ A}$			1.0	V
Transition frequency	$f_T$	$V_{CE} = 10 \text{ V}, I_C = 0.05 \text{ A}, f = 1 \text{ MHz}$		4		MHz
Turn-on time	$t_{on}$	$I_C = 0.2 \text{ A}$			1.0	$\mu\text{s}$
Storage time	$t_{stg}$	$I_{B1} = 0.04 \text{ A}, I_{B2} = -0.04 \text{ A}$			3.0	$\mu\text{s}$
Fall time	$t_f$	$V_{CC} = 250 \text{ V}$			1.0	$\mu\text{s}$

Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

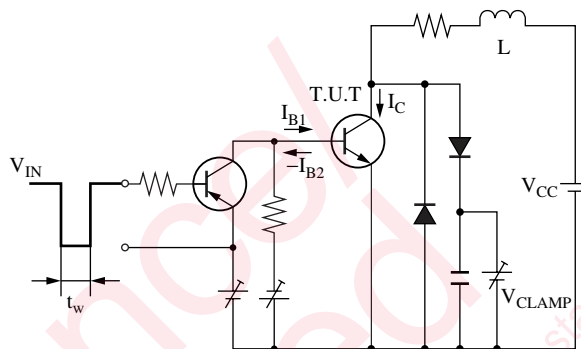




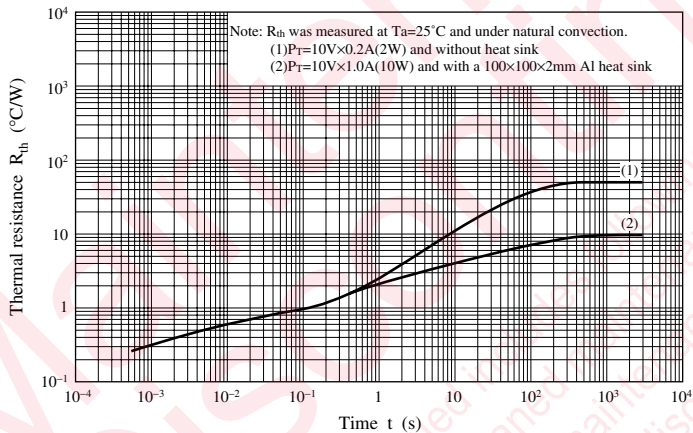
Safe operation area (Reverse bias)



Safe operation area (Reverse bias) measurement circuit



$R_{th} - t$



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