

TOSHIBA Transistor Silicon NPN Epitaxial Type

TPCP8510

High-Speed, High-Voltage Switching Applications
DC-DC Converter Applications

- High DC current gain: $h_{FE} = 120$ to 300 ($I_C = 0.1$ A)
- Low collector-emitter saturation: $V_{CE(sat)} = 0.14$ V (max)
- High-speed switching: $t_f = 0.2$ μ s (typ)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	180	V
Collector-emitter voltage		V_{CEX}	150	V
		V_{CEO}	120	V
Emitter-base voltage		V_{EBO}	7	V
Collector current	DC (Note 1)	I_C	1.0	A
	Pulse (Note 1)	I_{CP}	2.0	
Base current		I_B	0.1	A
Collector power dissipation	$t = 10$ s	P_C (Note 2)	2.25	W
	DC		1.1	
Junction temperature		T_j	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$

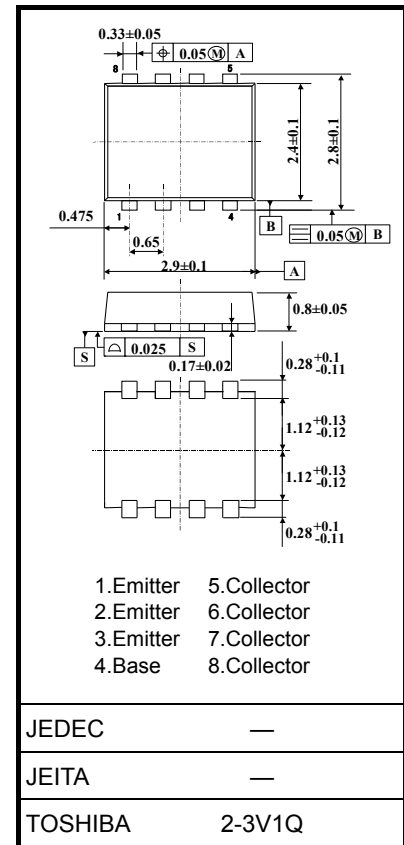
Note 1: Please use devices on condition that the junction temperature is below 150°C .

Note 2: Mounted on FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm^2)

Note 3: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm



Weight: 0.017 g (typ.)

Figure 1. Circuit configuration (top view)

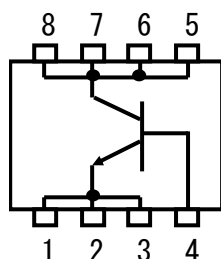
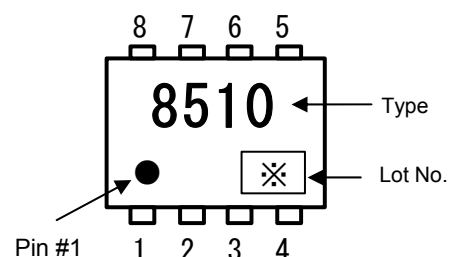
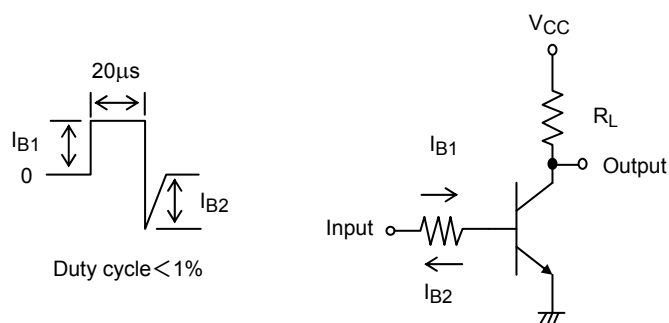


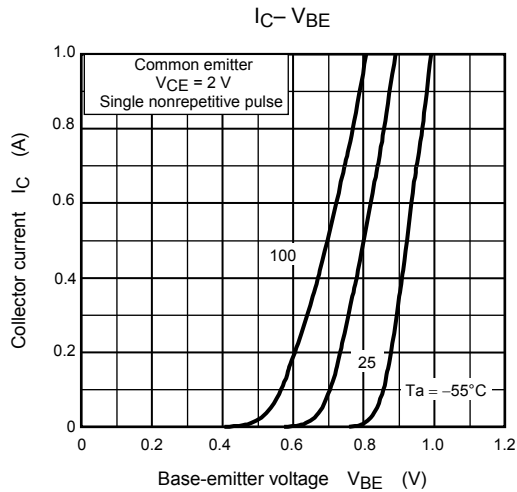
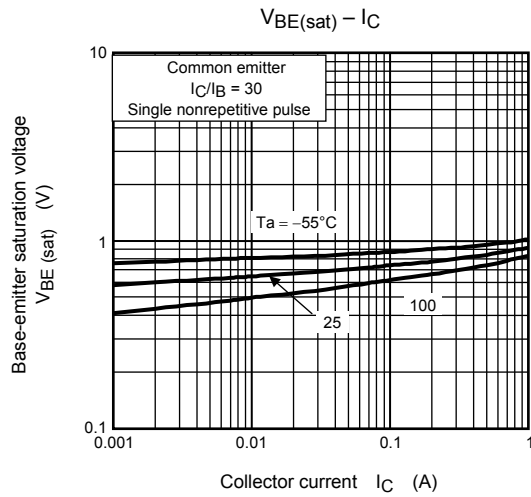
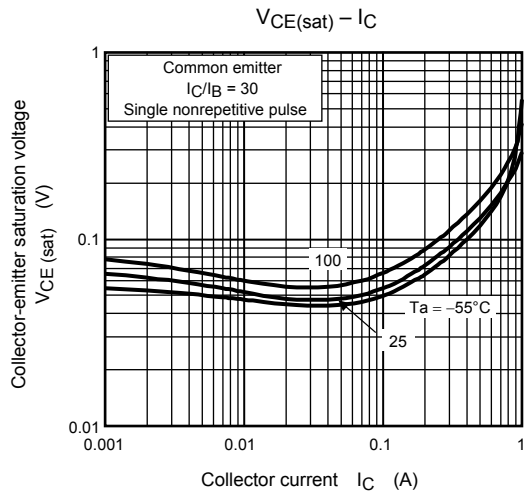
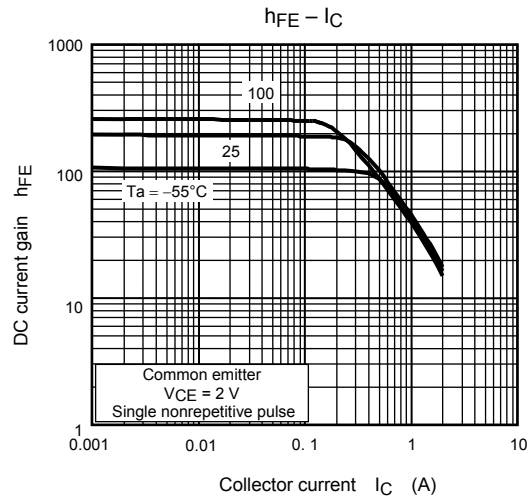
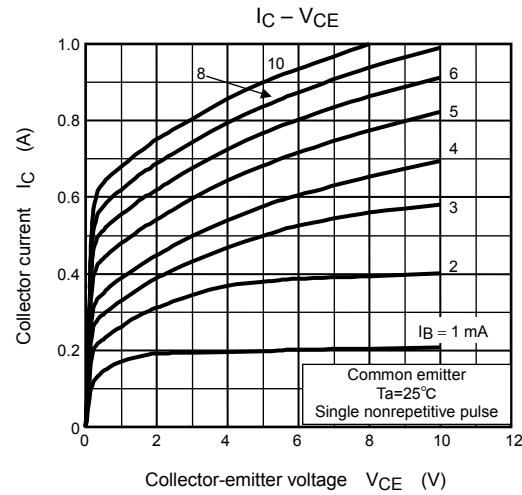
Figure 2. Marking

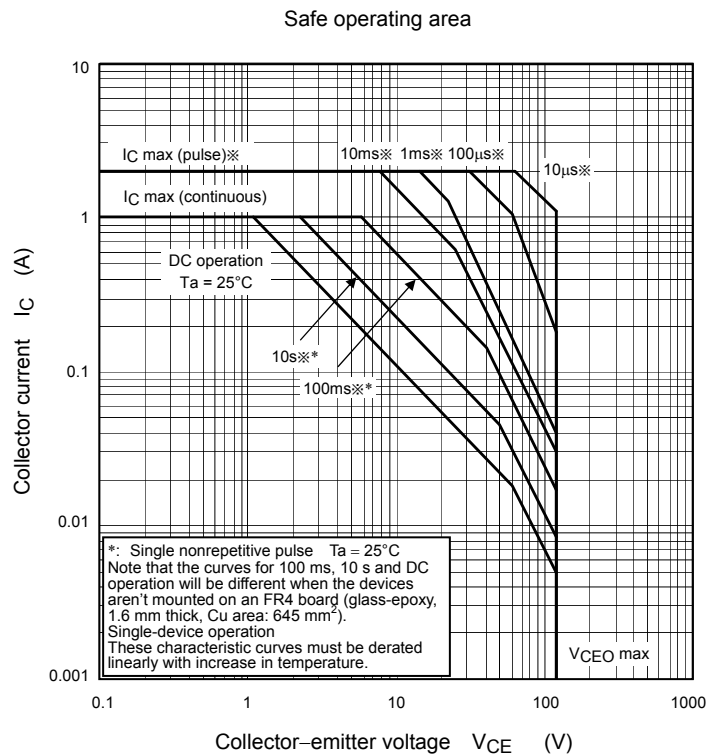
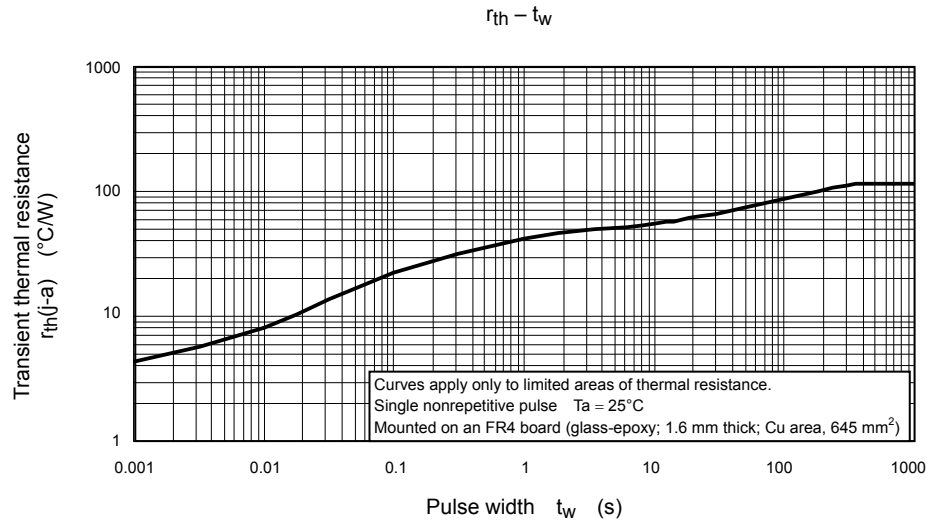


Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 180 \text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current		I_{EBO}	$V_{EB} = 7 \text{ V}, I_C = 0$	—	—	100	nA
Collector-base breakdown voltage		$V_{(BR)CBO}$	$I_C = 1 \text{ mA}, I_B = 0$	180	—	—	V
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10 \text{ mA}, I_B = 0$	120	—	—	V
DC current gain	$h_{FE(1)}$		$V_{CE} = 2 \text{ V}, I_C = 0.1 \text{ A}$	120	—	300	
	$h_{FE(2)}$		$V_{CE} = 2 \text{ V}, I_C = 0.3 \text{ A}$	60	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 0.3 \text{ A}, I_B = 0.01 \text{ A}$	—	—	0.14	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 0.3 \text{ A}, I_B = 0.01 \text{ A}$	—	—	1.1	V
Switching time	Rise time	t_r	See Figure 3 circuit diagram $V_{CC} \approx 72 \text{ V}, R_L = 240 \Omega$ $I_{B1} = I_{B2} = 10 \text{ mA}$	—	0.1	—	μs
	Storage time	t_{stg}		—	1.5	—	
	Fall time	t_f		—	0.2	—	

Figure 3. Switching Time Test Circuit






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