

TOSHIBA Transistor Silicon NPN Epitaxial Type

TPCP8507

High-Speed Switching Applications
DC-DC Converters

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

Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	180	V
Collector-emitter voltage	V_{CEX}	150	V
Collector-emitter voltage	V_{CEO}	120	V
Emitter-base voltage	V_{EBO}	7	V
Collector current	DC (Note 1)	I_C	1.0
	Pulsed (Note 1)	I_{CP}	2.0
Base current	I_B	0.1	A
Collector power dissipation	t = 10 s	P_C (Note 2)	3.00
	DC		1.25
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C

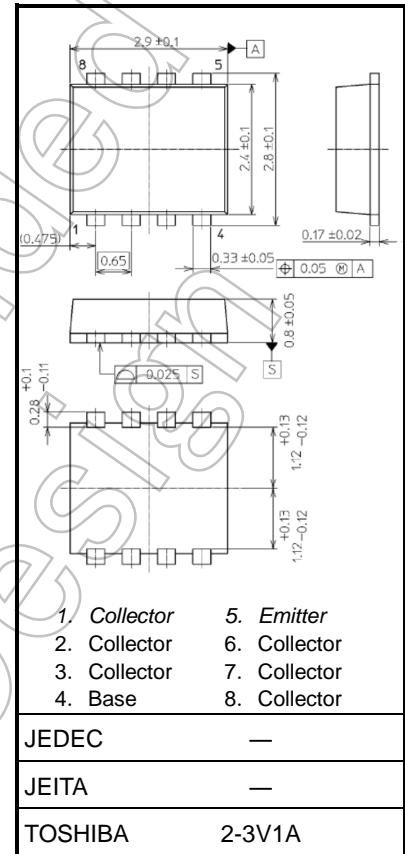
Note 1: Ensure that the junction temperature does not exceed 150°C.

Note 2: Device mounted on a 25.4 mm x 25.4 mm x 1.6 mm FR-4 glass epoxy board (with a dissipating copper surface of 645 mm²)

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.)

Start of commercial production
2005-02

Figure 1. Circuit configuration (top view)

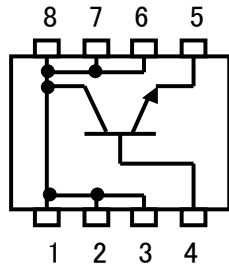
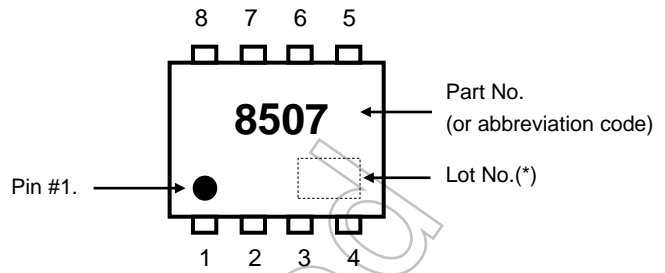


Figure 2. Marking



* Lot No.:

Weekly code (Three digits)



Week of manufacture

(01 for first week of calendar year ; sequential number up to 52 or 53)

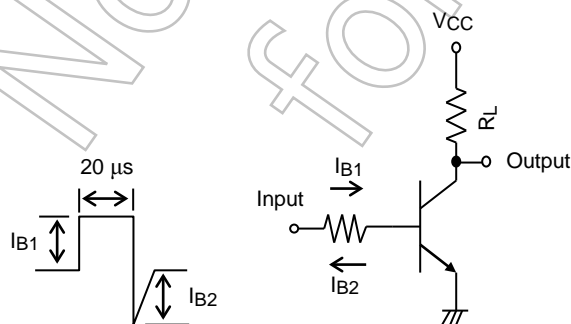
Year of manufacture

(Last digit of calendar year)

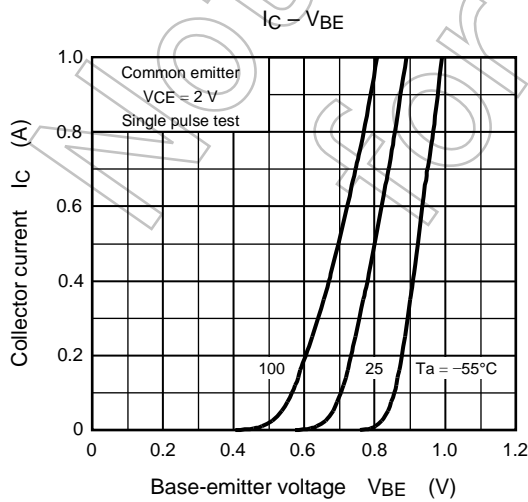
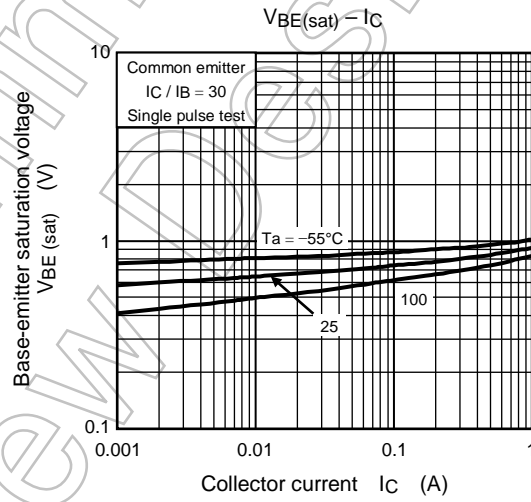
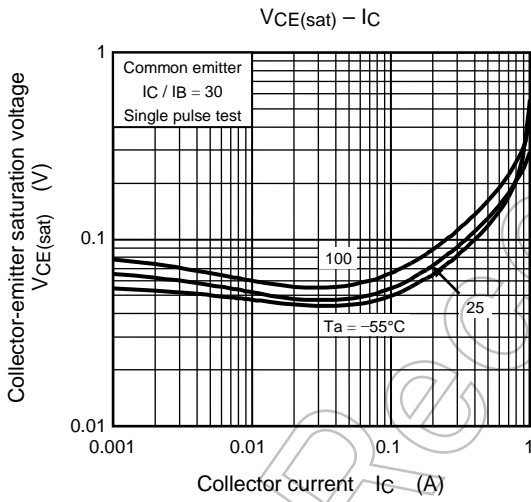
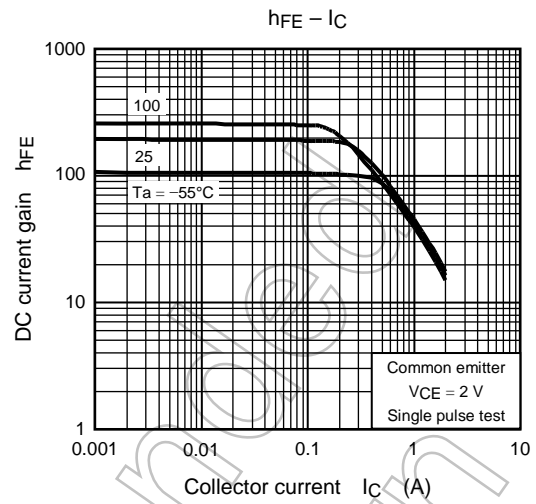
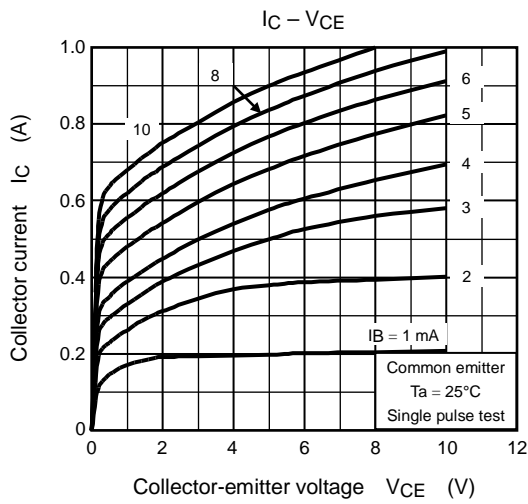
Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 180\text{ V}, I_E = 0\text{ A}$	—	—	100	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 7\text{ V}, I_C = 0\text{ A}$	—	—	100	nA
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 1\text{ mA}, I_B = 0\text{ A}$	180	—	—	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0\text{ A}$	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	—	0.1	—	μs
	Storage time	t_{stg}	—	1.5	—	
	Fall time	t_f	—	0.2	—	

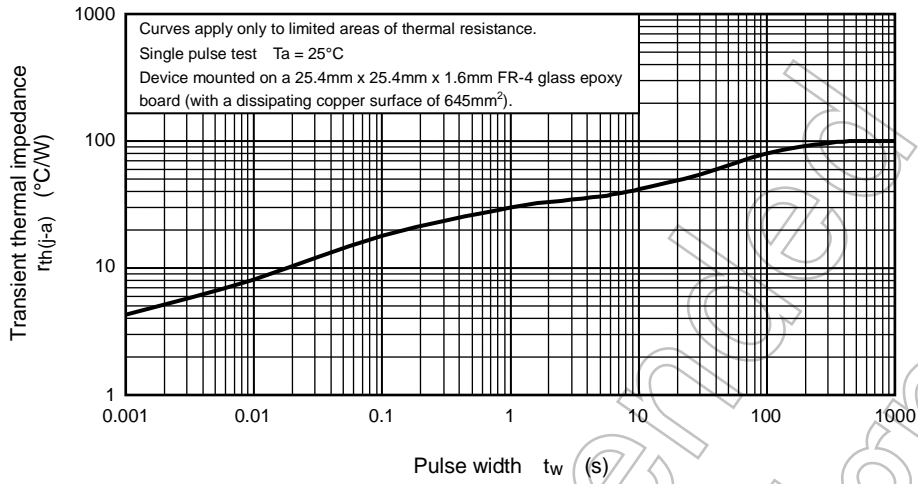
Figure 3. Switching Time Test Circuit



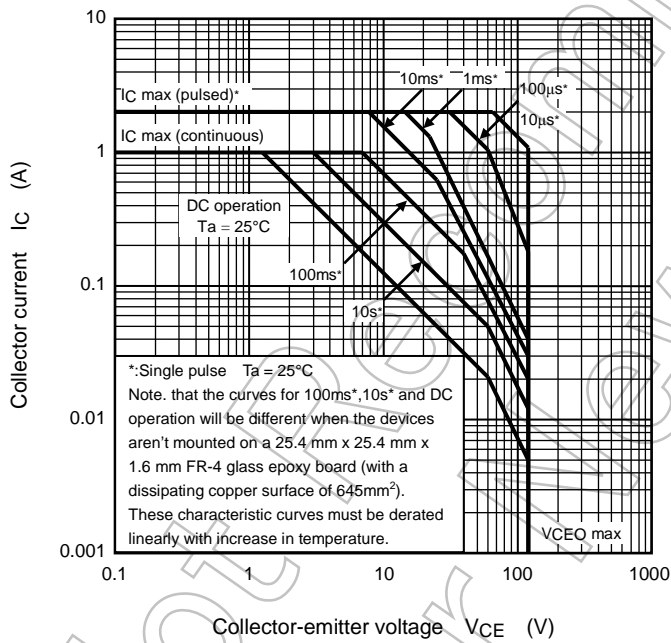
Duty cycle < 1 %



$r_{th(j-a)} - t_w$
(Guaranteed Maximum)



Safe Operating Area



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