TOSHIBA Transistor Silicon NPN Epitaxial Type

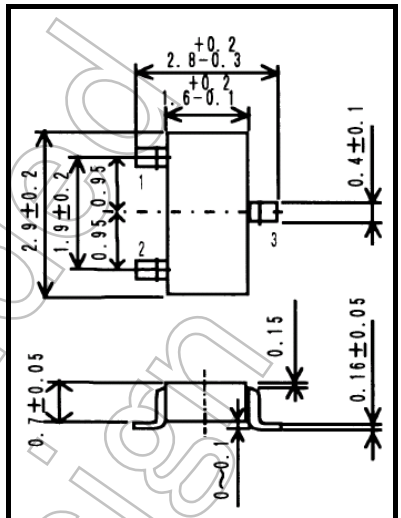
TTC007

Unit: mm

High-Speed Switching Applications

DC-DC Converter Applications

- High DC current gain: h_{FE} = 400 to1000 (I_C = 0.1 A)
- Low collector-emitter saturation voltage: $V_{CE(sat)}$ = 0.12 V (max)
- High-speed switching : t_f = 85 ns (typ.)



JEDEC	―
JEITA	―
TOSHIBA	2-3S1C

Weight: 0.01 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	100	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	7	V
Collector current	DC	I_C	1	A
	Pulse	I_{CP}	2	
Base current		I_B	0.1	A
Collector power dissipation	t = 10 s	P_C	1.1	W
	DC	(Note 1)	0.7	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note1: Mounted on FR4 board (glass epoxy; 645 mm^2,1.6 mm thick; Cu area: 645 mm^2)

Note2: 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).

Start of commercial production
2010-01

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 100 V, I_E = 0	—	—	100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = 7 V, I_C = 0	—	—	100	nA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	50	—	—	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = 2 V, I_C = 0.1 A	400	—	1000	–
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 0.3 A	200	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 0.3 A, I_B = 6 mA	—	—	0.12	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 0.3 A, I_B = 6 mA	—	—	1.1	V
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1MHz	—	5	—	pF
Switching time	Rise time	t_r	See Figure 1	—	35	—	ns
	Storage time	t_{stg}	V_{CC} = 30 V, R_L = 100 Ω	—	680	—	
	Fall time	t_f	I_{B1} = I_{B2} = 10 mA	—	85	—	

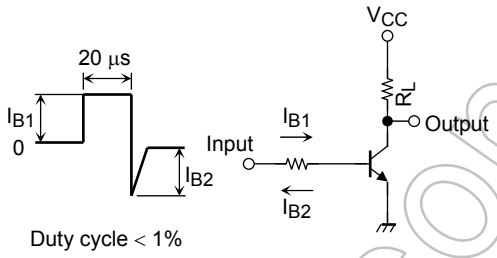
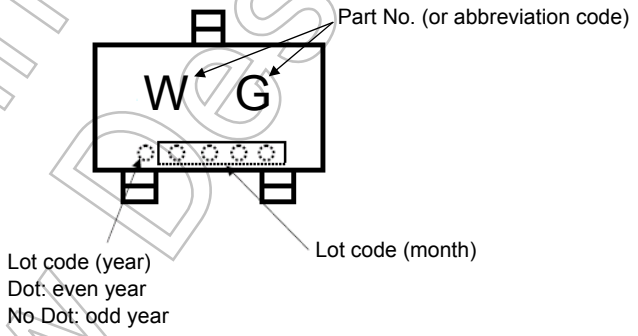
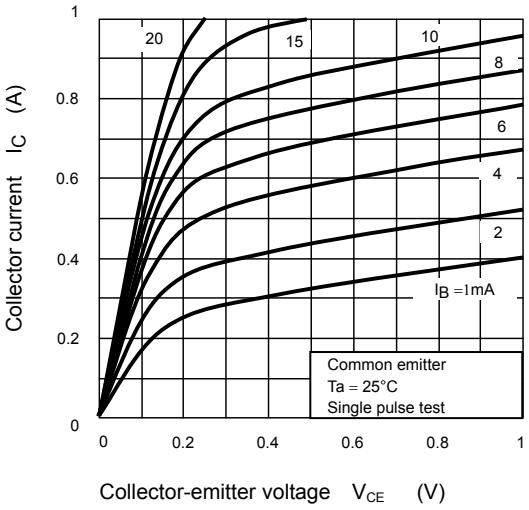


Figure 1. Switching Time Test Circuit

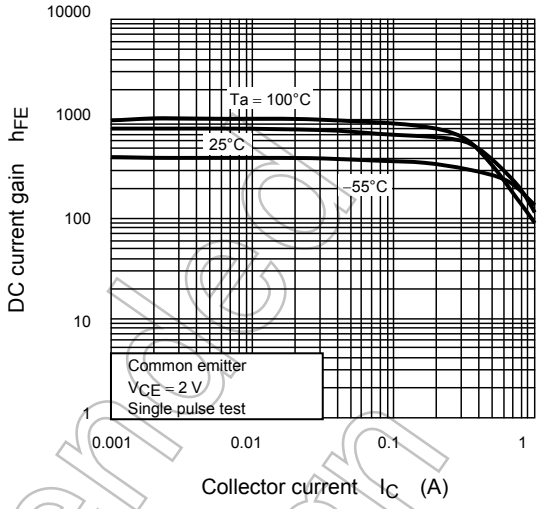
Marking



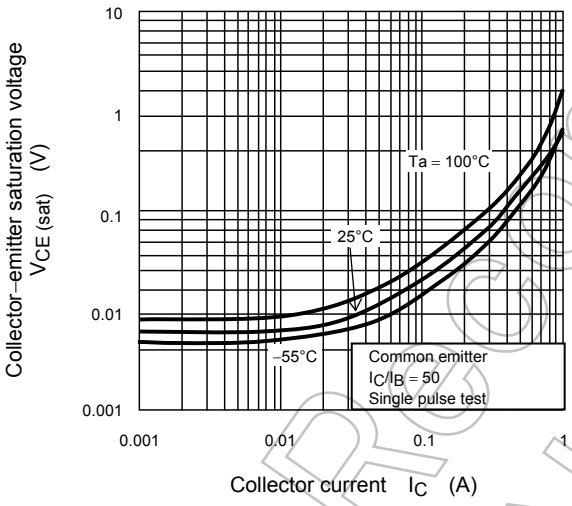
$I_C - V_{CE}$



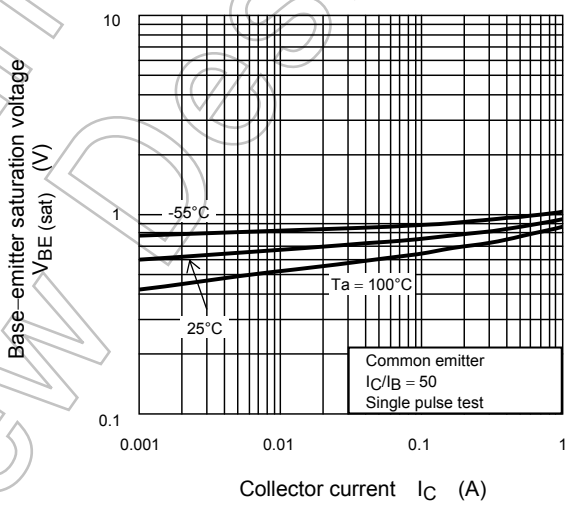
$h_{FE} - I_C$



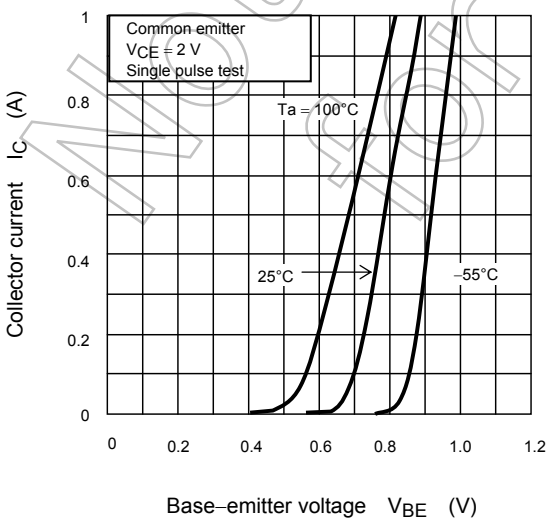
$V_{CE\ (sat)} - I_C$



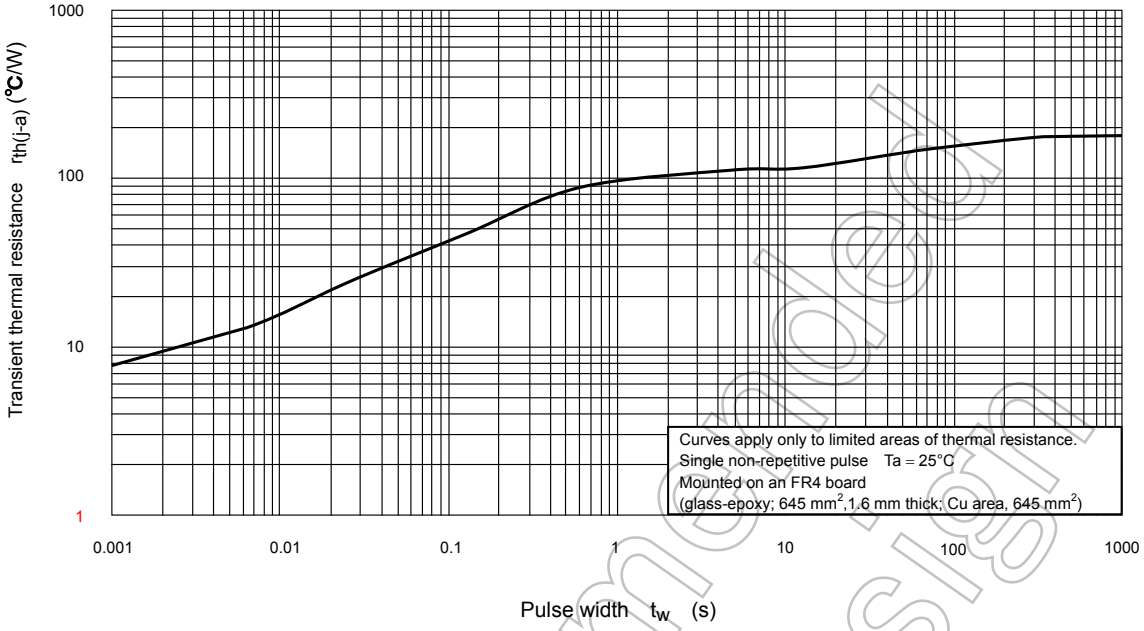
$V_{BE\ (sat)} - I_C$



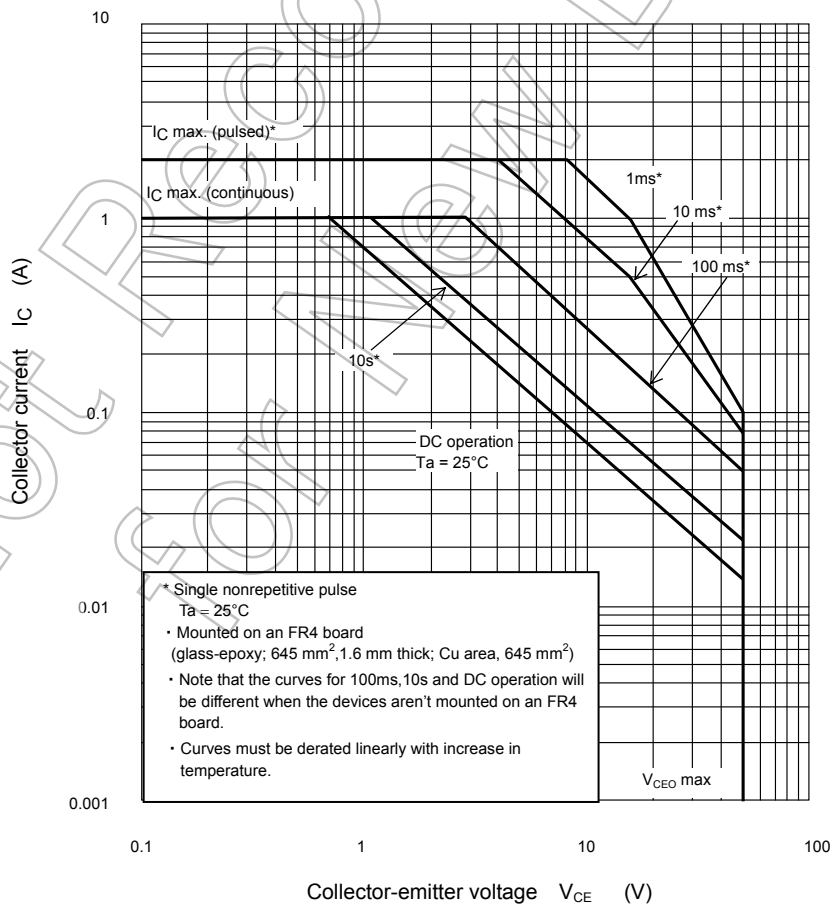
$I_C - V_{BE}$



$r_{th(j-a)}$ – t_w



Safe Operating Area



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