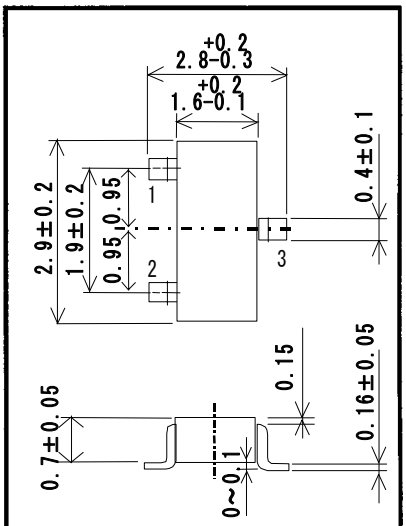
TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC6033

Unit : mm

High-Speed Swtching Applications
DC-DC Converter Applications
Storobe Flash Applications



JEDEC	―
JEITA	―
TOSHIBA	2-3S1A

Weight: 0.01g (Typ.)

- High DC current gain: h_{FE} = 250 to 400 (I_C = 0.3 A)
- Low collector-emitter saturation: $V_{CE\ (sat)}$ = 0.18 V (max)
- High-speed switching: t_f = 38 ns (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	100	V
Collector-emitter voltage		V_{CEX}	80	V
		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	6	V
Collector current	DC	I_C	2.5	A
	Pulse	I_{CP}	5	
Base current		I_B	0.3	A
Collector power dissipation	t = 10s	P_C (Note 1)	1.00	W
	DC		0.625	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note 1: Mounted on an FR4 board (glass epoxy, 1.6mm thick, Cu area: 64.5 mm^2)

Note 2: 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).

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 100 V, I_E = 0	—	—	0.1	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 6 V, I_C = 0	—	—	0.1	μA
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 = 0.3 A	250	—	400	
		h_{FE} (2)	V_{CE} = 2 V, I_C = 1.0 A	120	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 1.0 A, I_B = 33 mA	—	—	0.18	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 1.0 A, I_B = 33 mA	—	—	1.10	V
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1MHz	—	18	—	pF
Switching time	Rise time	t_r	See Figure 1. $V_{CC} \simeq$ 20 V, R_L = 20 Ω $I_{B1} = -I_{B2}$ = 33 mA	—	25	—	ns
	Storage time	t_{stg}		—	470	—	
	Fall time	t_f		—	38	—	

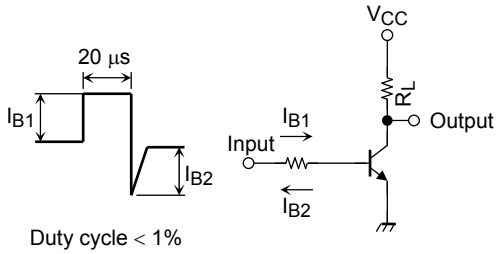
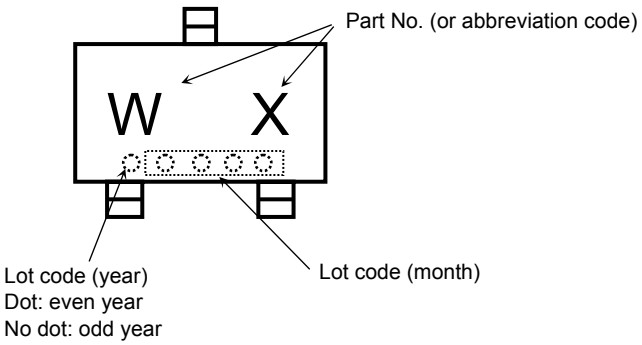
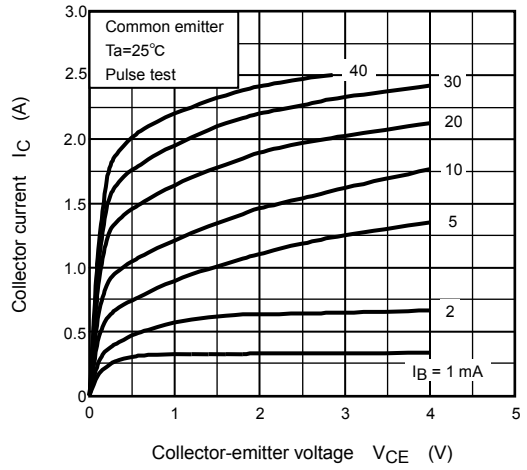


Figure 1 Switching Time Test Circuit & Timing Chart

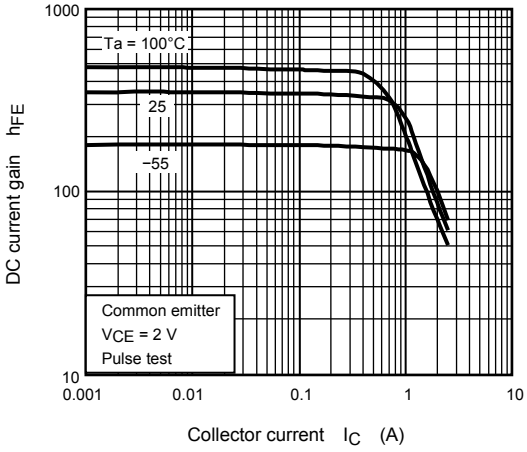
Marking



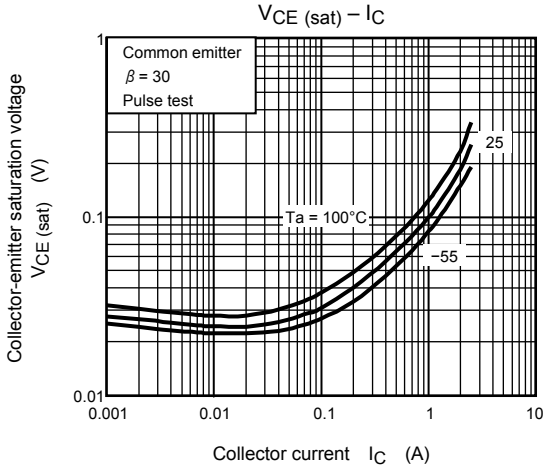
$I_C - V_{CE}$



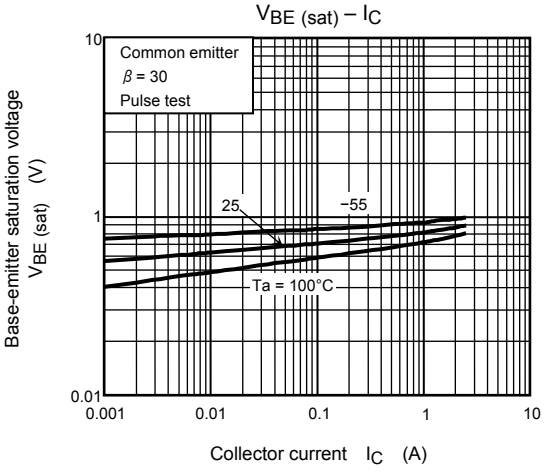
$h_{FE} - I_C$



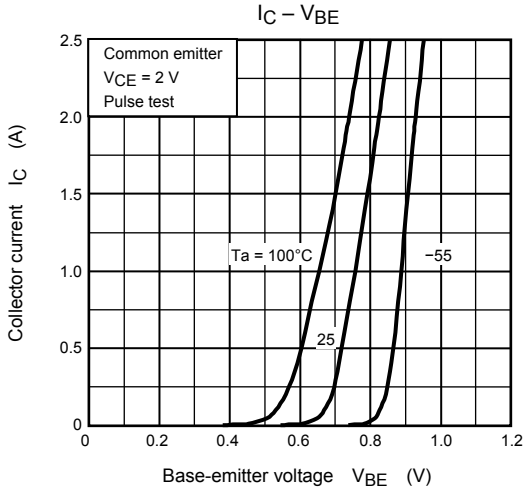
$V_{CE\ (sat)} - I_C$



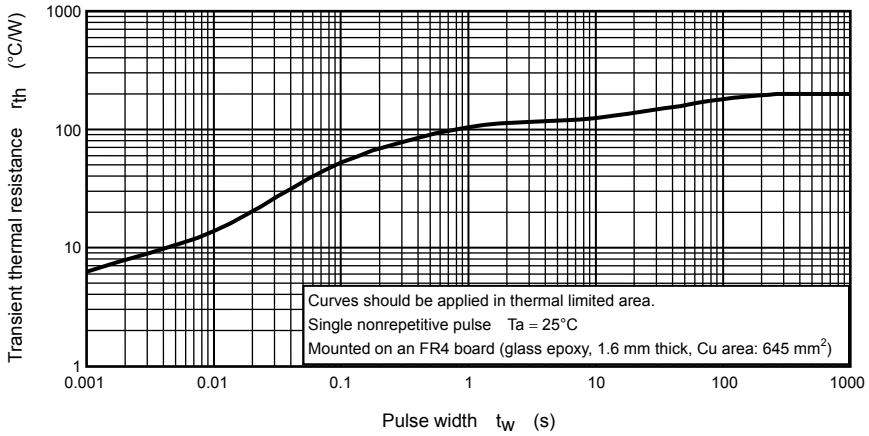
$V_{BE\ (sat)} - I_C$



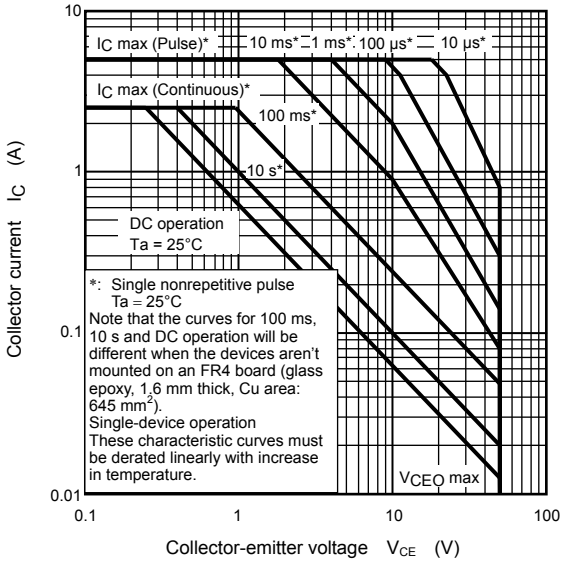
$I_C - V_{BE}$



$r_{th} - t_w$



Safe Operating Area



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20070701-EN

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