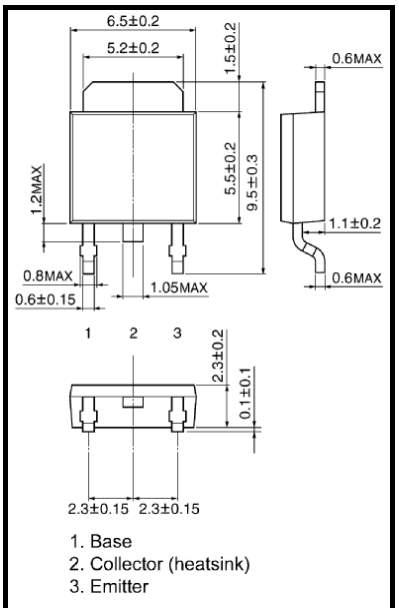
TOSHIBA Transistor Silicon NPN Epitaxial Type

2SC6000

High Speed Switching Applications
DC-DC Converter Applications

- High DC current gain: h_{FE} = 250 to 400 (I_C = 2.5 A)
- Low collector-emitter saturation: $V_{CE\ (sat)}$ = 0.18 V (max)
- High speed switching: t_f = 13 ns (typ)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-7J1A

Weight: 0.36 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

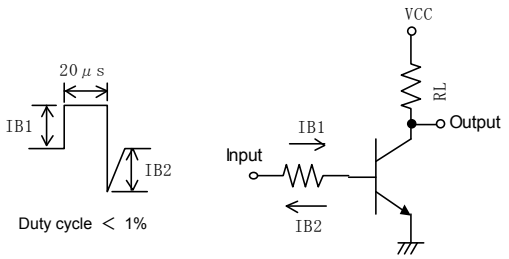
Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	120	V
Collector-emitter voltage		V_{CEX}	120	V
Collector-emitter voltage		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	6	V
Collector current	DC	I_C	7.0	A
	Pulse	I_{CP}	10.0	
Base current		I_B	0.5	A
Collector power dissipation	Tc = 25°C	P_C	20	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note: 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).

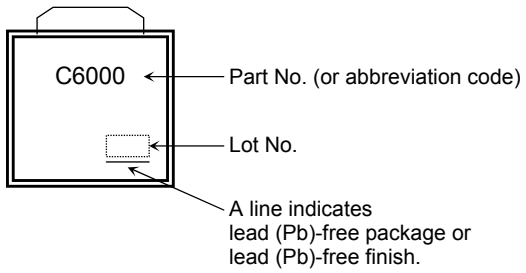
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 120 V, I_E = 0	—	—	100	nA
Emitter cut-off current		I_{EBO}	V_{EB} = 6 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 = 1 mA	160	—	—	
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 2.5 A	250	—	400	
Collector emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 2.5 A, I_B = 83 mA	—	—	0.18	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 2.5 A, I_B = 83 mA	—	—	1.10	V
Switching time	Rise time	t_r	See Figure 1 circuit diagram	—	45	—	ns
	Storage time	t_{stg}	$V_{CC} \simeq$ 20 V, R_L = 8.0 Ω	—	450	—	
	Fall time	t_f	I_{B1} = 83 mA, I_{B2} = −166 mA	—	13	—	

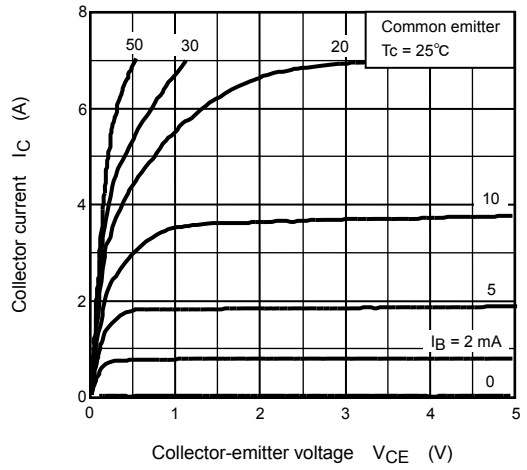
Figure 1 Switching Time Test Circuit & Timing Chart



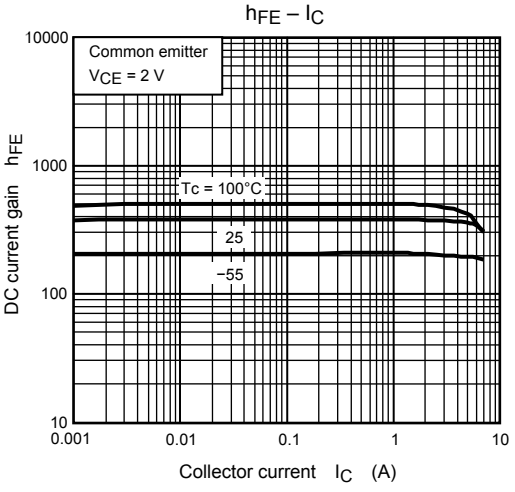
Marking



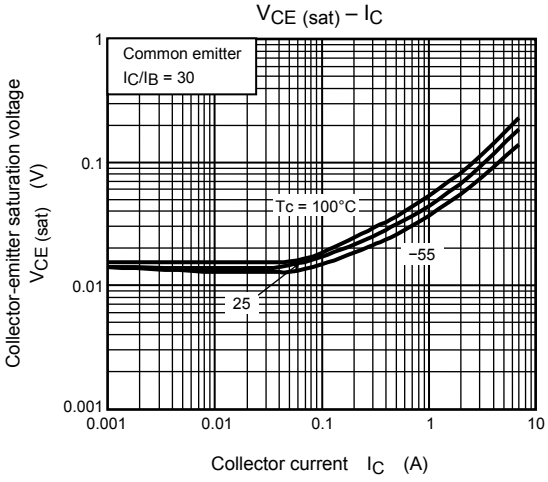
$I_C - V_{CE}$



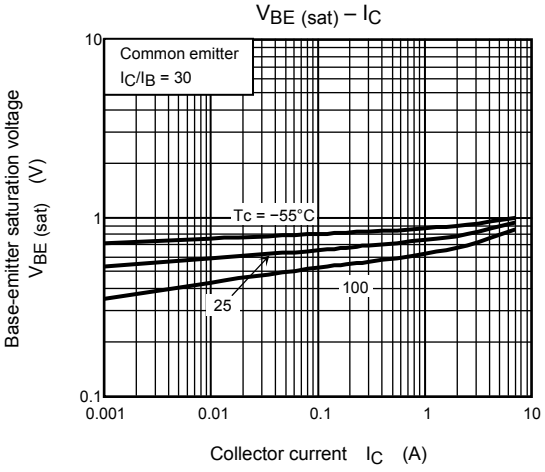
$h_{FE} - I_C$



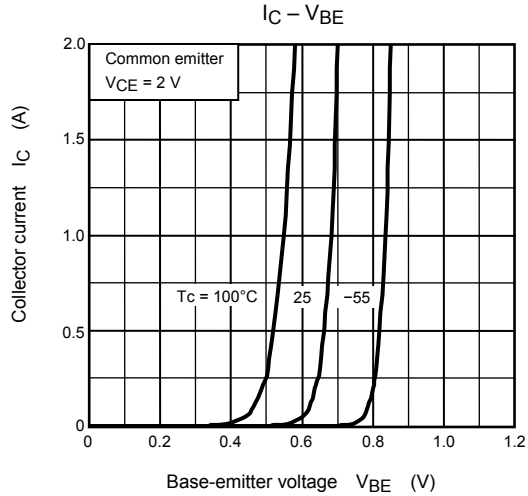
$V_{CE\ (sat)} - I_C$



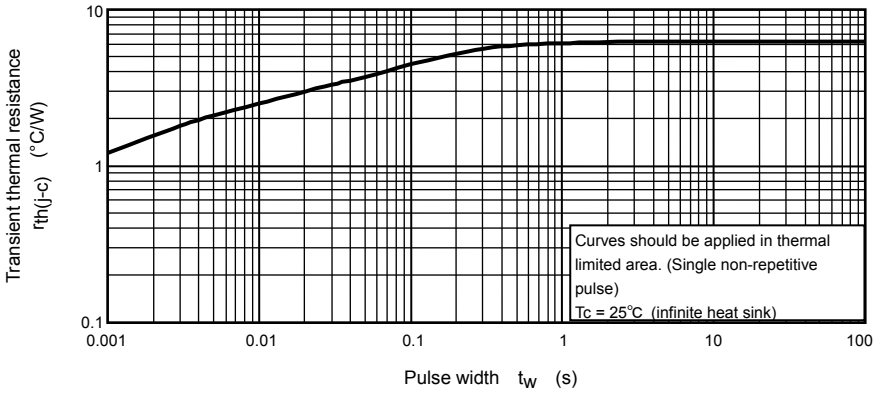
$V_{BE\ (sat)} - I_C$



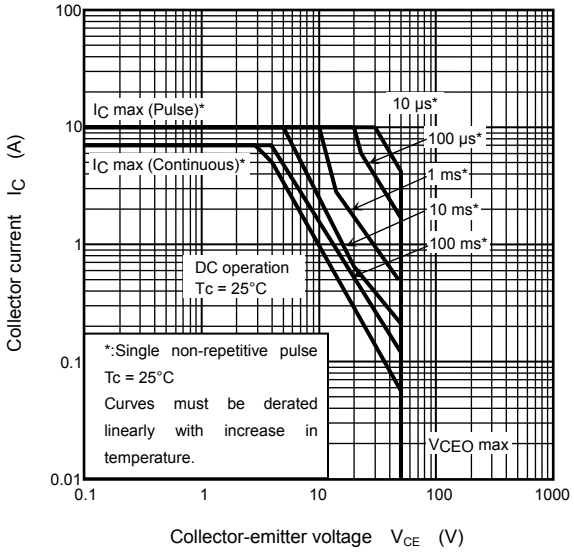
$I_C - V_{BE}$



$r_{th(j-c)} - t_w$



Safe Operating Area



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20070701-EN

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