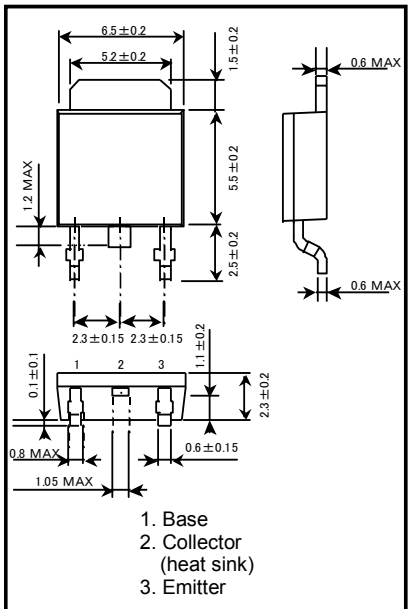
TOSHIBA Transistor Silicon NPN Epitaxial Type

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	SC-64
TOSHIBA	2-7J1A

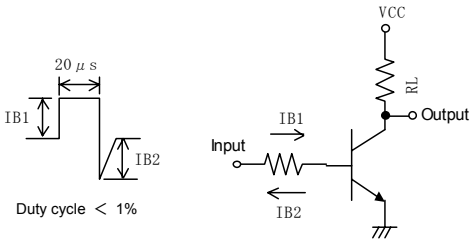
Maximum Ratings (Ta = 25°C)

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

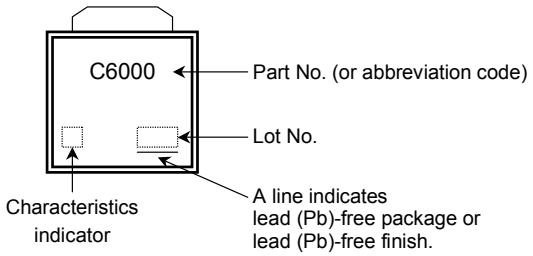
Electrical Characteristics (Ta = 25°C)

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 I_{B1} = 83 mA, I_{B2} = −166 mA	—	450	—	
	Fall time	t_f		—	13	—	

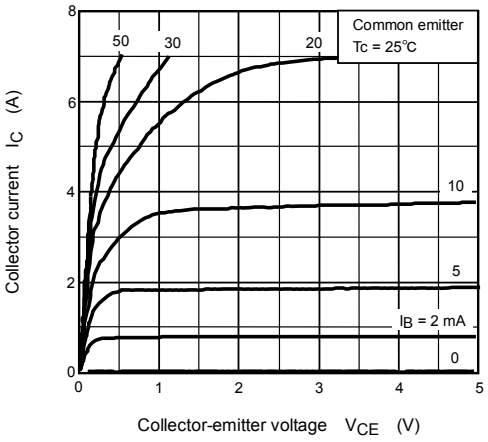
Figure 1 Switching Time Test Circuit & Timing Chart



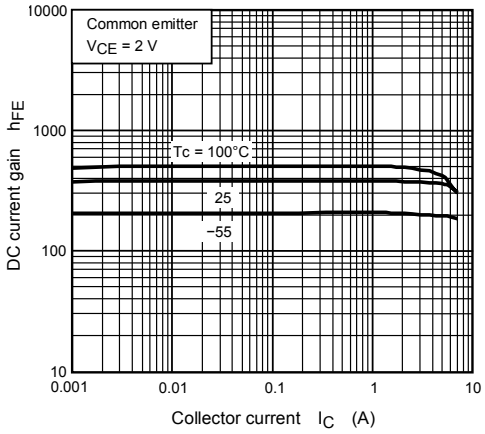
Marking



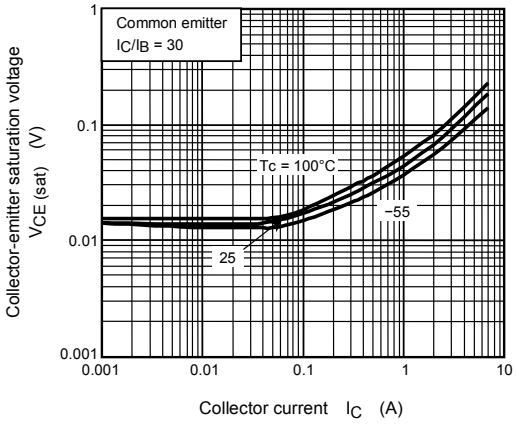
$I_C - V_{CE}$



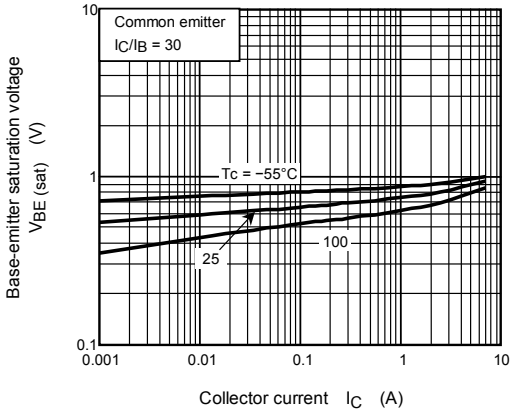
$h_{FE} - I_C$



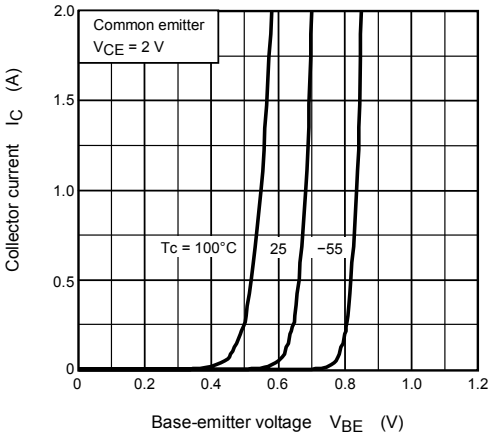
$V_{CE\ (sat)} - I_C$

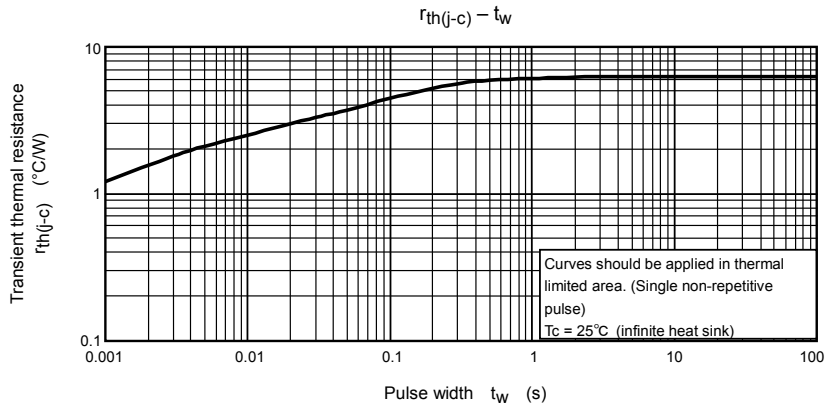


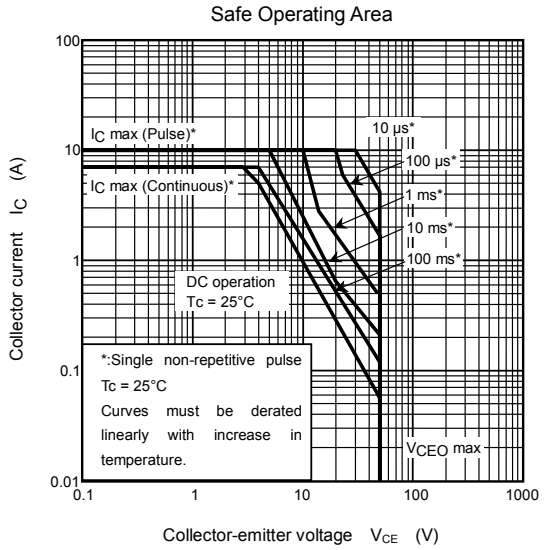
$V_{BE\ (sat)} - I_C$



$I_C - V_{BE}$




$r_{th(j-c)} - t_w$
Transient thermal resistance $r_{th(j-c)}$ (°C/W)
10
1
0.1
0.001
0.01
0.1
1
10
100
Curves should be applied in thermal limited area. (Single non-repetitive pulse)
Tc = 25°C (infinite heat sink)
Pulse width t_w (s)


Safe Operating Area
100
10
1
0.1
0.01
0.1
1
10
100
1000
I_C max (Pulse)*
I_C max (Continuous)*
10 µs*
100 µs*
1 ms*
10 ms*
100 ms*
DC operation
Tc = 25°C
*:Single non-repetitive pulse
Tc = 25°C
Curves must be derated linearly with increase in temperature.
V_{CEO} max
Collector current I_C (A)
Collector-emitter voltage V_{CE} (V)

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