

TOSHIBA Transistor Silicon NPN Epitaxial Type

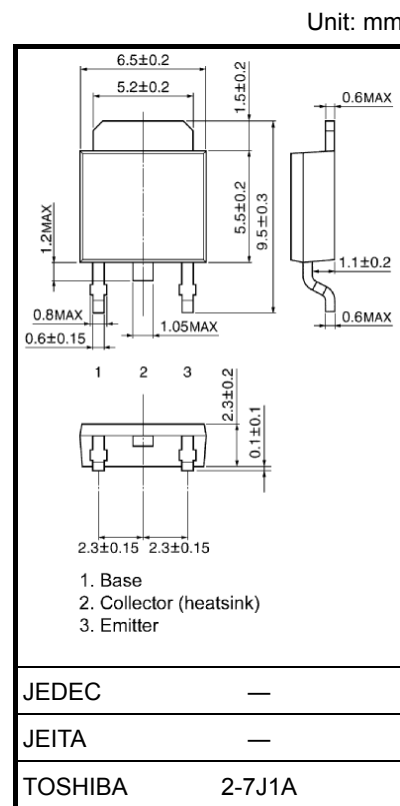
# 2SC6000

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)

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

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	$T_c = 25^\circ\text{C}$	$P_C$	20	W
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$



Weight: 0.36 g (typ.)

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.

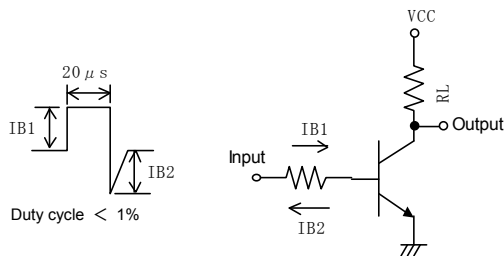
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Start of commercial production  
2003-11

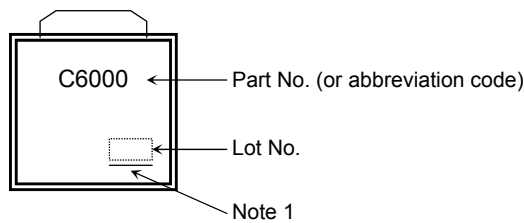
**Electrical Characteristics (Ta = 25°C)**

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 120\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 6\text{ V}, I_C = 0$	—	—	100	nA
Collector-emitter breakdown voltage		$V_{(BR) CEO}$	$I_C = 10\text{ mA}, I_B = 0$	50	—	—	V
DC current gain	$h_{FE} (1)$		$V_{CE} = 2\text{ V}, I_C = 1\text{ mA}$	160	—	—	
	$h_{FE} (2)$		$V_{CE} = 2\text{ V}, I_C = 2.5\text{ A}$	250	—	400	
Collector emitter saturation voltage		$V_{CE (sat)}$	$I_C = 2.5\text{ A}, I_B = 83\text{ mA}$	—	—	0.18	V
Base-emitter saturation voltage		$V_{BE (sat)}$	$I_C = 2.5\text{ A}, I_B = 83\text{ mA}$	—	—	1.10	V
Switching time	Rise time	$t_r$	See Figure 1 circuit diagram $V_{CC} \approx 20\text{ V}, R_L = 8.0\ \Omega$ $I_{B1} = 83\text{ mA}, I_{B2} = -166\text{ mA}$	—	45	—	ns
	Storage time	$t_{stg}$		—	450	—	
	Fall time	$t_f$		—	13	—	

**Figure 1 Switching Time Test Circuit & Timing Chart**



**Marking**



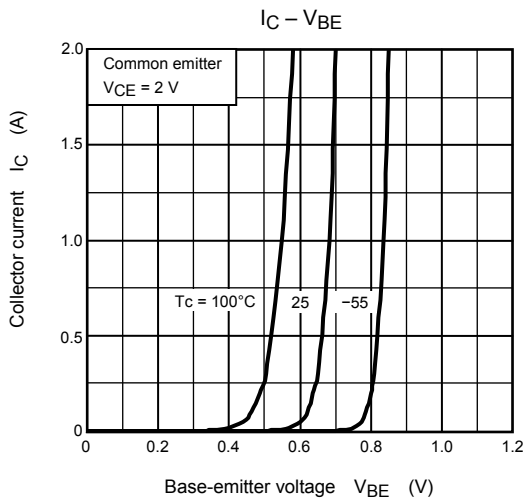
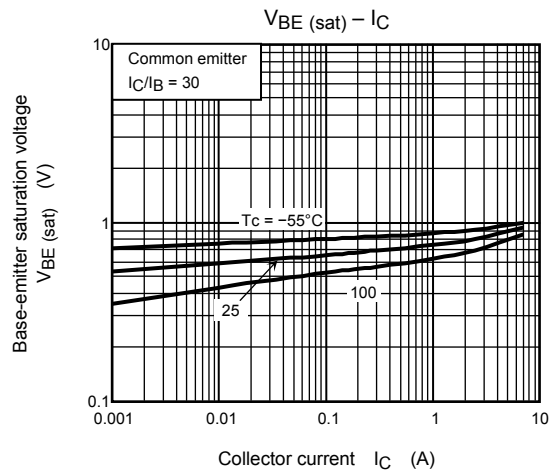
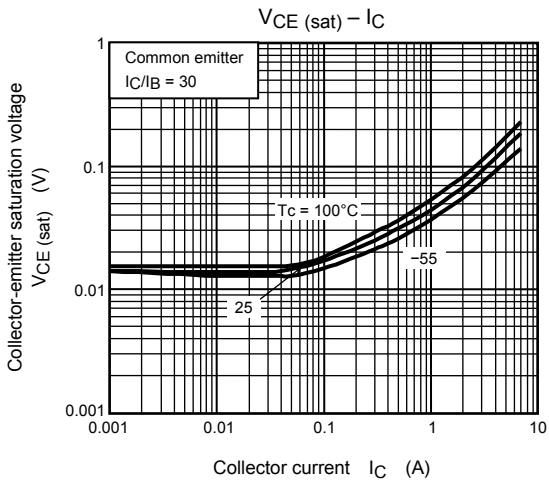
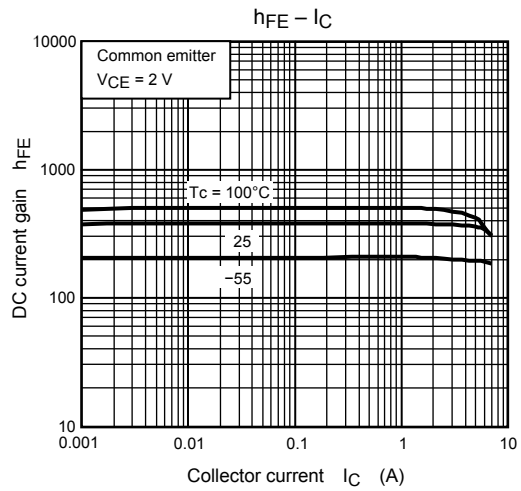
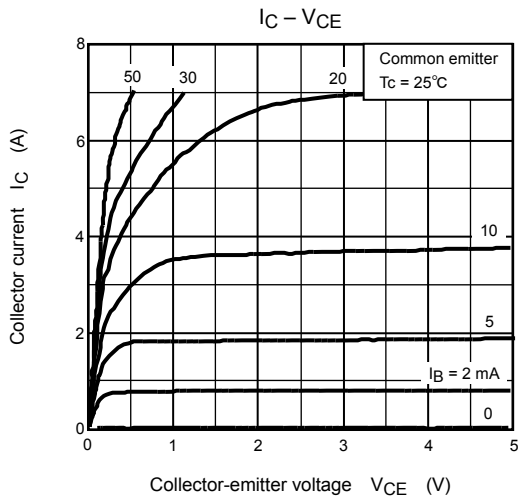
Note 1: A line under a Lot No. identifies the indication of product Labels.

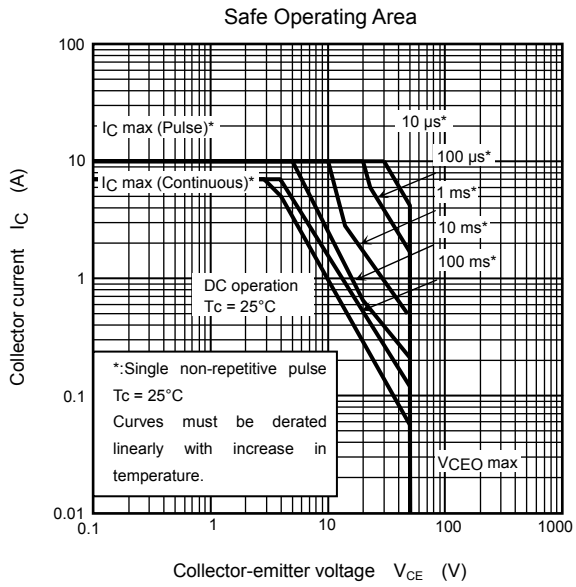
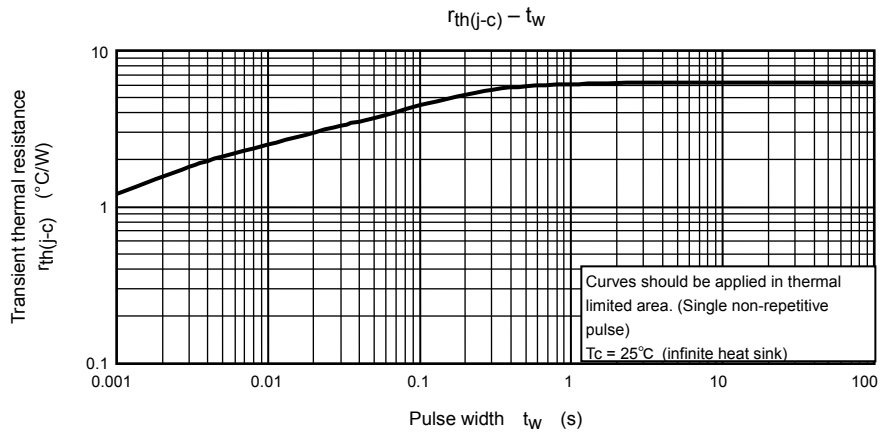
Not underlined :  $[[Pb]]/INCLUDES > MCV$

Underlined :  $[[G]]/RoHS COMPATIBLE$  or  $[[G]]/RoHS [[Pb]]$

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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