

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC3303

High Current Switching Applications  
DC-DC Converter Applications

- Low collector saturation voltage:  $V_{CE(sat)} = 0.4 \text{ V (max)}$  ( $I_C = 3 \text{ A}$ )
- High speed switching time:  $t_{stg} = 1.0 \mu\text{s (typ.)}$

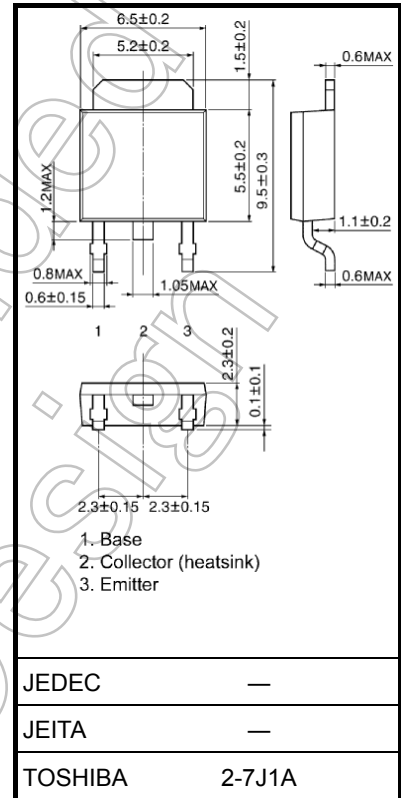
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	100	V
Collector-emitter voltage		$V_{CEO}$	80	V
Emitter-base voltage		$V_{EBO}$	7	V
Collector current	DC	$I_C$	5	A
	Pulse	$I_{CP}$	8	A
Base current		$I_B$	1	A
Collector power dissipation	$T_a = 25^\circ\text{C}$	$P_C$	1.0	W
	$T_c = 25^\circ\text{C}$		20	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

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).

Industrial Applications

Unit: mm



Weight: 0.36 g (typ.)

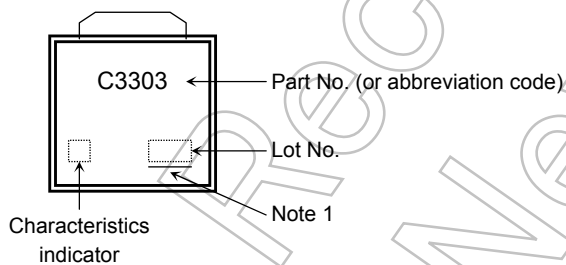
Start of commercial production  
1989-02

## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	1	$\mu\text{A}$
Emitter cut-off current		$I_{EBO}$	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	1	$\mu\text{A}$
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	80	—	—	V
DC current gain	$h_{FE(1)}$ (Note)		$V_{CE} = 1\text{ V}, I_C = 1\text{ A}$	70	—	240	
	$h_{FE(2)}$		$V_{CE} = 1\text{ V}, I_C = 3\text{ A}$	40	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 3\text{ A}, I_B = 0.15\text{ A}$	—	0.2	0.4	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 3\text{ A}, I_B = 0.15\text{ A}$	—	0.9	1.2	V
Transition frequency		$f_T$	$V_{CE} = 4\text{ V}, I_C = 1\text{ A}$	—	120	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	80	—	pF
Switching time	Turn-on time	$t_{on}$		—	0.2	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	1.0	—	
	Fall time	$t_f$		$I_{B1} = -I_{B2} = 0.15\text{ A},$ $\text{DUTY CYCLE} \leq 1\%$	—	0.1	

Note:  $h_{FE(1)}$  classification O: 70 to 140, Y: 120 to 240

## Marking

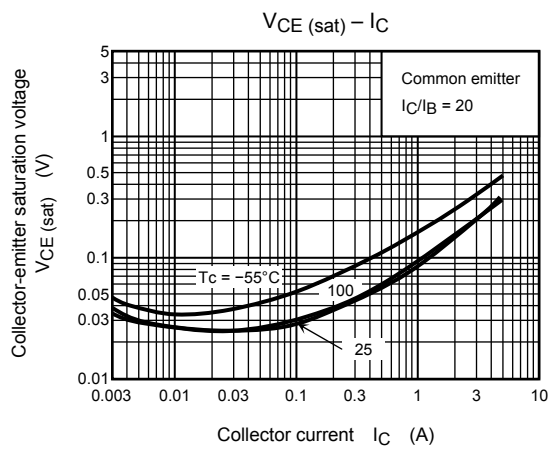
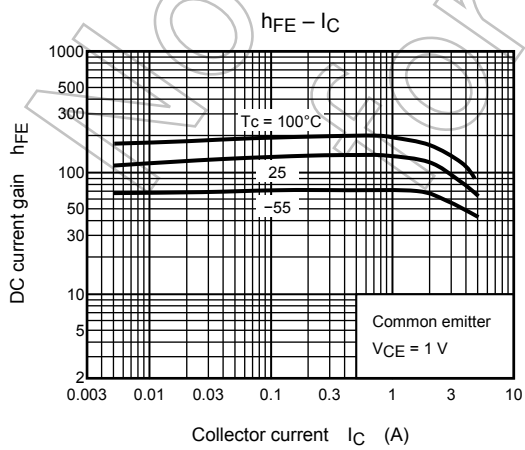
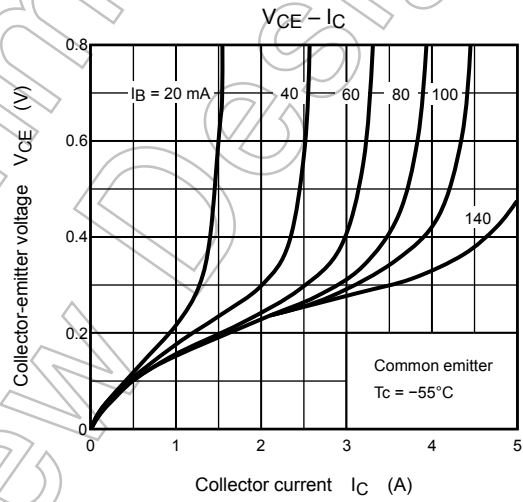
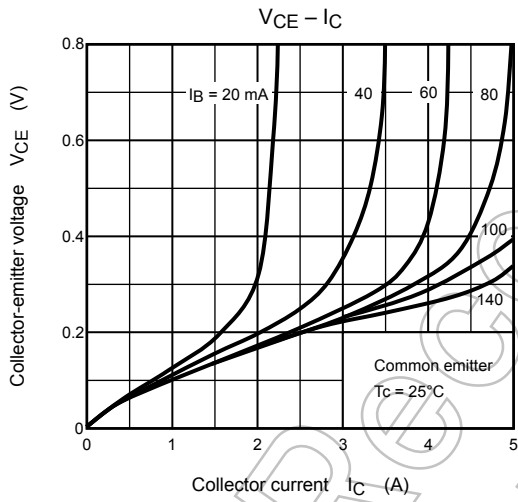
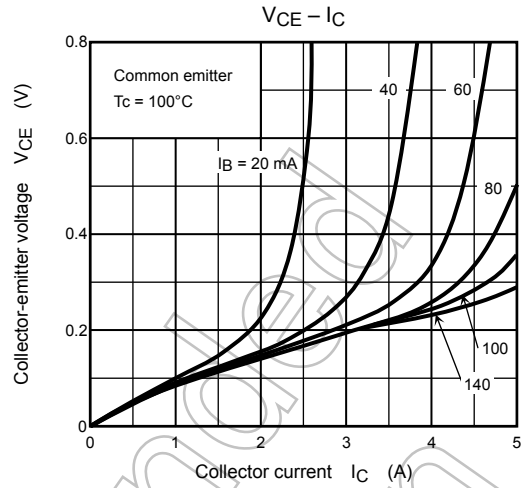
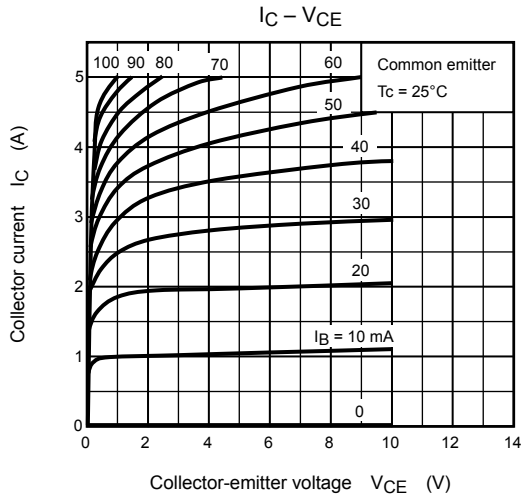


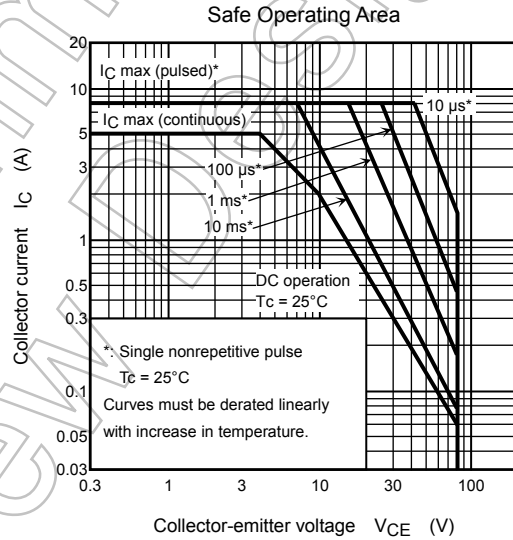
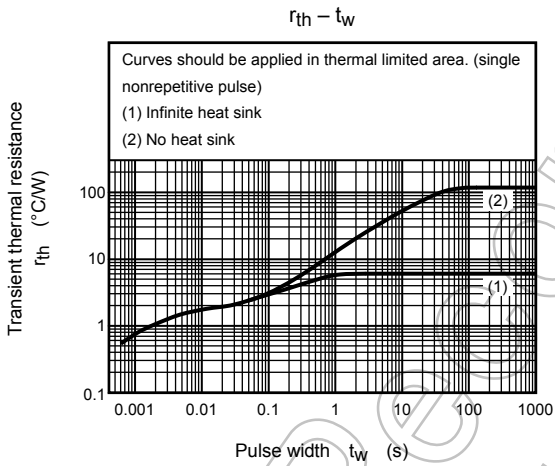
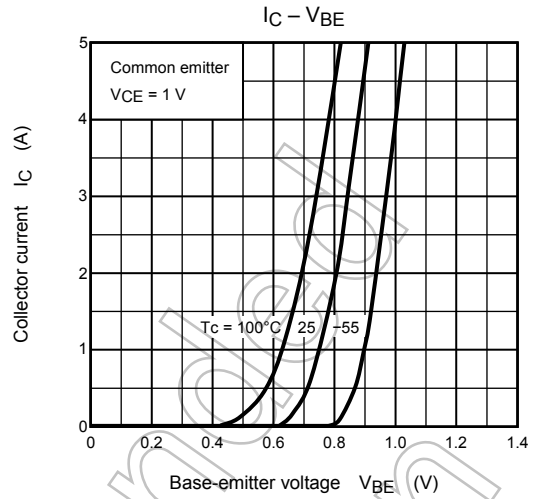
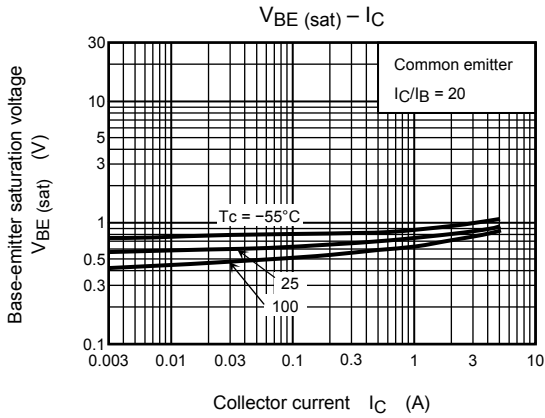
Note 1: A line under a Lot No. identifies the indication of product Labels.

Not underlined:  $[[\text{Pb}]]/\text{INCLUDES} > \text{MCV}$

Underlined:  $[[\text{G}]]/\text{RoHS COMPATIBLE}$  or  $[[\text{G}]]/\text{RoHS} [[\text{Pb}]]$

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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