

TOSHIBA Transistor Silicon NPN Epitaxial Type

# TPC6502

High-Speed Switching Applications  
 DC-DC Converter Applications  
 Strobe Applications

- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.3$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.14$  V (max)
- High-speed switching:  $t_f = 120$  ns (typ.)

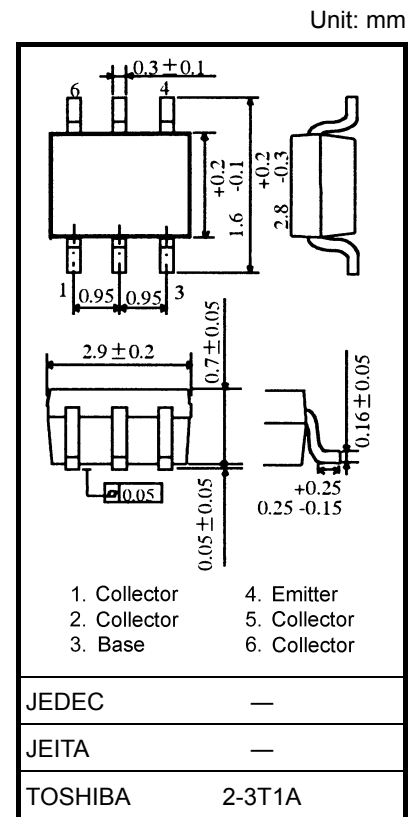
### Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit	
Collector-base voltage	$V_{CBO}$	100	V	
Collector-emitter voltage	$V_{CEX}$	80	V	
Collector-emitter voltage	$V_{CEO}$	50	V	
Emitter-base voltage	$V_{EBO}$	7	V	
Collector current	DC	$I_C$	3.0	A
	Pulse	$I_{CP}$	5.0	
Base current	$I_B$	300	mA	
Collector power dissipation	DC	$P_C$ (Note 1)	0.8	W
	$t = 10$ s		1.6	
Junction temperature	$T_j$	150	°C	
Storage temperature range	$T_{stg}$	-55 to 150	°C	

Note 1: Mounted on an FR4 board (glass-epoxy; 1.6 mm thick; Cu area, 645 mm<sup>2</sup>)

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.

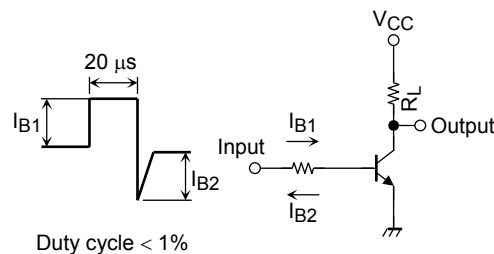
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



Weight: 0.01 g (typ.)

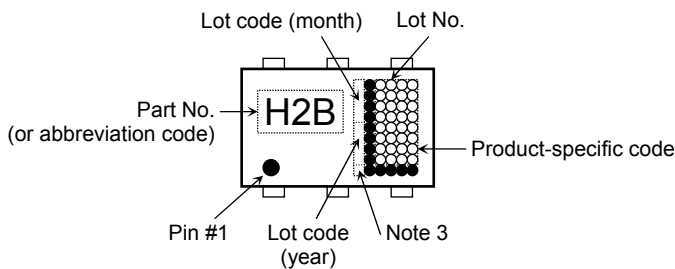
**Electrical Characteristics (Ta = 25°C)**

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit	
Collector cutoff current	$I_{CBO}$	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	100	nA	
Emitter cutoff current	$I_{EBO}$	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	100	nA	
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	50	—	—	V	
DC current gain	$h_{FE(1)}$	$V_{CE} = 2\text{ V}, I_C = 0.3\text{ A}$	400	—	1000		
	$h_{FE(2)}$	$V_{CE} = 2\text{ V}, I_C = 1\text{ A}$	200	—	—		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 20\text{ mA}$	—	—	0.14	V	
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 20\text{ mA}$	—	—	1.10	V	
Collector output capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	13	—	pF	
Switching time	Rise time	$t_r$	See Figure 1 circuit diagram.		—	40	ns
	Storage time	$t_{stg}$	$V_{CC} \approx 30\text{ V}, R_L = 30\ \Omega$		—	500	
	Fall time	$t_f$	$I_{B1} = 33.3\text{ mA}, I_{B2} = 33.3\text{ mA}$		—	120	

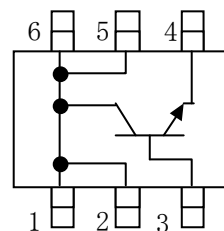


**Figure 1. Switching Time Test Circuit & Timing Chart**

**Marking**



**Circuit Configuration**

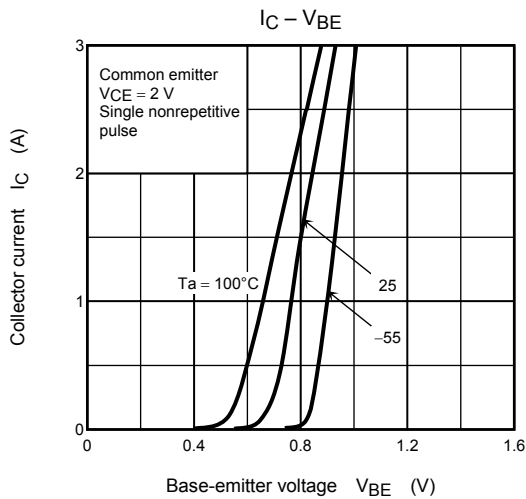
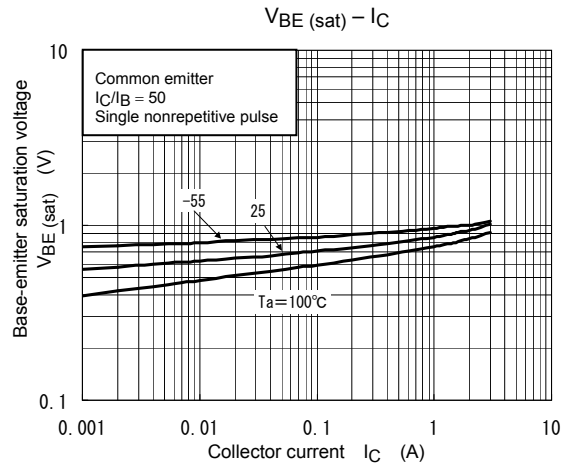
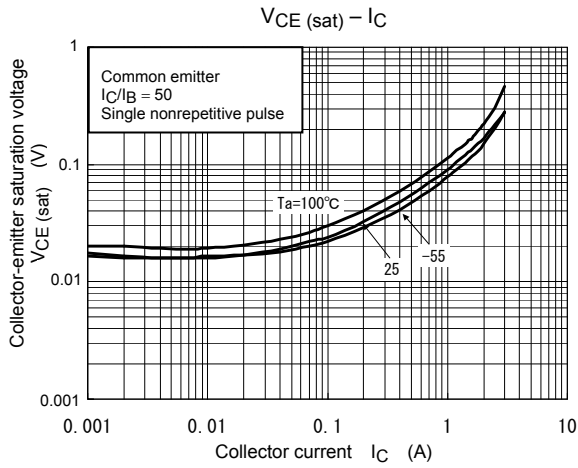
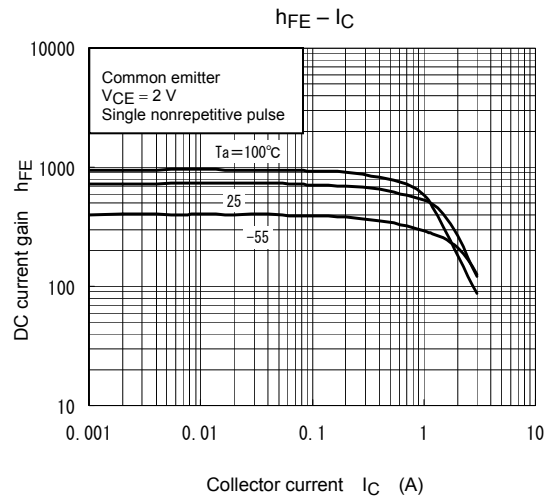
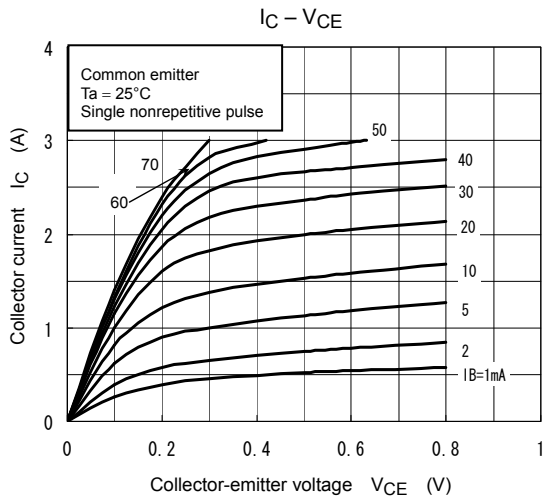


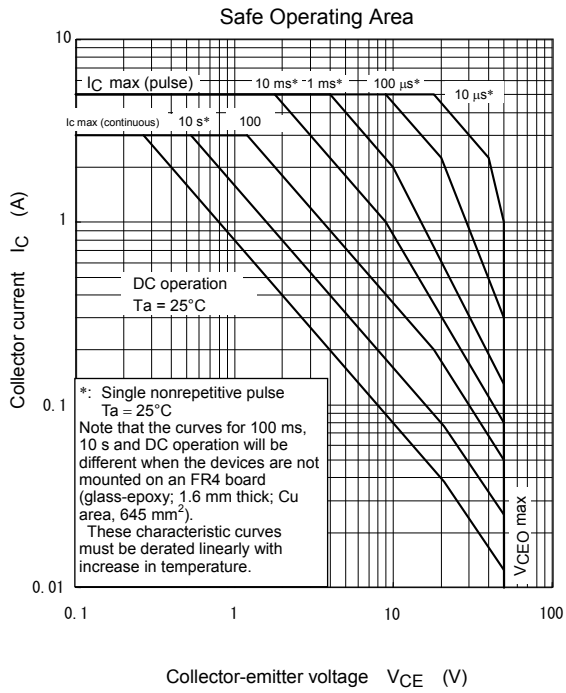
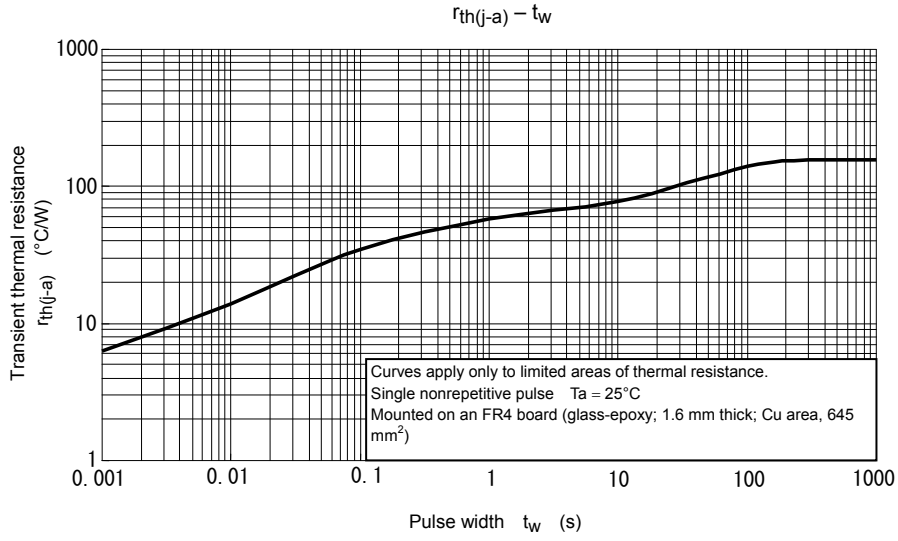
Note 3: A dot marking for identifying the indication of product Labels.

Without a dot: [[Pb]]/INCLUDES > MCV

With a dot: [[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 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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