

# TPC6701

High-Speed Switching Applications  
 Motor Drive Applications  
 Inverter Lighting Applications

- Two NPN transistors are mounted on a compact and slim package.
- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.1$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.17$  V (max)
- High-speed switching:  $t_f = 85$  ns (typ.)

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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	100	V
Collector-emitter voltage	$V_{CEX}$	80	V
Collector-emitter voltage	$V_{CEO}$	50	V
Emitter-base voltage	$V_{EBO}$	7	V
Collector current	DC	$I_C$	1.0
	Pulse	$I_{CP}$	2.0
Base current	$I_B$	0.1	A
Collector power dissipation (single-device operation)	$P_C$ (Note 1)	400	mW
Total collector power dissipation (simultaneous operation)	$P_{CT}$ (Note 2)	660	mW
Thermal resistance, junction to ambient (single-device operation)	$R_{th(j-a)}$ (Note 1)	312	$^\circ\text{C/W}$
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$

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

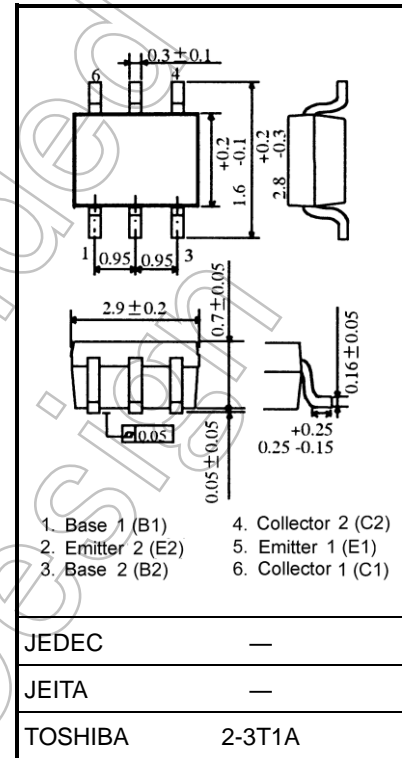
Note 2: Mounted on an FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm<sup>2</sup>)

Total collector power dissipation value when two devices are operated at the same time

Note 3: 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).

Unit: mm

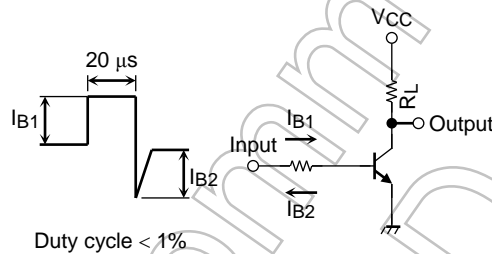


Weight: 0.011 g (typ.)

Start of commercial production  
 2001-09

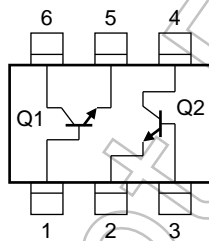
**Electrical Characteristics (Ta = 25°C)**

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		ICBO	V <sub>CB</sub> = 100 V, I <sub>E</sub> = 0 A	—	—	100	nA
Emitter cut-off current		IEBO	V <sub>EB</sub> = 7 V, I <sub>C</sub> = 0 A	—	—	100	nA
Collector-emitter breakdown voltage		V <sub>(BR)</sub> CEO	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0 A	50	—	—	V
DC current gain		hFE (1)	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 0.1 A	400	—	1000	
		hFE (2)	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 0.3 A	200	—	—	
Collector-emitter saturation voltage		V <sub>CE (sat)</sub>	I <sub>C</sub> = 300 mA, I <sub>B</sub> = 6 mA	—	—	0.17	V
Base-emitter saturation voltage		V <sub>BE (sat)</sub>	I <sub>C</sub> = 300 mA, I <sub>B</sub> = 6 mA	—	—	1.10	V
Collector output capacitance		Cob	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 A, f = 1 MHz	—	5	—	pF
Switching time	Rise time	t <sub>r</sub>	See Figure 1 circuit diagram.	—	35	—	ns
	Storage time	t <sub>stg</sub>	V <sub>CC</sub> ≈ 30 V, R <sub>L</sub> = 100 Ω	—	680	—	
	Fall time	t <sub>f</sub>	I <sub>B1</sub> = I <sub>B2</sub> = 10 mA	—	85	—	

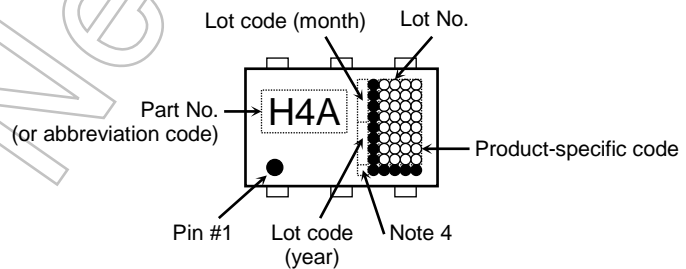


**Figure 1 Switching Time Test Circuit & Timing Chart**

**Circuit Configuration**



**Marking**

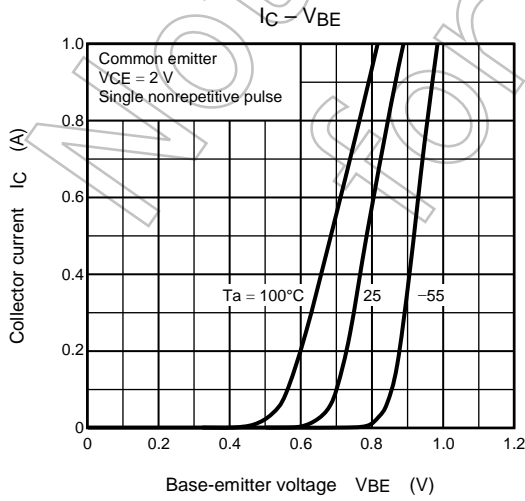
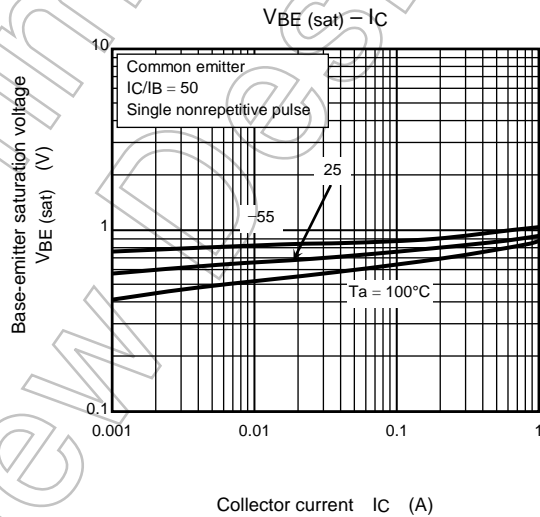
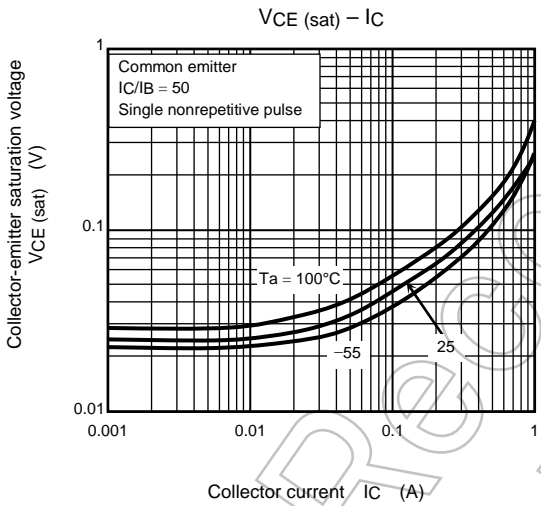
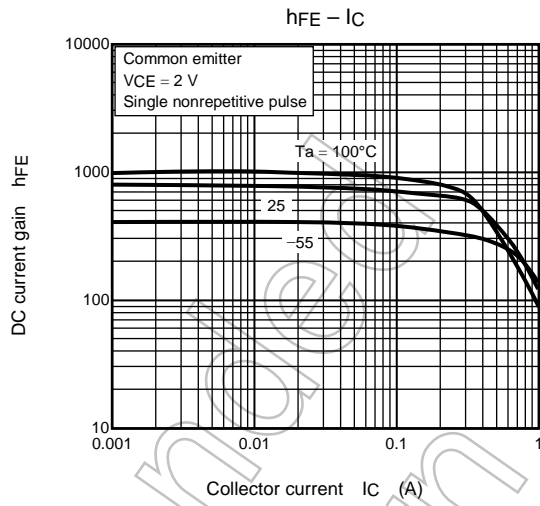
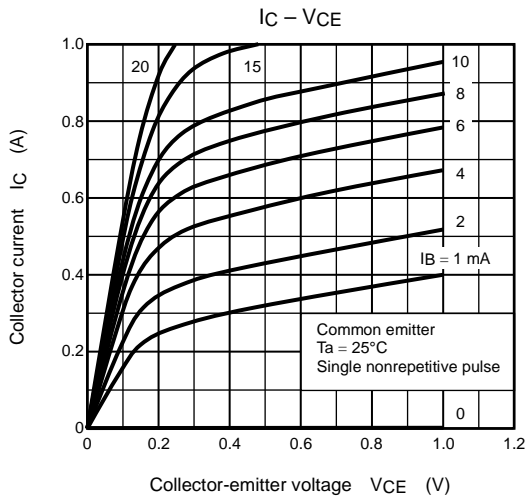


Note 4: A dot-marking identifies the indication of product Labels.

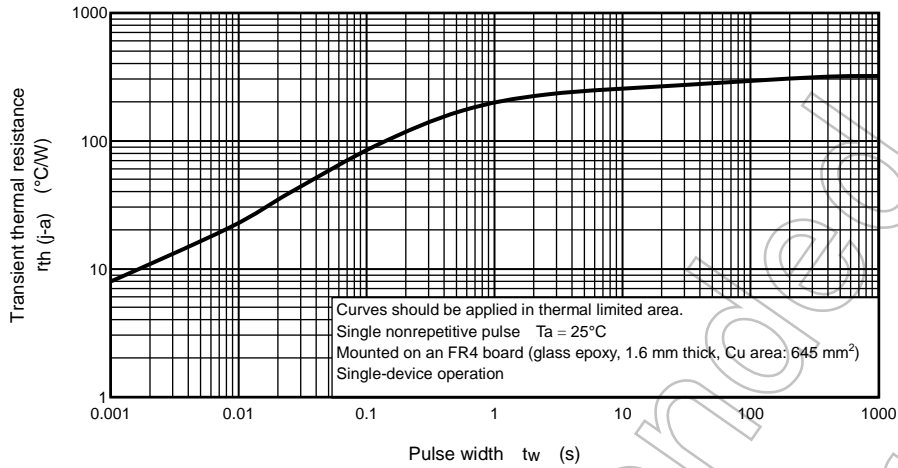
Without a dot: [[Pb]]/INCLUDES > MCV

With a dot: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

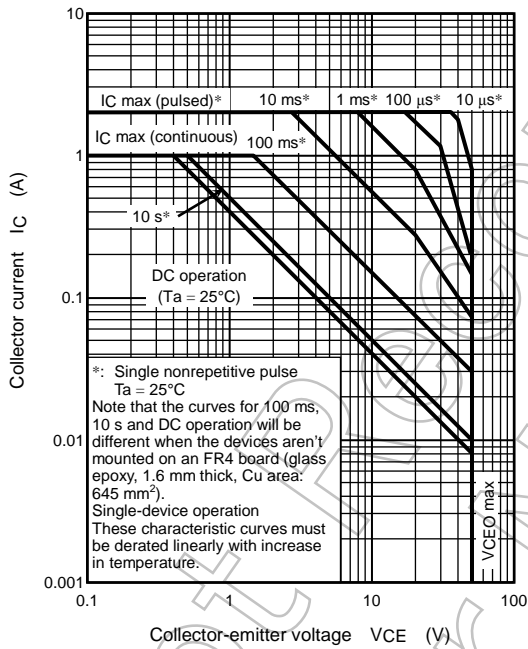
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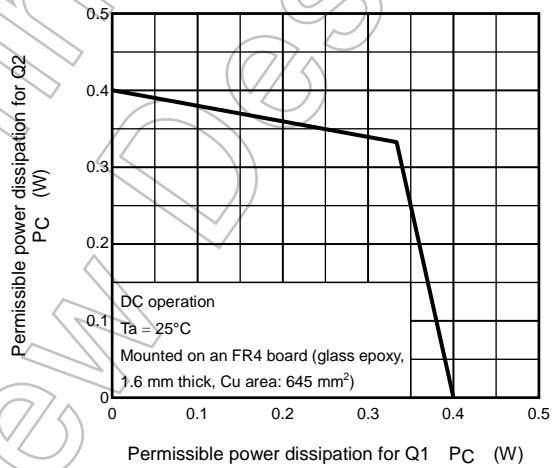
Transient Thermal Resistance  $r_{th} - t_w$



Safe Operating Area



Permissible Power Dissipation for Simultaneous Operation



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