

TOSHIBA Transistor Silicon NPN Epitaxial Type

# TPC6503

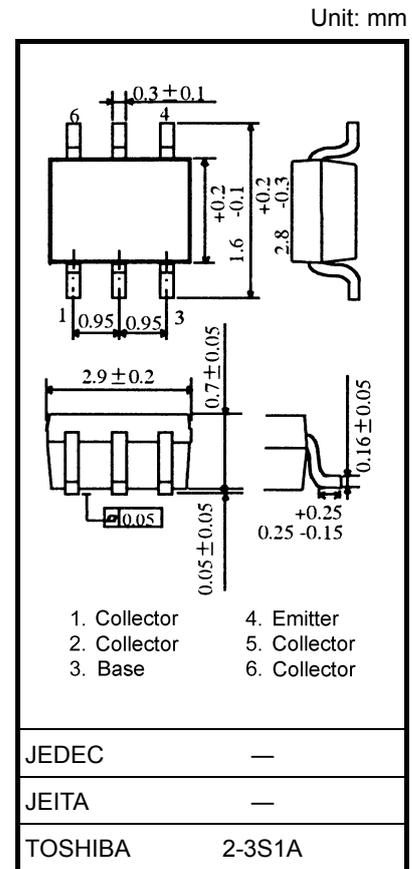
High-Speed Switching Applications  
 DC-DC Converter Applications  
 Strobe Applications

- High DC current gain:  $h_{FE} = 400$  to  $1000$  ( $I_C = 0.15$  A)
- Low collector-emitter saturation voltage:  $V_{CE(sat)} = 0.12$  V (max)
- High-speed switching:  $t_f = 45$  ns (typ.)

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

Characteristic	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	40	V
Collector-emitter voltage	$V_{CEX}$	30	V
Collector-emitter voltage	$V_{CEO}$	20	V
Emitter-base voltage	$V_{EBO}$	7	V
Collector current	DC	$I_C$	A
	Pulse	$I_{CP}$	
Base current	$I_B$	150	mA
Collector power dissipation	DC	$P_C$ (Note)	0.8
	$t = 10$ s		1.6
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$

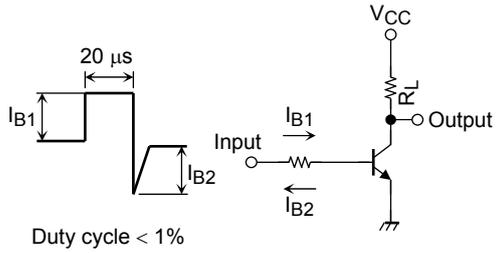
Note: Mounted on FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm<sup>2</sup>)



Weight: 0.01 g (typ.)

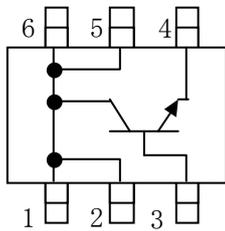
## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Test Conditions	Min	Typ.	Max	Unit	
Collector cut-off current	$I_{CBO}$	$V_{CB} = 40$ V, $I_E = 0$	—	—	100	nA	
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 7$ V, $I_C = 0$	—	—	100	nA	
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10$ mA, $I_B = 0$	20	—	—	V	
DC current gain	$h_{FE(1)}$	$V_{CE} = 2$ V, $I_C = 0.15$ A	400	—	1000		
	$h_{FE(2)}$	$V_{CE} = 2$ V, $I_C = 0.5$ A	200	—	—		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.5$ A, $I_B = 10$ mA	—	—	0.12	V	
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.5$ A, $I_B = 10$ mA	—	—	1.10	V	
Collector output capacitance	$C_{ob}$	$V_{CB} = 10$ V, $I_E = 0$ , $f = 1$ MHz	—	18	—	pF	
Switching time	Rise time	$t_r$	See Figure 1 circuit diagram.		—	43	ns
	Storage time	$t_{stg}$	$V_{CC} \approx 12$ V, $R_L = 24 \Omega$		—	295	
	Fall time	$t_f$	$I_{B1} = -I_{B2} = 17$ mA		—	45	

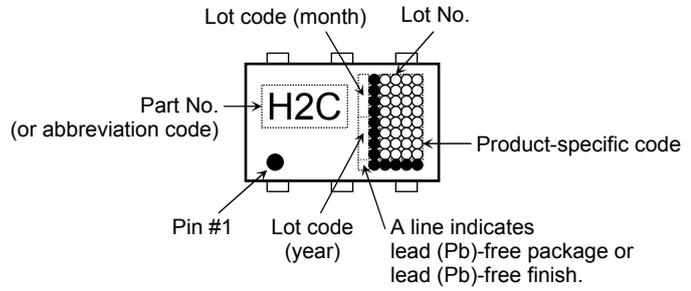


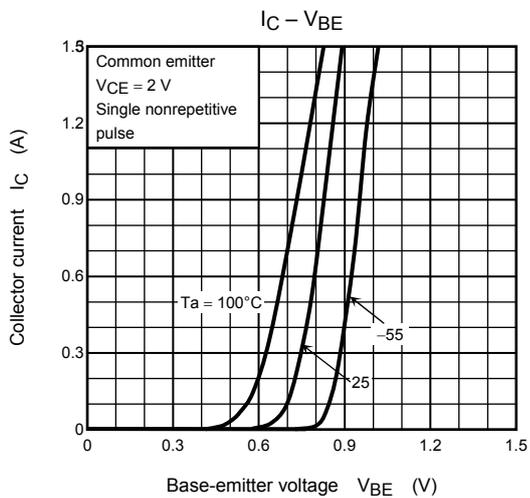
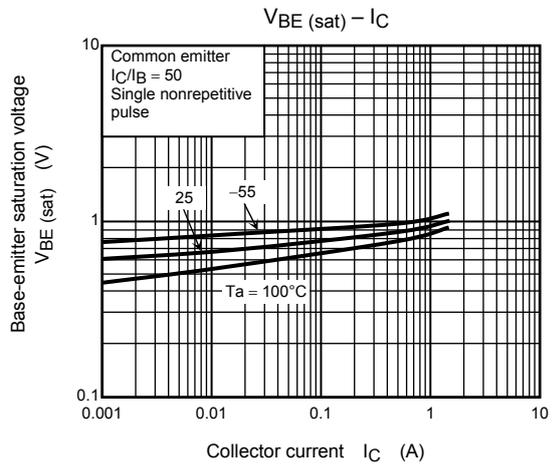
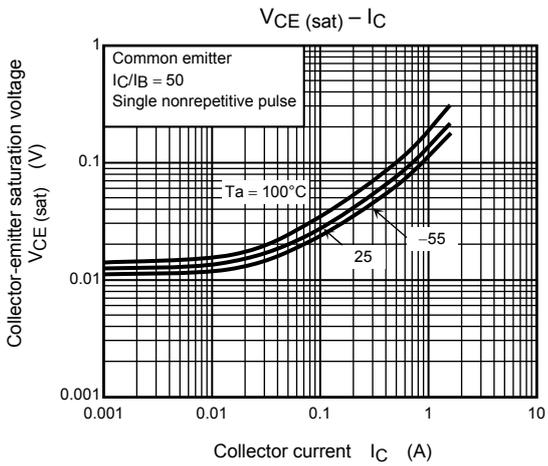
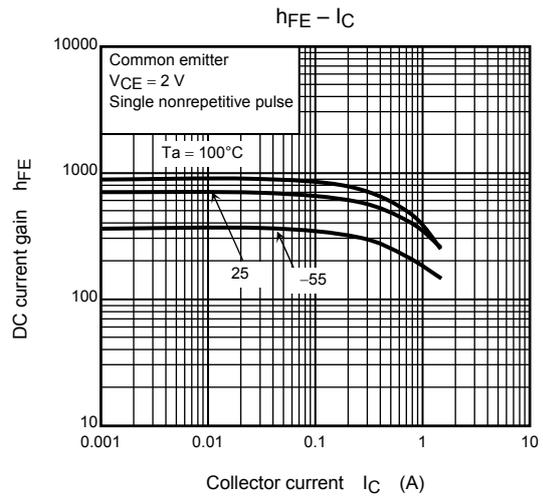
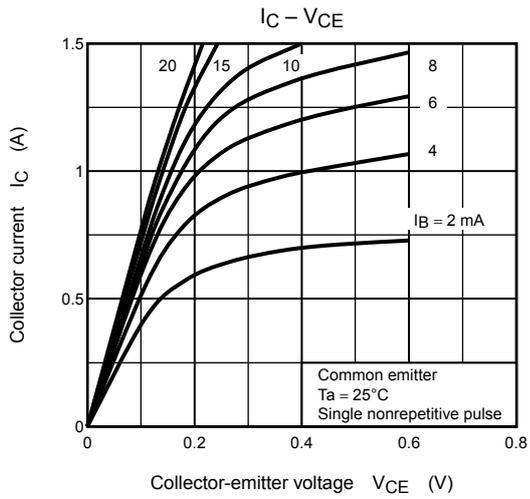
**Figure 1 Switching Time Test Circuit & Timing Chart**

**Circuit Configuration**

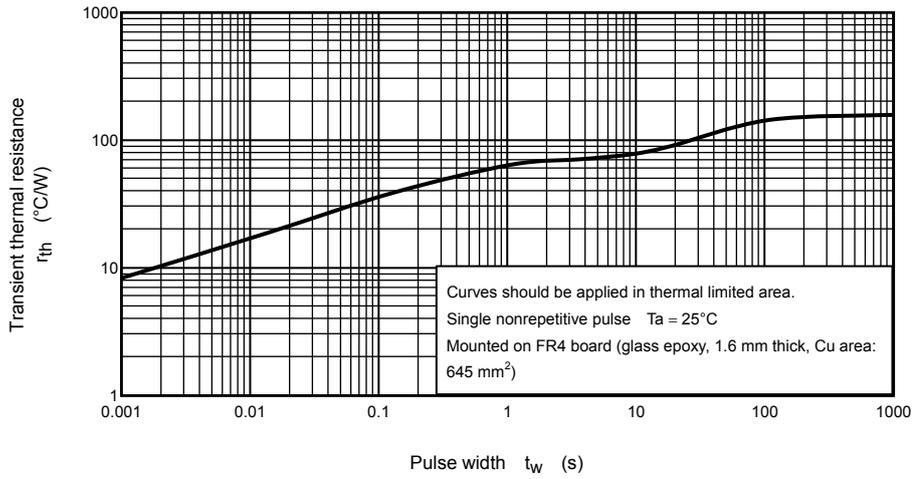


**Marking**

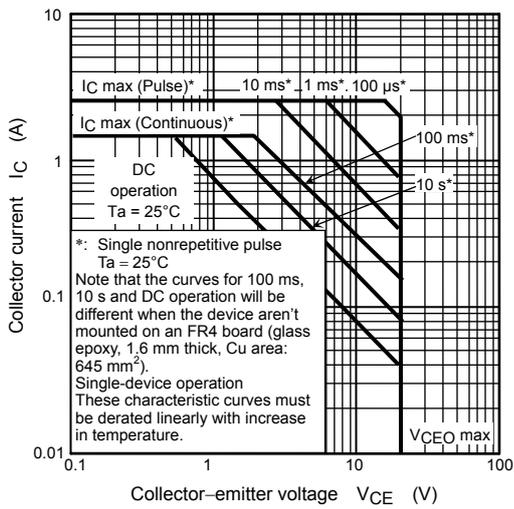




Transient Thermal Resistance  $r_{th} - t_w$



Safe operating area



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