

TOSHIBA Transistor Silicon NPN Epitaxial Type

TPC6503

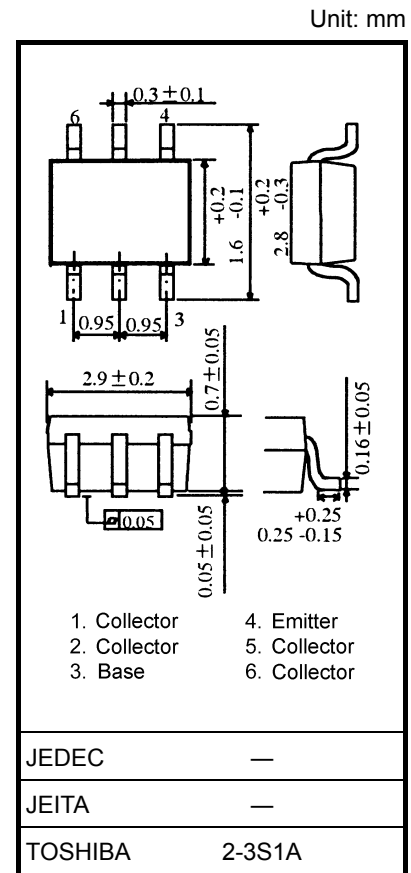
High-Speed Switching Applications
 DC-DC Converter Applications
 Strobe Applications

- 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 (Ta = 25°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	1.5
	Pulse	I_{CP}	2.5
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	°C
Storage temperature range	T_{stg}	-55 to 150	°C

Note: Mounted on FR4 board (glass epoxy, 1.6 mm thick, Cu area: 645 mm²)



Weight: 0.01 g (typ.)

Electrical Characteristics (Ta = 25°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	

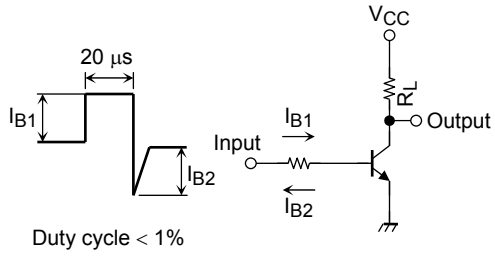
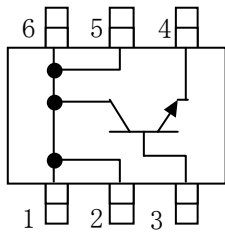
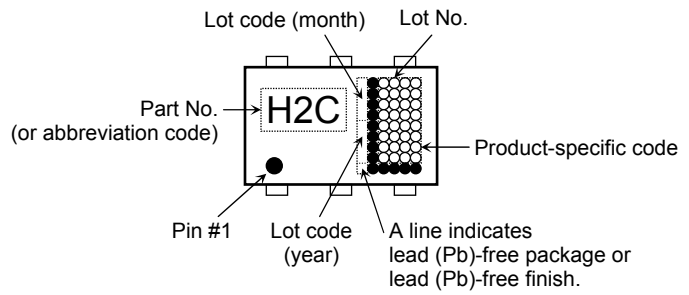


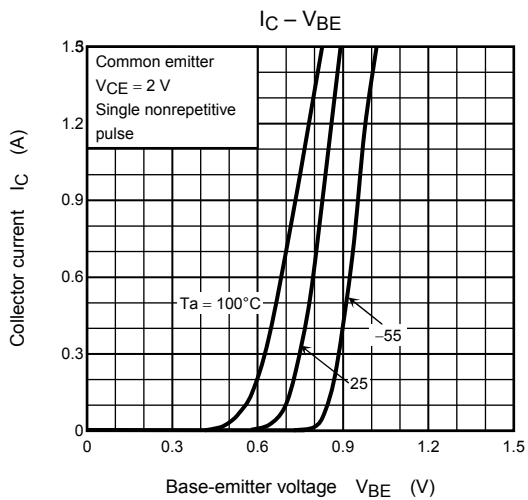
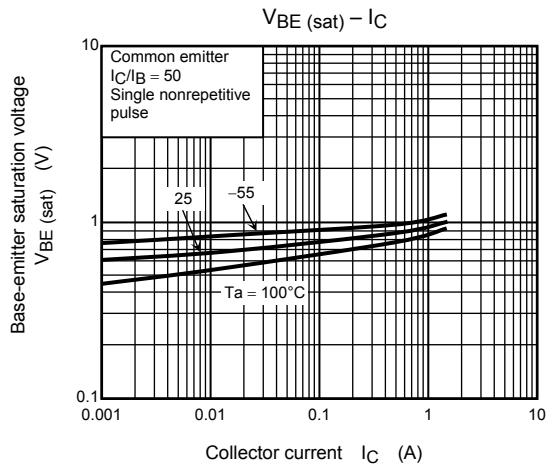
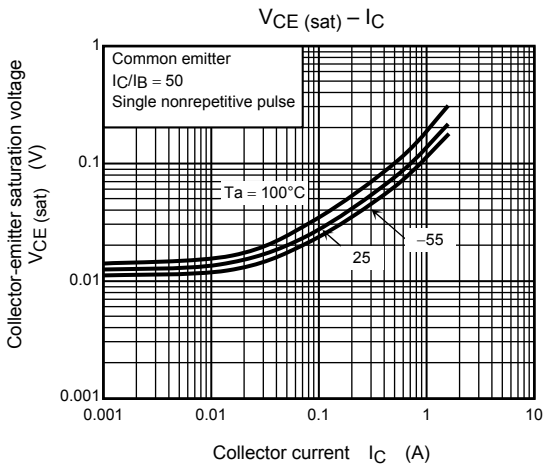
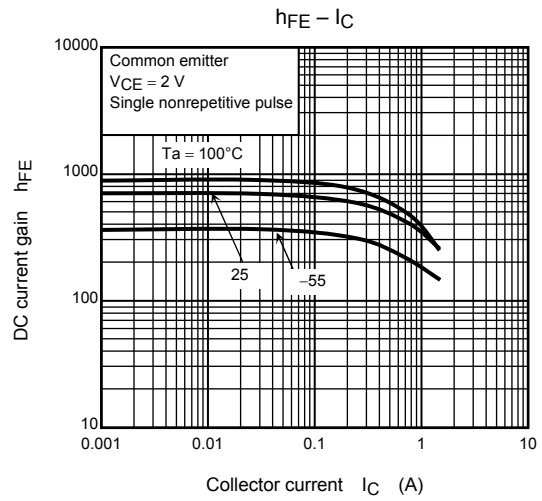
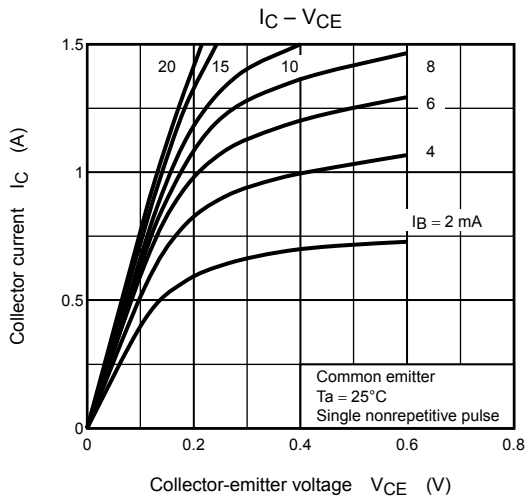
Figure 1 Switching Time Test Circuit & Timing Chart

Circuit Configuration

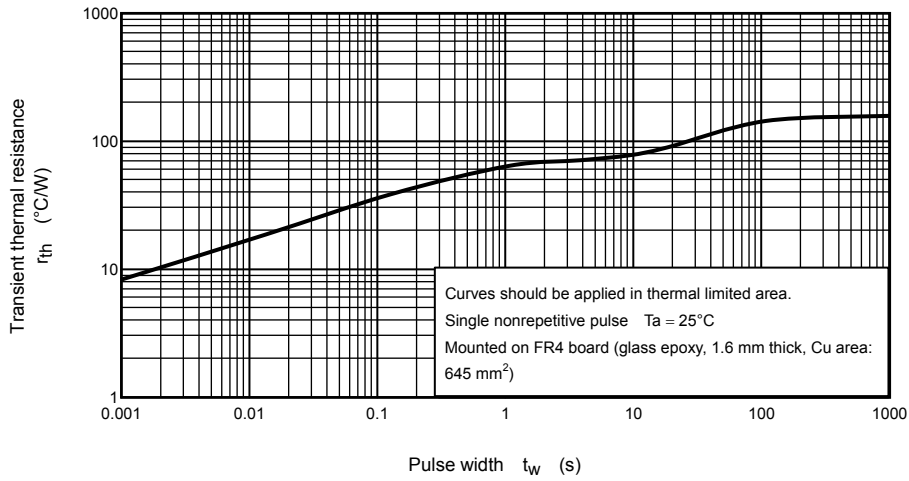


Marking

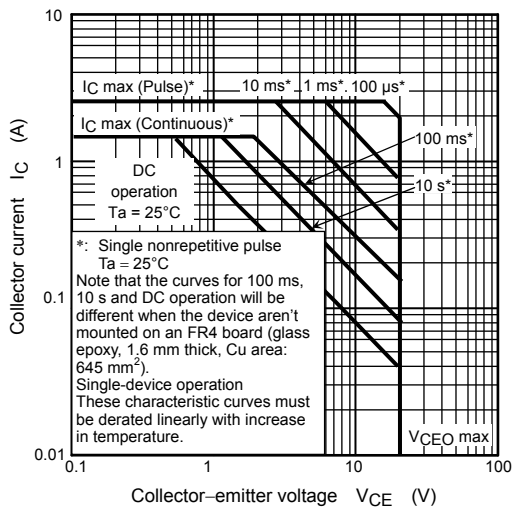




Transient Thermal Resistance $r_{th} - t_w$



Safe operating area



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