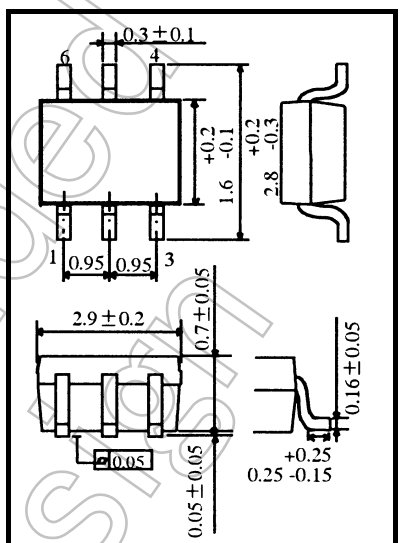
TOSHIBA Transistor Silicon NPN Epitaxial Type

TPC6504

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

- 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.)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-3T1C

Weight: 0.011 g (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
		V_{CEO}	50	V
Emitter-base voltage		V_{EBO}	7	V
Collector current (Note 1)	DC	I_C	1.0	A
	Pulse	I_{CP}	2.0	
Base current		I_B	0.1	A
Collector power dissipation (Note 2)	DC	P_C	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: Ensure that the channel temperature does not exceed 150°C during use of the device.

Note 2: Mounted on an FR4 board (glass-epoxy; 1.6 mm thick; Cu area, 645 mm^2)

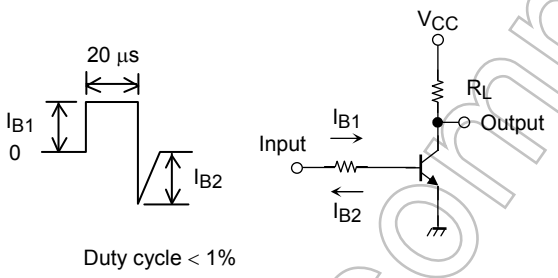
Note 3: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

Start of commercial production
2008-11

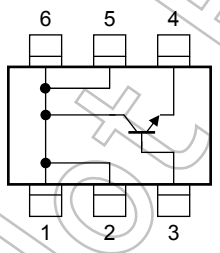
Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Conditions	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 100 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	50	—	—	V
DC current gain		h_{FE} (1)	V_{CE} = 2 V, I_C = 0.1 A	400	—	1000	
		h_{FE} (2)	V_{CE} = 2 V, I_C = 0.3 A	200	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 300 mA, I_B = 6 mA	—	—	0.17	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 300 mA, I_B = 6 mA	—	—	1.1	V
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	5	—	pF
Switching time	Rise time	t_r	See Figure 1 circuit diagram. $V_{CC} \approx$ 30 V, R_L = 100 Ω $I_{B1} = I_{B2}$ = 10mA	—	35	—	ns
	Storage time	t_{stg}		—	680	—	
	Fall time	t_f		—	85	—	

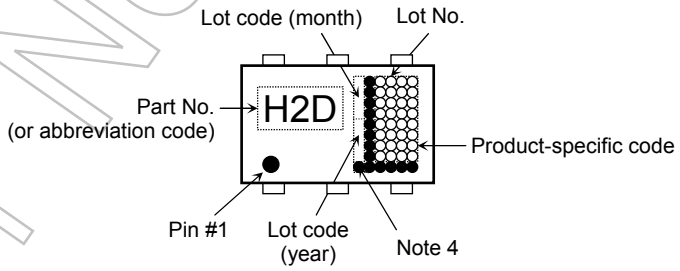
Figure 1. Switching Time Test Circuit & Timing Chart



Circuit Configuration



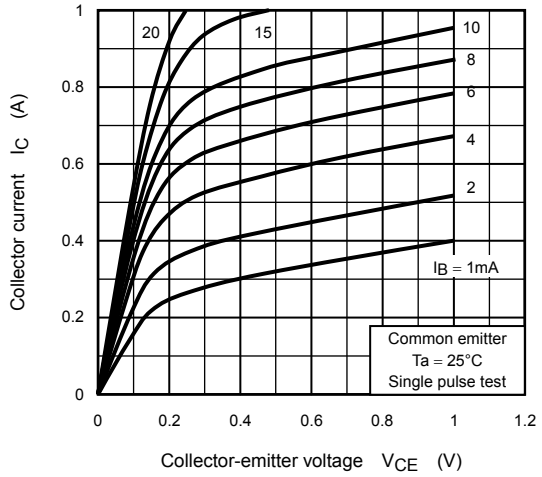
Marking



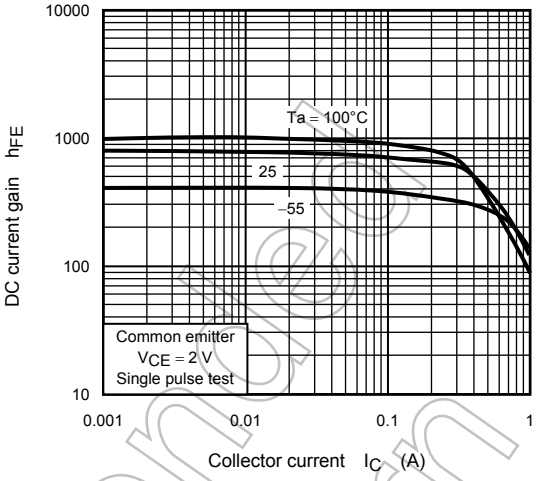
Note 4 : A dot marking identifies the indication of product Labels.
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.
The RoHS is the Directive 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.

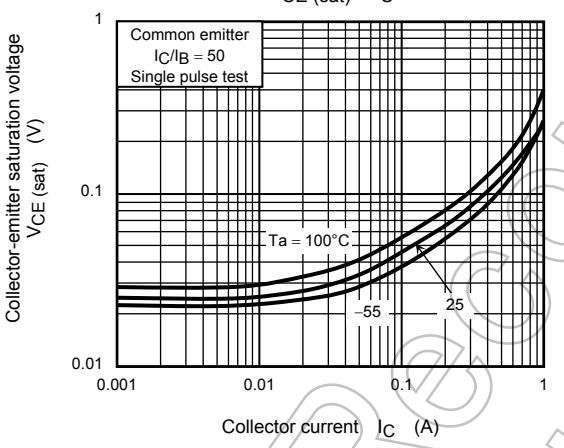
$I_C - V_{CE}$



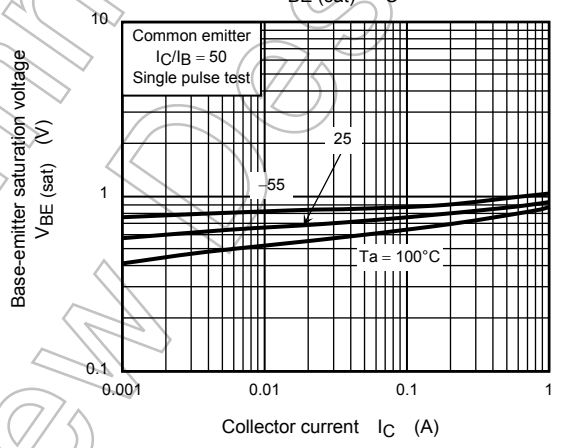
$h_{FE} - I_C$



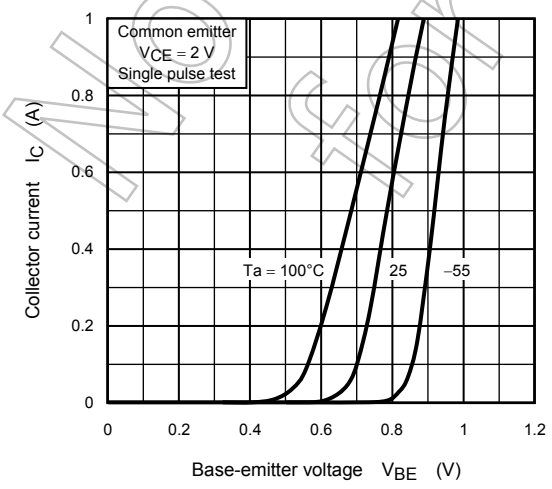
$V_{CE\ (sat)} - I_C$



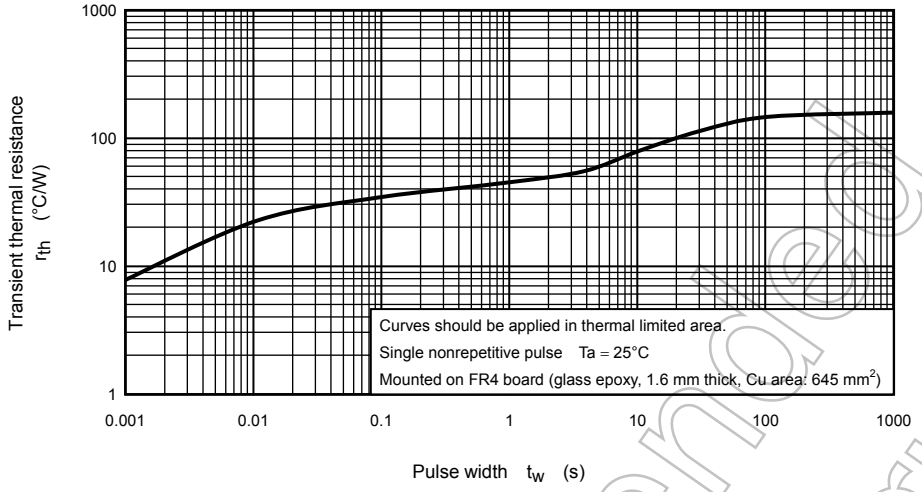
$V_{BE\ (sat)} - I_C$



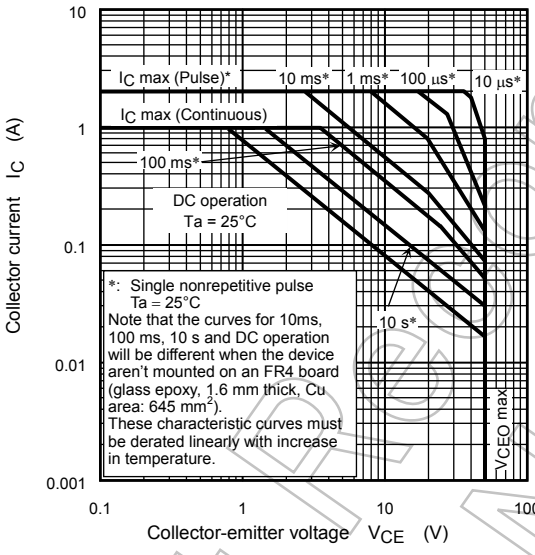
$I_C - V_{BE}$



$r_{th} - t_w$



Safe operating area



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