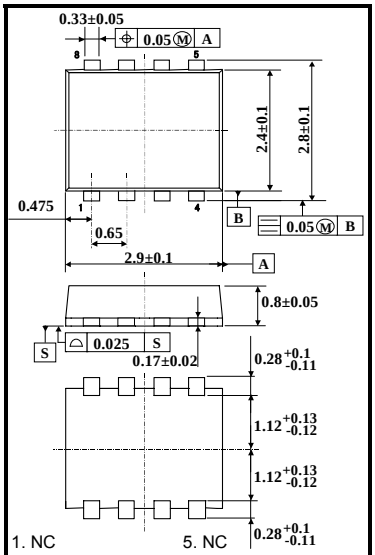
TOSHIBA Transistor Silicon NPN Triple Diffused Type

TPCP8503

High-Voltage Switching Applications

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-3V1D

Weight: 0.36 g (typ.)

- High breakdown voltage: V_{CEO} = 600 V
- Low saturation voltage: $V_{CE\ (sat)}$ = 1.0 V (max)
  (I_C = 20 mA, I_B = 0.5 mA)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	600	V
Collector-emitter voltage		V_{CEO}	600	V
Emitter-base voltage		V_{EBO}	7	V
Collector current (Note 1)	DC	I_C	50	mA
	Pulse	I_{CP}	100	
Base current		I_B	25	mA
Collector power dissipation (Note 2)	t=10s	P_C	2.2	W
	DC		1.1	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note: 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).

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	V_{CB} = 600 V, I_E = 0	—	—	100	μA
Emitter cut-off current	I_{EBO}	V_{EB} = 7 V, I_C = 0	—	—	100	μA
Collector-emitter breakdown voltage	V_{CEO}	I_C = 1 mA, I_B = 0	600	—	—	V
DC current gain	$h_{FE\ (1)}$	V_{CE} = 5 V, I_C = 1 mA	80	—	—	
	$h_{FE\ (2)}$	V_{CE} = 5 V, I_C = 20 mA	100	—	300	
Collector-emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 20 mA, I_B = 0.5 mA	—	—	1.0	V
Base-emitter voltage	V_{BE}	V_{CE} = 5 V, I_C = 20 mA	—	—	1.1	V
Collector output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	5.5	—	pF

Figure1. Circuit Configuration

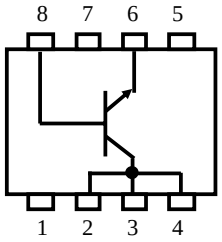
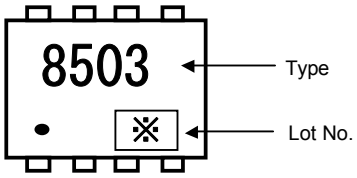
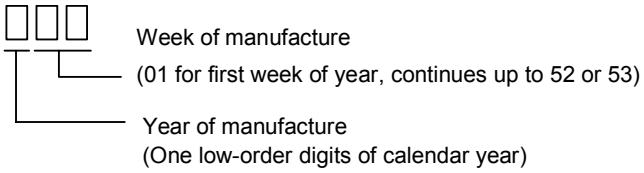


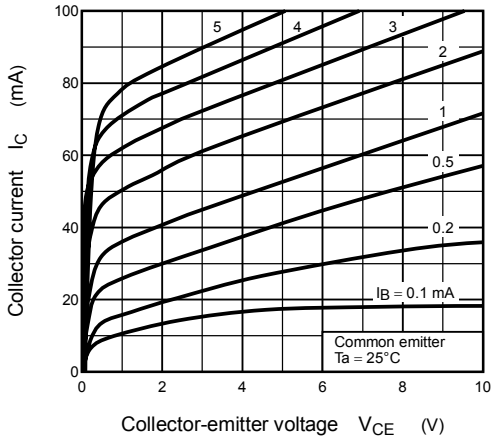
Figure2. Marking(Note 3)



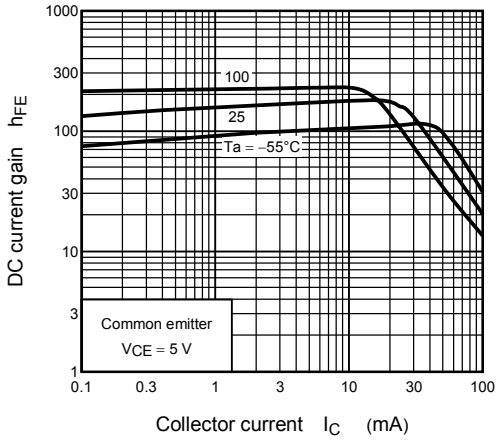
Note 1 : Please use devices on condition that the junction temperature is below 150°C.
Note 2 : Mounted on FR4 board(glass epoxy, 1.6mm thick, Cu area: 645mm^2)
Note 3 :● on lower left of the marking indicates Pin 1.
※ Weekly code: (three digits)



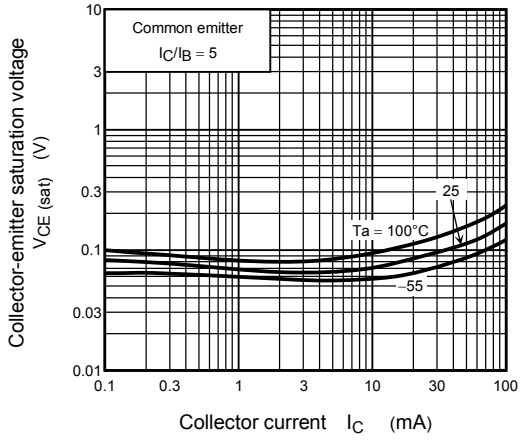
$I_C - V_{CE}$



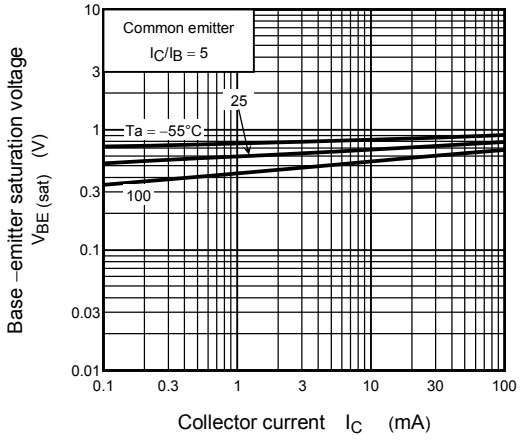
$h_{FE} - I_C$



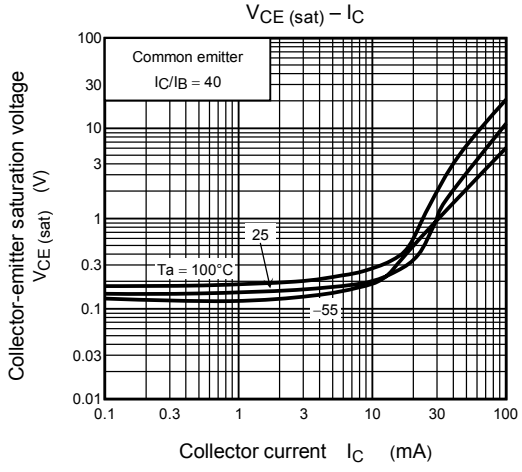
$V_{CE\ (sat)} - I_C$



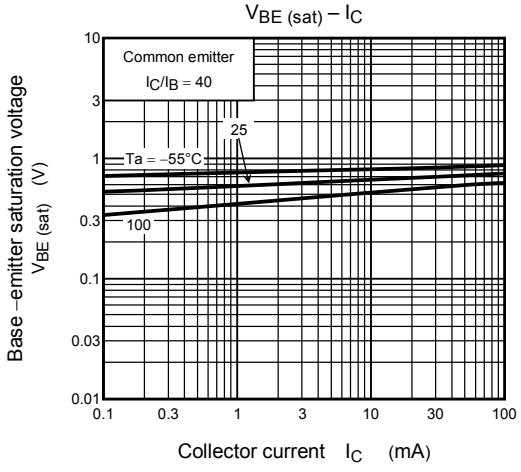
$V_{BE\ (sat)} - I_C$

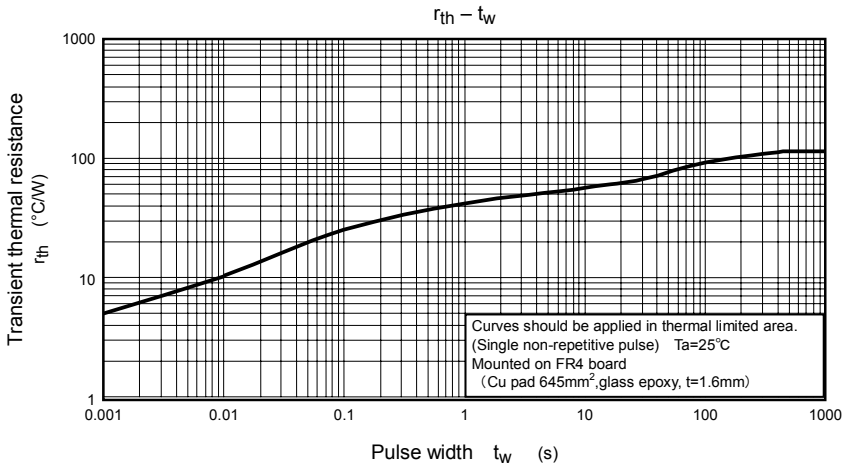


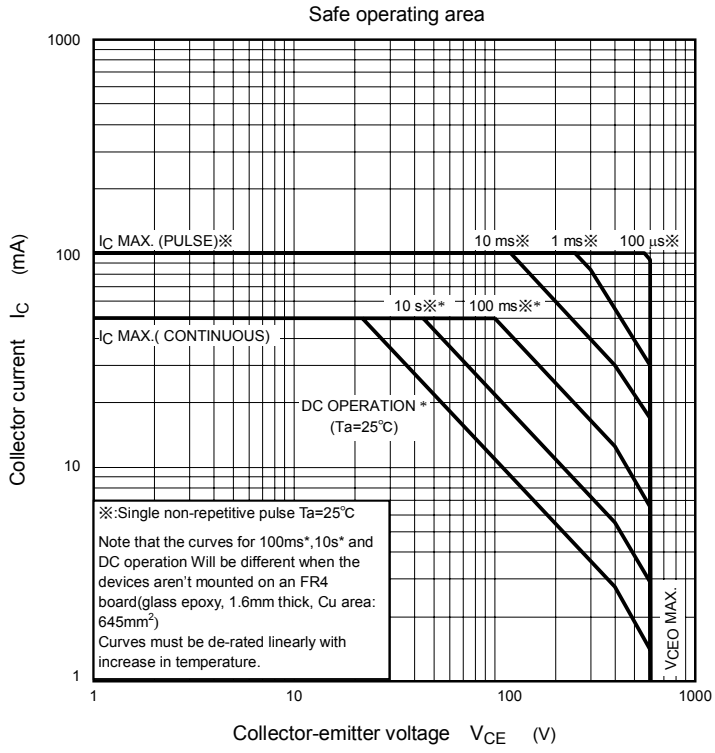
$V_{CE\ (sat)} - I_C$



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




$r_{th} - t_w$
Transient thermal resistance r_{th} (°C/W)
1000
100
10
1
0.001
0.01
0.1
1
10
100
1000
Curves should be applied in thermal limited area.
(Single non-repetitive pulse) Ta=25°C
Mounted on FR4 board
(Cu pad 645mm², glass epoxy, t=1.6mm)
Pulse width t_w (s)


Safe operating area
Collector current I_C (mA)
1000
100
10
1
I_C MAX. (PULSE)※
10 ms※
1 ms※
100 μs※
10 s※*
100 ms※*
I_C MAX.(CONTINUOUS)
DC OPERATION *
(Ta=25°C)
※:Single non-repetitive pulse Ta=25°C
Note that the curves for 100ms*,10s* and DC operation Will be different when the devices aren't mounted on an FR4 board(glass epoxy, 1.6mm thick, Cu area: 645mm²)
Curves must be de-rated linearly with increase in temperature.
V_{CEO} MAX.
1
10
100
1000
Collector-emitter voltage V_{CE} (V)

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