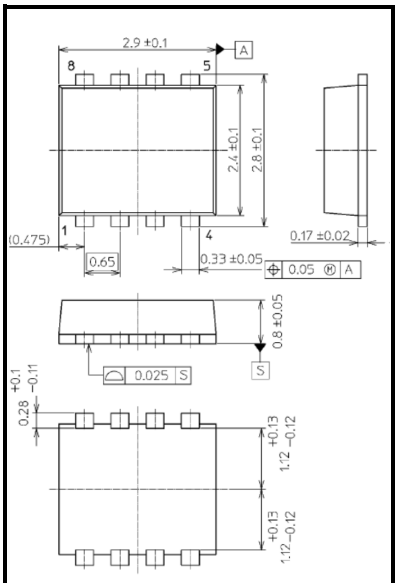
TOSHIBA Transistor Silicon PNP Diffused Type

TPCP8604

High-Voltage Switching Applications

High breakdown voltage: V_{CEO} = −400 V

Unit: mm



1. NC
2. Collector
3. Collector
4. Collector
5. NC
6. Emitter
7. NC
8. Base

JEDEC	—
JEITA	—
TOSHIBA	2-3V1D

Weight: 0.05 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	−400	V
Collector-emitter voltage		V_{CEO}	−400	V
Emitter-base voltage		V_{EBO}	−7	V
Collector current	DC (Note 1)	I_C	−0.3	A
	Pulse(Note 1)	I_{CP}	−1	
Base current		I_B	−0.25	A
Collector power dissipation	t=10s	P_C (Note 2)	−2.2	W
	DC		−1.1	
Junction temperature		T_j	−150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Note 1: Ensure that the junction temperature does not exceed 150°C.

Note 2: Device mounted on a 25.4mm x 25.4mm x 1.6mm FR-4 glass epoxy board (with a dissipating copper surface of 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
2006-02

Figure 1. Circuit Configuration (top view)

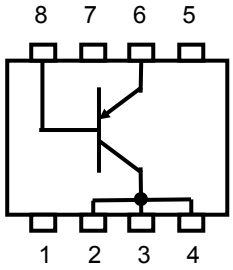
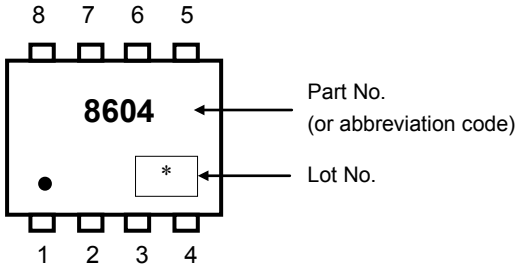
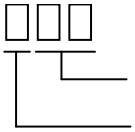


Figure 2. Marking (Note 4)



Note 4 ● on lower left of the marking indicates Pin #1.

* Weekly code (three digits)



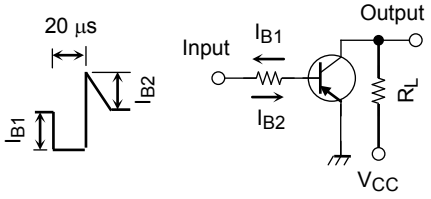
Week of manufacture
(01 for first week of calendar year ; sequential number up to 52 or 53)

Year of manufacture
(Last digit of calendar year)

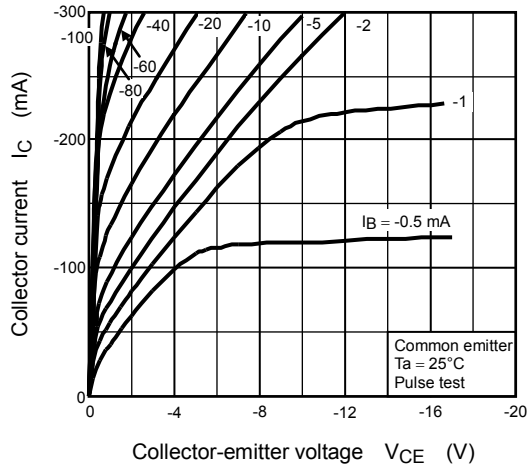
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −400 V, I_E = 0	—	—	−10	μA
Emitter cut-off current		I_{EBO}	V_{EB} = −7 V, I_C = 0	—	—	−1	μA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	I_C = −10 mA, I_B = 0	−400	—	—	V
DC current gain		$h_{FE}(1)$	V_{CE} = −5 V, I_C = −20 mA	140	—	450	
		$h_{FE}(2)$	V_{CE} = −5 V, I_C = −100 mA	140	—	400	
Collector-emitter saturation voltage		$V_{CE(sat)}$	I_C = −100 mA, I_B = −10 mA	—	−0.4	−1.0	V
Base-emitter saturation voltage		$V_{BE(sat)}$	I_C = −100 mA, I_B = −10 mA	—	−0.76	−0.9	V
Transition frequency		f_T	V_{CE} = −5 V, I_C = −50 mA	—	35	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = −10 V, I_E = 0, f = 1 MHz	—	18	—	pF
Switching time	Turn-on time	t_{on}	See Figure 3	—	0.2	—	μs
	Storage time	t_{stg}	I_{B1} = 10 mA, I_{B2} = 20 mA,	—	2.3	—	
	Fall time	t_f	Duty cycle ≤ 1%	—	0.2	—	

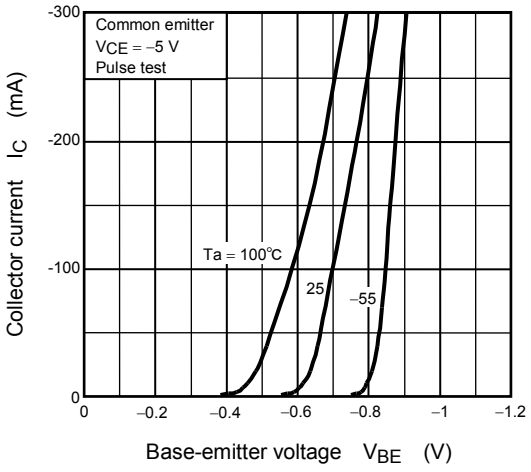
Figure 3. Switching Time Test Circuit



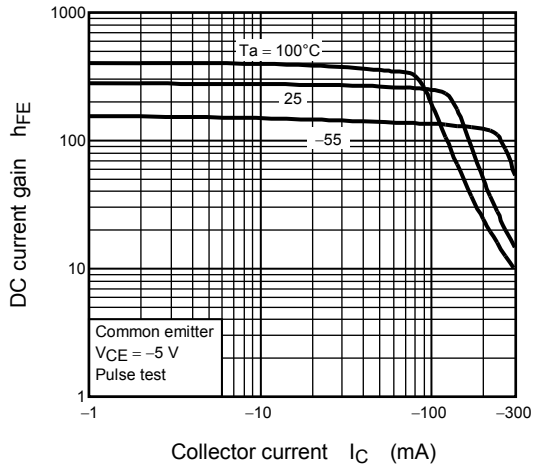
$I_C - V_{CE}$



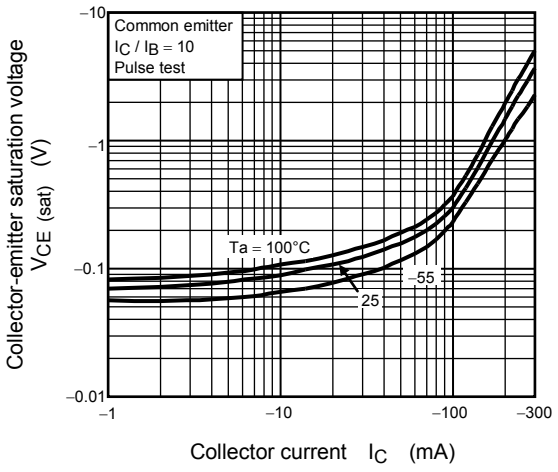
$I_C - V_{BE}$



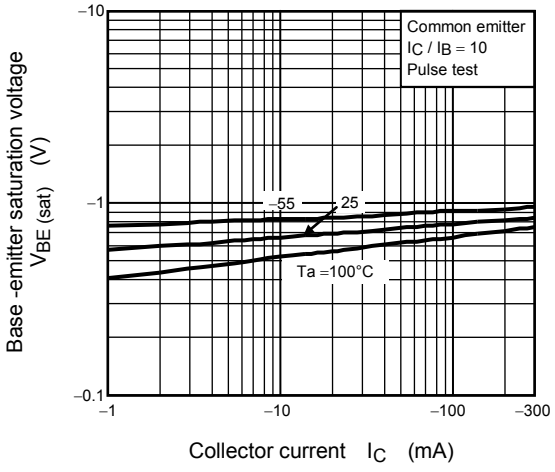
$h_{FE} - I_C$



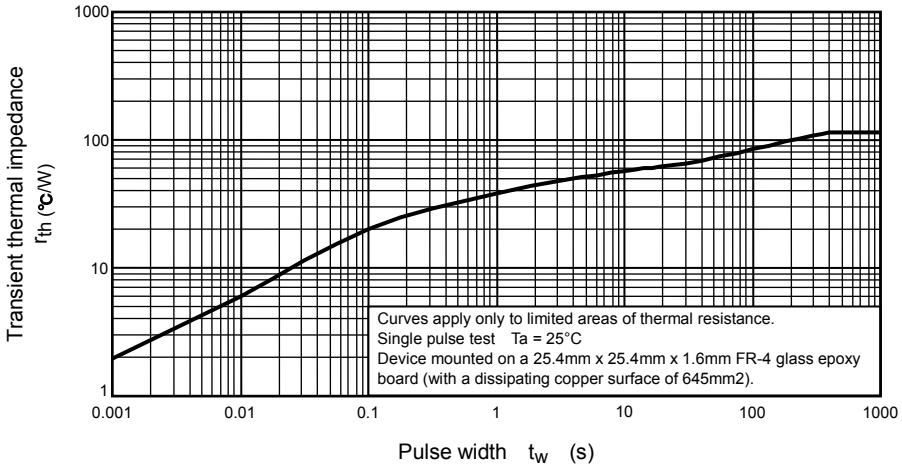
$V_{CE\ (sat)} - I_C$



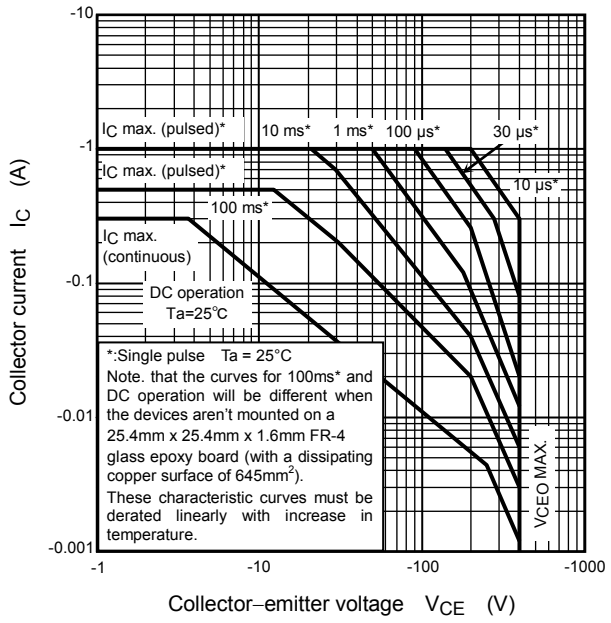
$V_{BE\ (sat)} - I_C$



$r_{th} - t_w$



Safe Operating Area



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