

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

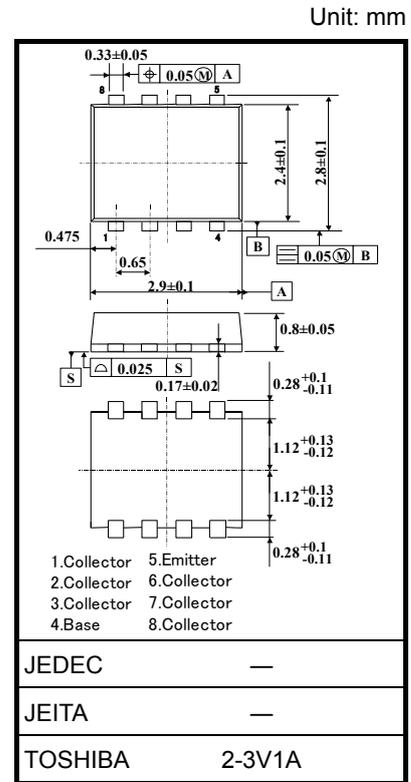
TPCP8505

High-Speed Switching Applications
DC-DC Converter Applications

- High DC current gain: $h_{FE} = 400$ to 1000 ($I_C = 0.3$ A)
- Low collector-emitter saturation: $V_{CE(sat)} = 0.14$ V (max)
- High-speed switching: $t_f = 120$ ns (typ.)

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

Characteristic		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	100	V
Collector-emitter voltage		V_{CEX}	80	V
		V_{CEO}	50	
Emitter-base voltage		V_{EBO}	7	V
Collector current	DC (Note 1)	I_C	3.0	A
	Pulse (Note 1)	I_{CP}	5.0	
Base current		I_B	0.3	A
Collector power dissipation ($t = 10$ s)	$t = 10$ s	P_C (Note 2)	3.0	W
	DC		1.25	
Junction temperature		T_j	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to 150	$^\circ\text{C}$



Weight: 0.017 g (typ.)

Note 1: Ensure that the junction temperature does not exceed 150°C during use of this 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
2004-06

Figure 1. Circuit Configuration (top view)

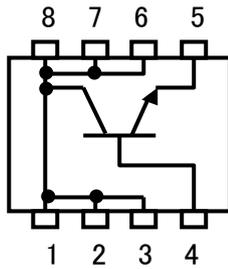
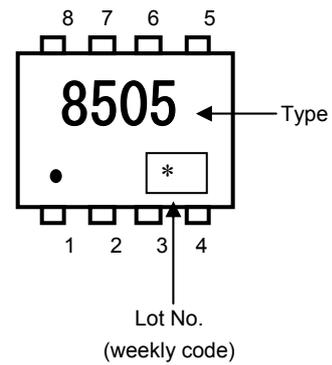
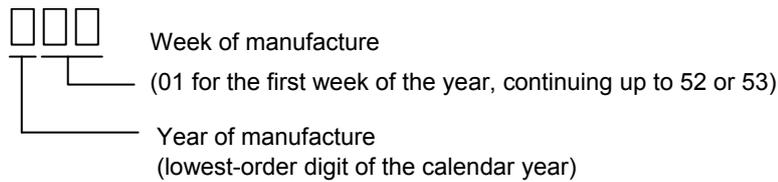


Figure 2. Marking (Note 4)



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

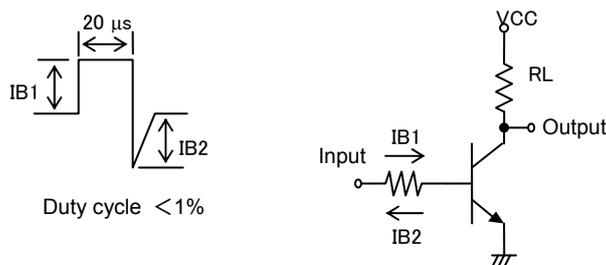
* Weekly code (three digits):

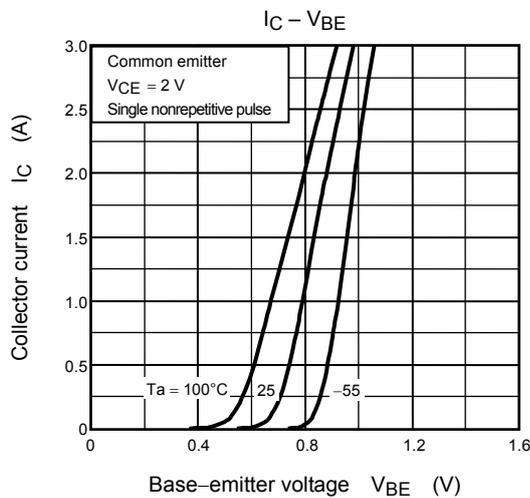
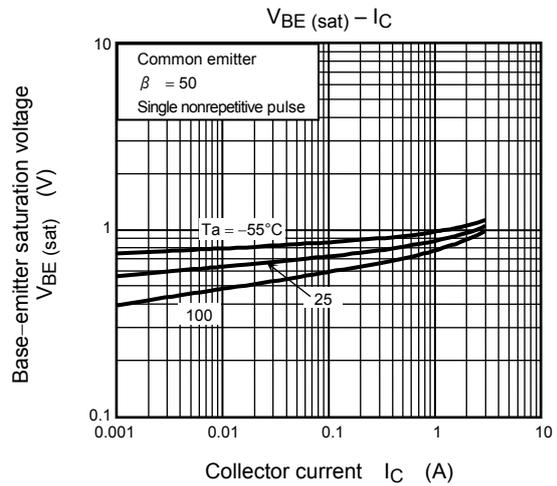
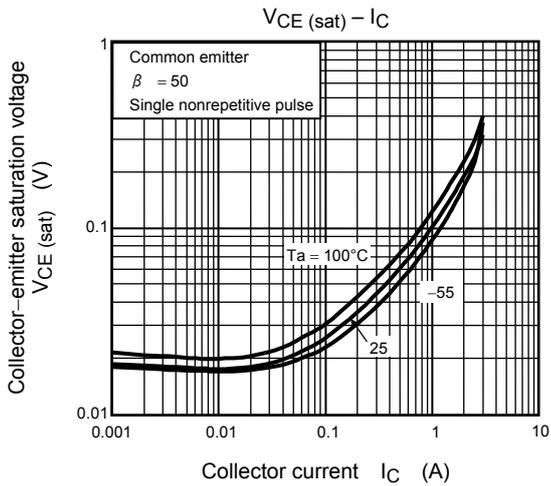
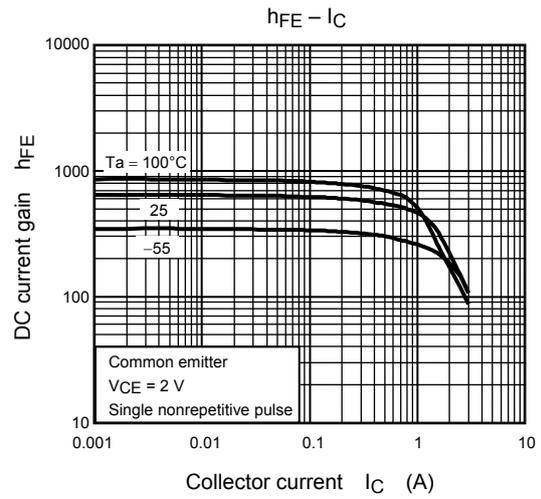
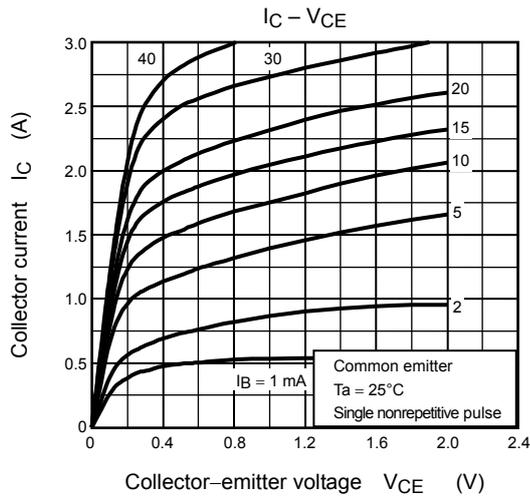


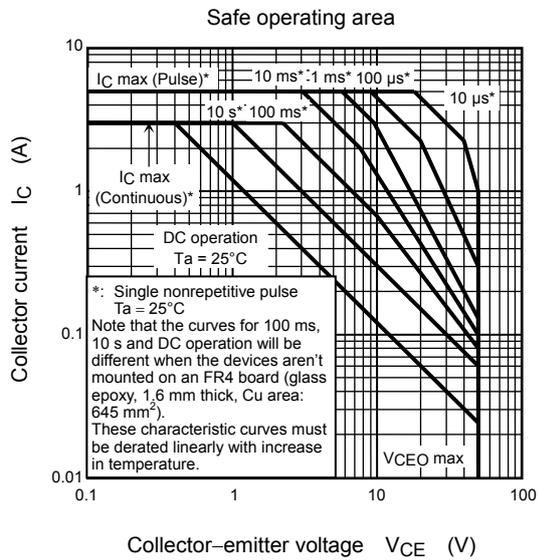
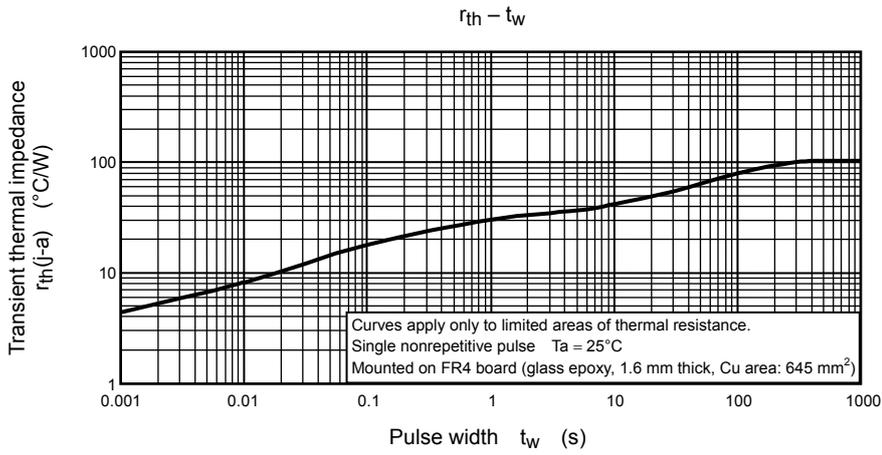
Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	$V_{CB} = 100\text{ V}, I_E = 0$	—	—	100	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 7\text{ V}, I_C = 0$	—	—	100	nA
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 1\text{ mA}, I_B = 0$	100	—	—	V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 10\text{ mA}, I_B = 0$	50	—	—	V
DC current gain	$h_{FE(1)}$	$V_{CE} = 2\text{ V}, I_C = 0.3\text{ A}$	400	—	1000	
	$h_{FE(2)}$	$V_{CE} = 2\text{ V}, I_C = 1.0\text{ A}$	200	—	—	
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = 20\text{ mA}$	—	—	0.14	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = 20\text{ mA}$	—	—	1.1	V
Switching time	Rise time	t_r	—	40	—	ns
	Storage time	t_{stg}	—	500	—	
	Fall time	t_f	—	120	—	

Figure 3. Switching Time Test Circuit & Timing Chart







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