

TOSHIBA Transistor Silicon PNP Epitaxial Type (PCT process)

2SA1681

Power Amplifier Applications  
Power Switching Applications

- Low saturation voltage:  $V_{CE(sat)} = -0.5\text{ V (max)}$  ( $I_C = -1\text{ A}$ )
- High speed switching time:  $t_{stg} = 300\text{ ns (typ.)}$
- Small flat package
- $P_C = 1.0\text{ to }2.0\text{ W}$  (mounted on a ceramic substrate)
- Complementary to 2SC4409

Absolute Maximum Ratings (Ta = 25°C)

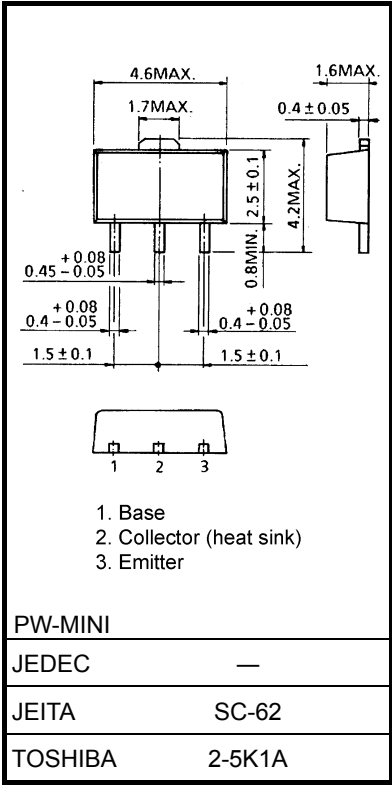
Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	-60	V
Collector-emitter voltage	$V_{CEO}$	-50	V
Emitter-base voltage	$V_{EBO}$	-6	V
Collector current	$I_C$	-2	A
Base current	$I_B$	-0.2	A
Collector power dissipation	$P_C$	500	mW
	$P_C$ (Note 1)	1000	
Junction temperature	$T_j$	150	°C
Storage temperature range	$T_{stg}$	-55 to 150	°C

Note 1: Mounted on a ceramic substrate (250 mm<sup>2</sup> × 0.8 t)

Note 2: 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.

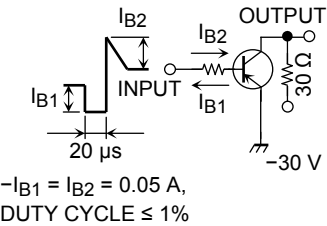
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm

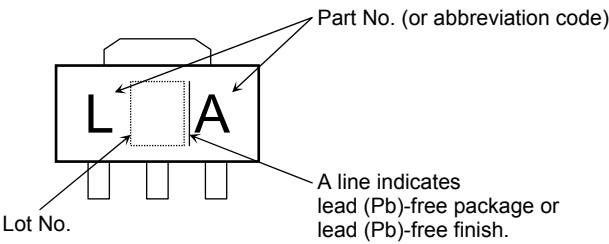


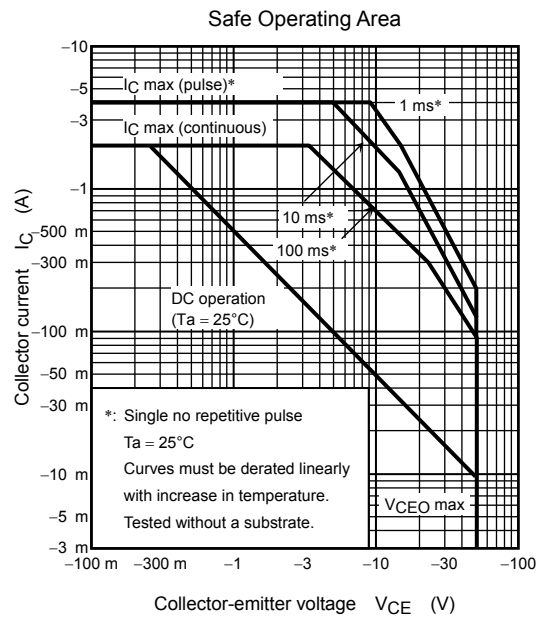
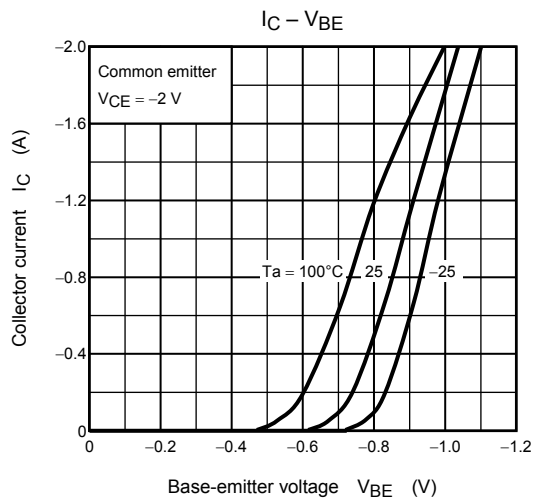
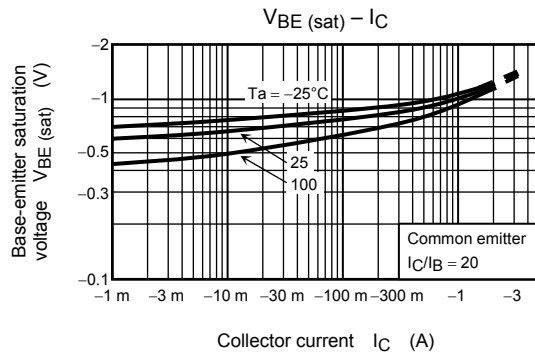
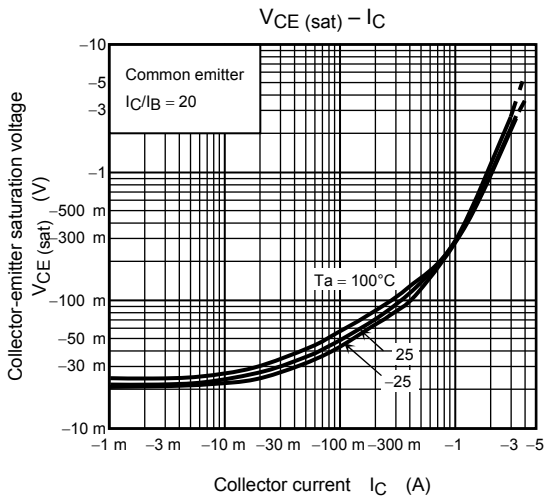
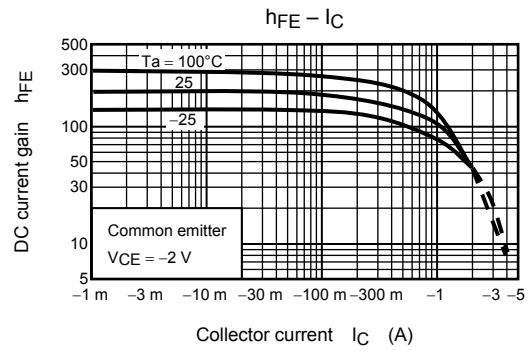
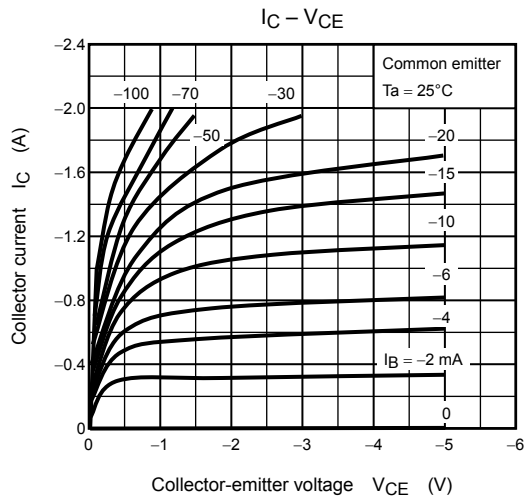
Weight: 0.05 g (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		ICBO	V <sub>CB</sub> = -60 V, I <sub>E</sub> = 0	—	—	-0.1	μA
Emitter cut-off current		IEBO	V <sub>EB</sub> = -6 V, I <sub>C</sub> = 0	—	—	-0.1	μA
Collector-emitter breakdown voltage		V (BR) CEO	I <sub>C</sub> = -10 mA, I <sub>B</sub> = 0	-50	—	—	V
DC current gain		h <sub>FE</sub> (1)	V <sub>CE</sub> = -2 V, I <sub>C</sub> = -100 mA	120	—	400	
		h <sub>FE</sub> (2)	V <sub>CE</sub> = -2 V, I <sub>C</sub> = -1.5 A	40	—	—	
Collector-emitter saturation voltage		V <sub>CE</sub> (sat)	I <sub>C</sub> = 1 A, I <sub>B</sub> = -0.05 A	—	—	-0.5	V
Base-emitter saturation voltage		V <sub>BE</sub> (sat)	I <sub>C</sub> = 1 A, I <sub>B</sub> = -0.05 A	—	—	-1.2	V
Transition frequency		f <sub>T</sub>	V <sub>CE</sub> = -2 V, I <sub>C</sub> = -100 mA	—	100	—	MHz
Collector output capacitance		C <sub>ob</sub>	V <sub>CB</sub> = -10 V, I <sub>E</sub> = 0, f = 1 MHz	—	23	—	pF
Switching time	Turn-on time	t <sub>on</sub>	 -I <sub>B1</sub> = I <sub>B2</sub> = 0.05 A, DUTY CYCLE ≤ 1%	—	0.1	—	μs
	Storage time	t <sub>stg</sub>		—	0.3	—	
	Fall time	t <sub>f</sub>		—	0.1	—	

Marking





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