

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

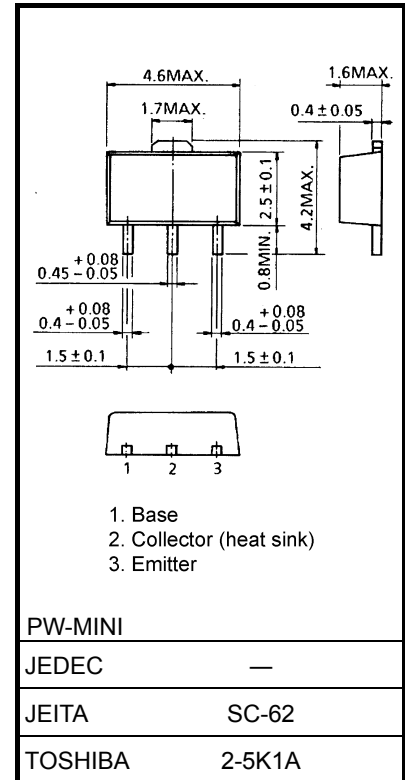
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-60	V
Collector-emitter voltage	V_{CEO}	-50	V
Emitter-base voltage	V_{EBO}	-6	V
Collector current	I_C	-2	A
Base current	I_B	-0.2	A
Collector power dissipation	P_C	500	mW
	P_C (Note 1)	1000	
Junction temperature	T_j	150	$^\circ\text{C}$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

Note 1: Mounted on a ceramic substrate ($250 \text{ mm}^2 \times 0.8 \text{ t}$)

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.

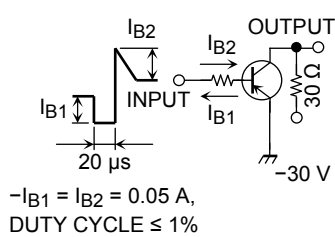
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm

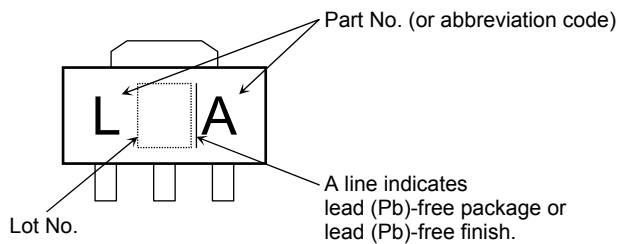


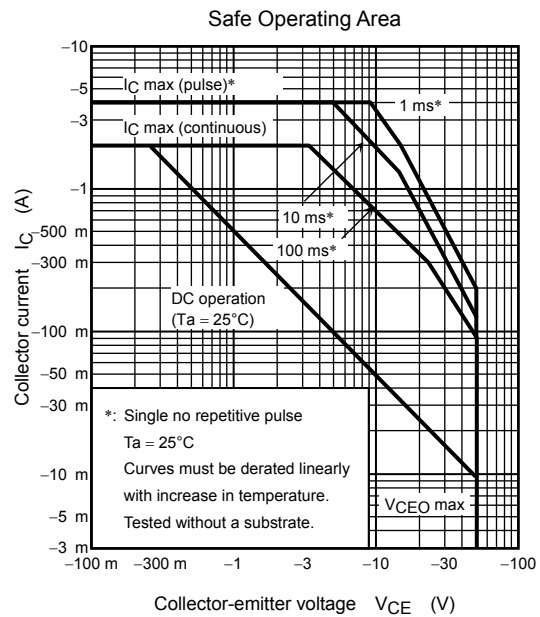
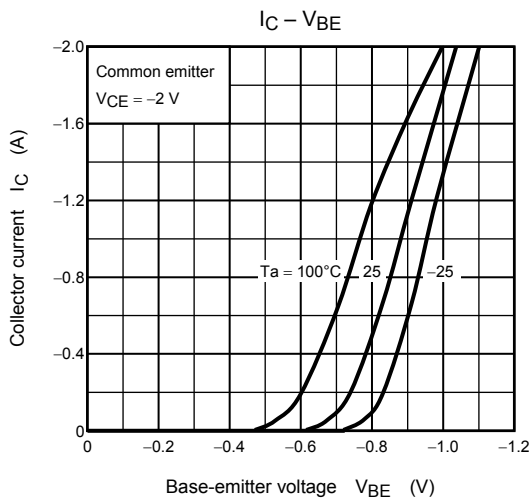
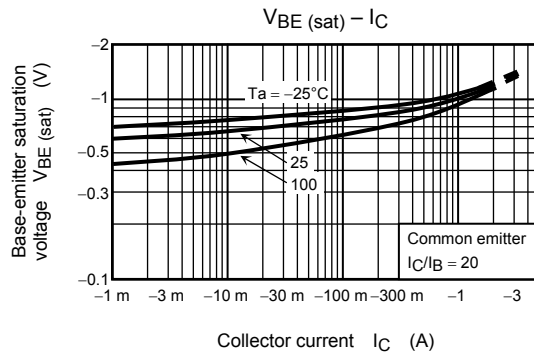
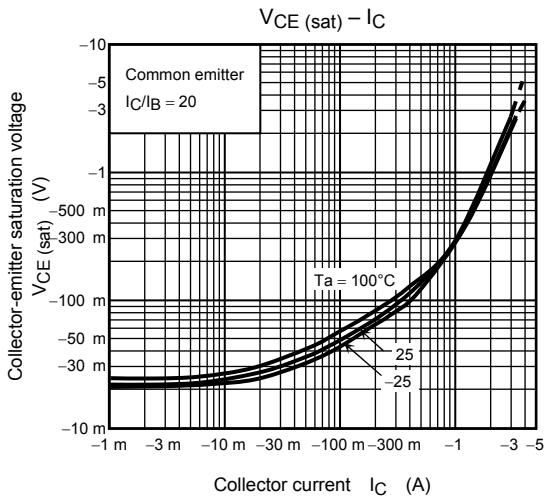
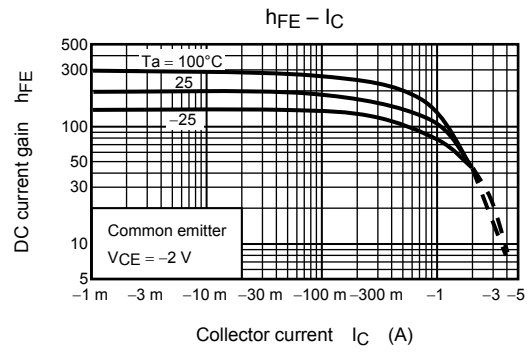
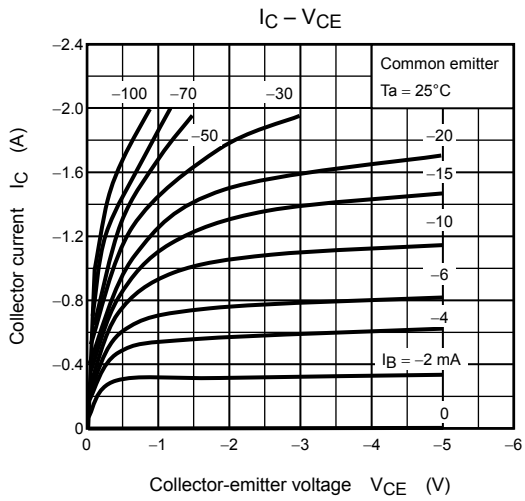
Weight: 0.05 g (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = -60\text{ V}, I_E = 0$	—	—	-0.1	μA
Emitter cut-off current		I_{EBO}	$V_{EB} = -6\text{ V}, I_C = 0$	—	—	-0.1	μA
Collector-emitter breakdown voltage		$V_{(BR)CEO}$	$I_C = -10\text{ mA}, I_B = 0$	-50	—	—	V
DC current gain		$h_{FE(1)}$	$V_{CE} = -2\text{ V}, I_C = -100\text{ mA}$	120	—	400	
		$h_{FE(2)}$	$V_{CE} = -2\text{ V}, I_C = -1.5\text{ A}$	40	—	—	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 1\text{ A}, I_B = -0.05\text{ A}$	—	—	-0.5	V
Base-emitter saturation voltage		$V_{BE(sat)}$	$I_C = 1\text{ A}, I_B = -0.05\text{ A}$	—	—	-1.2	V
Transition frequency		f_T	$V_{CE} = -2\text{ V}, I_C = -100\text{ mA}$	—	100	—	MHz
Collector output capacitance		C_{ob}	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	23	—	pF
Switching time	Turn-on time	t_{on}	 <p>$-I_{B1} = I_{B2} = 0.05\text{ A}$ DUTY CYCLE $\leq 1\%$</p>	—	0.1	—	μs
	Storage time	t_{stg}		—	0.3	—	
	Fall time	t_f		—	0.1	—	

Marking





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20070701-EN

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