

TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

2SC4409

Power Amplifier Applications

Power switching applications

- Low collector saturation voltage: $V_{CE(sat)} = 0.5V$ (max) (at $I_C = 1A$)
- High speed switching time: $t_{stg} = 500ns$ (typ.)
- Small flat package
- $P_C = 1\sim 2$ W (Mounted on a ceramic substrate)
- Complementary to 2SA1681

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

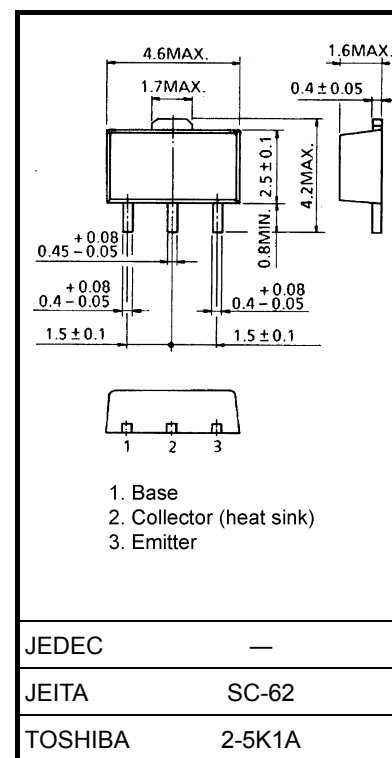
Characteristics	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	80	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	2	A
Base current	I_B	0.2	A
Collector power dissipation	P_C	500	mW
Collector power dissipation	P_C (Note 1)	1000	mW
Junction temperature	T_j	150	$^\circ C$
Storage temperature range	T_{stg}	$-55\sim 150$	$^\circ C$

Note 1: 2SC4409 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.

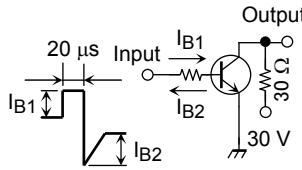
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit: mm

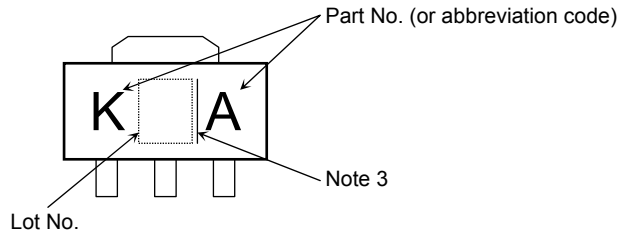


Weight: 0.05 g (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	$V_{CB} = 80 \text{ V}, I_E = 0$	—	—	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}	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	14	—	pF
Switching time	Turn-on time	t_{on}	 <p>$I_{B1} = 0.05 \text{ A}, I_{B2} = 0.05 \text{ A}$ Duty cycle $\leq 1\%$</p>	—	0.1	—	μs
	Storage time	t_{stg}		—	0.5	—	
	Fall time	t_f		—	0.1	—	

Marking

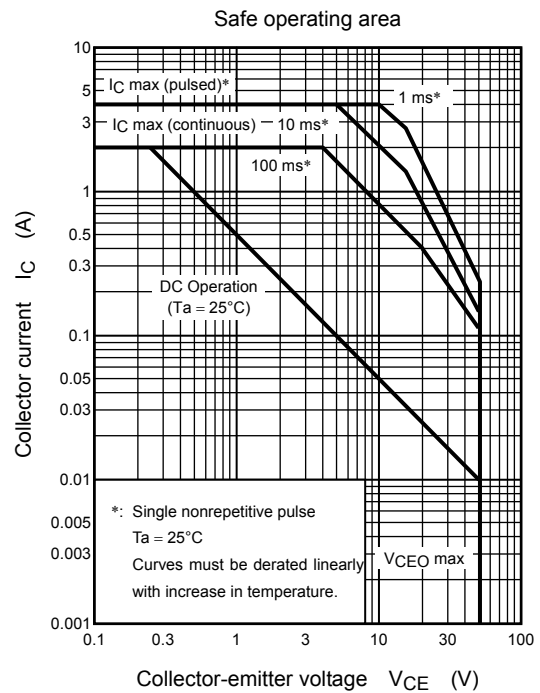
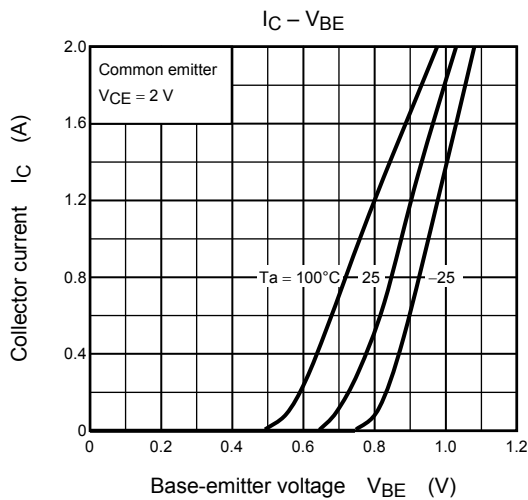
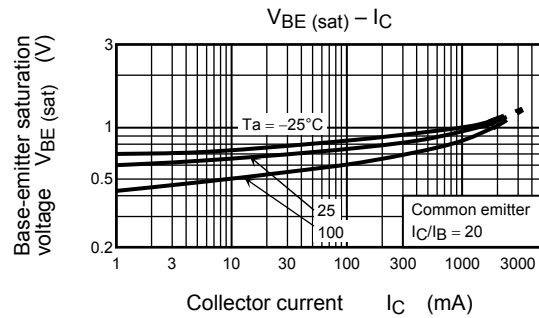
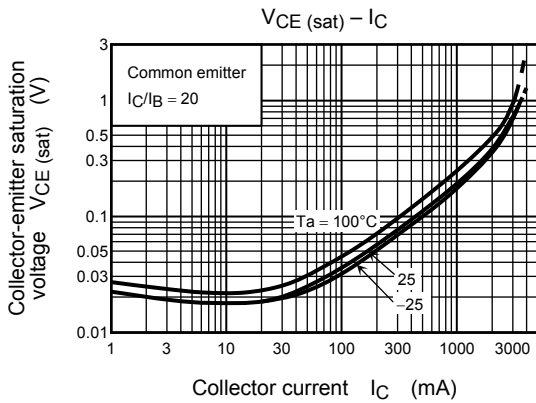
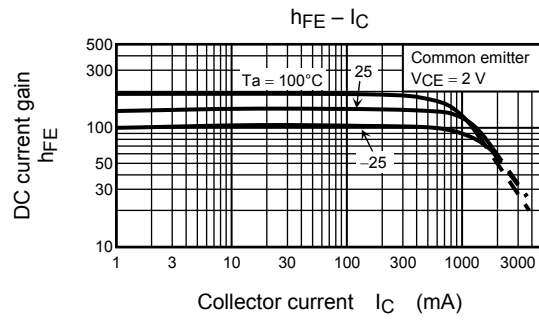
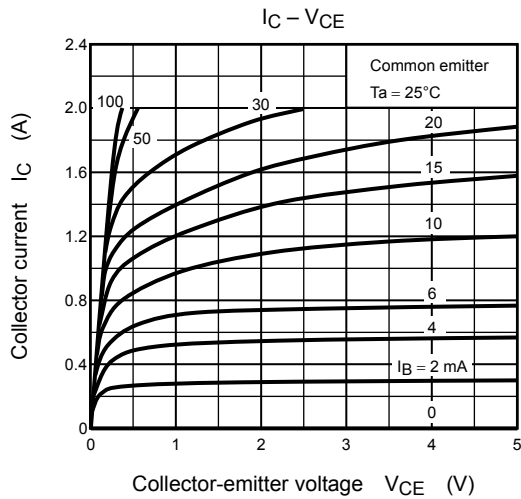


Note 3: A line to the right of a Lot No. identifies the indication of product Labels.

Without a line: [[Pb]]/INCLUDES > MCV

With a line: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.



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