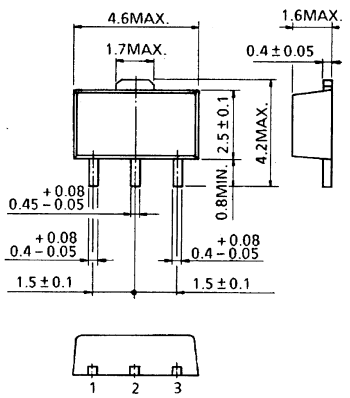
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT Process)

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 = 1~2 W (Mounted on a ceramic substrate)
- Complementary to 2SA1681

Unit: mm



1. Base
2. Collector (heat sink)
3. Emitter

JEDEC	—
JEITA	SC-62
TOSHIBA	2-5K1A

Weight: 0.05 g (typ.)

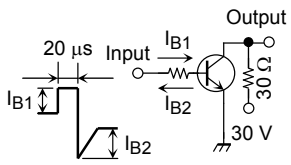
Absolute Maximum Ratings (Ta = 25°C)

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	°C
Storage temperature range	T_{stg}	−55~150	°C

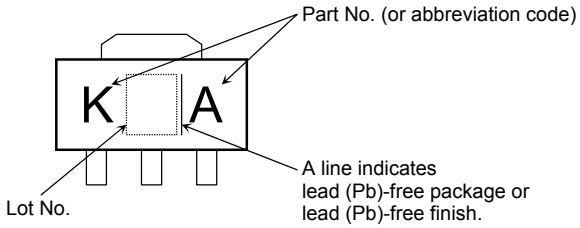
Note 1: 2SC4409 mounted on a ceramic substrate (250 mm^2 × 0.8 t)

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).

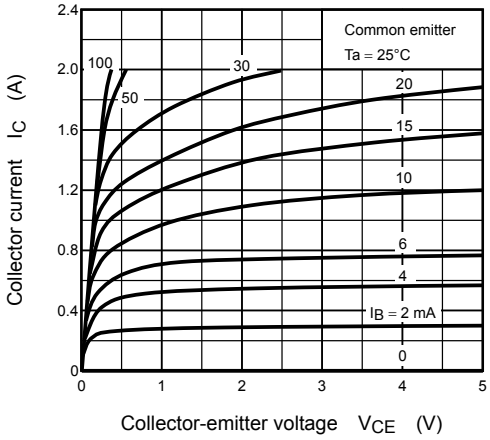
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 80 V, I_E = 0	—	—	0.1	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 6 V, I_C = 0	—	—	0.1	μA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0	50	—	—	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = 2 V, I_C = 100 mA	120	—	400	
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 1.5 A	40	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 1 A, I_B = 0.05 A	—	—	0.5	V
Base-emitter saturation voltage		$V_{BE\ (sat)}$	I_C = 1 A, I_B = 0.05 A	—	—	1.2	V
Transition frequency		f_T	V_{CE} = 2 V, I_C = 100 mA	—	100	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	14	—	pF
Switching time	Turn-on time	t_{on}	 $I_{B1} = -I_{B2}$ = 0.05 A, Duty cycle ≦ 1%	—	0.1	—	μs
	Storage time	t_{stg}		—	0.5	—	
	Fall time	t_f		—	0.1	—	

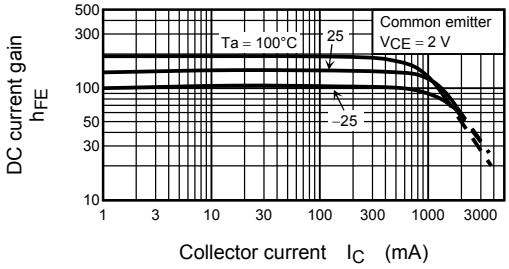
Marking



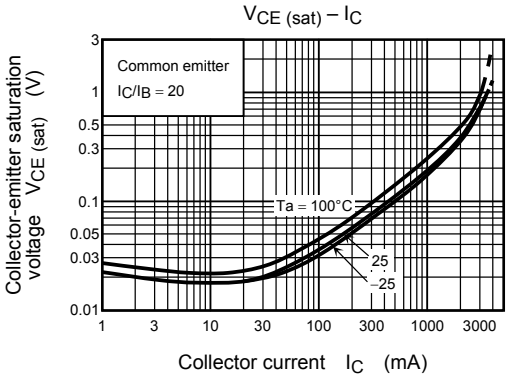
$I_C - V_{CE}$



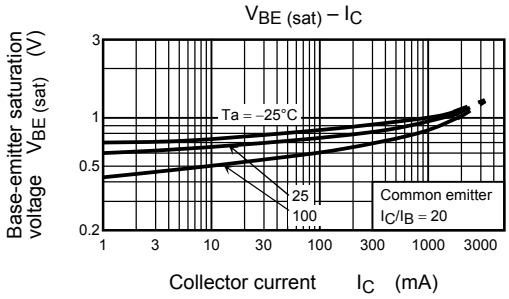
$h_{FE} - I_C$



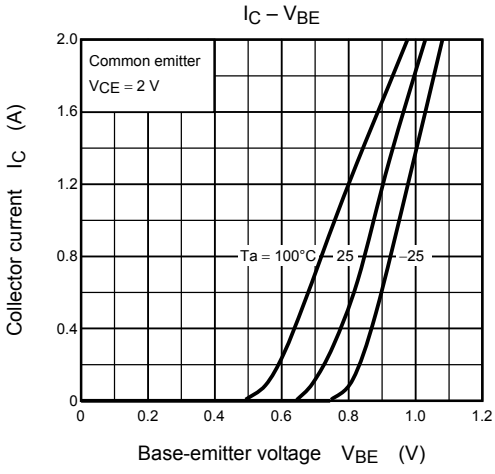
$V_{CE\ (sat)} - I_C$



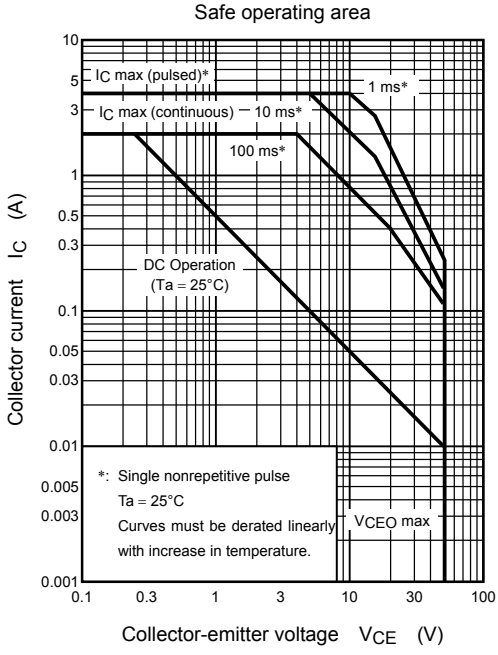
$V_{BE\ (sat)} - I_C$



$I_C - V_{BE}$



Safe operating area



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