

TOSHIBA Transistor Silicon NPN Epitaxial Type

**2SC3964**

Switching Applications

Solenoid Drive Applications

Temperature Compensated for Audio Amplifier Output Stage

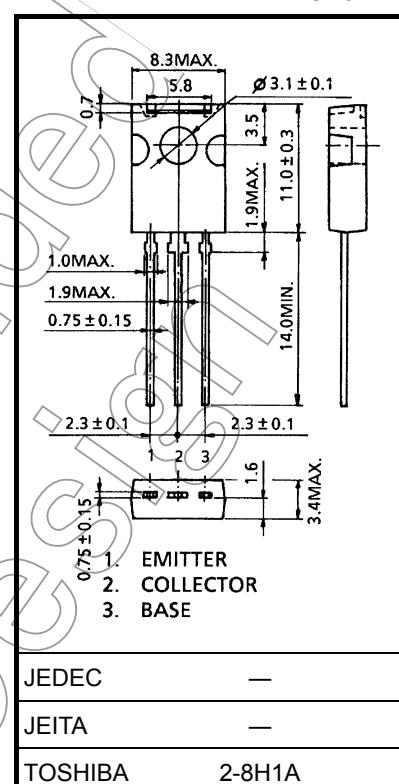
- High DC current gain:  $hFE = 500$  (min) ( $I_C = 400$  mA)
- Low collector-emitter saturation voltage:  $V_{CE}(\text{sat}) = 0.5$  V (max) ( $I_C = 300$  mA)

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

Characteristics	Symbol	Rating	Unit
Collector-base voltage	$V_{CBO}$	40	V
Collector-emitter voltage	$V_{CEO}$	40	V
Emitter-base voltage	$V_{EBO}$	7	V
Collector current	$I_C$	2	A
Base current	$I_B$	0.5	A
Collector power dissipation	$P_C$	1.5	W
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$

Industrial Applications

Unit: mm

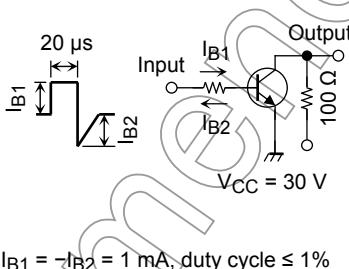


Weight: 0.82 g (typ.)

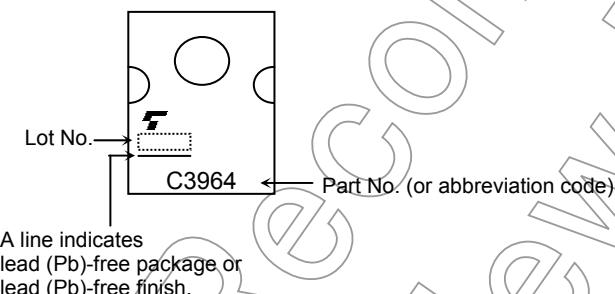
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

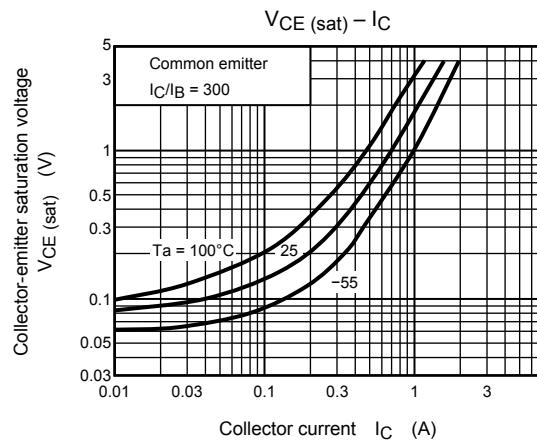
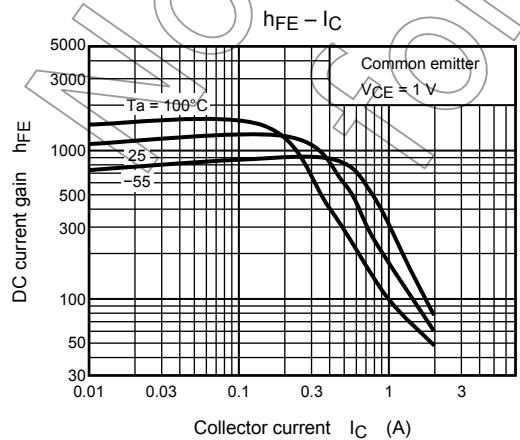
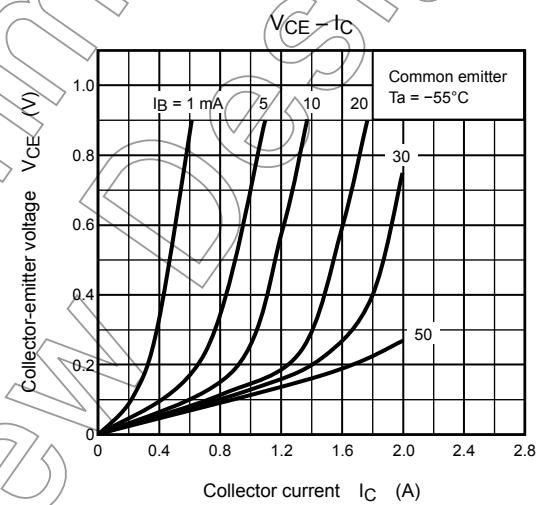
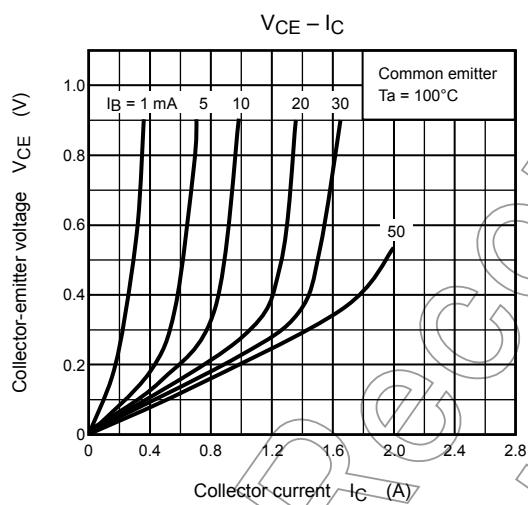
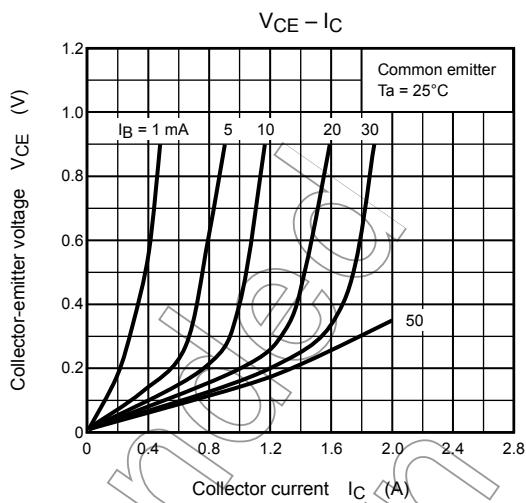
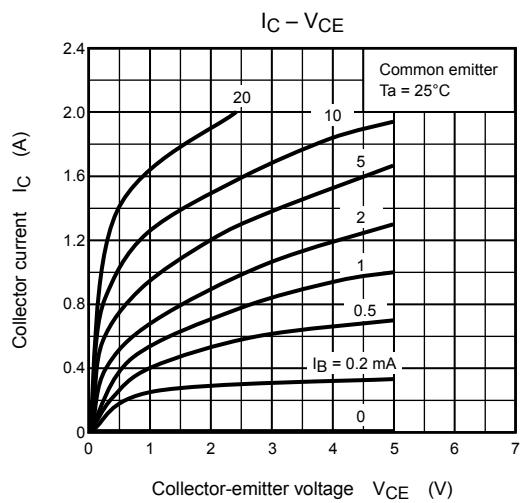
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

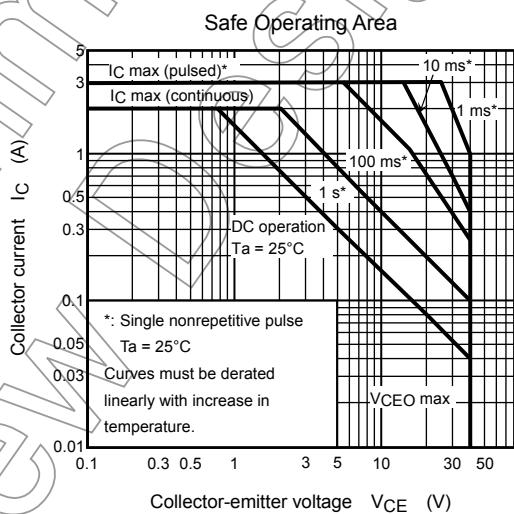
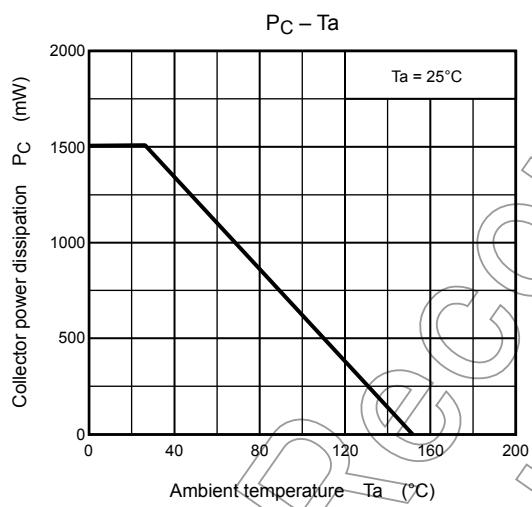
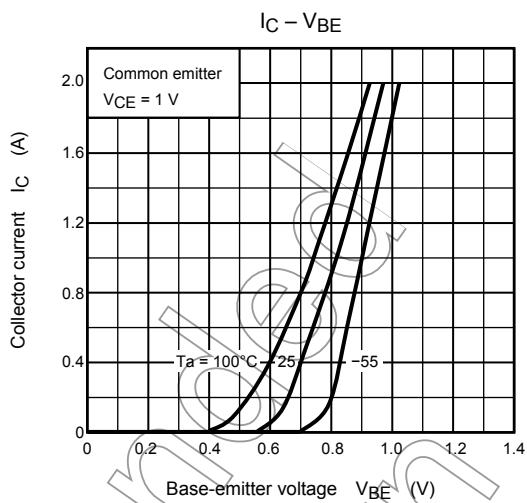
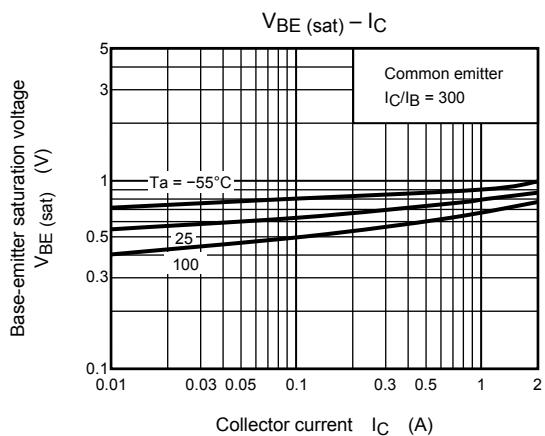
## Electrical Characteristics (Tc = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I <sub>CBO</sub>	V <sub>CB</sub> = 40 V, I <sub>E</sub> = 0	—	—	10	μA
Emitter cut-off current	I <sub>EBO</sub>	V <sub>EB</sub> = 7 V, I <sub>C</sub> = 0	—	—	1	μA
Collector-emitter breakdown voltage	V <sub>(BR)</sub> CEO	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0	40	—	—	V
DC current gain	h <sub>FE</sub>	V <sub>CE</sub> = 1 V, I <sub>C</sub> = 400 mA	500	—	—	
Collector-emitter saturation voltage	V <sub>CE</sub> (sat)	I <sub>C</sub> = 300 mA, I <sub>B</sub> = 1 mA	—	0.3	0.5	V
Base-emitter saturation voltage	V <sub>BE</sub> (sat)	I <sub>C</sub> = 300 mA, I <sub>B</sub> = 1 mA	—	—	1.1	V
Transition frequency	f <sub>T</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 100 mA	220	—	—	MHz
Collector output capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>B</sub> = 0, f = 1 MHz	—	20	—	pF
Switching time	Turn-on time	t <sub>on</sub>	 $I_B1 = -I_B2 = 1 \text{ mA, duty cycle } \leq 1\%$	—	1.0	—
	Storage time	t <sub>stg</sub>		—	3.0	—
	Fall time	t <sub>f</sub>		—	1.2	—

## Marking







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20070701-EN

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