

TOSHIBA Transistor Silicon PNP Diffused Type (PCT process)

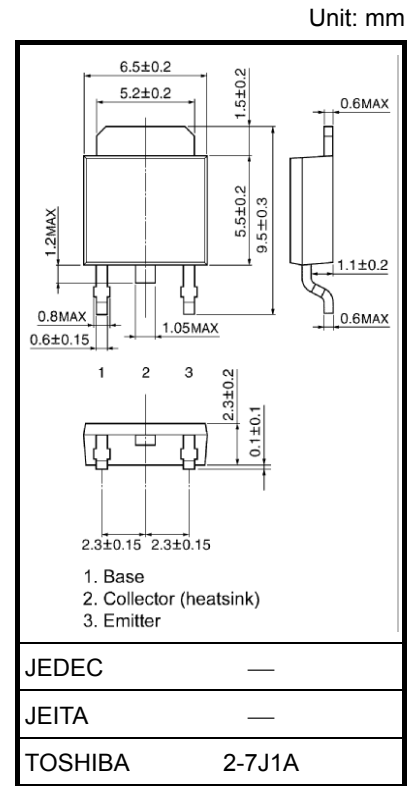
# TTB002

○ Audio Frequency Power Amplifier Application

- Low collector saturation voltage :  $V_{CE(sat)} = -0.5 \text{ V (max)}$
- High power dissipation :  $P_C = 30 \text{ W (} T_c = 25^\circ\text{C)}$

**Absolute Maximum Ratings (Ta = 25°C)**

Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	-60	V
Collector-emitter voltage		$V_{CEO}$	-60	V
Emitter-base voltage		$V_{EBO}$	-7	V
Collector current (Note 1)	DC	$I_C$	-3	A
	Pulse	$I_{CP}$	-6	A
Base current		$I_B$	-0.5	A
Collector power dissipation	$T_c = 25^\circ\text{C}$	$P_C$	30	W
Junction temperature (Note 2)		$T_j$	175	°C
Storage temperature range (Note 2)		$T_{stg}$	-55 to 175	°C



Weight : 0.36 g (typ.)

Note 1: Ensure that the junction temperature does not exceed 175°C during use of the device.

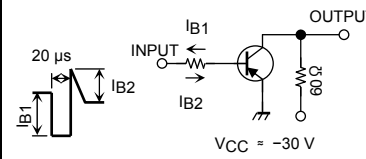
Note 2: The definitions of the absolute maximum junction and storage temperatures are based on AEC-Q101.

Note 3: 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.

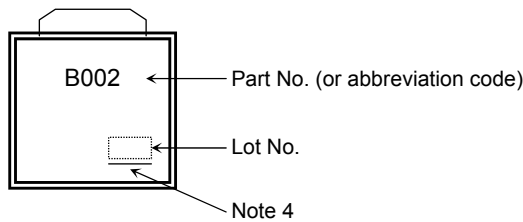
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Start of commercial production  
2009-06

## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		$I_{CBO}$	$V_{CB} = -60\text{ V}, I_E = 0$	—	—	-100	nA
Emitter cut-off current		$I_{EBO}$	$V_{EB} = -7\text{ V}, I_C = 0$	—	—	-100	nA
Collector-emitter breakdown voltage		$V_{(BR) CEO}$	$I_C = -10\text{ mA}, I_B = 0$	-60	—	—	V
DC current gain		$h_{FE} (1)$	$V_{CE} = -5\text{ V}, I_C = -0.5\text{ A}$	100	—	250	—
		$h_{FE} (2)$	$V_{CE} = -5\text{ V}, I_C = -3\text{ A}$	20	—	—	
Collector-emitter saturation voltage		$V_{CE (sat)} (1)$	$I_C = -0.6\text{ A}, I_B = -0.06\text{ A}$	—	—	-0.5	V
		$V_{CE (sat)} (2)$	$I_C = -3\text{ A}, I_B = -0.3\text{ A}$	—	—	-1.7	V
Base-emitter voltage		$V_{BE}$	$V_{CE} = -5\text{ V}, I_C = -0.5\text{ A}$	—	—	-1	V
Transition frequency		$f_T$	$V_{CE} = -5\text{ V}, I_C = -0.5\text{ A}$	—	9	—	MHz
Collector output capacitance		$C_{ob}$	$V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$	—	90	—	pF
Switching time	Turn-on time	$t_{on}$	 <p><math>I_{B1} = 25\text{ mA}, I_{B2} = 50\text{ mA}</math> Duty cycle <math>\leq 1\%</math></p>	—	0.6	—	$\mu\text{s}$
	Storage time	$t_{stg}$		—	1.7	—	
	Fall time	$t_f$		—	—	0.2	

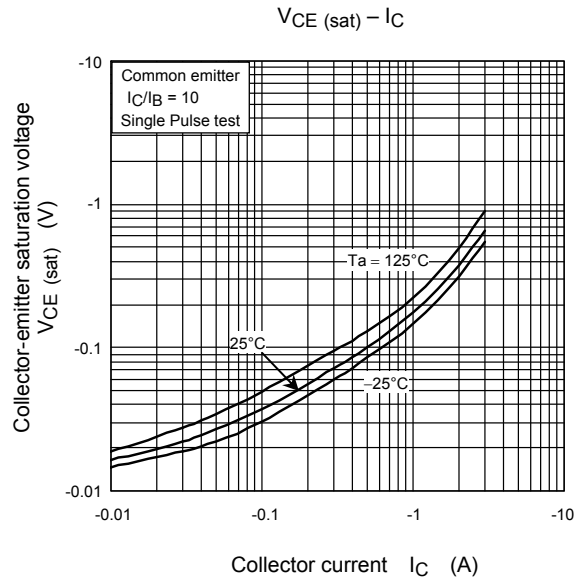
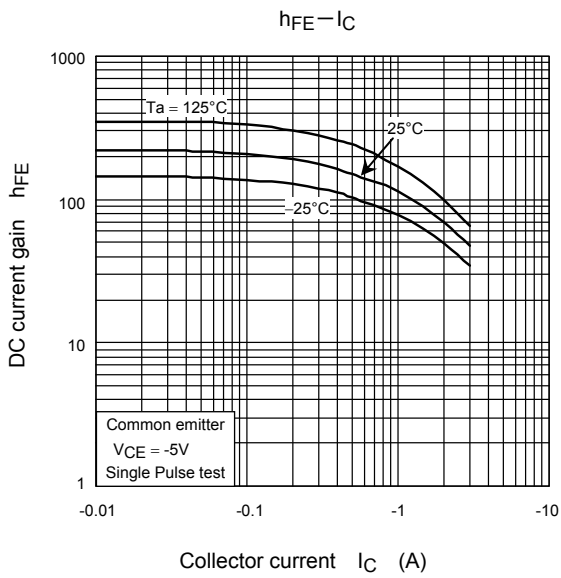
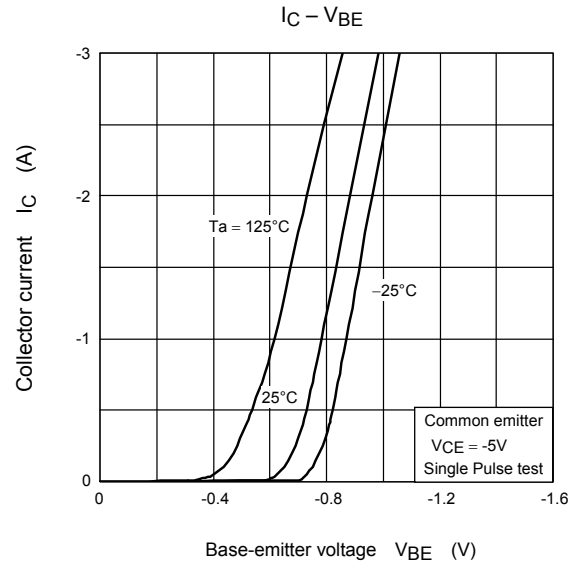
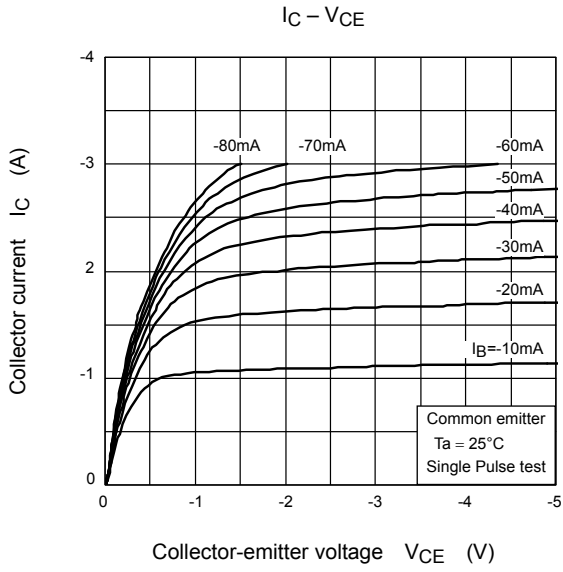
## Marking

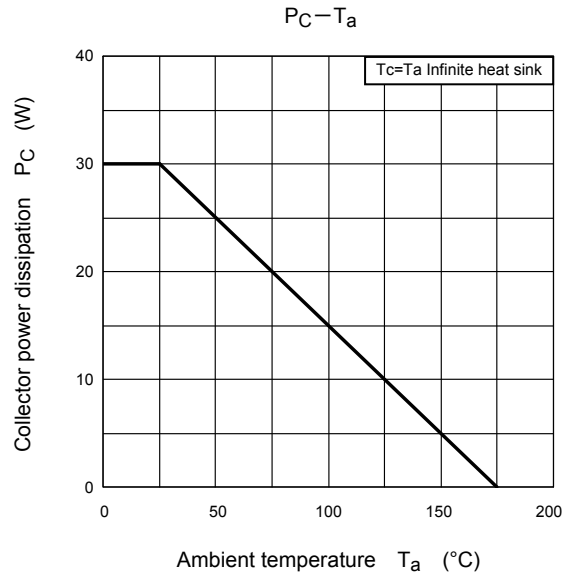
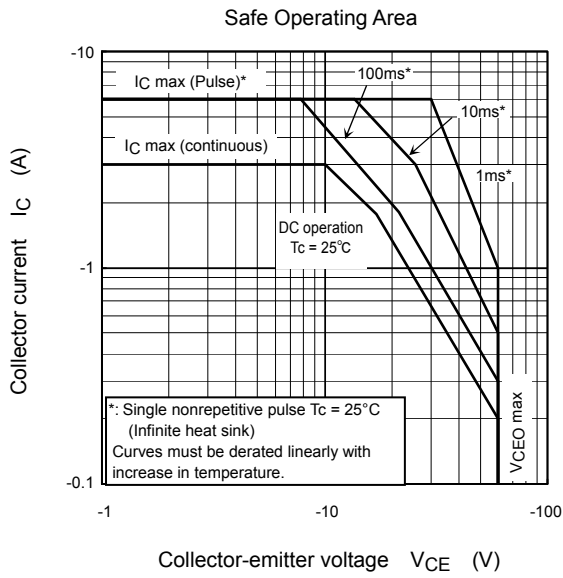
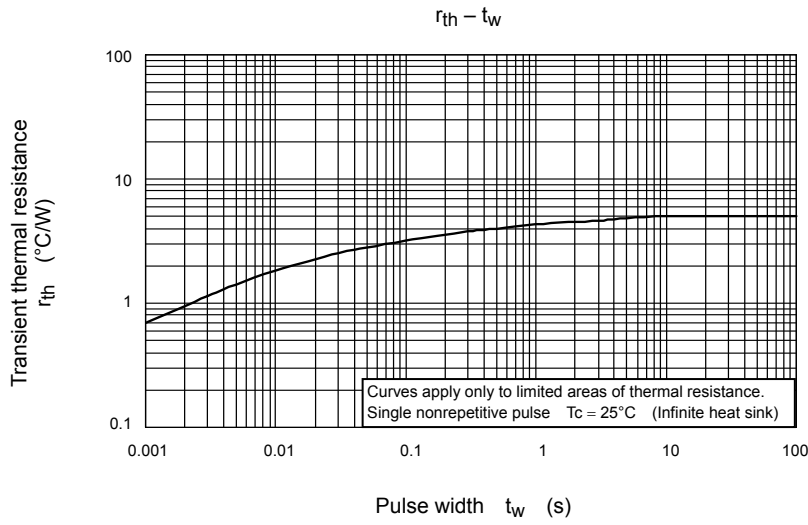


Note 4: A line under a Lot No. identifies the indication of product Labels  
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.

The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.





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