

## TOSHIBA Transistor Silicon NPN Diffused Type (PCT Process)

# 2SD1221

## Audio Frequency Power Amplifier Application

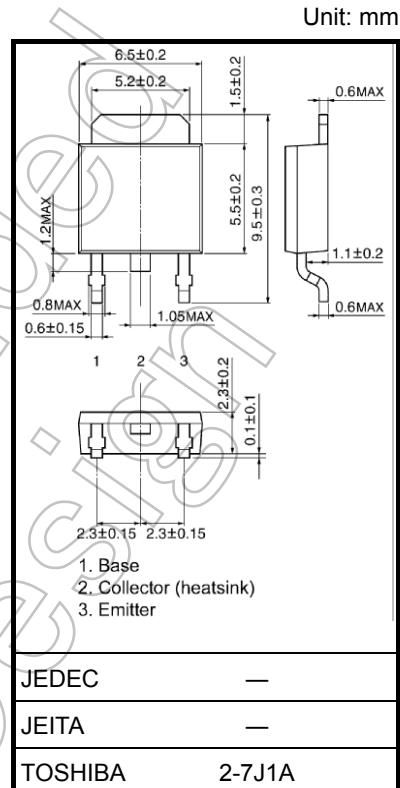
- Low collector saturation voltage  
:  $V_{CE}(\text{sat}) = 0.4 \text{ V (typ.)}$  ( $I_C = 3 \text{ A}$ ,  $I_B = 0.3 \text{ A}$ )
- High power dissipation:  $P_C = 20 \text{ W}$  ( $T_C = 25^\circ\text{C}$ )
- Complementary to 2SB906

## 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	$I_C$	3	A
Base current	$I_B$	0.5	A
Collector power dissipation	$T_A = 25^\circ\text{C}$	$P_C$	1.0
	$T_C = 25^\circ\text{C}$		20
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 150	$^\circ\text{C}$

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 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).



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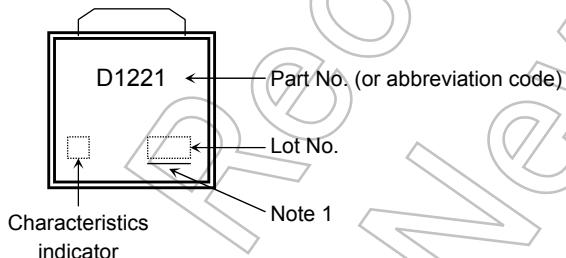
Weight: 0.36 g (typ.)

## Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	$I_{CBO}$	$V_{CB} = 60 \text{ V}, I_E = 0$	—	—	100	$\mu\text{A}$
Emitter cut-off current	$I_{EBO}$	$V_{EB} = 7 \text{ V}, I_C = 0$	—	—	100	$\mu\text{A}$
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 50 \text{ mA}, I_B = 0$	60	—	—	V
DC current gain	$h_{FE}$ (1) (Note)	$V_{CE} = 5 \text{ V}, I_C = 0.5 \text{ A}$	60	—	300	—
	$h_{FE}$ (2)	$V_{CE} = 5 \text{ V}, I_C = 3 \text{ A}$	20	—	—	
Collector-emitter saturation voltage	$V_{CE(\text{sat})}$	$I_C = 3 \text{ A}, I_B = 0.3 \text{ A}$	—	0.4	1.0	V
Base-emitter voltage	$V_{BE}$	$V_{CE} = 5 \text{ V}, I_C = 0.5 \text{ A}$	—	0.7	1.0	V
Transition frequency	$f_T$	$V_{CE} = 5 \text{ V}, I_C = 0.5 \text{ A}$	—	3.0	—	MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$	—	70	—	$\text{pF}$
Switching time	Turn-on time	$t_{on}$		—	0.8	—
	Storage time	$t_{stg}$		—	1.5	—
	Fall time	$t_f$		—	0.8	—

Note:  $h_{FE}$  classification O: 60 to 120, Y: 100 to 200, GR: 150 to 300

## Marking

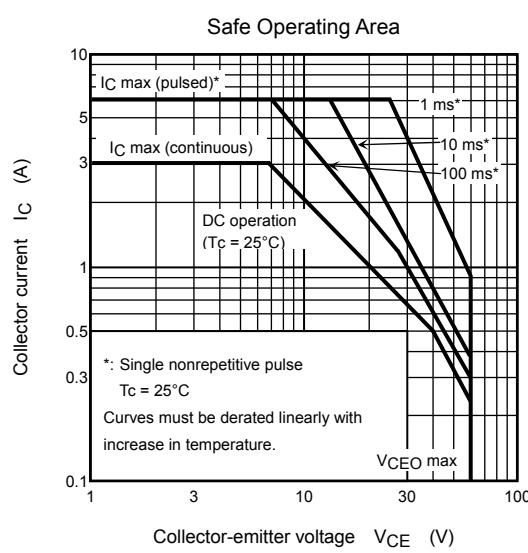
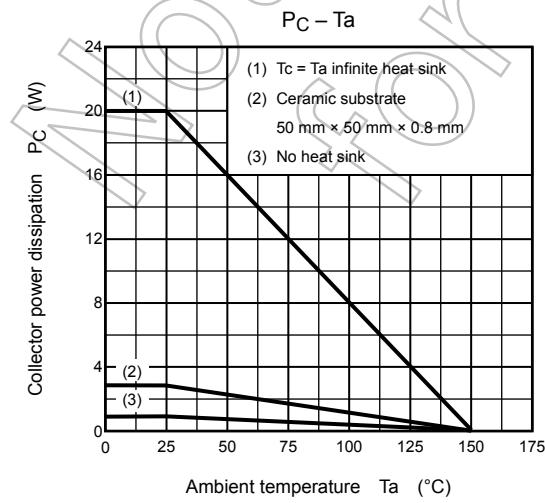
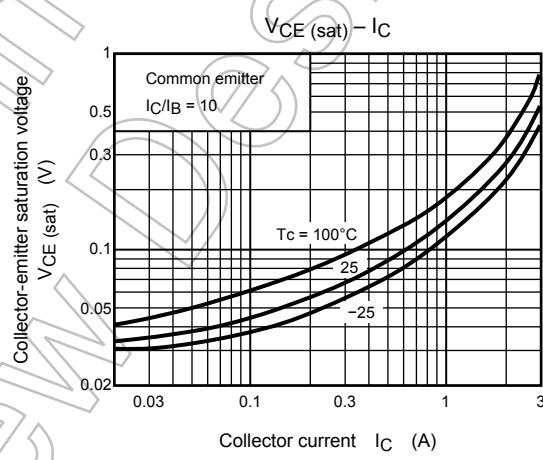
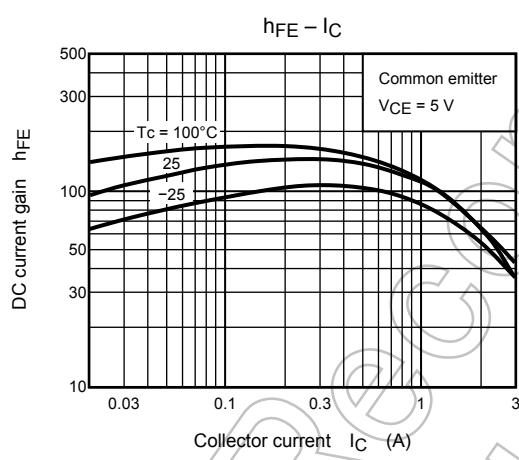
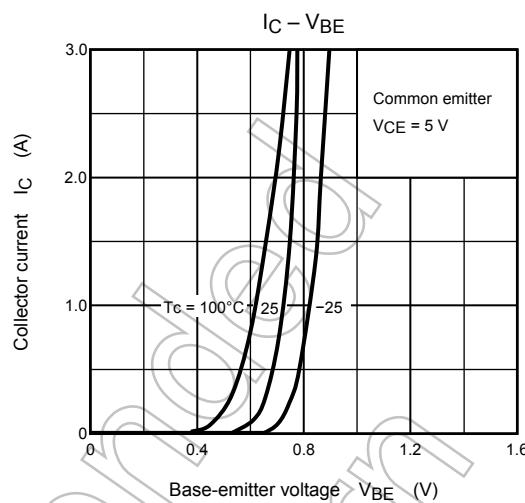
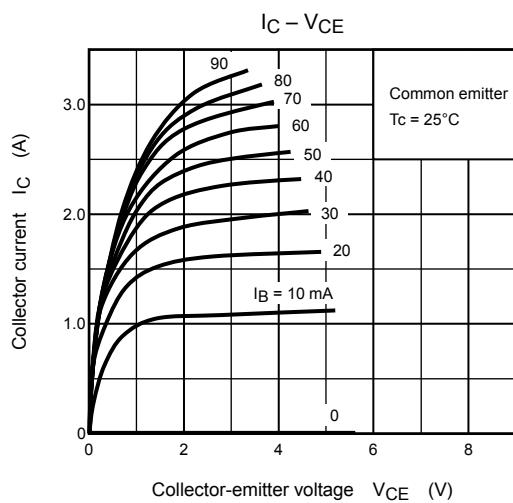


Note 1: A line under a Lot No. identifies the indication of product Labels.

Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[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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