

TOSHIBA Transistor Silicon NPN Diffused Type (PCT Process)

2SD1221

Audio Frequency Power Amplifier Application

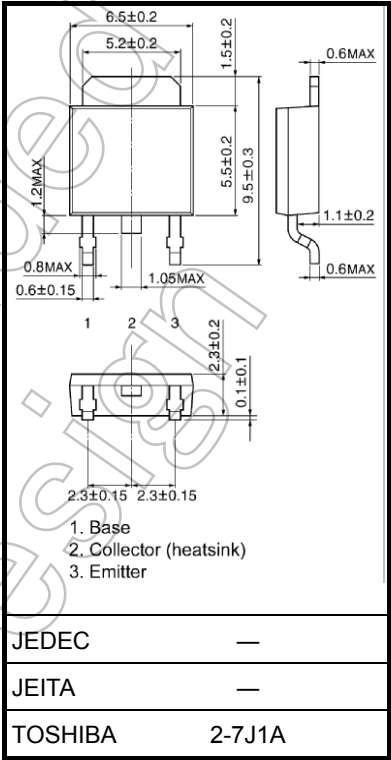
- Low collector saturation voltage  
:  $V_{CE(sat)} = 0.4\text{ V (typ.)}$  ( $I_C = 3\text{ A}$ ,  $I_B = 0.3\text{ A}$ )
- High power dissipation:  $P_C = 20\text{ W}$  ( $T_c = 25^\circ\text{C}$ )
- Complementary to 2SB906

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

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	W
	$T_c = 25^\circ\text{C}$		20	
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

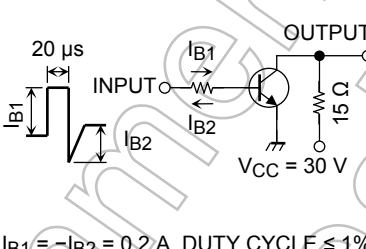
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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



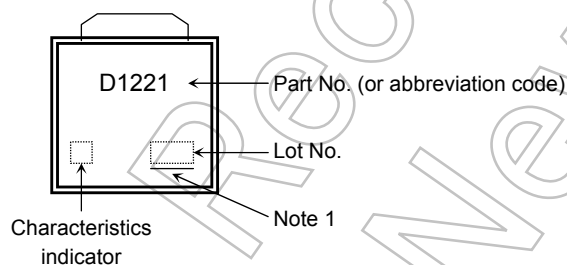
Weight: 0.36 g (typ.)

## 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		$V_{CE (sat)}$	$I_C = 3 \text{ A}, I_B = 0.3 \text{ A}$	—	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	—	pF
Switching time	Turn-on time	$t_{on}$	 <p><math>I_{B1} = -I_{B2} = 0.2 \text{ A}, \text{DUTY CYCLE} \leq 1\%</math></p>	—	0.8	—	$\mu\text{s}$
	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

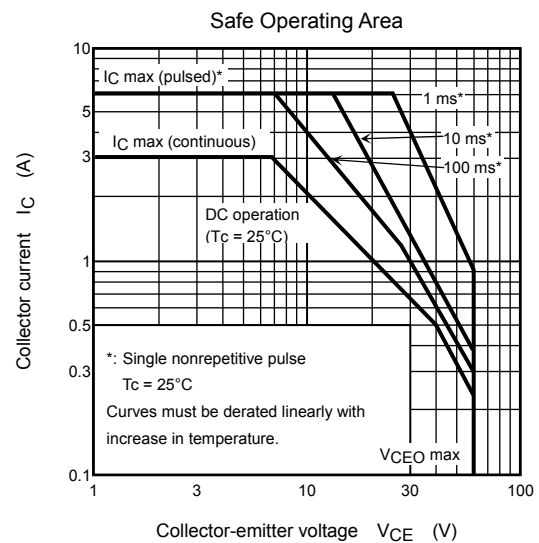
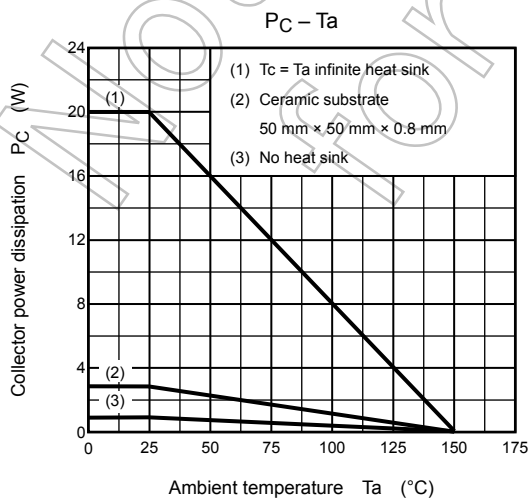
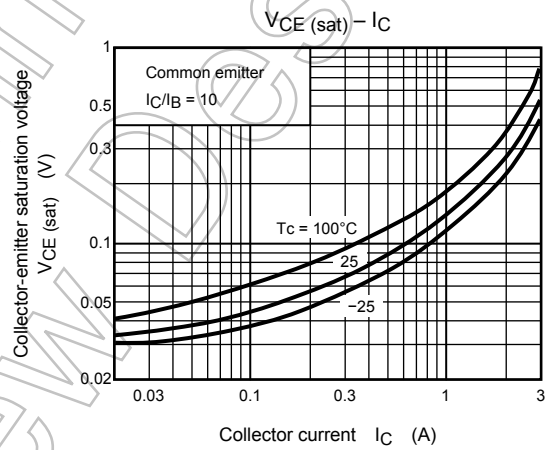
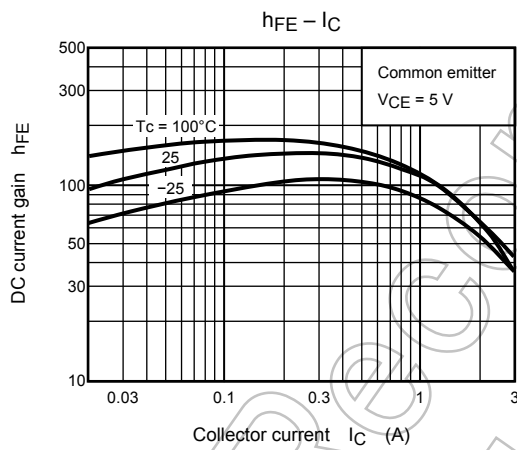
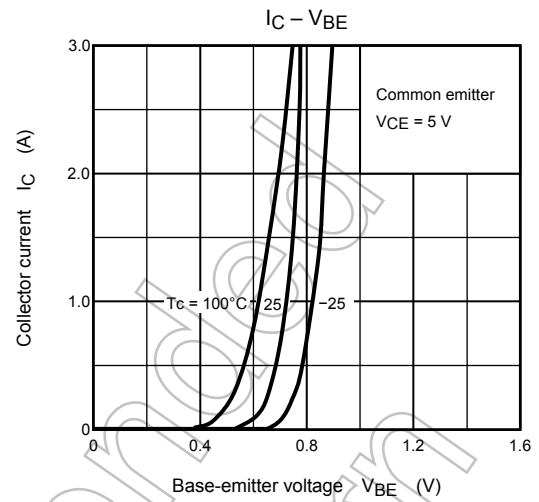
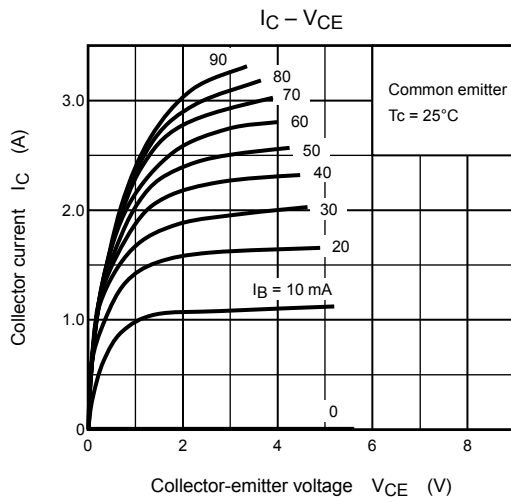


Note 1: A line under a Lot No. identifies the indication of product Labels.

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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