TOSHIBA Transistor Silicon NPN Diffused Type (PCT Process)

2SD1221

Audio Frequency Power Amplifier Application

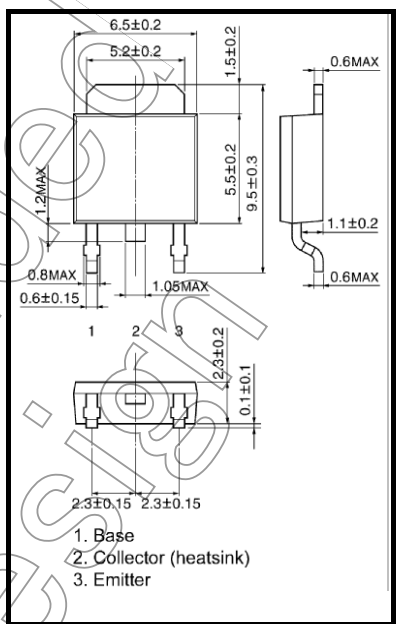
- Low collector saturation voltage
  : $V_{CE\ (sat)}$ = 0.4 V (typ.) (I_C = 3 A, I_B = 0.3 A)
- High power dissipation: P_C = 20 W (T_c = 25°C)
- Complementary to 2SB906

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	Ta = 25°C	P_C	1.0	W
	Tc = 25°C		20	
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°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).

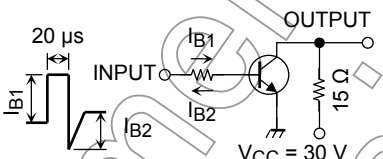
Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	2-7J1A

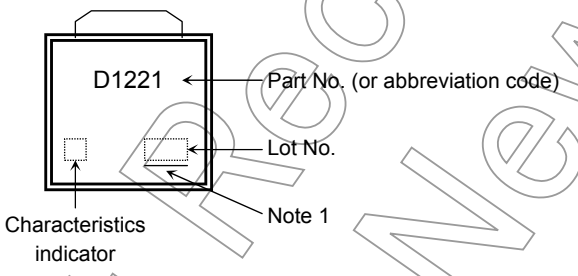
Weight: 0.36 g (typ.)

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 60 V, I_E = 0	—	—	100	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 7 V, I_C = 0	—	—	100	μA
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 50 mA, I_B = 0	60	—	—	V
DC current gain		$h_{FE\ (1)}$ (Note)	V_{CE} = 5 V, I_C = 0.5 A	60	—	300	—
		$h_{FE\ (2)}$	V_{CE} = 5 V, I_C = 3 A	20	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)}$	I_C = 3 A, I_B = 0.3 A	—	0.4	1.0	V
Base-emitter voltage		V_{BE}	V_{CE} = 5 V, I_C = 0.5 A	—	0.7	1.0	V
Transition frequency		f_T	V_{CE} = 5 V, I_C = 0.5 A	—	3.0	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1 MHz	—	70	—	pF
Switching time	Turn-on time	t_{on}		—	0.8	—	μs
	Storage time	t_{stg}		—	1.5	—	
	Fall time	t_f	I_{B1} = −I_{B2} = 0.2 A, DUTY CYCLE ≤ 1%	—	0.8	—	

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

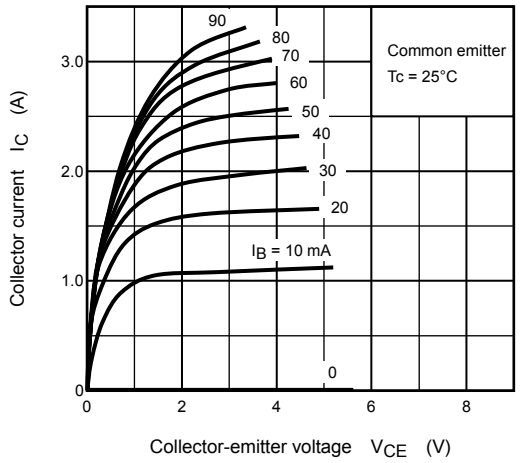
Marking



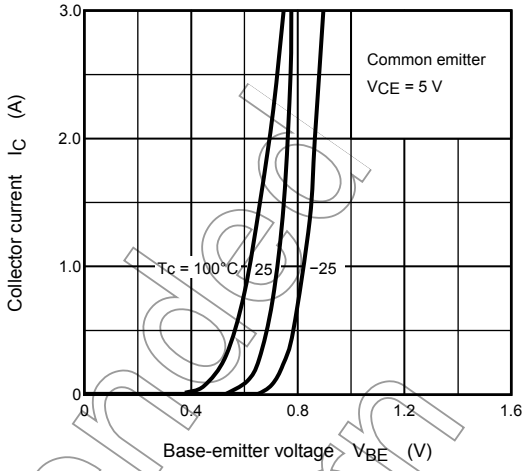
Note 1: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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.

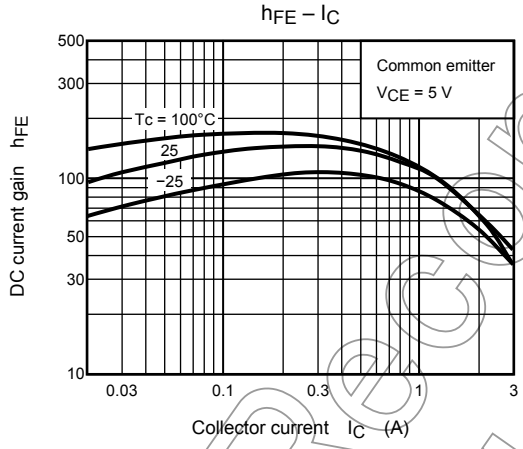
$I_C - V_{CE}$



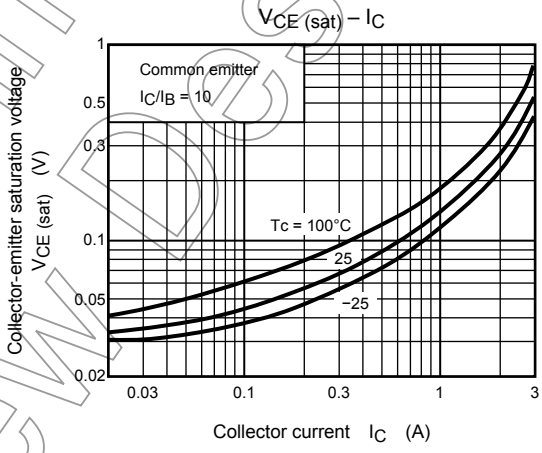
$I_C - V_{BE}$



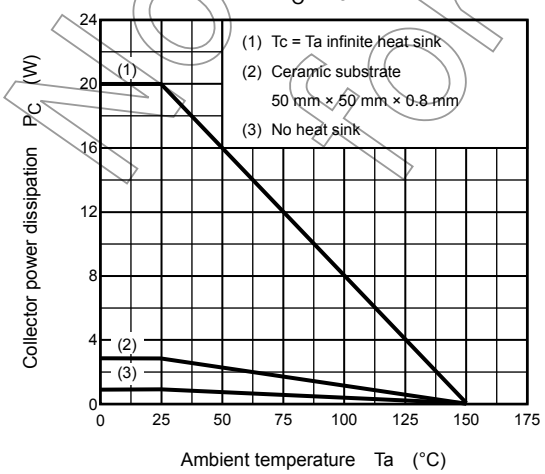
$h_{FE} - I_C$



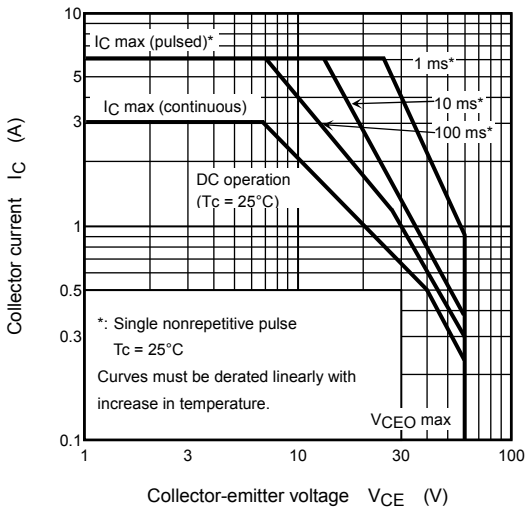
$V_{CE\ (sat)} - I_C$



$P_C - Ta$



Safe Operating Area



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