TOSHIBA Transistor Silicon NPN Diffused Type (PCT process)

# 2SD1221

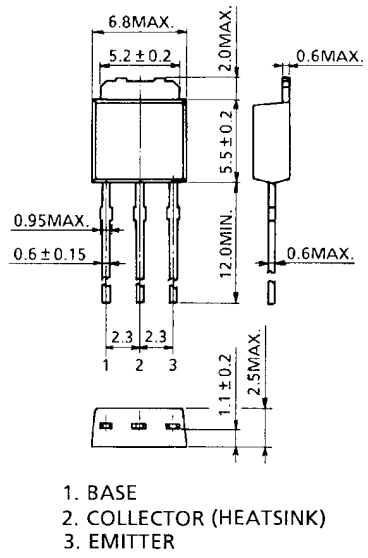
Audio Frequency Power Amplifier Application

- Low collector saturation voltage
  : $V_{CE\ (sat)}$ = 4.0 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

## Maximum Ratings (Ta = 25°C)

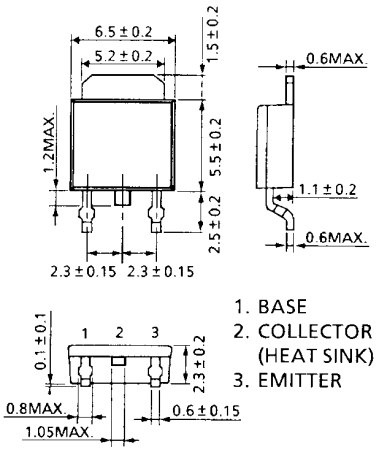
| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | 60 | V |
| Collector-emitter voltage | | $V_{CEO}$ | 60 | V |
| Emitter-base voltage | | $V_{EBO}$ | 7 | V |
| Collector current | | $I_C$ | 3 | A |
| Base current | | $I_B$ | 0.5 | A |
| Collector 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 |

Unit: mm




| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-7B1A |

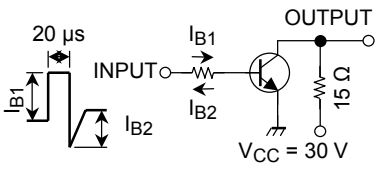
Weight: 0.36 g (typ.)




| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-7J1A |

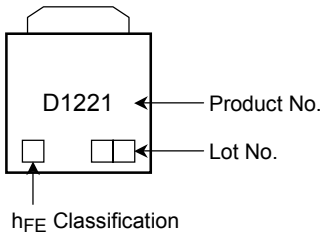
Weight: 0.36 g (typ.)

## Electrical Characteristics (Ta = 25°C)

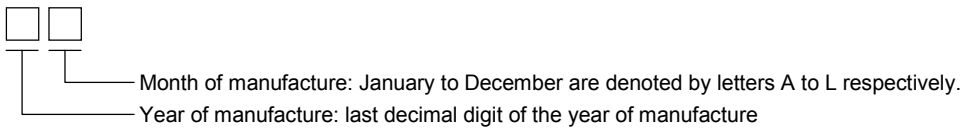
| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cut-off current | | $I_{CBO}$ | $V_{CB}$ = 60 V, $I_E$ = 0 | — | — | 100 | μA |
| Emitter cut-off current | | $I_{EBO}$ | $V_{EB}$ = 7 V, $I_C$ = 0 | — | — | 100 | μA |
| Collector-emitter 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

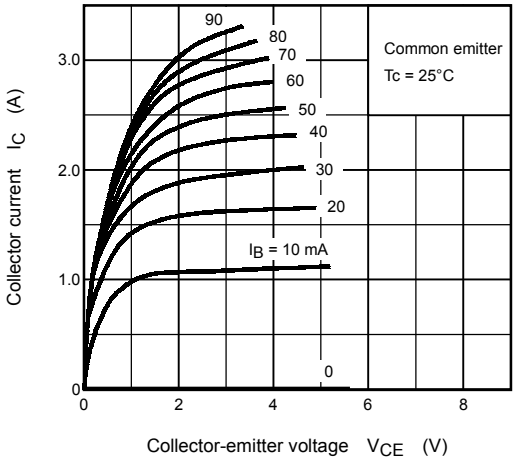
## Marking



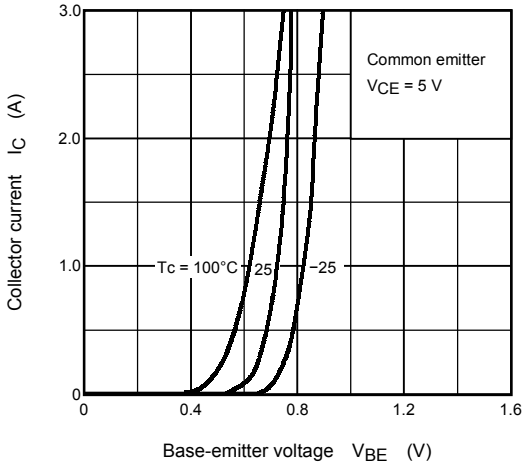

## Explanation of Lot No.



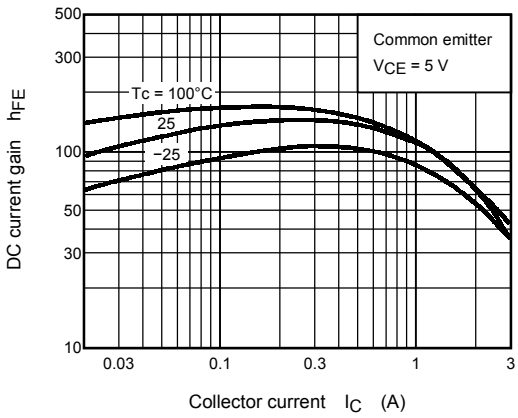
$I_C - V_{CE}$



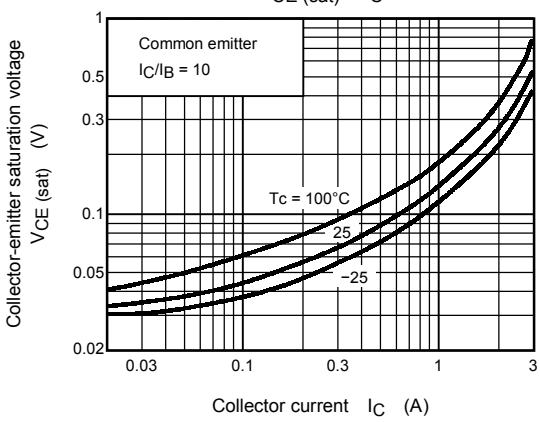

$I_C - V_{BE}$



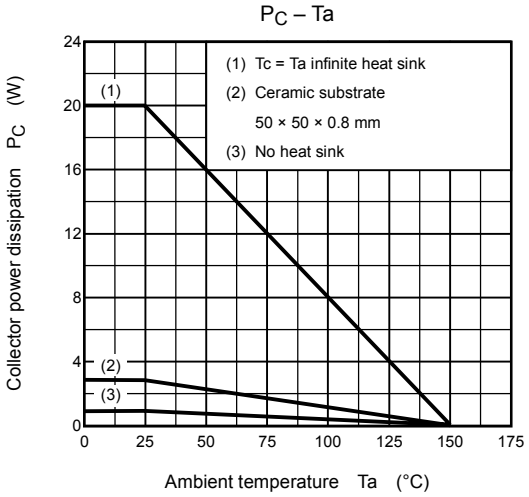

$h_{FE} - I_C$



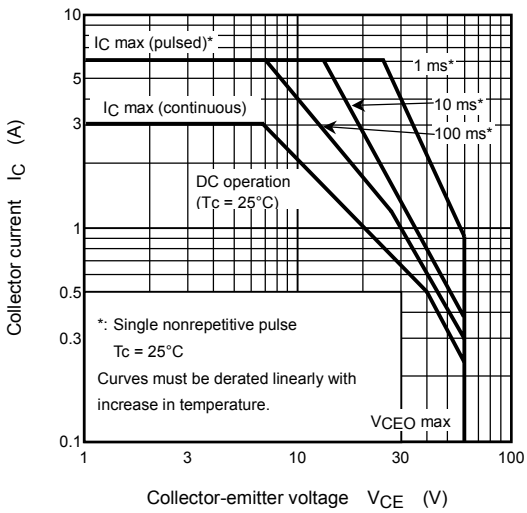

$V_{CE\ (sat)} - I_C$




$P_C - Ta$




Safe Operating Area



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