TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL TYPE (PCT PROCESS) (DARLINGTON)

# 2SD1224

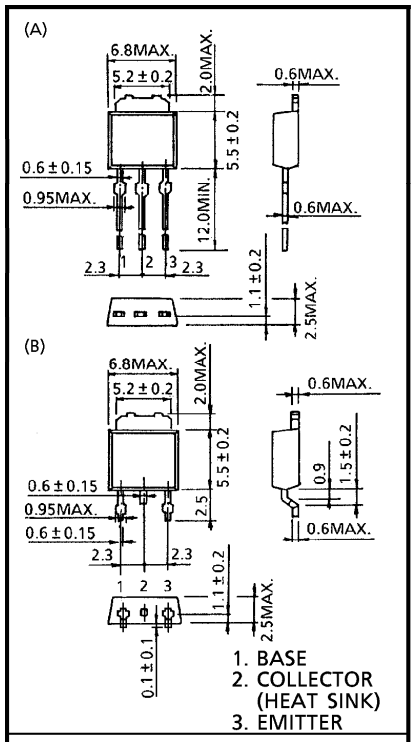
PULSE MOTOR DRIVE, HAMMER DRIVE APPLICATIONS

SWITCHING APPLICATIONS

POWER AMPLIFIER APPLICATIONS

- High DC Current Gain
  : $h_{FE}$ = 4000 (Min.)
- Low Saturation Voltage
  : $V_{CE\ (sat)}$ = 1.5 V (Max.)

Unit in mm



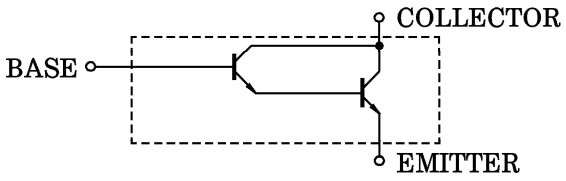

| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | (A) 2-7B1A (B) 2-7B2A |

Weight : 0.36 g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Collector-Base Voltage | | $V_{CBO}$ | 30 | V |
| Collector-Emitter Voltage | | $V_{CEO}$ | 30 | V |
| Emitter-Base Voltage | | $V_{EBO}$ | 10 | V |
| Collector Current | | $I_C$ | 1.5 | A |
| Base Current | | $I_B$ | 0.15 | A |
| Collector Power Dissipation | Ta = 25°C | $P_C$ | 1.0 | W |
| | Tc = 25°C | | 10 | |
| Junction Temperature | | $T_j$ | 150 | °C |
| Storage Temperature Range | | $T_{stg}$ | −55~150 | °C |

EQUIVALENT CIRCUIT

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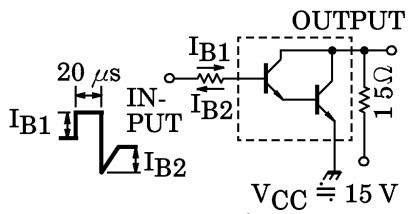
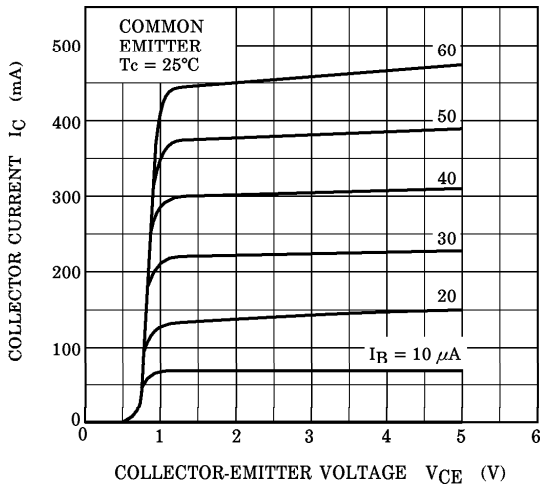
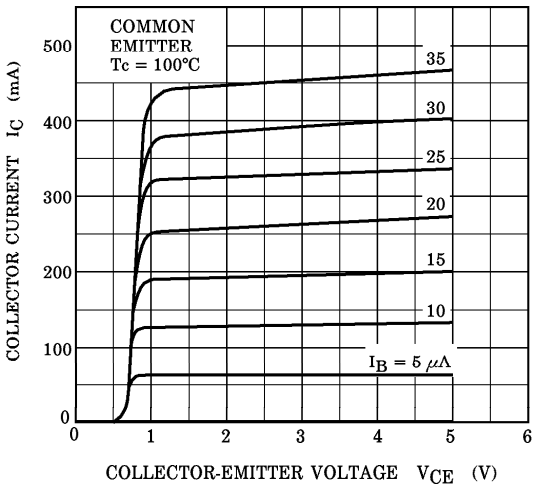
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Collector Cut-off Current | | $I_{CBO}$ | $V_{CB}$ = 30 V, $I_E$ = 0 | — | — | 10 | μA |
| Emitter Cut-off Current | | $I_{EBO}$ | $V_{EB}$ = 10 V, $I_C$ = 0 | — | — | 10 | μA |
| Collector-Emitter Breakdown Voltage | | $V_{(BR)CEO}$ | $I_C$ = 10 mA, $I_B$ = 0 | 30 | — | — | V |
| DC Current Gain | | $h_{FE}$ | $V_{CE}$ = 2 V, $I_C$ = 150 mA | 4000 | — | — | |
| Collector-Emitter Saturation Voltage | | $V_{CE\ (sat)}$ | $I_C$ = 1 A, $I_B$ = 1 mA | — | — | 1.5 | V |
| Base-Emitter Saturation Voltage | | $V_{BE\ (sat)}$ | $I_C$ = 1 A, $I_B$ = 1 mA | — | — | 2.2 | V |
| Switching Time | Turn-on Time | $t_{on}$ |  $I_{B1} = -I_{B2}$ = 1 mA, DUTY CYCLE ≦ 1% | — | 0.18 | — | μs |
| | Storage Time | $t_{stg}$ | | — | 0.6 | — | |
| | Fall Time | $t_f$ | | — | 0.3 | — | |

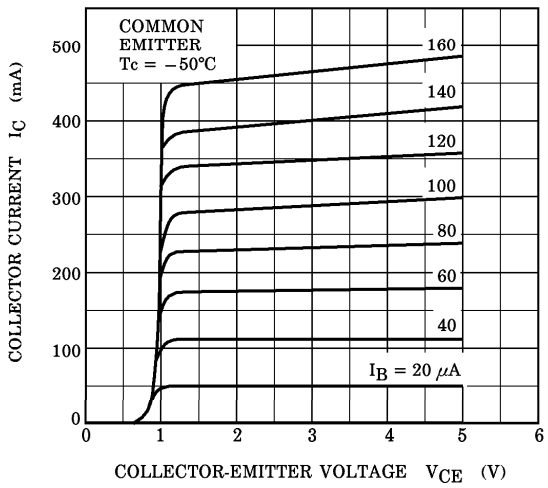
$I_C - V_{CE}$



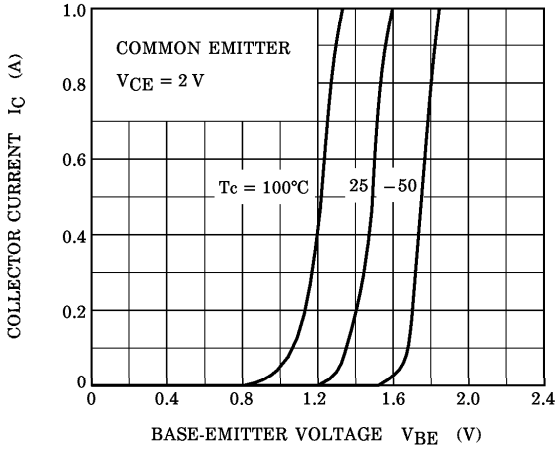

$I_C - V_{CE}$



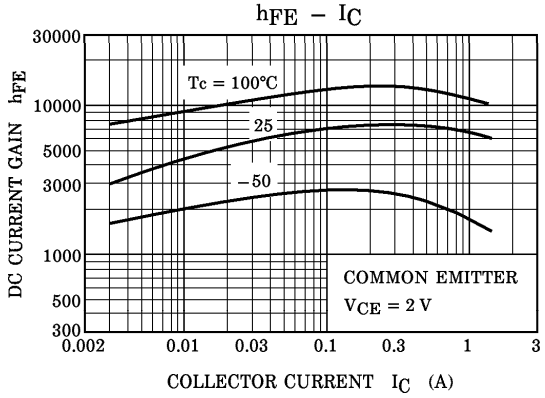

$I_C - V_{CE}$



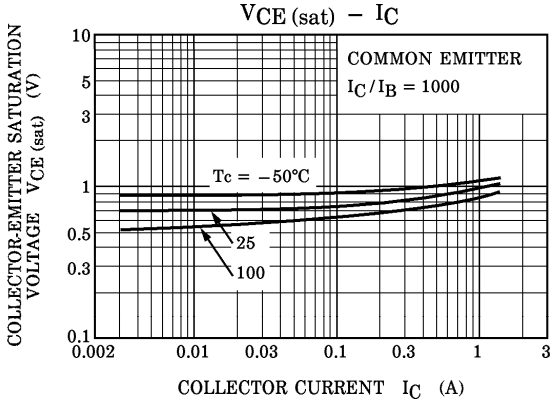

$I_C - V_{BE}$



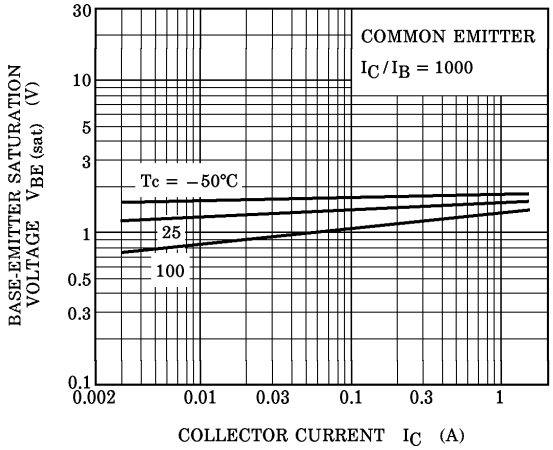

$h_{FE} - I_C$



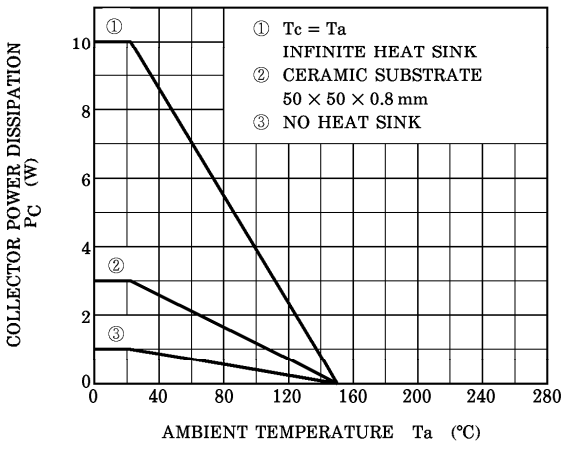

$V_{CE\,(sat)} - I_C$



$V_{BE\,(sat)}$ – $I_C$




$P_C$ – Ta




SAFE OPERATING AREA