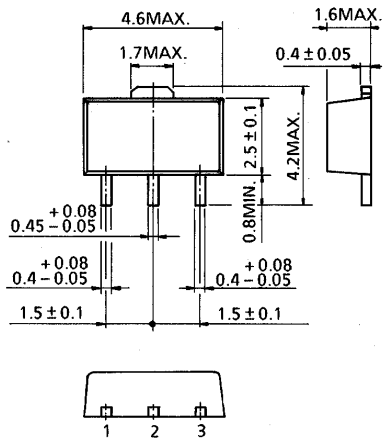
TOSHIBA FIELD EFFECT TRANSISTOR SILICON NPN EPITAXIAL TYPE (PCT PROCESS) (DARLINGTON)

# 2SD1784

MICRO MOTOR DRIVE, HAMMER DRIVE APPLICATIONS.
SWITCHING APPLICATIONS.
POWER AMPLIFIER APPLICATIONS.

- High DC Current Gain : $h_{FE}$ = 4000 (Min.) ($V_{CE}$ = 2V, $I_C$ = 150mA)
- Low Saturation Voltage : $V_{CE}$ (sat) = 1.5V (Max.) ($I_C$ = 1A, $I_B$ = 1mA)

Unit in mm




1. BASE
2. COLLECTOR (HEAT SINK)
3. EMITTER

| | |
|---|---|
| JEDEC | — |
| EIAJ | — |
| TOSHIBA | 2-5K1A |

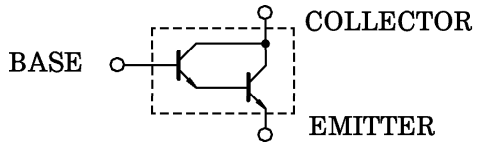
Weight : 0.05g

MAXIMUM RATINGS

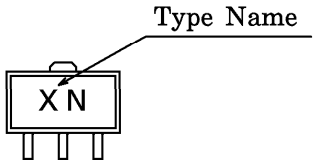
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 30 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 30 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 10 | V |
| Collector Current | $I_C$ | 1.5 | A |
| Base Current | $I_B$ | 50 | mA |
| Collector Power Dissipation | $P_C$* | 1000 | mW |
| Junction Temperature | $T_j$ | 150 | °C |
| Storage Temperature Range | $T_{stg}$ | −55~150 | °C |

$P_C$* : 2SD1784 mounted on ceramic substrate ($250mm^2 \times 0.8t$)

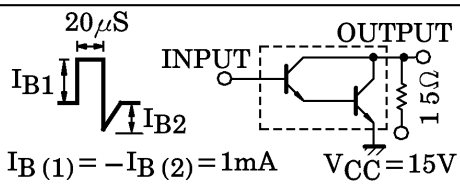
EQUIVALENT CIRCUIT




Marking



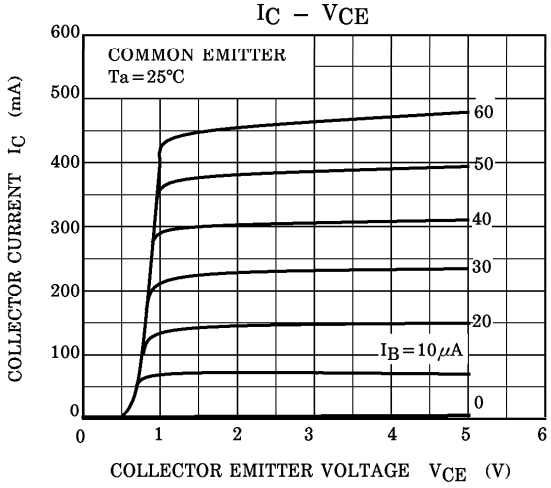

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Collector Cut-off Current | | $I_{CBO}$ | $V_{CB}$ = 30V, $I_E$ = 0 | — | — | 10 | μA |
| Emitter Cut-off Current | | $I_{EBO}$ | $V_{EB}$ = 10V, $I_C$ = 0 | — | — | 10 | μA |
| Collector-Emitter Breakdown Voltage | | $V_{(BR)CEO}$ | $I_C$ = 10mA, $I_B$ = 0 | 30 | — | — | V |
| DC Current Gain | | $h_{FE}$ | $V_{CE}$ = 2V, $I_C$ = 150mA | 4000 | — | — | |
| Collector-Emitter Saturation Voltage | | $V_{CE\ (sat)}$ | $I_C$ = 1A, $I_B$ = 1mA | — | — | 1.5 | V |
| Base-Emitter Saturation Voltage | | $V_{BE\ (sat)}$ | $I_C$ = 1A, $I_B$ = 1mA | | — | 2.2 | V |
| Switching Time | Turn-on Time | $t_{on}$ |  | — | 0.20 | — | μS |
| | Storage Time | $t_{stg}$ | | — | 0.6 | — | |
| | Fall Time | $t_f$ | | — | 0.3 | — | |

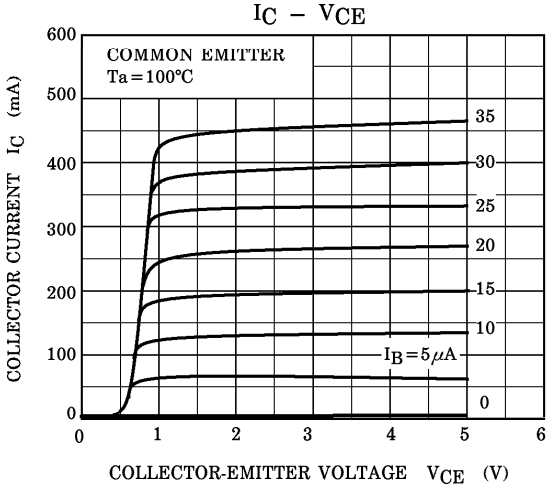


$I_{B(1)} = -I_{B(2)}$ = 1mA $V_{CC}$ = 15V
$I_C$ = 1A, $P_W$ = 20μS, Du ≦ 1%

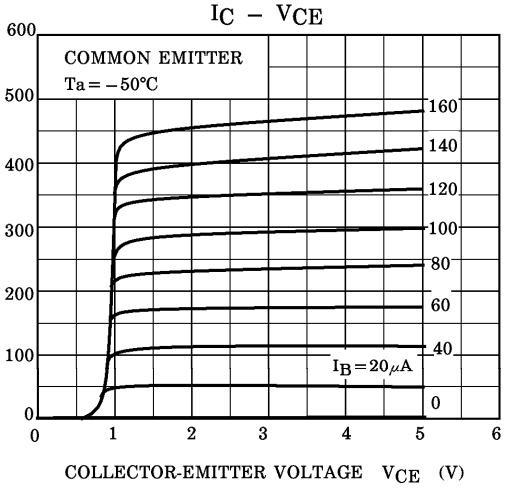
$I_C - V_{CE}$



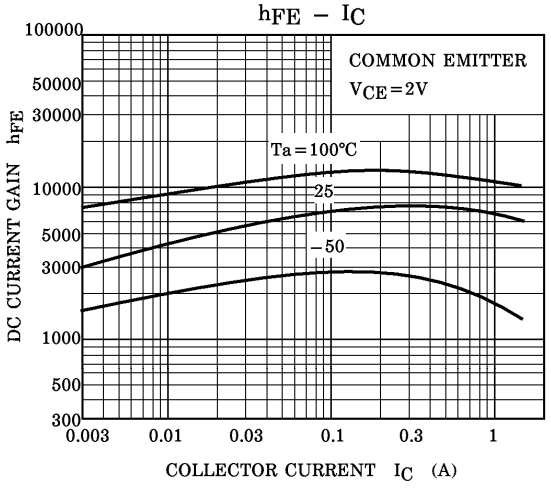

$I_C - V_{CE}$



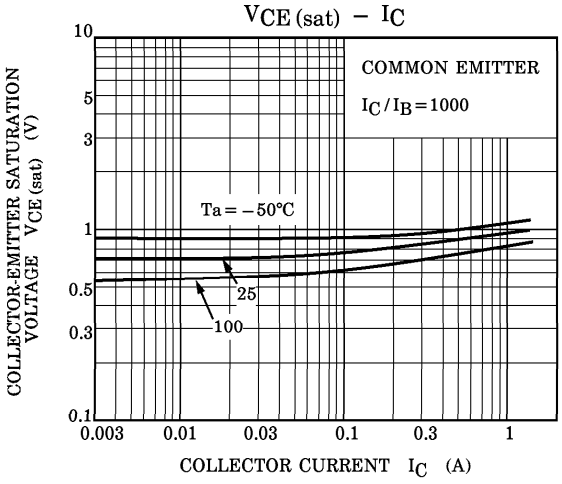

$I_C - V_{CE}$



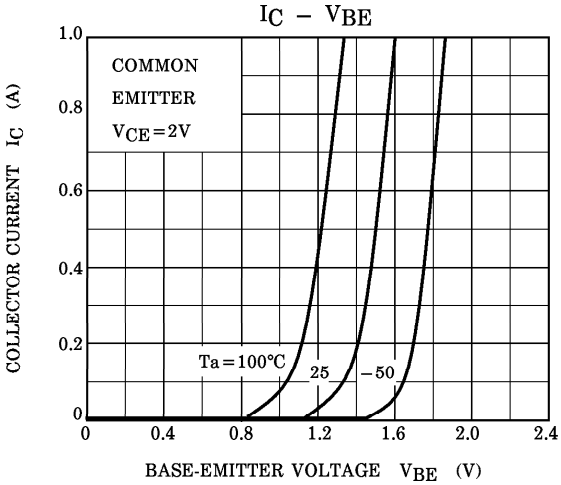

$h_{FE} - I_C$



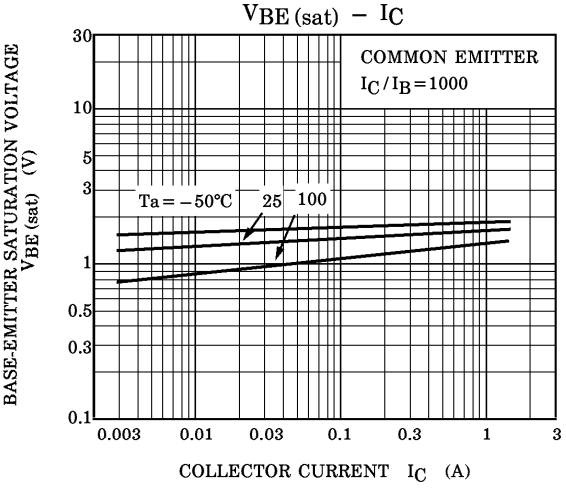

$V_{CE\,(sat)} - I_C$



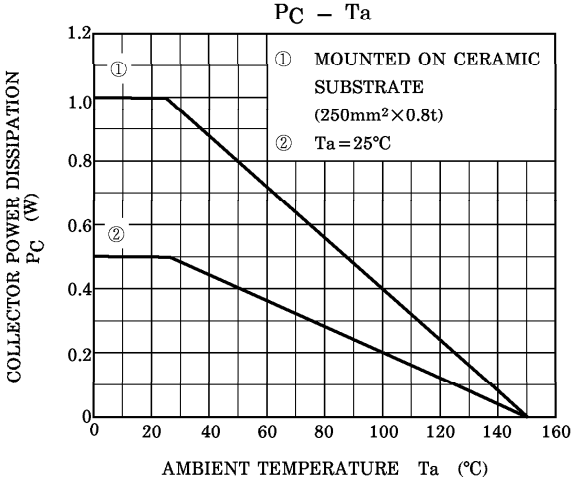

$I_C - V_{BE}$



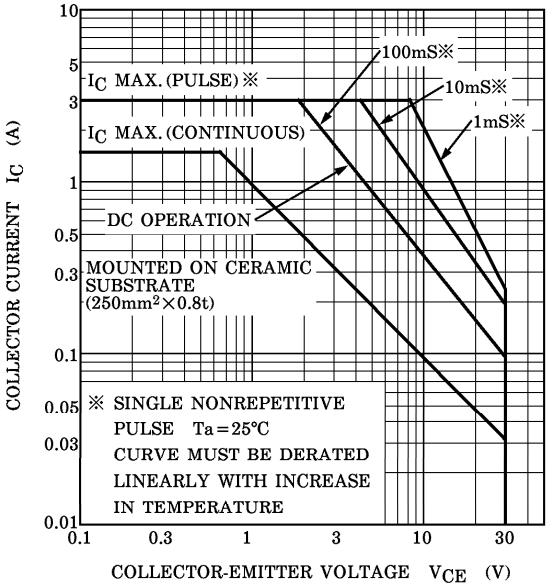
$V_{BE\,(sat)}$ – $I_C$




$P_C$ – Ta




SAFE OPERATING AREA



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