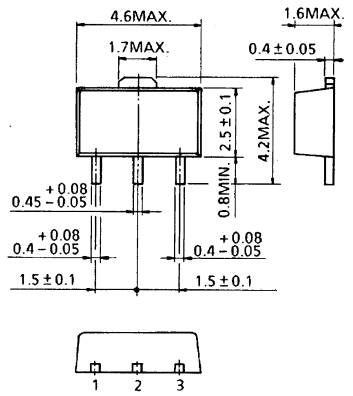
TOSHIBA Transistor Silicon NPN Epitaxial Type (PCT process)

# 2SC4540

Power Amplifier Applications
Power Switching Applications

- Low saturation voltage: $V_{CE\ (sat)}$ = 0.5 V (max) ($I_C$ = 500 mA)
- High speed switching time: $t_{stg}$ = 0.4 μs (typ.)
- Small flat package
- $P_C$ = 1.0 to 2.0 W (mounted on a ceramic substrate)
- Complementary to 2SA1735

Unit: mm




1. Base
2. Collector (heat sink)
3. Emitter

| | |
|---|---|
| JEDEC | — |
| JEITA | SC-62 |
| TOSHIBA | 2-5K1A |

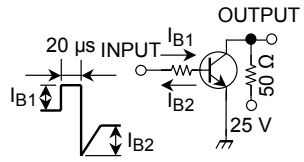
Weight: 0.05 g (typ.)

## Maximum Ratings (Ta = 25°C)

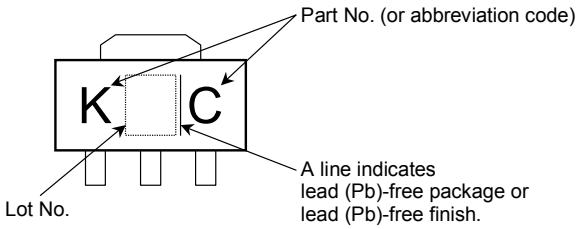
| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-base voltage | $V_{CBO}$ | 80 | V |
| Collector-emitter voltage | $V_{CEO}$ | 50 | V |
| Emitter-base voltage | $V_{EBO}$ | 6 | V |
| Collector current | $I_C$ | 1 | A |
| Base current | $I_B$ | 0.2 | A |
| Collector power dissipation | $P_C$ | 500 | mW |
| Collector power dissipation | $P_C$ (Note) | 1000 | mW |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature range | $T_{stg}$ | −55 to 150 | °C |

Note: Mounted on a ceramic substrate (250 $mm^2$ × 0.8 t)

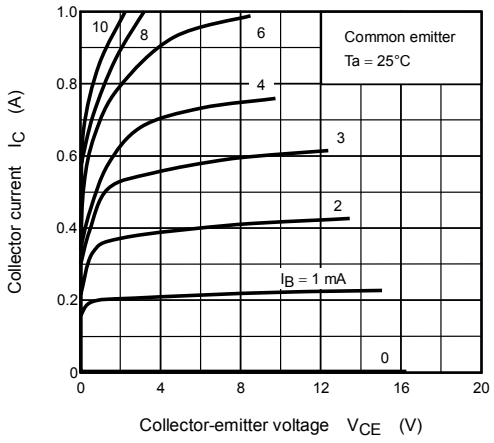
## Electrical Characteristics (Ta = 25°C)

| Characteristics | | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cut-off current | | $I_{CBO}$ | $V_{CB}$ = 80 V, $I_E$ = 0 | — | — | 0.1 | μA |
| Emitter cut-off current | | $I_{EBO}$ | $V_{EB}$ = 6 V, $I_C$ = 0 | — | — | 0.1 | μA |
| Collector-emitter breakdown voltage | | $V_{(BR)\ CEO}$ | $I_C$ = 10 mA, $I_B$ = 0 | 50 | — | — | V |
| DC current gain | | $h_{FE\ (1)}$ | $V_{CE}$ = 2 V, $I_C$ = 100 mA | 120 | — | 400 | |
| | | $h_{FE\ (2)}$ | $V_{CE}$ = 2 V, $I_C$ = 700 mA | 40 | — | — | |
| Collector-emitter saturation voltage | | $V_{CE\ (sat)}$ | $I_C$ = 500 mA, $I_B$ = 25 mA | — | — | 0.5 | V |
| Base-emitter saturation voltage | | $V_{BE\ (sat)}$ | $I_C$ = 500 mA, $I_B$ = 25 mA | — | — | 1.2 | V |
| Transition frequency | | $f_T$ | $V_{CE}$ = 2 V, $I_C$ = 100 mA | — | 100 | — | MHz |
| Collector output capacitance | | $C_{ob}$ | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | — | 10 | — | pF |
| Switching time | Turn-on time | $t_{on}$ |  $I_{B1} = -I_{B2}$ = 35 mA, DUTY CYCLE ≤ 1% | — | 0.1 | — | μs |
| | Storage time | $t_{stg}$ | | — | 0.4 | — | |
| | Fall time | $t_f$ | | — | 0.1 | — | |

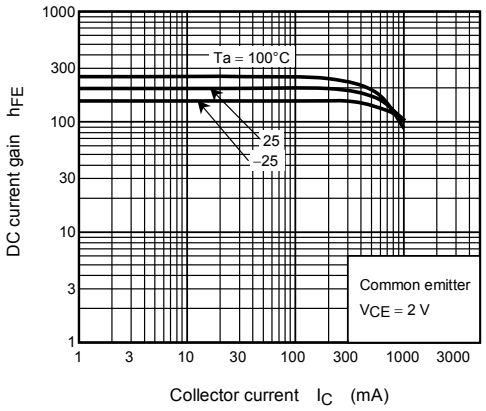
## Marking



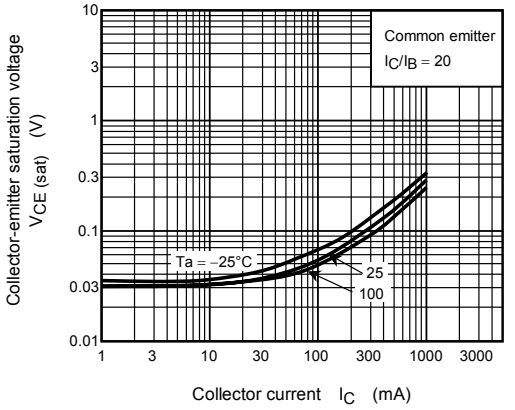
$I_C - V_{CE}$



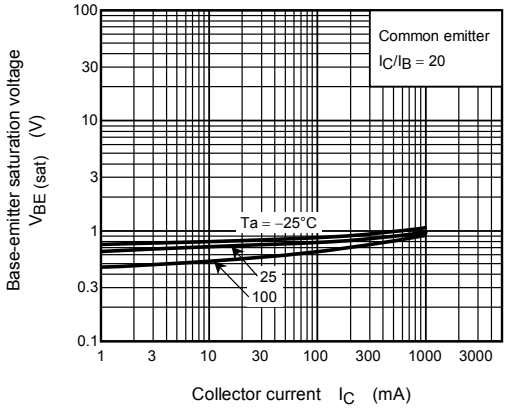

$h_{FE} - I_C$



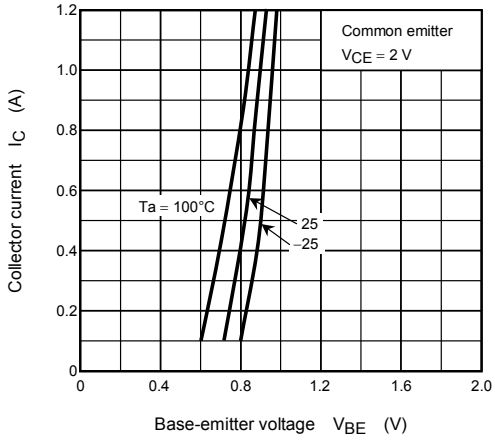

$V_{CE\ (sat)} - I_C$



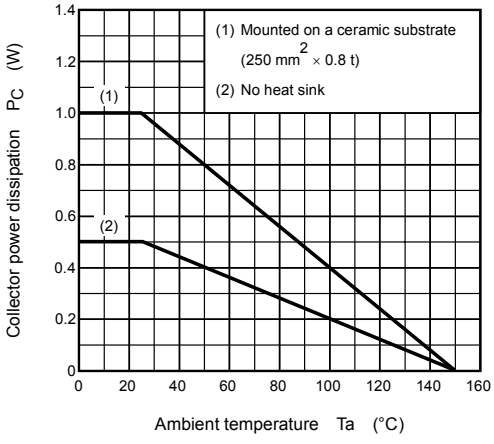

$V_{BE\ (sat)} - I_C$




$I_C - V_{BE}$




$P_C - Ta$



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