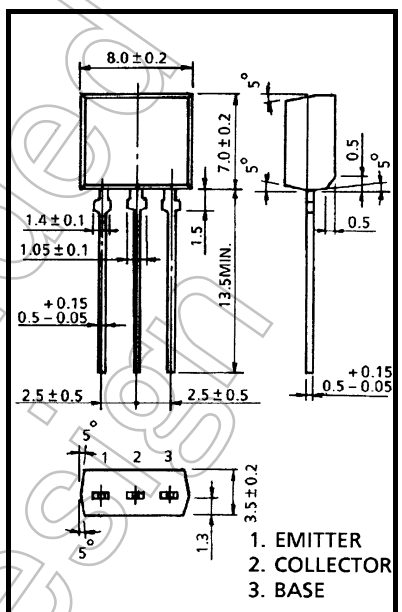
TOSHIBA Transistor Silicon NPN Triple Diffused Type

# 2SD2461

Power Amplifier Applications

- High DC current gain: $h_{FE\ (1)}$ = 800 to 3200 ($V_{CE}$ = 5 V, $I_C$ = 0.1 A)
- Low saturation voltage: $V_{CE\ (sat)}$ = 0.3 V (typ.) ($I_C$ = 0.5 A, $I_B$ = 5 mA)

Unit: mm




| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-8M1A |

Weight: 0.55 g (typ.)

## Absolute Maximum Ratings (Ta = 25°C)

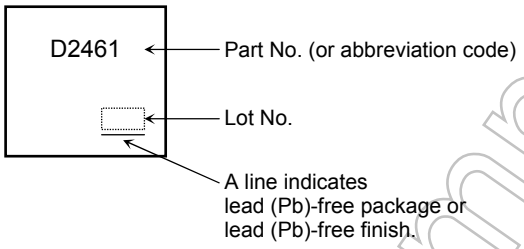
| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | 60 | V |
| Collector-emitter voltage | | $V_{CEO}$ | 60 | V |
| Emitter-base voltage | | $V_{EBO}$ | 7 | V |
| Collector current | DC | $I_C$ | 2 | A |
| | Pulse | $I_{CP}$ | 4 | |
| Base current | | $I_B$ | 0.4 | A |
| Collector power dissipation | | $P_C$ | 1.3 | W |
| 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).

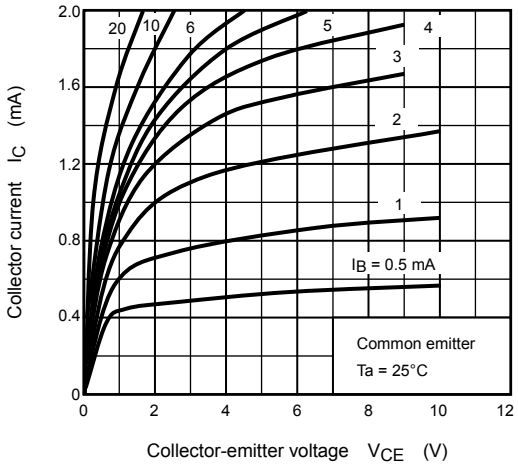
## Electrical Characteristics (Ta = 25°C)

| 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 | $h_{FE\ (1)}$ | $V_{CE}$ = 5 V, $I_C$ = 0.1 A | 800 | — | 3200 | |
| | $h_{FE\ (2)}$ | $V_{CE}$ = 5 V, $I_C$ = 1 A | 350 | — | — | |
| Collector-emitter saturation voltage | $V_{CE\ (sat)}$ | $I_C$ = 0.5 A, $I_B$ = 5 mA | — | 0.3 | 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 | — | 17 | — | MHz |
| Collector output capacitance | $C_{ob}$ | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | — | 30 | — | pF |

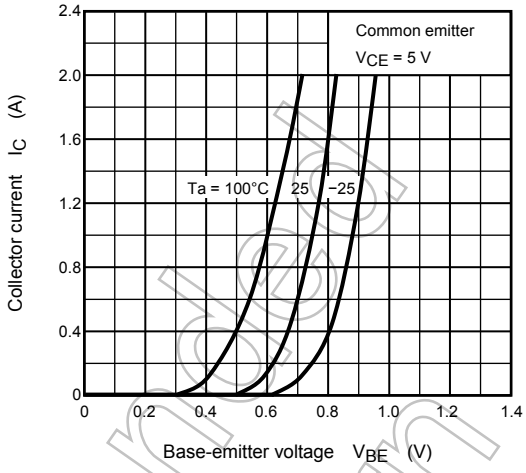
## Marking



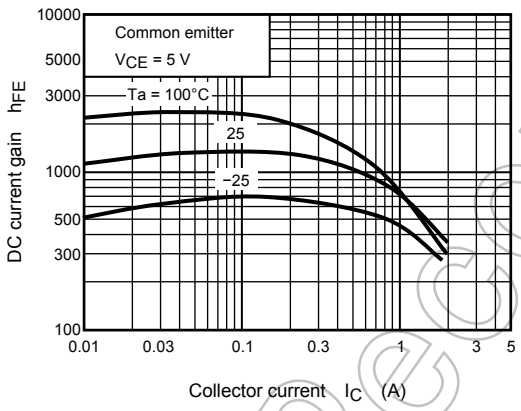
$I_C - V_{CE}$



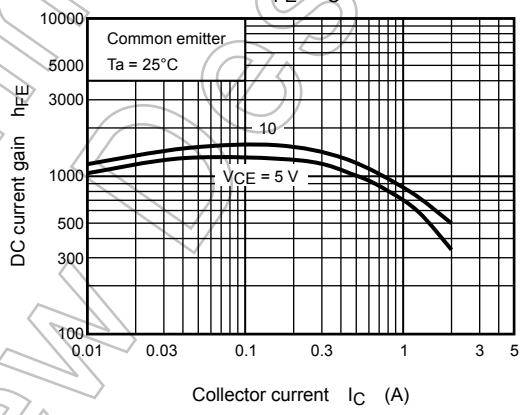

$I_C - V_{BE}$



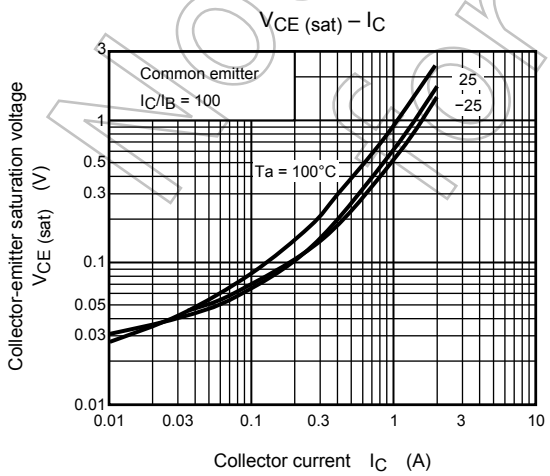

$h_{FE} - I_C$



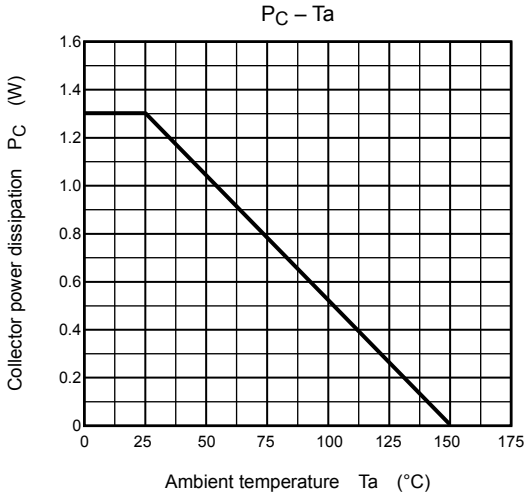

$h_{FE} - I_C$



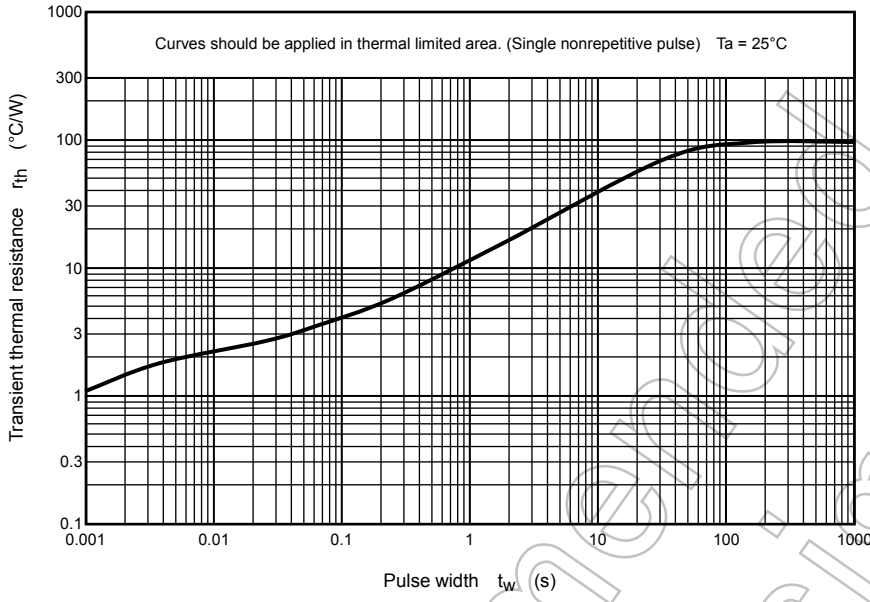

$V_{CE\ (sat)} - I_C$



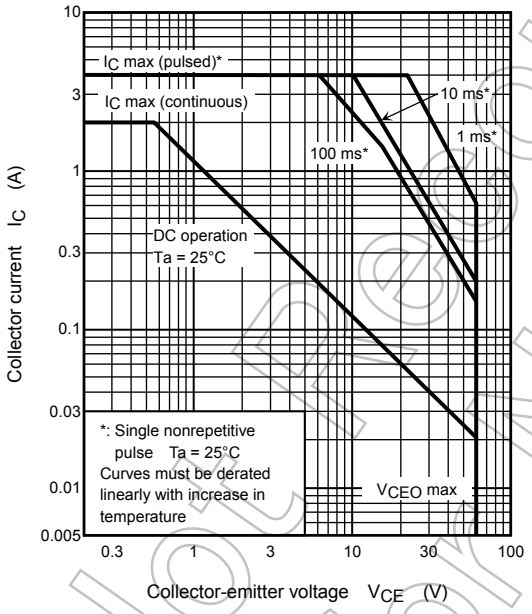

$P_C - Ta$



$r_{th} - t_w$




Safe Operating Area



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