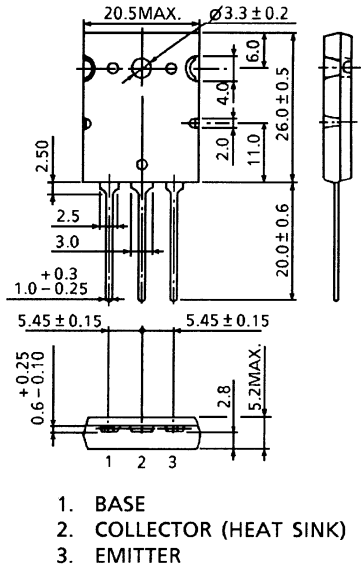
TOSHIBA Transistor Silicon PNP Triple Diffused Type

# 2SA1943

Power Amplifier Applications

- High collector voltage: $V_{CEO}$ = −230 V (min)
- Complementary to 2SC5200
- Recommended for 100-W high-fidelity audio frequency amplifier output stage.

Unit: mm




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

| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-21F1A |

Weight: 9.75 g (typ.)

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

| Characteristics | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-base voltage | $V_{CBO}$ | −230 | V |
| Collector-emitter voltage | $V_{CEO}$ | −230 | V |
| Emitter-base voltage | $V_{EBO}$ | −5 | V |
| Collector current | $I_C$ | −15 | A |
| Base current | $I_B$ | −1.5 | A |
| Collector power dissipation (Tc = 25°C) | $P_C$ | 150 | W |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature range | $T_{stg}$ | −55 to 150 | °C |

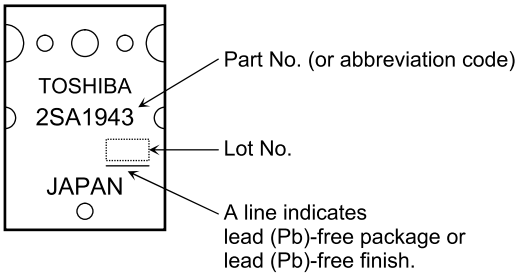
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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)

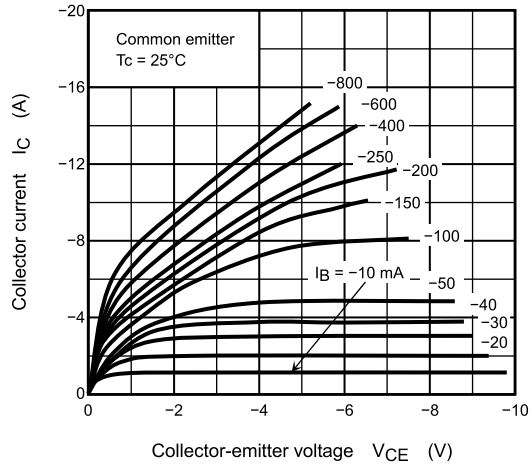
| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Collector cut-off current | $I_{CBO}$ | $V_{CB}$ = −230 V, $I_E$ = 0 | — | — | −5.0 | μA |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$ = −5 V, $I_C$ = 0 | — | — | −5.0 | μA |
| Collector-emitter breakdown voltage | $V_{(BR)\ CEO}$ | $I_C$ = −50 mA, $I_B$ = 0 | −230 | — | — | V |
| DC current gain | $h_{FE\ (1)}$ (Note) | $V_{CE}$ = −5 V, $I_C$ = −1 A | 55 | — | 160 | |
| | $h_{FE\ (2)}$ | $V_{CE}$ = −5 V, $I_C$ = −7 A | 35 | 60 | — | |
| Collector-emitter saturation voltage | $V_{CE\ (sat)}$ | $I_C$ = −8 A, $I_B$ = −0.8 A | — | −1.5 | −3.0 | V |
| Base-emitter voltage | $V_{BE}$ | $V_{CE}$ = −5 V, $I_C$ = −7 A | — | −1.0 | −1.5 | V |
| Transition frequency | $f_T$ | $V_{CE}$ = −5 V, $I_C$ = −1 A | — | 30 | — | MHz |
| Collector output capacitance | $C_{ob}$ | $V_{CB}$ = −10 V, $I_E$ = 0, f = 1 MHz | — | 360 | — | pF |

Note: $h_{FE\ (1)}$ classification R: 55 to 110, O: 80 to 160

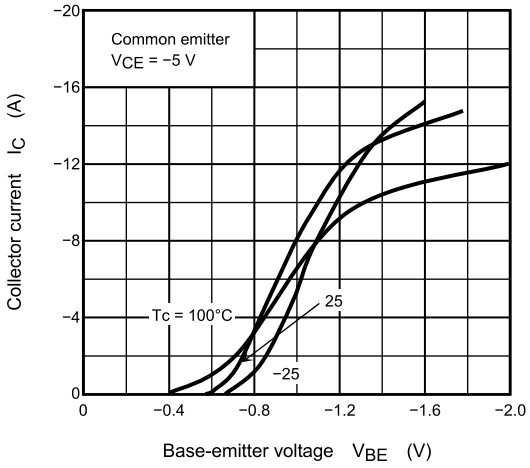
## Marking



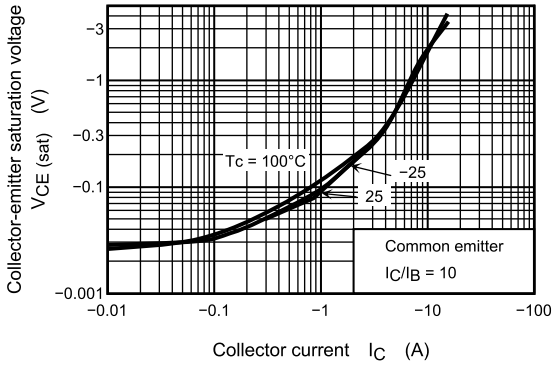
$I_C - V_{CE}$



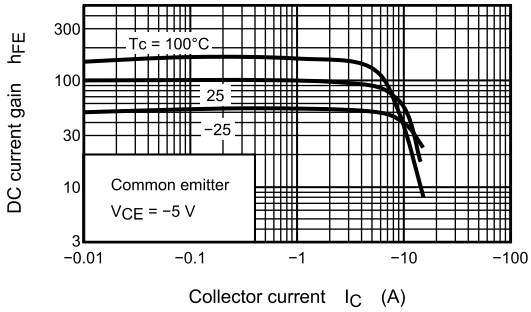

$I_C - V_{BE}$



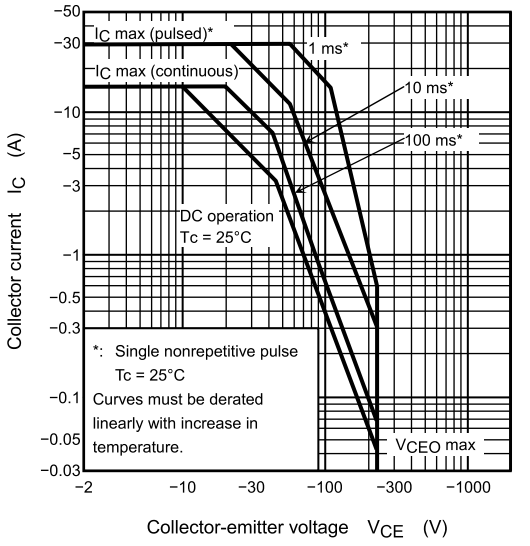

$V_{CE\ (sat)} - I_C$

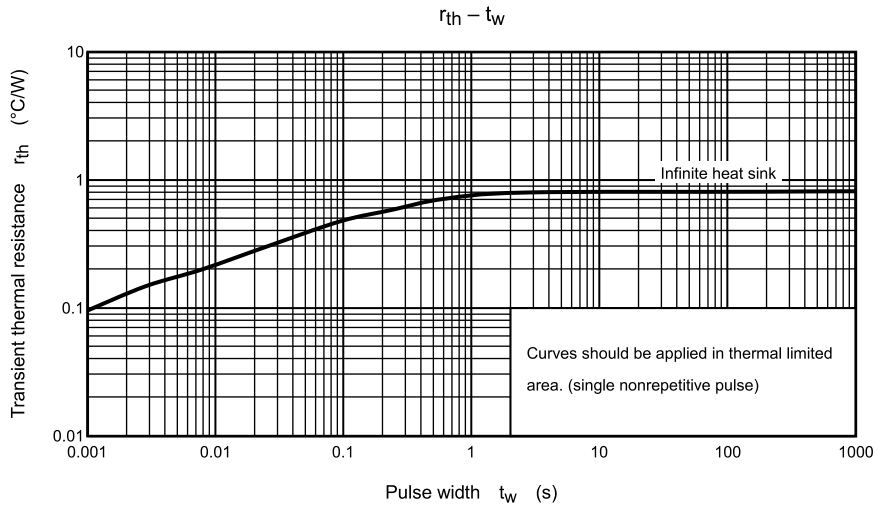



$h_{FE} - I_C$




Safe Operating Area




$r_{th} - t_w$
Transient thermal resistance $r_{th}$ (°C/W)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100
1000
Infinite heat sink
Curves should be applied in thermal limited area. (single nonrepetitive pulse)
Pulse width $t_w$ (s)

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20070701-EN

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