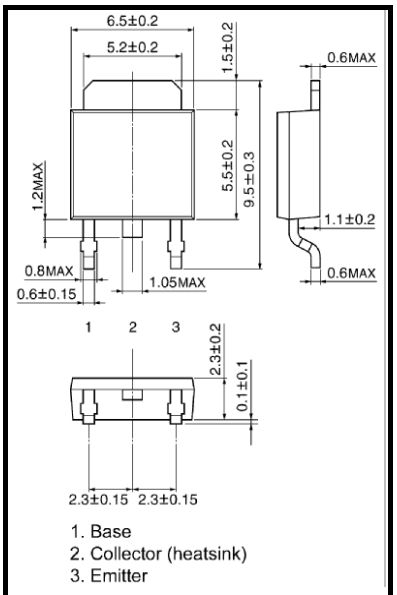
TOSHIBA Transistor Silicon NPN Triple Diffused Type

# 2SC5458

High Voltage Switching Applications
Switching Regulator Applications
DC-DC Converter Applications
DC-AC Inverter Applications

- Excellent switching times: $t_r$ = 0.5 μs (max)
  $t_f$ = 0.3 μs (max) ($I_C$ = 0.4 A)
- High collector breakdown voltage: $V_{CEO}$ = 400 V

Unit: mm




| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-7J1A |

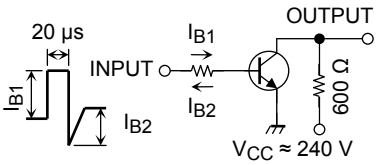
Weight: 0.36 g (typ.)

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

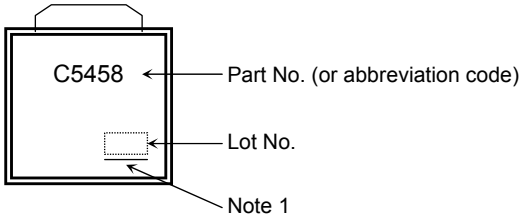
| Characteristics | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Collector-base voltage | | $V_{CBO}$ | 600 | V |
| Collector-emitter voltage | | $V_{CEO}$ | 400 | V |
| Emitter-base voltage | | $V_{EBO}$ | 7 | V |
| Collector current | DC | $I_C$ | 0.8 | A |
| | Pulse | $I_{CP}$ | 1.5 | |
| Base current | | $I_B$ | 0.5 | 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 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 | | $I_{CBO}$ | $V_{CB}$ = 480 V, $I_E$ = 0 | — | — | 100 | μA |
| Emitter cut-off current | | $I_{EBO}$ | $V_{EB}$ = 7 V, $I_C$ = 0 | — | — | 100 | μA |
| Collector-base breakdown voltage | | $V_{(BR)\ CBO}$ | $I_C$ = 1 mA, $I_E$ = 0 | 600 | — | — | V |
| Collector-emitter breakdown voltage | | $V_{(BR)\ CEO}$ | $I_C$ = 10 mA, $I_B$ = 0 | 400 | — | — | V |
| DC current gain | | $h_{FE}$ | $V_{CE}$ = 5 V, $I_C$ = 1 mA | 20 | — | — | |
| | | | $V_{CE}$ = 5 V, $I_C$ = 0.1 A | 30 | — | 80 | |
| Collector emitter saturation voltage | | $V_{CE\ (sat)}$ | $I_C$ = 0.3 A, $I_B$ = 0.04 A | — | — | 1.0 | V |
| Base-emitter saturation voltage | | $V_{BE\ (sat)}$ | $I_C$ = 0.3 A, $I_B$ = 0.04 A | — | — | 1.3 | V |
| Switching time | Turn-on time | $t_r$ |   | — | — | 0.5 | μs |
| | Storage time | $t_{stg}$ | | — | — | 2.0 | |
| | Fall time | $t_f$ | $I_{B1}$ = 50 mA, $I_{B2}$ = −100 mA<br>DUTY CYCLE ≤ 1% | — | — | 0.3 | |

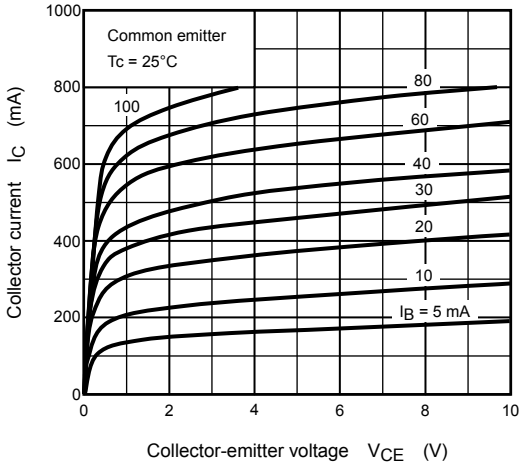
## Marking



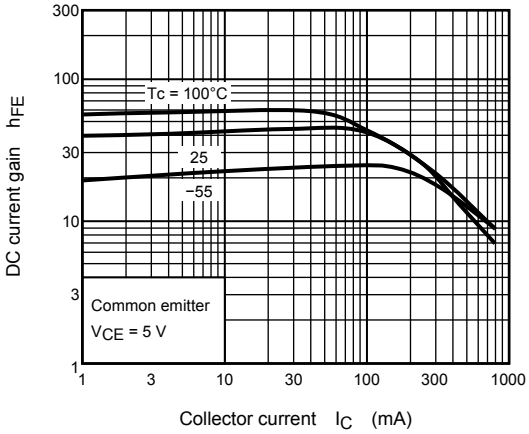

Note 1: A line under a Lot No. identifies the indication of product Labels.
Not underlined: [[Pb]]/INCLUDES > MCV
Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

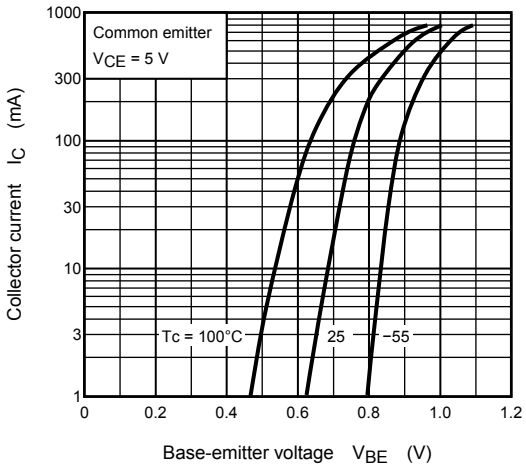
$I_C - V_{CE}$



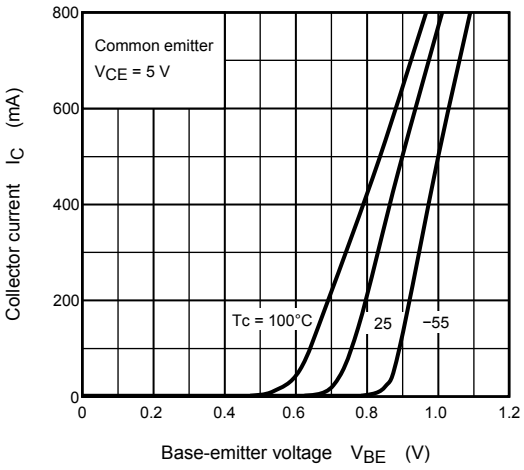

$h_{FE} - I_C$



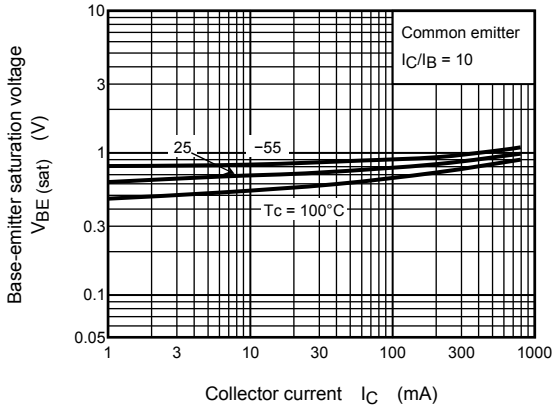

$I_C - V_{BE}$



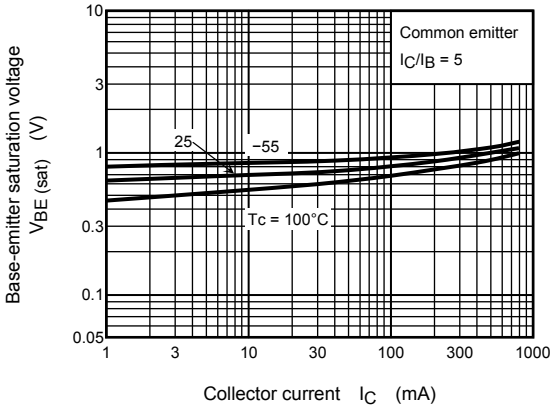

$I_C - V_{BE}$

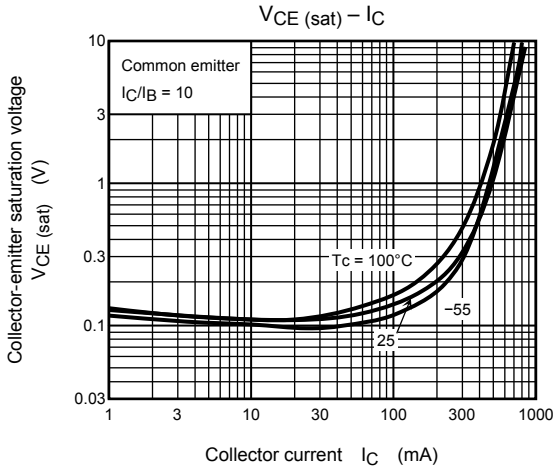


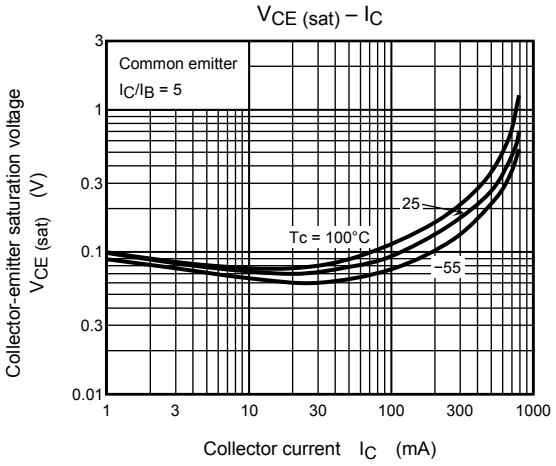

$V_{BE\ (sat)} - I_C$

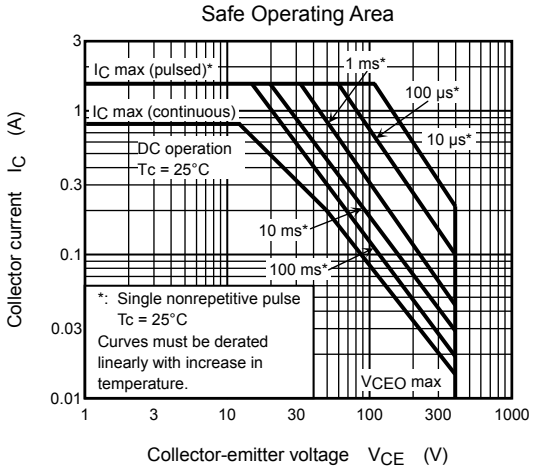



$V_{BE\ (sat)} - I_C$




$V_{CE\ (sat)} - I_C$
Common emitter
$I_C/I_B = 10$
Tc = 100°C
25
−55
Collector-emitter saturation voltage $V_{CE\ (sat)}$ (V)
Collector current $I_C$ (mA)
10
3
1
0.3
0.1
0.03
1
3
10
30
100
300
1000


$V_{CE\ (sat)} - I_C$
Common emitter
$I_C/I_B = 5$
Tc = 100°C
25
−55
Collector-emitter saturation voltage $V_{CE\ (sat)}$ (V)
Collector current $I_C$ (mA)
3
1
0.3
0.1
0.3
0.01
1
3
10
30
100
300
1000


Safe Operating Area
$I_C$ max (pulsed)*
$I_C$ max (continuous)
DC operation
Tc = 25°C
1 ms*
100 μs*
10 μs*
10 ms*
100 ms*
*: Single nonrepetitive pulse
Tc = 25°C
Curves must be derated
linearly with increase in
temperature.
$V_{CEO}$ max
Collector current $I_C$ (A)
Collector-emitter voltage $V_{CE}$ (V)
3
1
0.3
0.1
0.03
0.01
1
3
10
30
100
300
1000

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