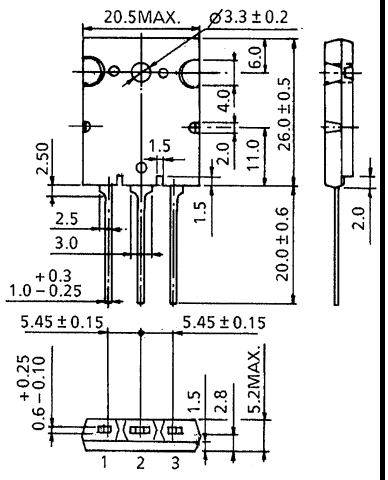
TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

# 2SC5858

## HORIZONTAL DEFLECTION OUTPUT FOR HDTV, DIGITAL TV, PROJECTION TV

- High Voltage : $V_{CBO}$ = 1700 V
- Low Saturation Voltage : $V_{CE\ (sat)}$ = 1.5 V (Max)
- High Speed : $t_{f(2)}$ = 0.1 μs (Typ.)

Unit: mm




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

| | |
|---|---|
| JEDEC | — |
| JEITA | — |
| TOSHIBA | 2-21F2A |

Weight: 9.75 g (typ.)

## ABSOLUTE MAXIMUM RATINGS (Tc = 25°C)

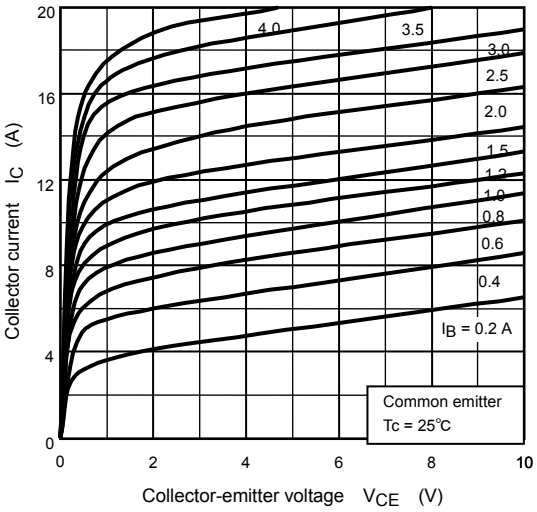
| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|
| Collector−Base Voltage | | $V_{CBO}$ | 1700 | V |
| Collector−Emitter Voltage | | $V_{CEO}$ | 750 | V |
| Emitter−Base Voltage | | $V_{EBO}$ | 5 | V |
| Collector Current | DC | $I_C$ | 22 | A |
| | Pulse | $I_{CP}$ | 44 | |
| Base Current | | $I_B$ | 11 | A |
| Collector Power Dissipation | | $P_C$ | 200 | W |
| Junction Temperature | | $T_j$ | 150 | °C |
| Storage Temperature Range | | $T_{stg}$ | −55~150 | °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).

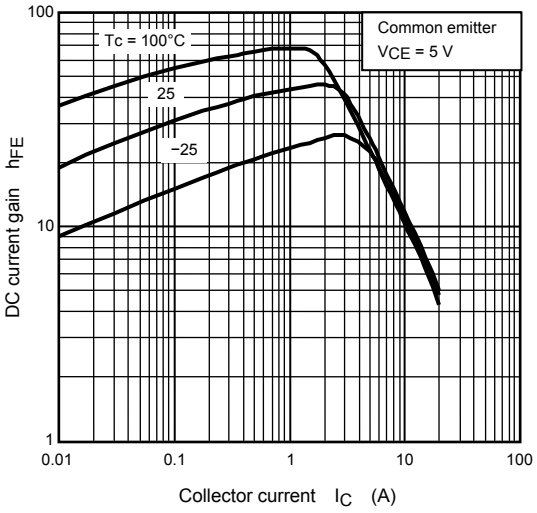
## ELECTRICAL CHARACTERISTICS (Tc = 25°C)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN | TYP. | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Collector Cut−off Current | | $I_{CBO}$ | $V_{CB}$ = 1700 V, $I_E$ = 0 | — | — | 1 | mA |
| Emitter Cut−off Current | | $I_{EBO}$ | $V_{EB}$ = 5 V, $I_C$ = 0 | — | — | 100 | μA |
| Collector − Emitter Breakdown Voltage | | $V_{(BR)\ CEO}$ | $I_C$ = 10 mA, $I_B$ = 0 | 750 | — | — | V |
| DC Current Gain | | $h_{FE\ (1)}$ | $V_{CE}$ = 5 V, $I_C$ = 2 A | 30 | — | 60 | — |
| | | $h_{FE\ (2)}$ | $V_{CE}$ = 5 V, $I_C$ = 8 A | 11 | — | 19 | |
| | | $h_{FE\ (3)}$ | $V_{CE}$ = 5 V, $I_C$ = 17 A | 5 | — | 7.5 | |
| Collector−Emitter Saturation Voltage | | $V_{CE\ (sat)}$ | $I_C$ = 17 A, $I_B$ = 4.25 A | — | — | 1.5 | V |
| Base−Emitter Saturation Voltage | | $V_{BE\ (sat)}$ | $I_C$ = 17 A, $I_B$ = 4.25 A | — | 1.0 | 1.5 | V |
| Transition Frequency | | $f_T$ | $V_{CE}$ = 10 V, $I_C$ = 0.1 A | — | 2 | — | MHz |
| Collector Output Capacitance | | $C_{ob}$ | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | — | 280 | — | pF |
| Switching Time | Storage Time | $t_{stg(1)}$ | $I_{CP}$ = 9 A , $I_{B1}$ (end) = 1.4 A<br>$f_H$ = 32 kHz | — | 4.5 | — | μs |
| | Fall Time | $t_{f(1)}$ | | — | 0.1 | — | |
| | Storage Time | $t_{stg(2)}$ | $I_{CP}$ = 8 A, $I_{B1}$ (end) = 1.2 A<br>$f_H$ = 45 kHz | — | 3.5 | — | μs |
| | Fall Time | $t_{f(2)}$ | | — | 0.1 | — | |

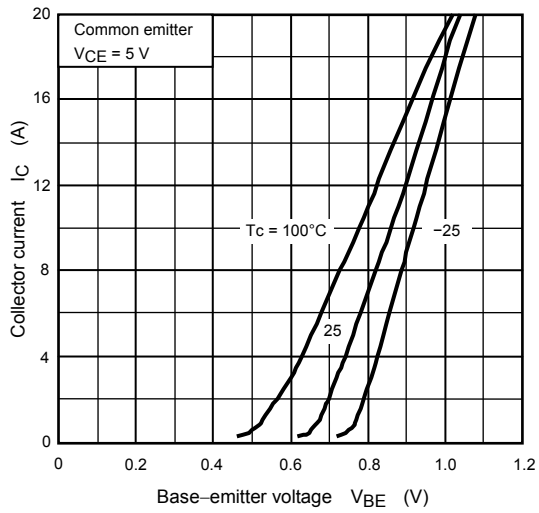
$I_C - V_{CE}$



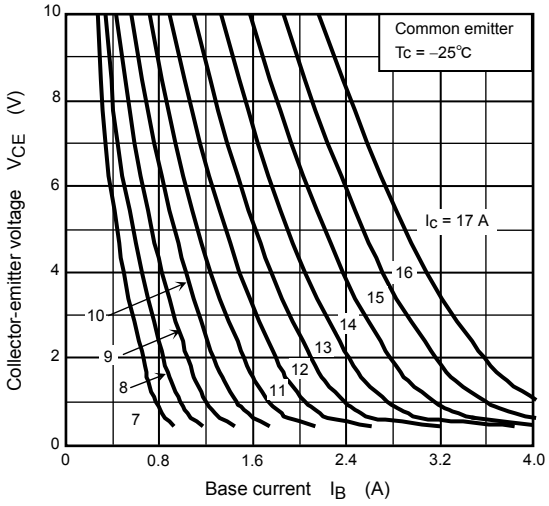

$h_{FE} - I_C$



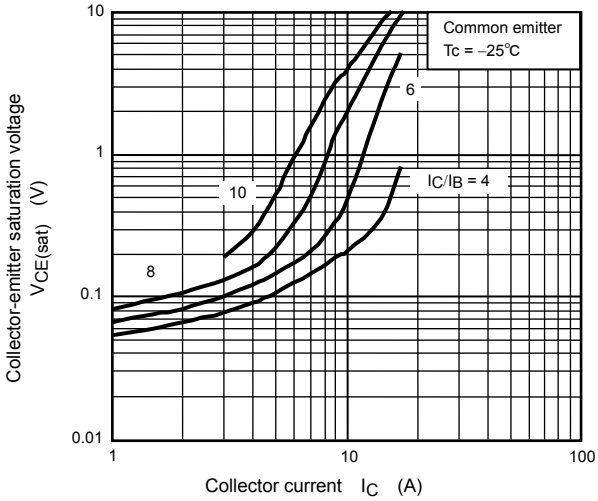

$I_C - V_{BE}$



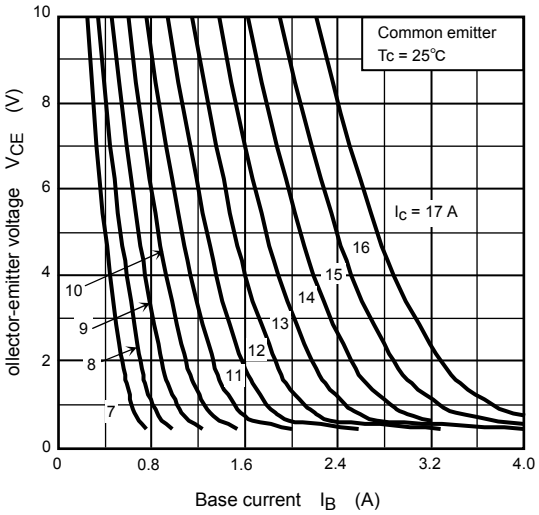
$V_{CE} - I_B$



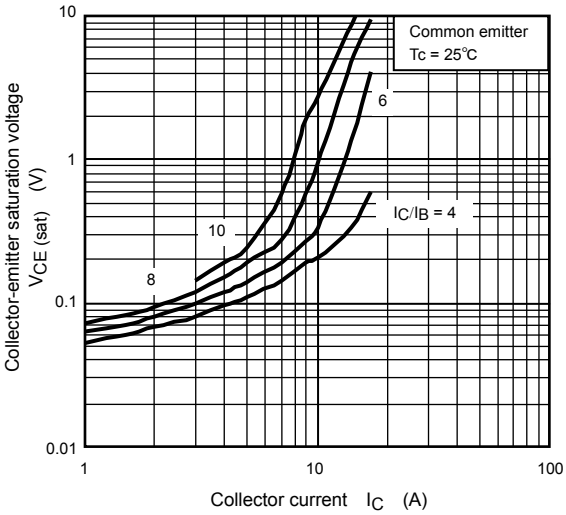

$V_{CE(sat)} - I_C$



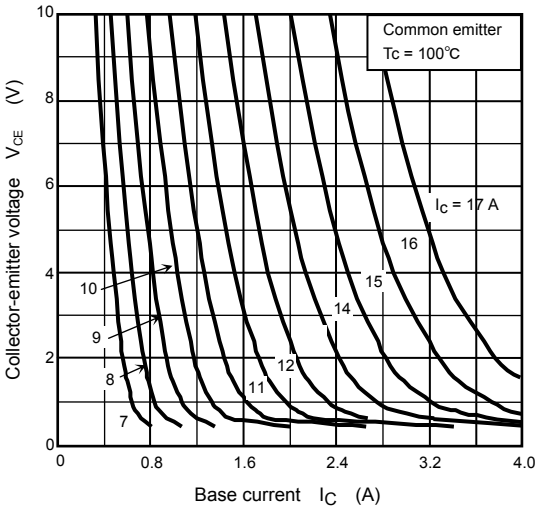

$V_{CE} - I_B$



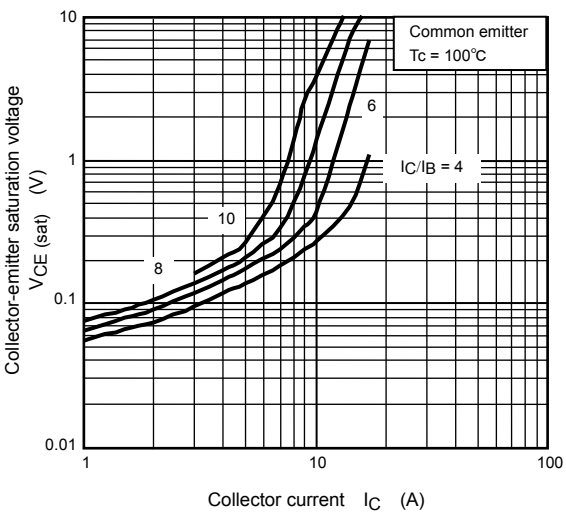

$V_{CE\ (sat)} - I_C$



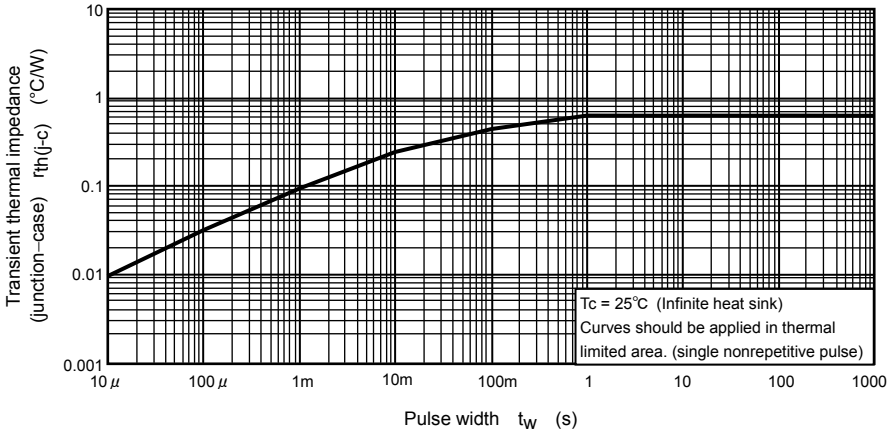

$V_{CE} - I_B$



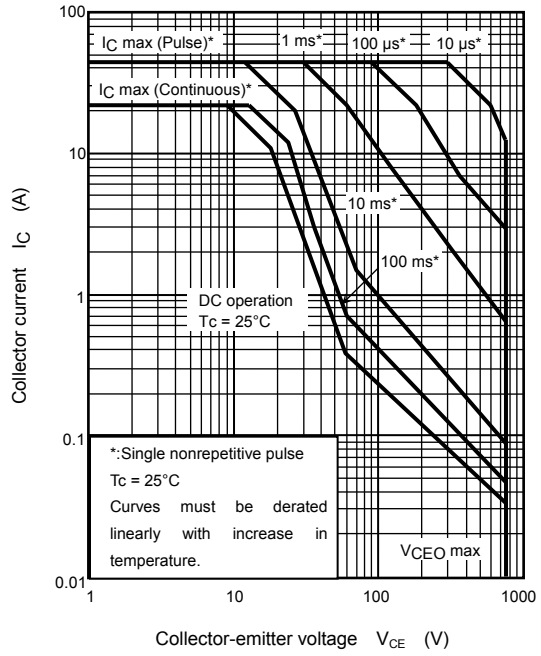

$V_{CE\ (sat)} - I_C$



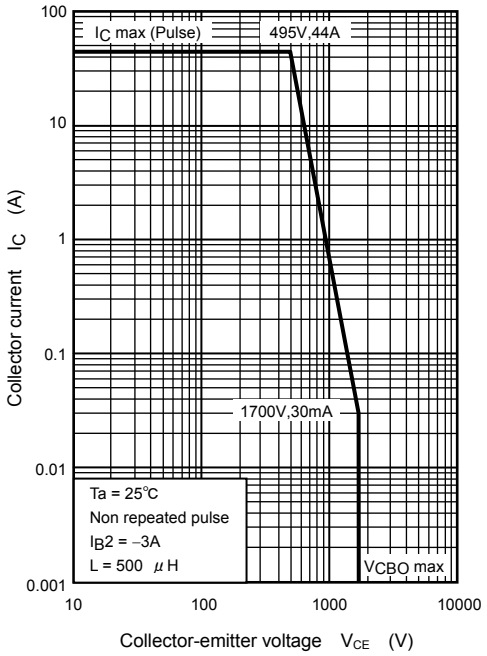
$r_{th(j-c)} - t_w$




Safe Operating Area




Reverse Bias – Safe Operating Area




$P_C$ – Tc