

TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED TYPE

# 2SD1313

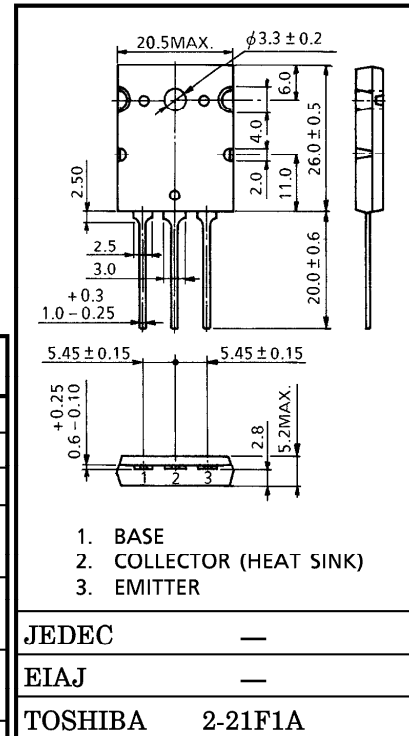
HIGH POWER AMPLIFIER APPLICATIONS.  
HIGH POWER SWITCHING APPLICATIONS.

INDUSTRIAL APPLICATIONS  
Unit in mm

- High Power Dissipation :  $P_C=200W$  ( $T_c=25^\circ C$ )
- High Collector Current :  $I_C=25A$  (DC)
- High Speed Switching :  $t_f=0.5\mu s$  (Typ.) ( $I_C=15A$ )
- Low Saturation Voltage :  $V_{CE(sat)}=1.0V$  (Max.) ( $I_C=15A$ )

MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

| CHARACTERISTIC                                      | SYMBOL    | RATING   | UNIT       |
|---|-----------|----------|------------|
| Collector-Base Voltage                              | $V_{CB0}$ | 800      | V          |
| Collector-Emitter Voltage                           | $V_{CEO}$ | 350      | V          |
| Emitter-Base Voltage                                | $V_{EBO}$ | 7        | V          |
| Collector Current                                   | DC        | $I_C$    | 25         |
|   | Pulse     | $I_{CP}$ | 35         |
| Base Current  | DC        | $I_B$    | 10         |
|   | Pulse     | $I_{BP}$ | 15         |
| Collector Power Dissipation<br>( $T_c=25^\circ C$ ) | $P_C$     | 200      | W          |
| Junction Temperature                                | $T_j$     | 150      | $^\circ C$ |
| Storage Temperature Range                           | $T_{stg}$ | -55~150  | $^\circ C$ |



Weight : 9.75g (Typ.)

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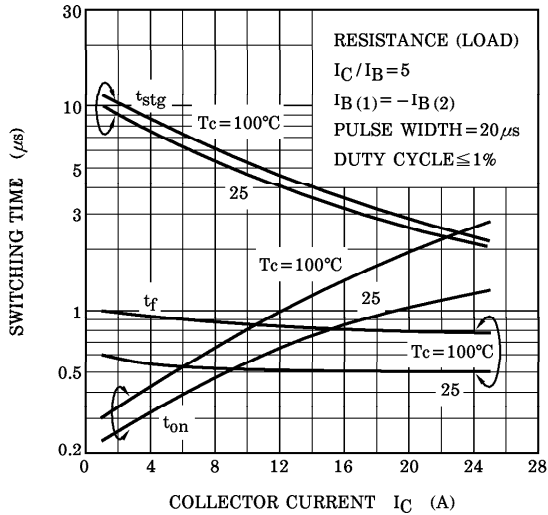
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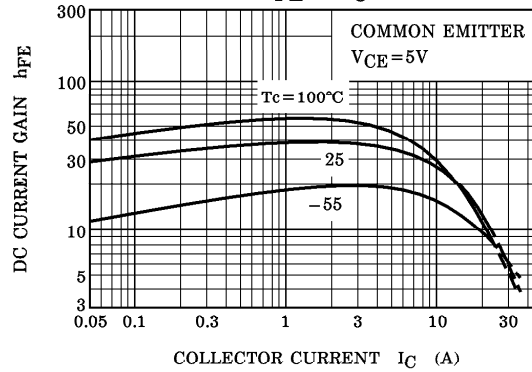
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                       | SYMBOL         | TEST CONDITION                    | MIN. | TYP.   | MAX. | UNIT |         |
|--------------------------------------|----------------|-----------------------------------|------|--|------|------|---------|
| Collector Cut-off Current            | $I_{CBO}$      | $V_{CB} = 800V, I_E = 0$          | —    | —  | 1    | mA   |         |
| Emitter Cut-off Current              | $I_{EBO}$      | $V_{EB} = 7V, I_C = 0$            | —    | —  | 1    | mA   |         |
| Collector-Emitter Breakdown Voltage  | $V_{(BR) CEO}$ | $I_C = 10mA, I_B = 0$             | 350  | —  | —    | V    |         |
| DC Current Gain                      | $h_{FE} (1)$   | $V_{CE} = 5V, I_C = 1A$           | 15   | —  | —    |      |         |
|                                      | $h_{FE} (2)$   | $V_{CE} = 5V, I_C = 25A$          | 6    | —  | —    |      |         |
| Collector-Emitter Saturation Voltage | $V_{CE (sat)}$ | $I_C = 15A, I_B = 3A$             | —    | —  | 1.0  | V    |         |
| Base-Emitter Saturation Voltage      | $V_{BE (sat)}$ | $I_C = 15A, I_B = 3A$             | —    | —  | 1.7  | V    |         |
| Collector Output Capacitance         | $C_{ob}$       | $V_{CB} = 50V, I_E = 0, f = 1MHz$ | —    | 170  | —    | pF   |         |
| Transition Frequency                 | $f_T$          | $V_{CE} = 10V, I_C = 1A$          | —    | 6  | —    | MHz  |         |
| Switching Time                       | Turn-on Time   | $t_{on}$                          |      | —  | 0.8  | —    | $\mu s$ |
|                                      | Storage Time   | $t_{stg}$                         |      | —  | 3.0  | —    |         |
|                                      | Fall Time      | $t_f$                             |      | $I_C = 15A, I_{B1} = -I_{B2} = 3A, DUTY CYCLE < 1\%$ | —    | 0.5  |         |

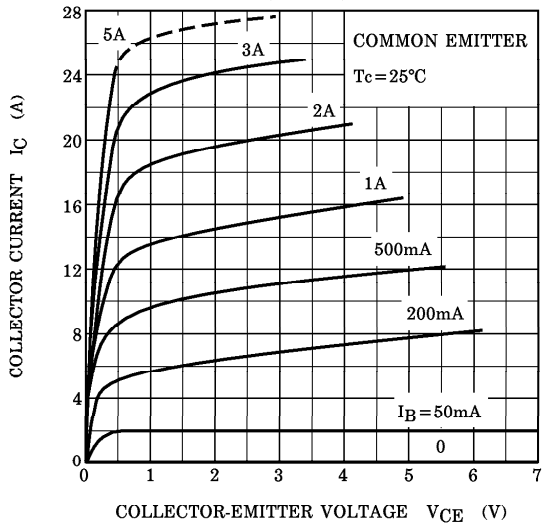
**SWITCHING APPLICATIONS**



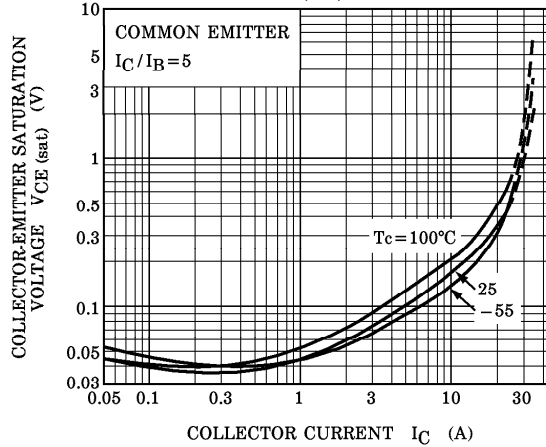
**hFE -  $I_C$**



**$I_C - V_{CE}$**



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



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

