

TOSHIBA TRANSISTOR SILICON PNP EPITAXIAL TYPE (PCT PROCESS)

## 2SA1933

HIGH CURRENT SWITCHING APPLICATIONS

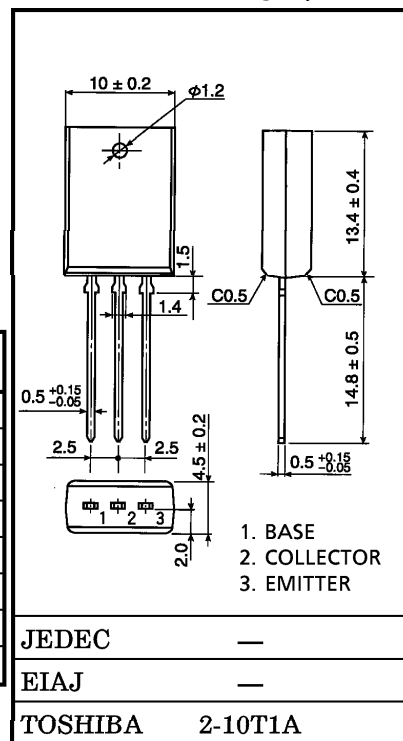
INDUSTRIAL APPLICATIONS

Unit in mm

- Low Saturation Voltage  
:  $V_{CE(sat)} = -0.4V$  (Max.) at  $I_C = -3A$
- High Speed Switching Time :  $t_{stg} = 1.0\mu s$  (Typ.)
- Complementary to 2SC5175

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

| CHARACTERISTIC              | SYMBOL    | RATING  | UNIT       |
|-----------------------------|-----------|---------|------------|
| Collector-Base Voltage      | $V_{CBO}$ | -60     | V          |
| Collector-Emitter Voltage   | $V_{CEO}$ | -50     | V          |
| Emitter-Base Voltage        | $V_{EBO}$ | -5      | V          |
| Collector Current           | $I_C$     | -5      | A          |
| Base Current                | $I_B$     | -1      | A          |
| Collector Power Dissipation | $P_C$     | 1.8     | W          |
| Junction Temperature        | $T_j$     | 150     | $^\circ C$ |
| Storage Temperature Range   | $T_{stg}$ | -55~150 | $^\circ C$ |

ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ C$ )

Weight : 1.5g

| CHARACTERISTIC                      | SYMBOL            | TEST CONDITION                     | MIN. | TYP. | MAX. | UNIT    |
|-------------------------------------|-------------------|------------------------------------|------|------|------|---------|
| Collector Cut-off Current           | $I_{CBO}$         | $V_{CB} = -50V, I_E = 0$           | —    | —    | -1   | $\mu A$ |
| Emitter Cut-off Current             | $I_{EBO}$         | $V_{EB} = -5V, I_C = 0$            | —    | —    | -1   | $\mu A$ |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$     | $I_C = -10mA, I_B = 0$             | -50  | —    | —    | V       |
| DC Current Gain                     | $h_{FE(1)}$       | $V_{CE} = -1V, I_C = -1A$          | 100  | —    | 320  |         |
|                                     | $h_{FE(2)}$       | $V_{CE} = -1V, I_C = -3A$          | 30   | —    | —    |         |
| Saturation Voltage                  | Collector-Emitter | $V_{CE(sat)}$                      | —    | -0.2 | -0.4 | V       |
|                                     | Base-Emitter      | $V_{BE(sat)}$                      | —    | -0.9 | -1.2 |         |
| Transition Frequency                | $f_T$             | $V_{CE} = -4V, I_C = -1A$          | —    | 60   | —    | MHz     |
| Collector Output Capacitance        | $C_{ob}$          | $V_{CB} = -10V, I_E = 0, f = 1MHz$ | —    | 170  | —    | pF      |
| Switching Time                      | Turn-on Time      | $t_{on}$                           | —    | 0.1  | —    | $\mu s$ |
|                                     | Storage Time      | $t_{stg}$                          | —    | 1.0  | —    |         |
|                                     | Fall Time         | $t_f$                              | —    | 0.1  | —    |         |

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