

TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED MESA TYPE

S2000N

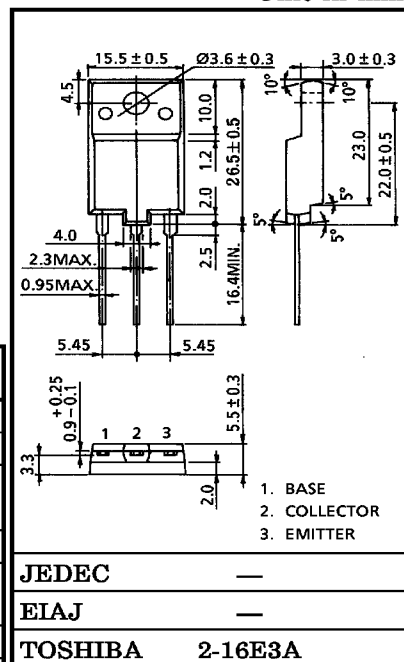
COLOR TV HORIZONTAL OUTPUT APPLICATIONS
 COLOR TV SWITCHING REGULATOR APPLICATIONS

Unit in mm

- High Voltage : $V_{CES} = 1500\text{ V}$
- High Speed : $t_f = 0.7\ \mu\text{s (Max.)}$
- Low Saturation Voltage : $V_{CE(sat)} = 5\text{ V (Max.)}$
- Collector Metal (Fin) is Fully Covered with Mold Resin. ((IS) Package)

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

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|--|---------------|----------|--------------------|
| Collector-Base Voltage | V_{CES} | 1500 | V |
| Emitter-Base Voltage | V_{EBO} | 5 | V |
| Collector Current | DC | I_C | 8 |
| | Pulse | I_{CP} | 15 |
| Base Current | I_B | 4 | A |
| Collector Power Dissipation ($T_c = 25^\circ\text{C}$) | P_C | 50 | W |
| Junction Temperature | T_j | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -55~150 | $^\circ\text{C}$ |
| Thermal Resistance | $R_{th(j-c)}$ | 2.5 | $^\circ\text{C/W}$ |



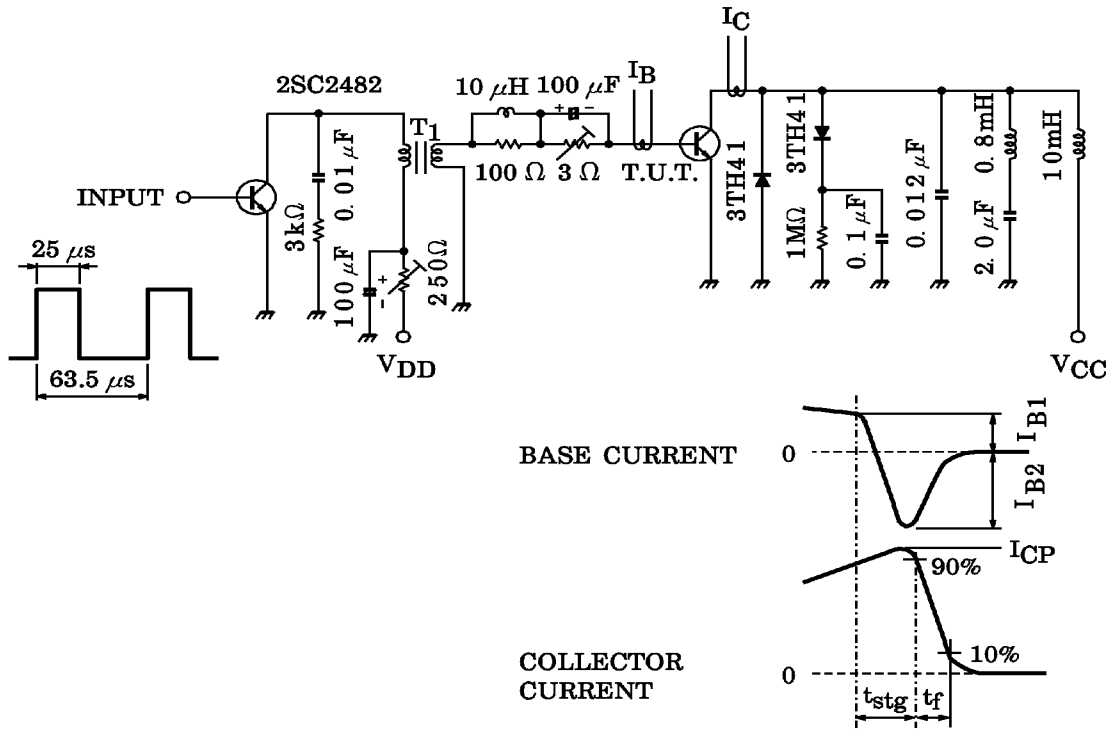
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|----------------|--|------|------|--------|---------------|
| Collector Cut-off Current | I_{CBO} | $V_{CB} = 1500\text{ V}, V_{BE} = 0$ | — | — | 1 | mA |
| Emitter-Base Breakdown Voltage | V_{EBO} | $I_E = 1\text{ mA}, I_C = 0$ | 5 | — | — | V |
| DC Current Gain | $h_{FE(1)}$ | $V_{CE} = 5\text{ V}, I_C = 1\text{ A}$ | 10 | — | 30 | V |
| | $h_{FE(2)}$ | $V_{CE} = 5\text{ V}, I_C = 4.5\text{ A}$ | 4.5 | — | 9 | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 4.5\text{ A}, I_B = 2\text{ A}$ $I_C = 4.5\text{ A}, I_B = 1\text{ A}$ | — | — | 1 5 | V |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C = 4.5\text{ A}, I_B = 1\text{ A}$ | — | 0.9 | 1.2 | V |
| Collector-Emitter Sustain Voltage | $V_{CEX(sus)}$ | $L = 40\text{ mH}, I_B = 500\text{ mA}$ $V_{BE} = -1.7\text{ V}$ | 700 | — | — | V |
| Transition Frequency | f_T | $V_{CE} = 10\text{ V}, I_C = 0.1\text{ A}$ | — | 2 | — | MHz |
| Collector Output Capacitance | C_{ob} | $V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$ | — | 95 | — | pF |
| Switching Time (Fig.1) | Storage Time | t_{stg} | — | 8 | 12 | μs |
| | Fall Time | t_f | — | 0.4 | 0.7 | |

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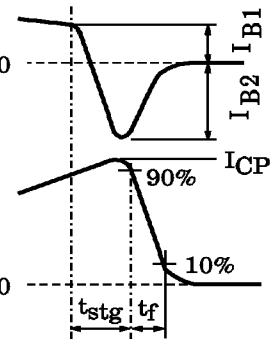
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Fig.1 SWITCHING TIME TEST CIRCUIT



BASE CURRENT

COLLECTOR CURRENT



Base Current Gradient

$$dI_B / dt = \frac{I_{B1} + I_{B2}}{t_{stg}} \text{ (A / } \mu\text{s)}$$

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