

TOSHIBA PROGRAMMABLE UNI JUNCTION TRANSISTOR SILICON PLANAR TYPE

TN41A, TN41B

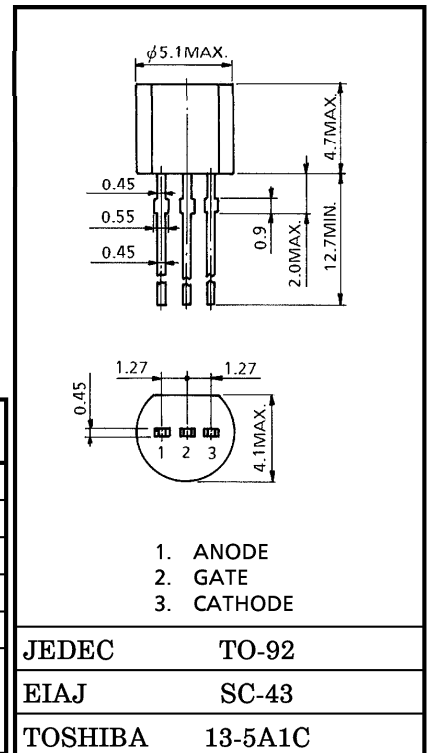
THYRISTOR-TRIGGER, RELAXATION OSCILLATOR, PULSER AND TIMER APPLICATIONS

Unit in mm

- Low Leakage Current : $I_{GAO} = 10\text{nA}$ (Max.)
 $I_{GKS} = 100\text{nA}$ (Max.)
- High Pulse Output Voltage : $V_O = 10\text{V}$ (Typ.)
- Low Peak Current : $I_P = 2\mu\text{A}$ (Max.) TN41A ($R_G = 1\text{M}\Omega$)
 $I_P = 0.15\mu\text{A}$ (Max.) TN41B ($R_G = 1\text{M}\Omega$)

MAXIMUM RATINGS

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|-----------|------------------------|--------------------|
| Gate-Cathode Forward Voltage | V_{GKF} | 40 | V |
| Gate-Cathode Reverse Voltage | V_{GKR} | -5 | V |
| Gate-Anode Reverse Voltage | V_{GAR} | 40 | V |
| Anode-Cathode Voltage | V_{AK} | ± 40 | V |
| DC Anode Current (Note 1) | I_T | 150 | mA |
| Repetitive Peak Forward Current (1% Duty Cycle) | I_{TM} | $t_w = 100\mu\text{s}$ | 1 |
| | | $t_w = 10\mu\text{s}$ | 2 |
| Non-Repetitive Peak Forward Current ($t_w = 10\mu\text{s}$) | I_{TSM} | 5 | A |
| DC Gate Current (Note 1) | I_G | ± 20 | mA |
| Capacitive Discharge Energy (Note 2) | E | 250 | μJ |
| Power Dissipation (Note 1) | P | 300 | mW |
| Operating Temperature | T_{opr} | -50~100 | $^{\circ}\text{C}$ |
| Junction Temperature | T_j | -50~125 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{stg} | -50~125 | $^{\circ}\text{C}$ |



Weight : 0.2g

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | FIGURE No. AND CONDITION | TN41A | | | TN41B | | | UNIT | |
|--|-----------------------|--------------------------------|---------|------|------|-------|------|------|------|----|
| | | | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | | |
| Peak Current (V _S = 10V) | R _G = 1MΩ | I _P | 1, 2, 3 | — | 0.05 | 2 | — | 0.01 | 0.15 | μA |
| | R _G = 10kΩ | | | — | 1.0 | 5 | — | 0.35 | 1.0 | |
| Offset Voltage (V _S = 10V) | R _G = 1MΩ | V _T | 1, 2, 3 | 0.2 | 0.35 | 1.6 | 0.2 | 0.35 | 0.6 | V |
| | R _G = 10kΩ | | | 0.2 | 0.45 | 0.6 | 0.2 | 0.45 | 0.6 | |
| Valley Current (V _S = 10V) | R _G = 1MΩ | I _V | 1, 2, 3 | — | 15 | 50 | — | 7 | 25 | μA |
| | R _G = 10kΩ | | | 70 | 200 | — | 25 | 160 | — | |
| Gate-Anode Leakage Current | I _{GAO} | 4, V _S = 40V | — | 0.03 | 10 | — | 0.03 | 10 | nA | |
| Gate-Cathode Leakage Current | I _{GKS} | 5, V _S = 40V | — | 0.3 | 100 | — | 0.3 | 100 | nA | |
| Forward Voltage | V _F | I _F = 50mA | — | 1 | 1.5 | — | 1 | 1.5 | V | |
| Pulse Output Voltage | V _O | 6, 7 | 6 | 10 | — | 6 | 10 | — | V | |
| Pulse Voltage Rise Time | t _r | 6, 7 | — | 70 | 80 | — | 70 | 80 | ns | |

(Note 1) Derate linearly current and powers 1%/°C above 25°C.

(Note 2) E = 0.5 · CV² capacitor discharge energy limiting resistor and repetition.

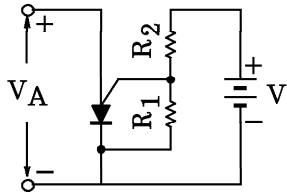


Fig.1 Programmable UJT with program resistor R1 and R2

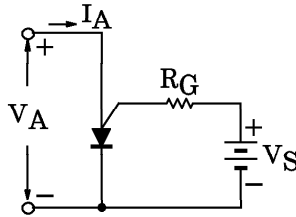


Fig.2 Equivalent test circuit for figure 1 used for electrical characteristic testing

$$R_G = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$V_S = \frac{R_1}{R_1 + R_2} V$$

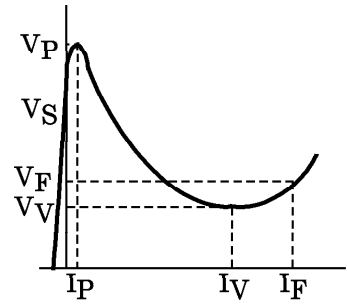


Fig.3 V-I electrical characteristics

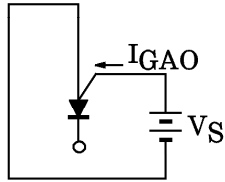


Fig.4 IGAO test circuit

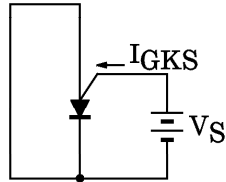


Fig.5 IGKS test circuit

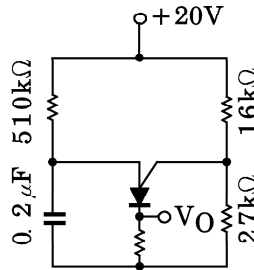


Fig.6 VO and tr test circuit

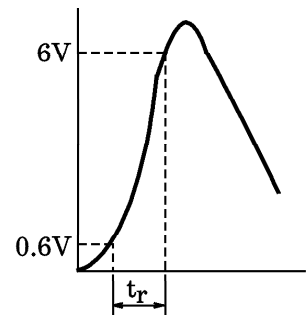


Fig.7 Waveform of VO and tr

