

TOSHIBA PROGRAMMABLE UNI JUNCTION TRANSISTOR SILICON PLANAR TYPE

# TN41A, TN41B

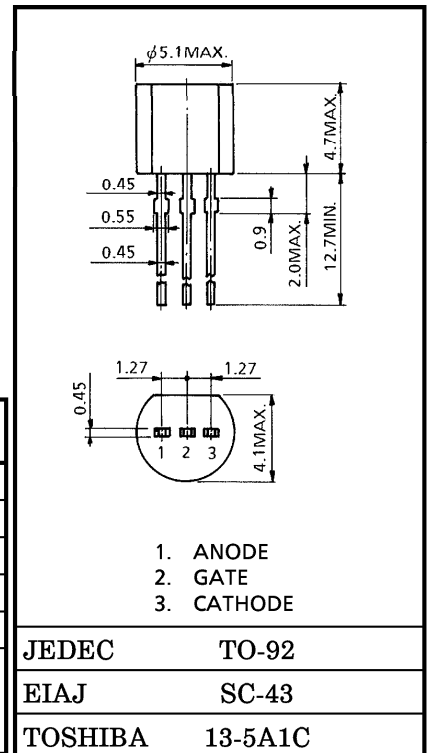
THYRISTOR-TRIGGER, RELAXATION OSCILLATOR, PULSER AND TIMER APPLICATIONS

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	$V_{AK}$	$\pm 40$	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)	$I_G$	$\pm 20$	mA
Capacitive Discharge Energy (Note 2)	E	250	$\mu\text{J}$
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 <sub>S</sub> = 10V)	R <sub>G</sub> = 1MΩ	I <sub>P</sub>	1, 2, 3	—	0.05	2	—	0.01	0.15	μA
	R <sub>G</sub> = 10kΩ			—	1.0	5	—	0.35	1.0	
Offset Voltage (V <sub>S</sub> = 10V)	R <sub>G</sub> = 1MΩ	V <sub>T</sub>	1, 2, 3	0.2	0.35	1.6	0.2	0.35	0.6	V
	R <sub>G</sub> = 10kΩ			0.2	0.45	0.6	0.2	0.45	0.6	
Valley Current (V <sub>S</sub> = 10V)	R <sub>G</sub> = 1MΩ	I <sub>V</sub>	1, 2, 3	—	15	50	—	7	25	μA
	R <sub>G</sub> = 10kΩ			70	200	—	25	160	—	
Gate-Anode Leakage Current	I <sub>GAO</sub>	4, V <sub>S</sub> = 40V	—	0.03	10	—	0.03	10	nA	
Gate-Cathode Leakage Current	I <sub>GKS</sub>	5, V <sub>S</sub> = 40V	—	0.3	100	—	0.3	100	nA	
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 50mA	—	1	1.5	—	1	1.5	V	
Pulse Output Voltage	V <sub>O</sub>	6, 7	6	10	—	6	10	—	V	
Pulse Voltage Rise Time	t <sub>r</sub>	6, 7	—	70	80	—	70	80	ns	

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

(Note 2) E = 0.5 · CV<sup>2</sup> capacitor discharge energy limiting resistor and repetition.

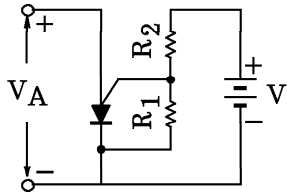


Fig.1 Programmable UJT with program resistor R<sub>1</sub> and R<sub>2</sub>

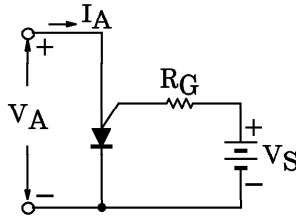


Fig.2 Equivalent test circuit for figure 1 used for electrical characteristic testing

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

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

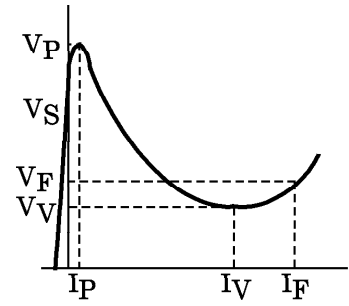


Fig.3 V-I electrical characteristics

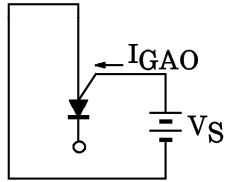


Fig.4 IGAO test circuit

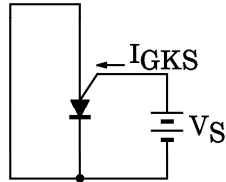


Fig.5 IGKS test circuit

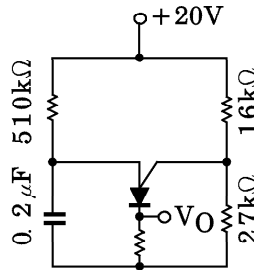


Fig.6 V<sub>O</sub> and t<sub>r</sub> test circuit

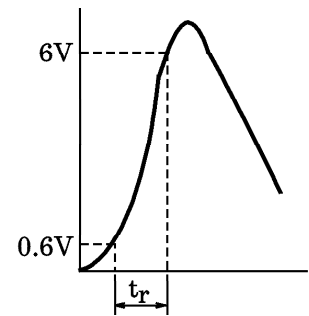


Fig.7 Waveform of V<sub>O</sub> and t<sub>r</sub>

