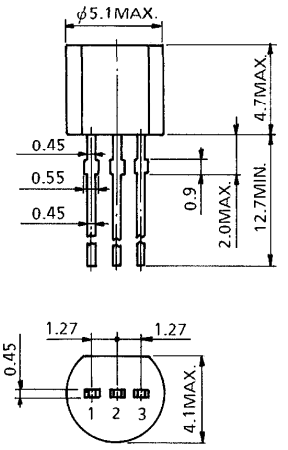
TOSHIBA PROGAMMABLE UNI JUNCTION TRANSISTOR SILICON PLANAR TYPE

TN41A, TN41B

THYRISTOR-TRIGGER, RELAXATION OSCILLATOR, PULSER AND TIMER APPLICATIONS

- Low Leakage Current : I_{GAO}=10nA (Max.)
  I_{GKS}=100nA (Max.)
- High Pulse Output Voltage : V_O=10V (Typ.)
- Low Peak Current : I_P=2μA (Max.) TN41A (R_G=1MΩ)
  I_P=0.15μA (Max.) TN41B (R_G=1MΩ)

Unit in mm



1. ANODE
2. GATE
3. CATHODE

JEDEC	TO-92
EIAJ	SC-43
TOSHIBA	13-5A1C

Weight : 0.2g

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)	t_W=100μs	I_{TM}	1	A
	t_W=10μs		2	
Non-Repetitive Peak Forward Current (t_W=10μs)		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	°C
Junction Temperature		T_j	−50~125	°C
Storage Temperature Range		T_{stg}	−50~125	°C

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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) $E = 0.5 \cdot CV^2$ capacitor discharge energy limiting resistor and repetition.

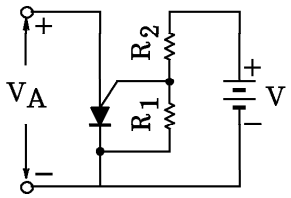
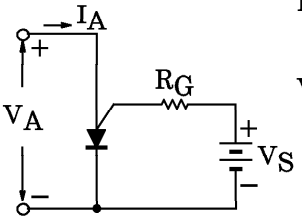


Fig.1 Programmable UJT with program resistor R_1 and R_2



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

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

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

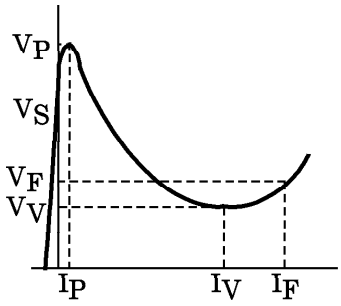


Fig.3 V-I electrical characteristics

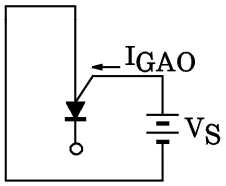


Fig.4 I_{GAO} test circuit

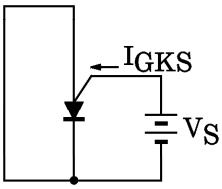


Fig.5 I_{GKS} test circuit

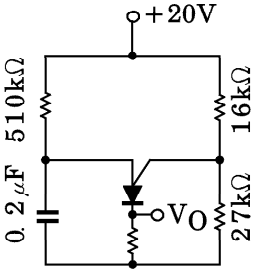


Fig.6 V_O and t_r test circuit

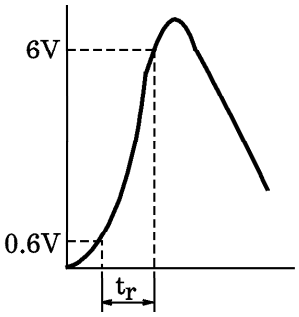
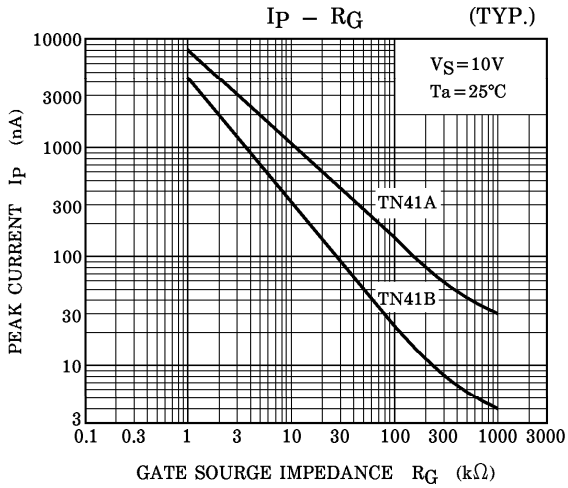
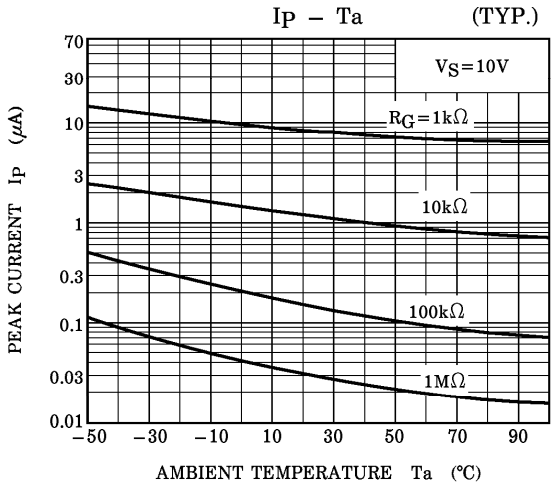
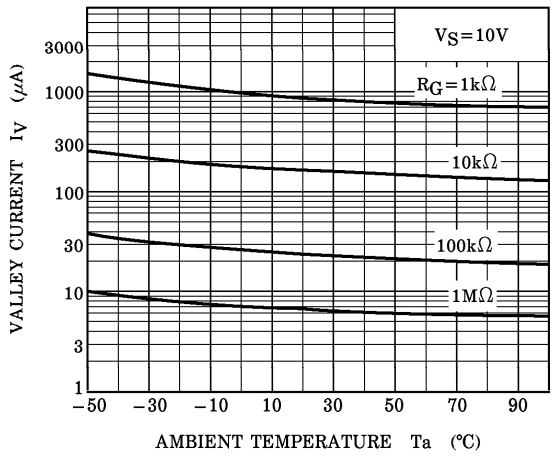


Fig.7 Waveform of V_O and t_r

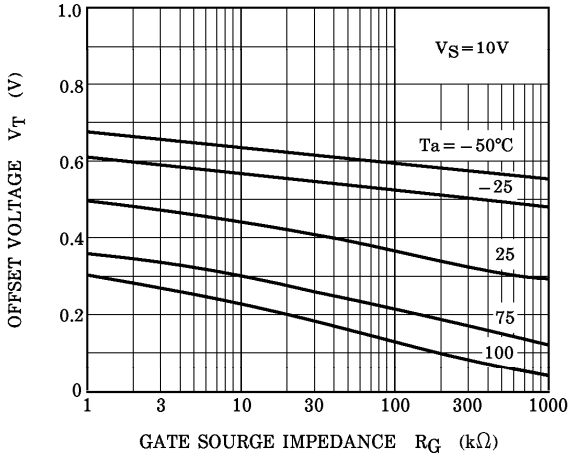




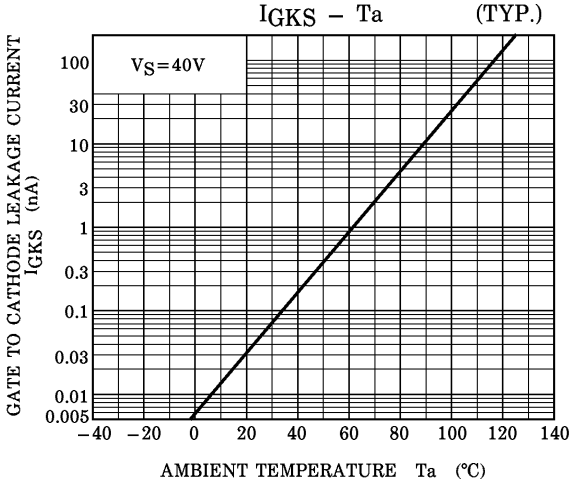
I_V – Ta (TYP.)



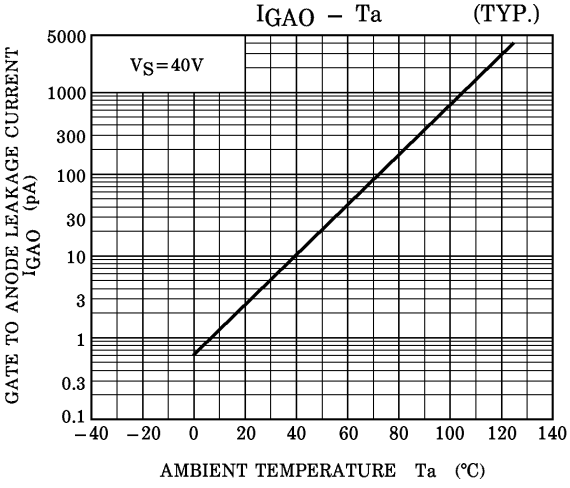
V_T – R_G (TYP.)



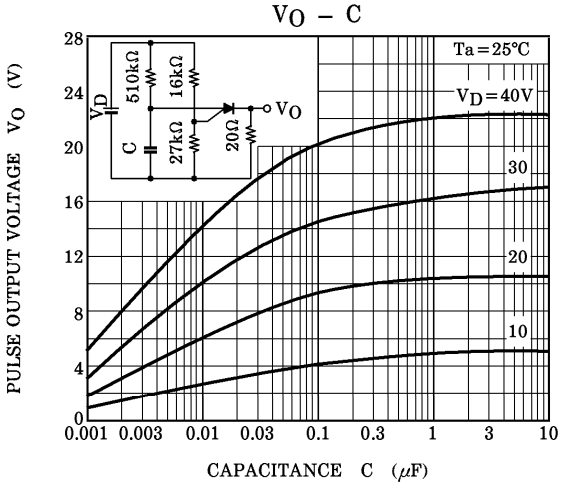
I_{GKS} – Ta (TYP.)



I_{GAO} – Ta (TYP.)



V_O – C



V_O – V_D (TYP.)