

Programmable Unijunction Transistors

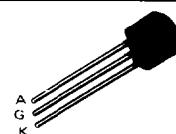
Silicon Programmable Unijunction Transistors

... designed to enable the engineer to "program" unijunction characteristics such as R_{BB} , η , I_V , and I_P by merely selecting two resistor values. Application includes thyristor-trigger, oscillator, pulse and timing circuits. These devices may also be used in special thyristor applications due to the availability of an anode gate. Supplied in an inexpensive TO-92 plastic package for high-volume requirements, this package is readily adaptable for use in automatic insertion equipment.

- Programmable — R_{BB} , η , I_V and I_P .
- Low On-State Voltage — 1.5 Volts Maximum @ $I_F = 50$ mA
- Low Gate to Anode Leakage Current — 10 nA Maximum
- High Peak Output Voltage — 11 Volts Typical
- Low Offset Voltage — 0.35 Volt Typical ($R_G = 10$ k ohms)

2N6027
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PUTs
40 VOLTS
300 mW



CASE 29-04
(TO-226AA)
STYLE 16

3

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
*Power Dissipation Derate Above 25°C	P_F $1/\theta_{JA}$	300 4	mW mW/ $^\circ\text{C}$
*DC Forward Anode Current Derate Above 25°C	I_T	150 2.67	mA mA/ $^\circ\text{C}$
*DC Gate Current	I_G	± 50	mA
Repetitive Peak Forward Current 100 μs Pulse Width, 1% Duty Cycle *20 μs Pulse Width, 1% Duty Cycle	I_{TRM}	1 2	Amps
Non-Repetitive Peak Forward Current 10 μs Pulse Width	I_{TSM}	5	Amps
*Gate to Cathode Forward Voltage	V_{GKF}	40	Volts
*Gate to Cathode Reverse Voltage	V_{GKR}	-5	Volts
*Gate to Anode Reverse Voltage	V_{GAR}	40	Volts
*Anode to Cathode Voltage, Note 1	V_{AK}	± 40	Volts
Operating Junction Temperature Range	T_J	-50 to +100	$^\circ\text{C}$
*Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$

*Indicates JEDEC Registered Data

Note 1. Anode positive, $R_{GA} = 1000$ ohms
Anode negative, $R_{GA} = \text{open}$

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Fig. No.	Symbol	Min	Typ	Max	Unit
*Peak Current (V _S = 10 Vdc, R _G = 1 MΩ)	2,9,11	I _P	—	1.25	2	μA
(V _S = 10 Vdc, R _G = 10 k ohms)			—	0.08	0.15	
(V _S = 10 Vdc, R _G = 10 k ohms)			—	4	5	
(V _S = 10 Vdc, R _G = 10 k ohms)			—	0.70	1	
*Offset Voltage (V _S = 10 Vdc, R _G = 1 MΩ)	1	V _T	0.2	0.70	1.6	Volts
(V _S = 10 Vdc, R _G = 10 k ohms)			0.2	0.50	0.6	
(V _S = 10 Vdc, R _G = 10 k ohms)			0.2	0.35	0.6	
*Valley Current (V _S = 10 Vdc, R _G = 1 MΩ)	1,4,5	I _V	—	18	50	μA
(V _S = 10 Vdc, R _G = 10 k ohms)			—	18	25	
(V _S = 10 Vdc, R _G = 10 k ohms)			70	150	—	
(V _S = 10 Vdc, R _G = 10 k ohms)			25	150	—	
(V _S = 10 Vdc, R _G = 200 ohms)			1.5	—	—	mA
(V _S = 10 Vdc, R _G = 200 ohms)			1	—	—	
*Gate to Anode Leakage Current (V _S = 40 Vdc, T _A = 25°C, Cathode Open)	—	I _{GAO}	—	1	10	nAdc
(V _S = 40 Vdc, T _A = 75°C, Cathode Open)			—	3	—	
Gate to Cathode Leakage Current (V _S = 40 Vdc, Anode to Cathode Shorted)	—	I _{GKS}	—	5	50	nAdc
*Forward Voltage (I _F = 50 mA Peak)	1,6	V _F	—	0.8	1.5	Volts
*Peak Output Voltage (V _G = 20 Vdc, C _C = 0.2 μF)	3,7	V _O	6	11	—	Volt
Pulse Voltage Rise Time (V _B = 20 Vdc, C _C = 0.2 μF)	3	t _r	—	40	80	ns

*Indicates JEDEC Registered Data.

FIGURE 1 — ELECTRICAL CHARACTERIZATION

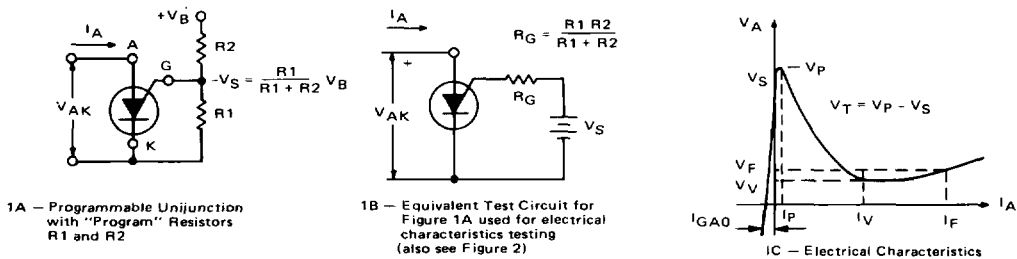
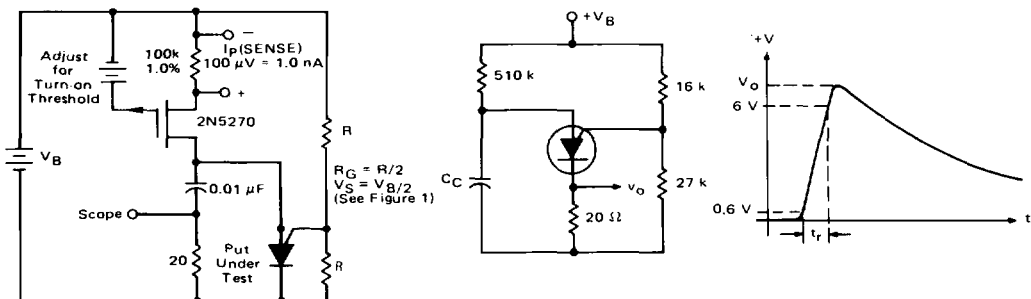


FIGURE 2 — PEAK CURRENT (I_P) TEST CIRCUIT

FIGURE 3 — V_O AND t_r TEST CIRCUIT



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TYPICAL VALLEY CURRENT BEHAVIOR

FIGURE 4 – EFFECT OF SUPPLY VOLTAGE

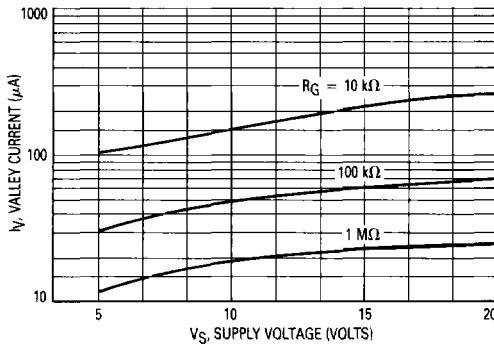


FIGURE 5 – EFFECT OF TEMPERATURE

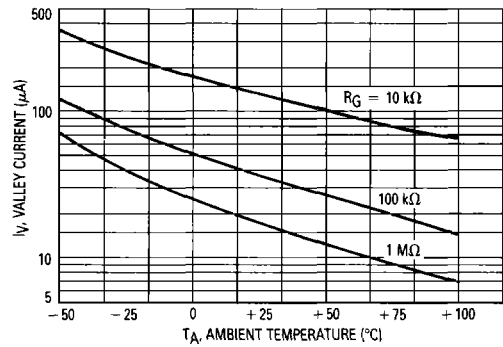


FIGURE 6 – FORWARD VOLTAGE

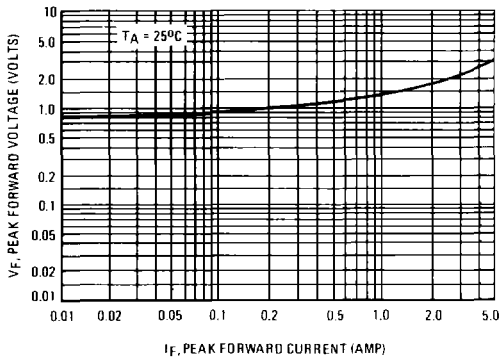


FIGURE 7 – PEAK OUTPUT VOLTAGE

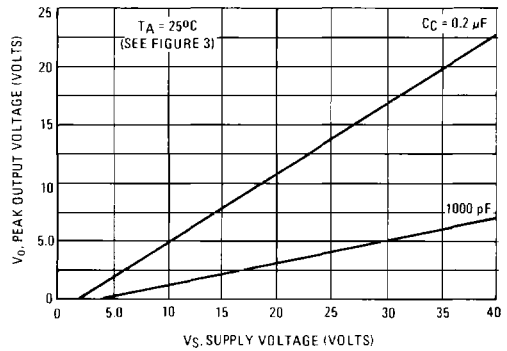
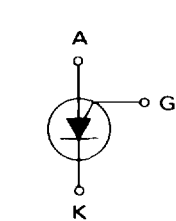
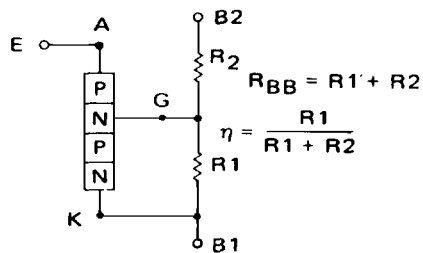


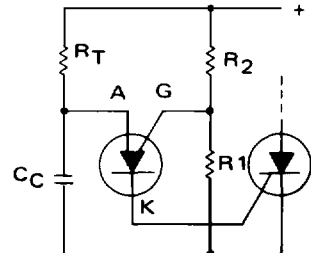
FIGURE 8
PROGRAMMABLE UNIJUNCTION



Circuit Symbol



Equivalent Circuit
with External "Program"
Resistors R_1 and R_2



Typical Application

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TYPICAL PEAK CURRENT BEHAVIOR

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FIGURE 9 – EFFECT OF SUPPLY VOLTAGE AND R_G

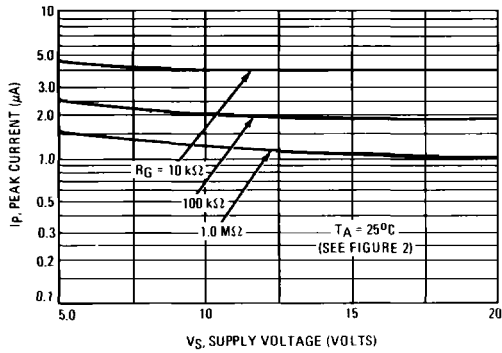
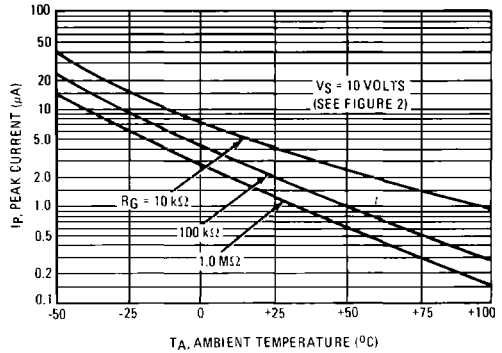


FIGURE 10 – EFFECT OF TEMPERATURE AND R_G



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FIGURE 11 – EFFECT OF SUPPLY VOLTAGE AND R_G

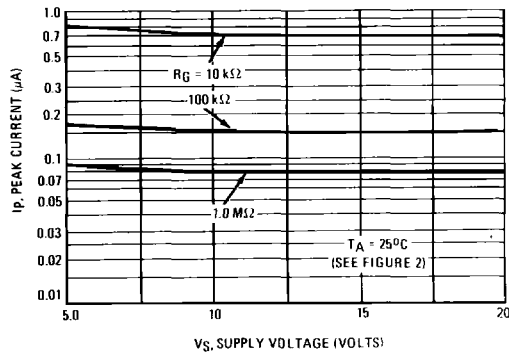


FIGURE 12 – EFFECT OF TEMPERATURE AND R_G

