

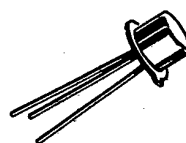
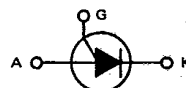
Silicon Programmable Unijunction Transistors

... 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.

- Programmable — R_{BB} , η , I_V and I_P
- Hermetic TO-18 Package
- Low On-State Voltage — 1.5 Volts Maximum @ $I_F = 50$ mA
- Low Gate to Anode Leakage Current — 5 nA Maximum
- High Peak Output Voltage — 16 Volts Typical
- Low Offset Voltage — 0.35 Volt Typical ($R_G = 10$ k ohms)

2N6116
2N6117
2N6118

PUTs
40 VOLTS — 250 mW



CASE 22-03
(TO-18)
STYLE 6

3

*MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Repetitive Peak Forward Current 100 μ s Pulse Width, 1% Duty Cycle	I_{TRM}	1	Amps
20 μ s Pulse Width, 1% Duty Cycle		2	
Non-Repetitive Peak Forward Current 10 μ s Pulse Width	I_{TSM}	5	Amps
DC Forward Anode Current Derate Above 25°C	I_T	200	mA
		2	mA/°C
DC Gate Current	I_G	± 20	mA
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	V_{AK}	± 40	Volts
Forward Power Dissipation @ $T_A = 25^\circ\text{C}$	P_F	250	mW
Derate Above 25°C	$1/\theta_{JA}$	2.5	mW/°C
Operating Junction Temperature Range	T_J	-55 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

*Indicates JEDEC Registered Data.

MOTOROLA THYRISTOR DEVICE DATA

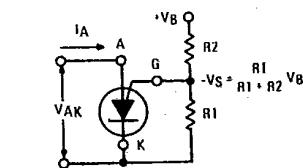
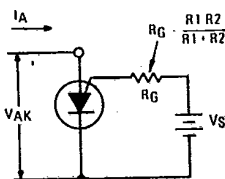
3-84

*ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

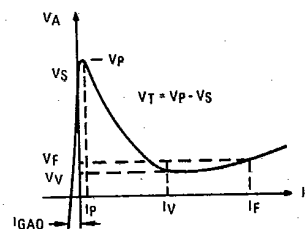
Characteristic	Fig. No.	Symbol	Min	Typ	Max	Unit
Offset Voltage ($V_S = 10\text{ Vdc}$, $R_G = 1\text{ M}\Omega$) ($V_S = 10\text{ Vdc}$, $R_G = 10\text{ k ohms}$) All Types	1	V_T	0.2 0.2 0.2 0.2	0.70 0.50 0.40 0.35	1.6 0.6 0.6 0.6	Volts
Gate to Anode Leakage Current ($V_S = 40\text{ Vdc}$, $T_A = 25^\circ\text{C}$, Cathode Open) ($V_S = 40\text{ Vdc}$, $T_A = 75^\circ\text{C}$, Cathode Open)	—	I_{GAO}	— —	1 30	5 75	nAdc
Gate to Cathode Leakage Current ($V_S = 40\text{ Vdc}$, Anode to Cathode Shorted)	—	I_{GKS}	—	5	50	nAdc
Peak Current ($V_S = 10\text{ Vdc}$, $R_G = 1\text{ M}\Omega$) ($V_S = 10\text{ Vdc}$, $R_G = 10\text{ k ohms}$) 2N6116 2N6117 2N6118 2N6116 2N6117 2N6118	2,9,14	I_p	— — — — — —	1.25 0.19 0.08 4 1.20 0.70	2 0.3 0.15 5 2 1	μA
Valley Current ($V_S = 10\text{ Vdc}$, $R_G = 1\text{ M}\Omega$) ($V_S = 10\text{ Vdc}$, $R_G = 10\text{ k ohms}$) 2N6116, 2N6117 2N6118 2N6116 2N6117, 2N6118	1,4,5	I_V	— — 70 50	18 18 270 270	50 25 — —	μA
Forward Voltage ($I_F = 50\text{ mA Peak}$)	1,6	V_F	—	0.8	1.5	Volts
Peak Output Voltage ($V_B = 20\text{ Vdc}$, $C_C = 0.2\text{ }\mu\text{F}$)	3,7	V_O	6	16	—	Volts
Pulse Voltage Rise Time ($V_B = 20\text{ Vdc}$, $C_C = 0.2\text{ }\mu\text{F}$)	3	t_r	—	40	80	ns

*Indicates JEDEC Registered Data.

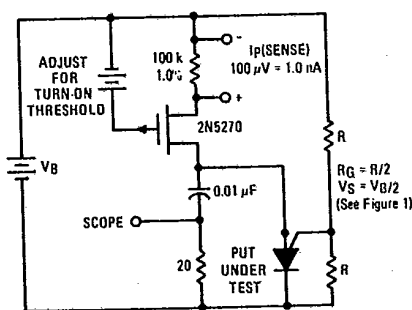
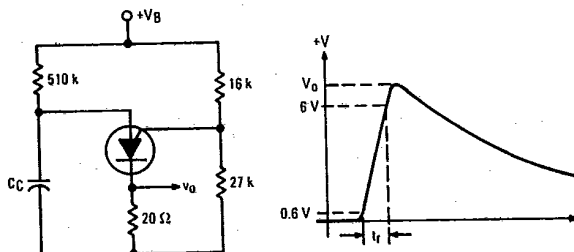
FIGURE 1 — ELECTRICAL CHARACTERIZATION

1A — PROGRAMMABLE UNIJUNCTION WITH "PROGRAM" RESISTORS R_1 and R_2 

1B — EQUIVALENT TEST CIRCUIT FOR FIGURE 1A USED FOR ELECTRICAL CHARACTERISTICS TESTING (ALSO SEE FIGURE 2)



1C — ELECTRICAL CHARACTERISTICS

FIGURE 2 — PEAK CURRENT (I_p) TEST CIRCUITFIGURE 3 — V_O AND t_r TEST CIRCUIT

TYPICAL VALLEY CURRENT BEHAVIOR

FIGURE 4 - EFFECT OF SUPPLY VOLTAGE

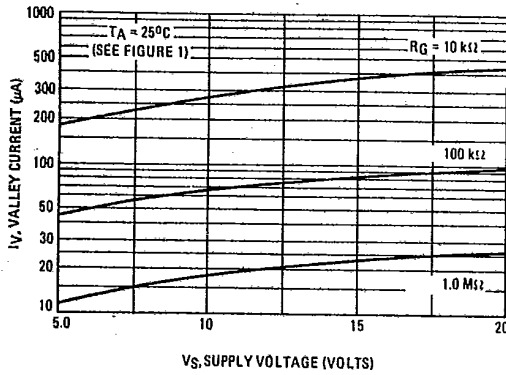


FIGURE 5 - EFFECT OF TEMPERATURE

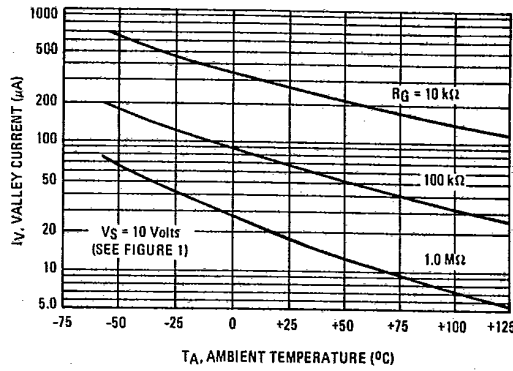


FIGURE 6 - FORWARD VOLTAGE

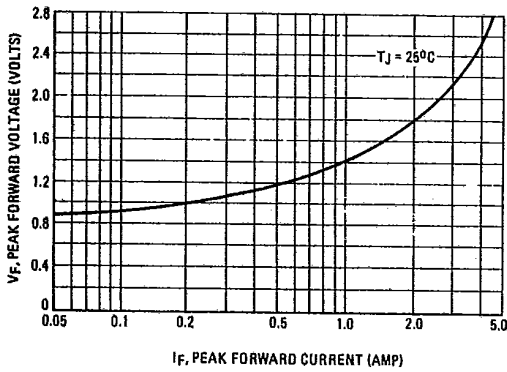


FIGURE 7 - PEAK OUTPUT VOLTAGE

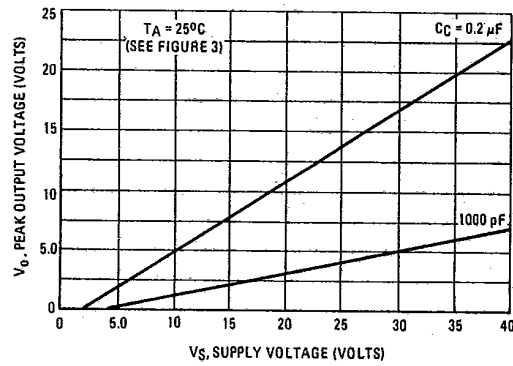
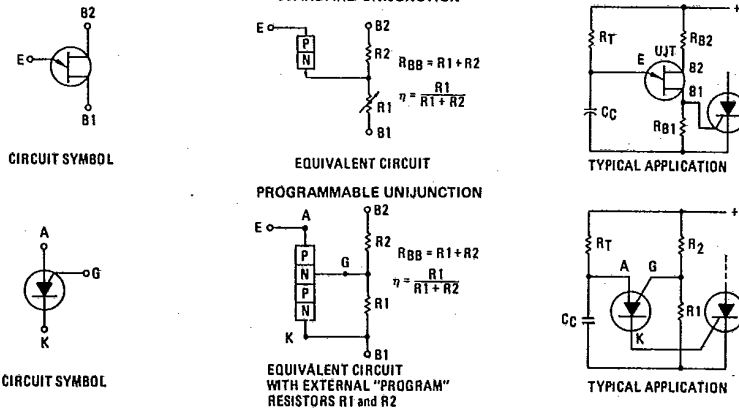


FIGURE 8 - STANDARD UNIJUNCTION COMPARED TO PROGRAMMABLE UNIJUNCTION

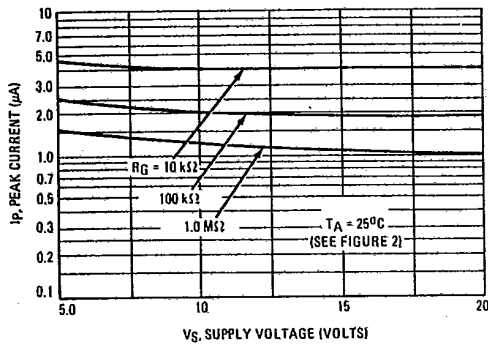
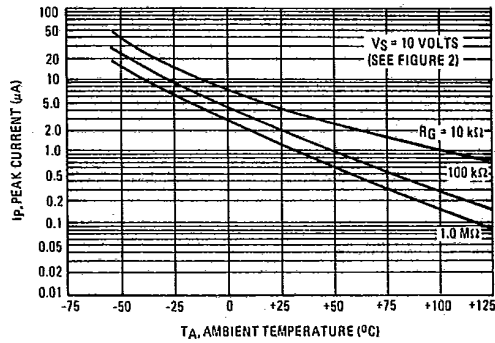


2N6116 • 2N6117 • 2N6118

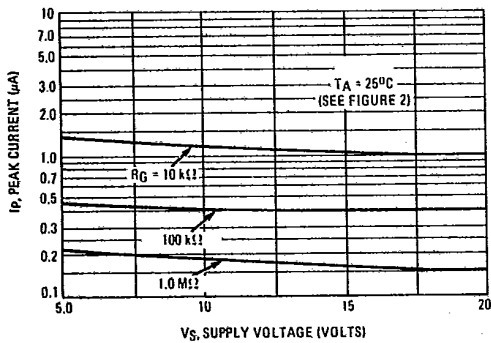
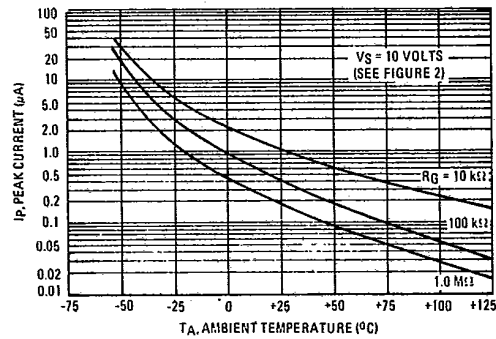
T-25-09

TYPICAL PEAK CURRENT BEHAVIOR

2N6116

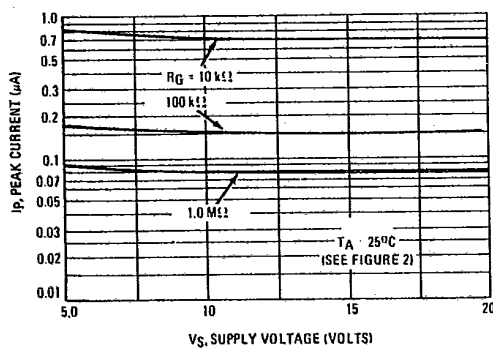
FIGURE 9 – EFFECT OF SUPPLY VOLTAGE AND R_G FIGURE 10 – EFFECT OF TEMPERATURE AND R_G 

2N6117

FIGURE 11 – EFFECT OF SUPPLY VOLTAGE AND R_G FIGURE 12 – EFFECT OF TEMPERATURE AND R_G 

3

2N6118

FIGURE 13 – EFFECT OF SUPPLY VOLTAGE AND R_G FIGURE 14 – EFFECT OF TEMPERATURE AND R_G 