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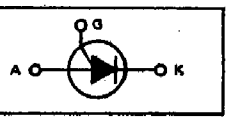
Silicon Programmable Unijunction Transistors

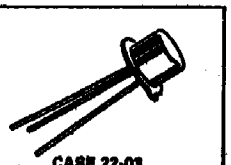
2N6116
2N6117
2N6118

PUTs
40 VOLTS — 250 mW

. . . 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)





CASE 22-03

***MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
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
DC Forward Anode Current Derate Above 25°C	I_T	200 2	mA 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°C Derate Above 25°C	P_F $1/\theta_{JA}$	250 2.5	mW mW/°C
Operating Junction Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	T_{stg}	−65 to +200	°C

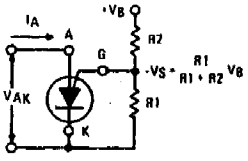
*Indicates JEDEC Registered Data.

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

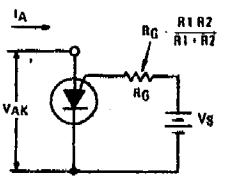
Characteristic		Fig. No.	Symbol	Min	Typ	Max	Unit
Offset Voltage	2N6116	1	V_T	0.2	0.70	1.6	Volts
(V_S = 10 Vdc, R_G = 1 MΩ)	2N6117			0.2	0.50	0.6	
	2N6118			0.2	0.40	0.6	
(V_S = 10 Vdc, R_G = 10 k ohms)	All Types			0.2	0.35	0.6	
Gate to Anode Leakage Current		—	I_{GAO}				nAdc
(V_S = 40 Vdc, T_A = 25°C,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

*Indicates JEDEC Registered Data.

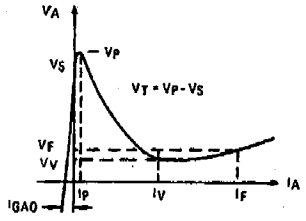
FIGURE 1 – ELECTRICAL CHARACTERIZATION



1A – PROGRAMMABLE UNIJUNCTION WITH "PROGRAM" RESISTORS R1 and R2



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 CIRCUIT

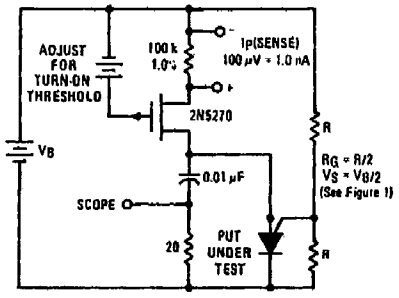


FIGURE 3 – V_O AND t_r TEST CIRCUIT