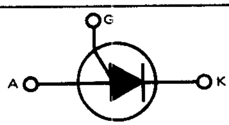
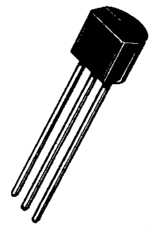
MPU131 (SILICON)
thru
MPU133



SILICON PROGRAMMABLE UNIJUNCTION TRANSISTORS

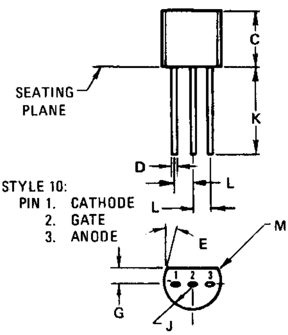
40 VOLTS
375 mW



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. The MPU131, MPU132 and MPU133 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 – 5.0 nA Maximum
- High Peak Output Voltage – 11 Volts Typical
- Low Offset Voltage – 0.35 Volt Typical (R_G = 10 k ohms)



STYLE 10:
PIN 1. CATHODE
2. GATE
3. ANODE

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
C	4.450	4.700	0.175	0.185
D	0.407	0.482	0.016	0.019
E	5° NOM		5° NOM	
G	1.150	1.390	0.045	0.055
J	2.160	2.420	0.085	0.095
K	12.700	–	0.500	–
L	1.270 TP		0.050 TP	
M	0.076	0.330	0.003	0.013

CASE 29-01

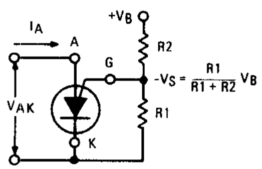
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Dissipation Derate Above 25°C	P_F $1/\theta_{JA}$	375 5.0	mW mW/°C
DC Forward Anode Current Derate Above 25°C	I_T	200 2.67	mA mA/°C
DC Gate Current	I_G	±20	mA
Repetitive Peak Forward Current 100 μs Pulse Width, 1.0% Duty Cycle 20 μs Pulse Width, 1.0% Duty Cycle	I_{TRM}	 1.0 2.0	 Amp Amp
Non-Repetitive Peak Forward Current 10 μs Pulse Width	I_{TSM}	5.0	Amp
Gate to Cathode Forward Voltage	V_{GKF}	40	Volt
Gate to Cathode Reverse Voltage	V_{GKR}	5.0	Volt
Gate to Anode Reverse Voltage	V_{GAR}	40	Volt
Anode to Cathode Voltage	V_{AK}	±40	Volt
Operating Junction Temperature Range	T_J	-50 to +100	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

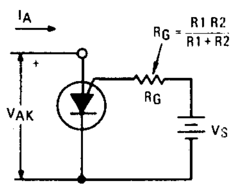
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Figure	Symbol	Min	Typ	Max	Unit
Peak Current (V_S = 10 Vdc, R_G = 1.0 MΩ) MPU131	2,9–14	I_P	–	1.25	2.0	μA
MPU132			–	0.19	0.30	
MPU133			–	0.08	0.15	
(V_S = 10 Vdc, R_G = 10 k ohms) MPU131			–	4.0	5.0	
MPU132			–	1.20	2.0	
MPU133				0.70	1.0	
Offset Voltage (V_S = 10 Vdc, R_G = 1.0 MΩ) MPU131	1	V_T	0.2	0.70	1.6	Volts
MPU132			0.2	0.50	0.6	
MPU133			0.2	0.40	0.6	
(V_S = 10 Vdc, R_G = 10 k ohms) (All Types)			0.2	0.35	0.6	
Valley Current (V_S = 10 Vdc, R_G = 1.0 MΩ) MPU131, 132	1,4,5,	I_V	–	18	50	μA
MPU133			–	18	25	
(V_S = 10 Vdc, R_G = 10 k ohms) MPU131			70	270	–	
MPU132, 133			50	270	–	
Gate to Anode Leakage Current	–	I_{GAO}				nAdc
(V_S = 40 Vdc, T_A = 25°C, Cathode Open)			–	1.0	5.0	
(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}	–	5.0	50	nAdc
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	6.0	11	–	Volts
Pulse Voltage Rise Time (V_B = 20 Vdc, C_C = 0.2 μF)	3	t_r	–	40	80	ns

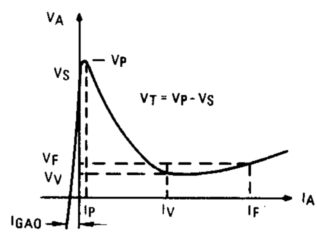
FIGURE 1 – ELECTRICAL CHARACTERIZATION



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

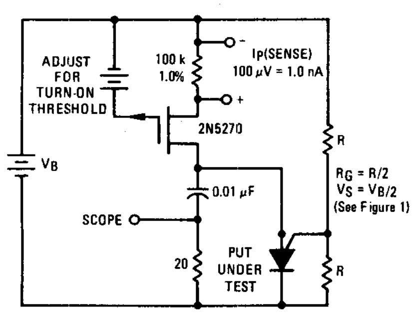
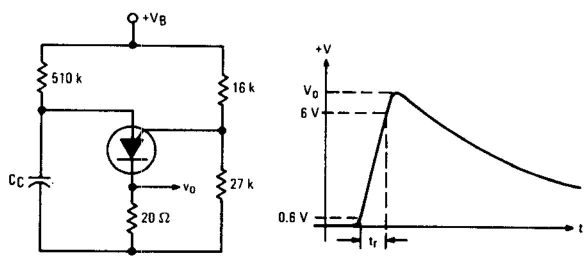


FIGURE 3 – V_o AND t_r TEST CIRCUIT



TYPICAL VALLEY CURRENT BEHAVIOR

FIGURE 4 – EFFECT OF SUPPLY VOLTAGE

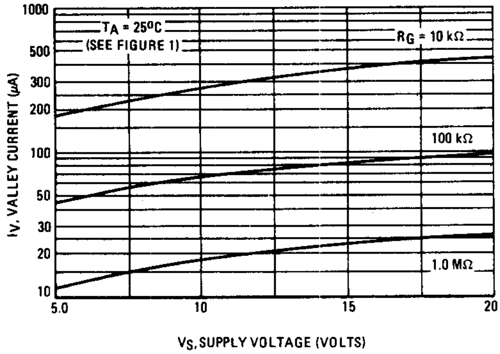


FIGURE 5 – EFFECT OF TEMPERATURE

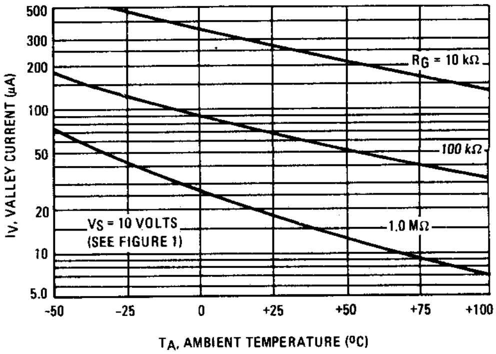


FIGURE 6 – FORWARD VOLTAGE

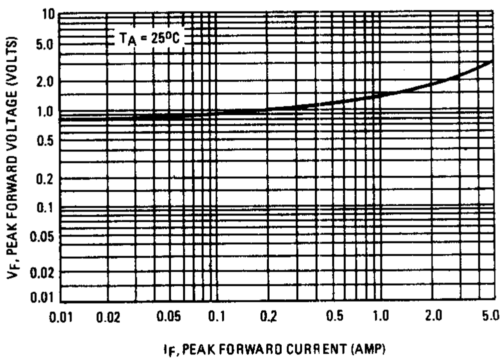


FIGURE 7 – PEAK OUTPUT VOLTAGE

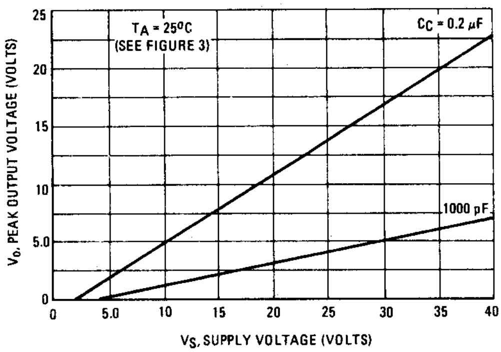
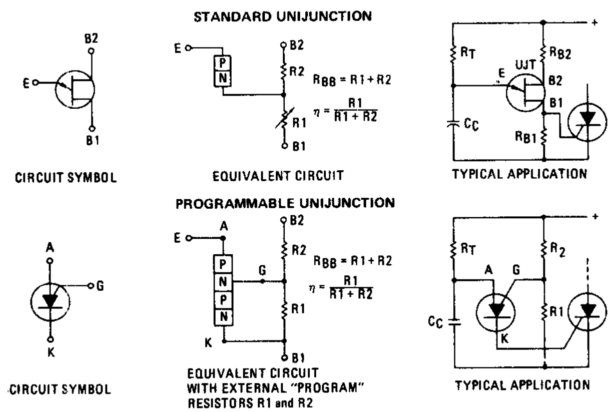


FIGURE 8 – STANDARD UNIJUNCTION
COMPARED TO PROGRAMMABLE UNIJUNCTION



TYPICAL PEAK CURRENT BEHAVIOR

MPU131

FIGURE 9 – EFFECT OF SUPPLY VOLTAGE AND R_G

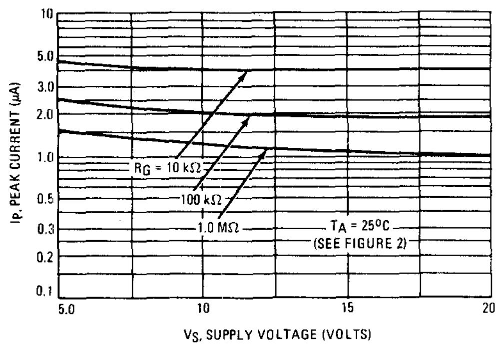
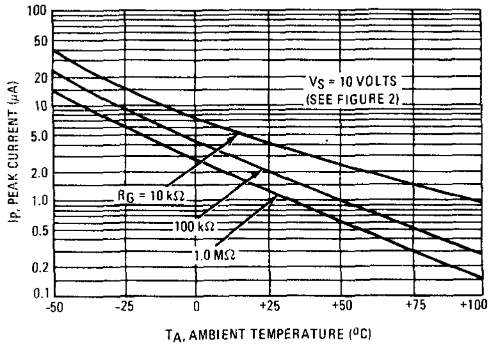


FIGURE 10 – EFFECT OF TEMPERATURE AND R_G



MPU132

FIGURE 11 – EFFECT OF SUPPLY VOLTAGE AND R_G

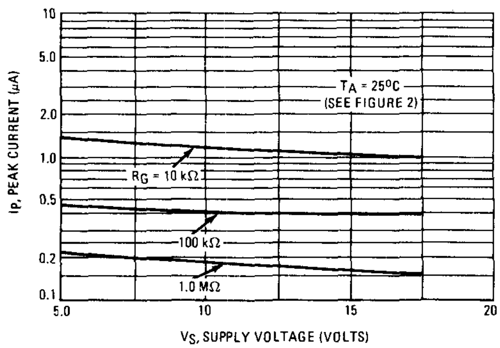
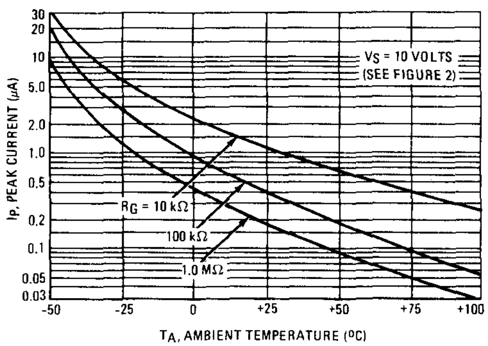


FIGURE 12 – EFFECT OF TEMPERATURE AND R_G



MPU133

FIGURE 13 – EFFECT OF SUPPLY VOLTAGE AND R_G

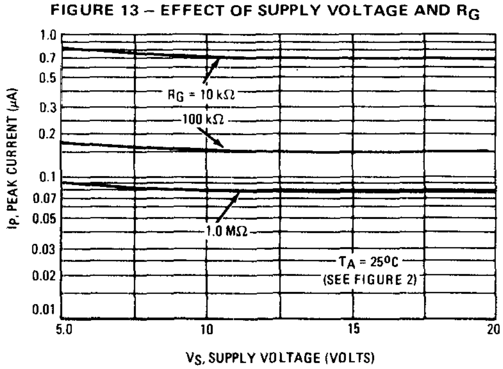


FIGURE 14 – EFFECT OF TEMPERATURE AND R_G