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2N6028
Programmable Unijunction Transistor

Description:

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. Applications include thyristor–trigger, oscillator, pulse and timing circuits. This device may also be used in special thyristor applications due to availability of an anode gate. Supplied in an inexpensive TO–92 type plastic package for high–volume requirements, this package is readily adaptable for use in automatic insertion equipment.

Features:

- Programmable – R_{BB}, η, I_V, and I_P
- Low On–State Voltage – 1.5V Maximum @ I_F = 50mA
- Low Gate–to–Anode Leakage Current – 10nA Maximum
- High Peak Output Voltage – 11V Typical
- Low Offset Voltage – 0.35V Typical (R_G = 10kW)

Absolute Maximum Ratings: (T_J = +25°C, Note 1 unless otherwise specified)

Power Dissipation, P_F	300mW
Derate above +25°C	4.0mW/°C
DC Forward Anode Current, I_T	150mA
Derate above +25°C	2.67mA/°C
DC Gate Current, I_G	±50mA
Repetitive Peak Forward Current (1% Duty Cycle), I_{TRM}	
100μs Pulse Width	1A
20μs Pulse Width	2A
Non–Repetitive Peak Forward Current (10ms Pulse Width), I_{TSM}	5A
Gate–to–Cathode Forward Voltage, V_{GKF}	40V
Gate–to–Cathode Reverse Voltage, V_{GKR}	–5V
Gate–to–Anode Reverse Voltage, V_{GAR}	40V
Anode–to–Cathode Voltage (Note 2), V_{AK}	±40V
capacitive Discharge Energy (Note 3), E	250μJ
Power Dissipation (Note 4), P_D	300mW
Operating Temperature Range, T_{opr}	–50° to +100°C
Junction Temperature Range, T_J	–50° to +125°C
Storage Temperature Range, T_{stg}	–55° to +150°C
Thermal Resistance, Junction–to–Case, R_{thJC}	75°C/W
Thermal Resistance, Junction–to–Ambient, R_{thJA}	200°C/W
Lead Temperature (During Soldering, < 1/16” from case, 10sec max), T_L	+260°C

Note 1. Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Note 2. Anode Positive, R_{GA} = 1000W; Anode Negative, R_{GA} = Open

Note 3. $E = 0.5 \bullet CV^2$capacitor discharge energy limiting resistor and repetition.

Note 4. Derate current an power above +25°C.

Electrical Characteristics: (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Peak Current	I_P	V_S = 10V	R_G = 1MΩ	–	0.08	0.15	μA
			R_G = 10kΩ	–	0.70	1.0	μA
Offset Voltage	V_T	V_S = 10V	R_G = 1MΩ	0.2	0.50	0.6	V
			R_G = 10kΩ	0.2	0.35	0.6	V
Valley Current	I_V	V_S = 10V	R_G = 1MΩ	–	18	25	μA
			R_G = 10kΩ	25	10	–	μA
			R_G = 200Ω	1.0	–	–	mA
Gate–to–Anode Leakage Current	I_{GAO}	V_S = 40V, Cathode Open	T_A = +25°C	–	1.0	10	nA
			T_A = +75°C	–	3.0	–	nA
Gate–to–Cathode Leakage Current	I_{GKS}	V_S = 40V, Anode–to–Cathode Shorted		–	5.0	50	nA
Forward Voltage	V_F	I_F = 50mA Peak, Note 5		–	0.8	1.5	V
Peak Output Voltage	V_o	V_G = 20V, C_C = 0.2μF		6.0	11	–	V
Pulse Voltage Rise Time	t_r	V_G = 20V, C_C = 0.2μF		–	40	80	ns

Note 5. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.