

PUTs

Military, Planar, TO-18, Hermetic

2N6137

T-25-09

FEATURES

- Available as JAN and JANTX types per MIL standard 19500/493
- -55°C to $+125^{\circ}\text{C}$ Temperature Range for Timing and Oscillator Circuits
- $I_p \leq 10\mu\text{A}$ at $T = -55^{\circ}\text{C}$
- $I_p \geq 40\mu\text{A}$ at $T = +125^{\circ}\text{C}$
- Programmable η , R_{BB} , I_p and I_V
- Peak Recurrent Currents of 5A
- Low On-State Voltage Drop
- Hermetically Sealed Metal Case and Planar Passivated Construction for Maximum Reliability and Parameter Stability.

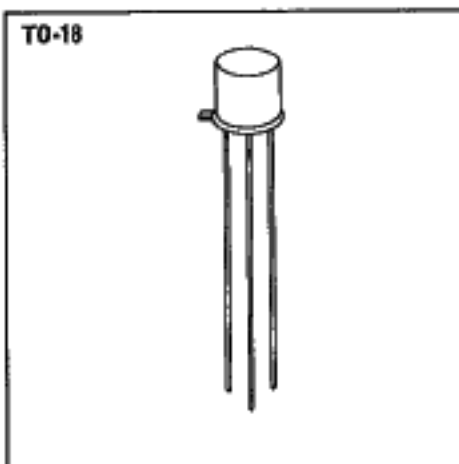
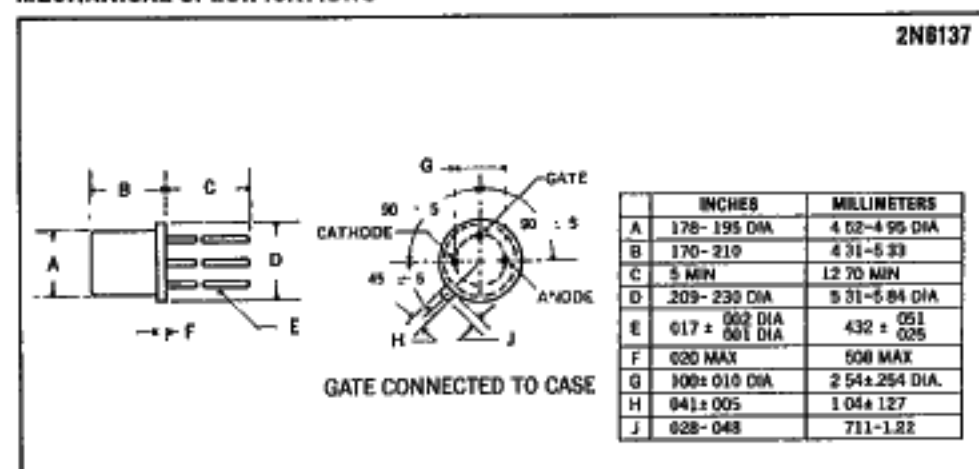
DESCRIPTION

The Programmable Unijunction Transistor is functionally equivalent to a standard unijunction transistor with the advantage that external resistors can be used to program η , R_{BB} , I_p , and I_V , depending upon the designer's needs. The Unitorde device, in addition to allowing programmable versatility, is completely planar passivated and packaged in a TO-18 hermetically sealed package, which offers an order of magnitude improvement in inherent reliability over many similar devices. Applications include pulse and timing circuits, SCR trigger circuits, relaxation oscillators, and sensing circuits. For further application information see Unitorde Application Note U-66.

ABSOLUTE MAXIMUM RATINGS

Anode-to-Cathode Forward Voltage, V_{AK}	40V
Anode-to-Cathode Reverse Voltage, V_{AKR}	40V
Gate-to-Cathode Forward Voltage, V_{GK}	40V
Gate-to-Anode Reverse Voltage, V_{GAR}	40V
Gate-to-Cathode Reverse Voltage, V_{GKR}	5V
Peak Recurrent Forward Current, $10\mu\text{s}$ 1% Duty Cycle	5A
Peak Gate Current, I_{GM}	250mA
Average Gate Current, $I_{G(AV)}$	50mA
Power Dissipation	
25°C Ambient	300mW
Derating Factor	2.4mW/ $^{\circ}\text{C}$
Storage Temperature Range	-55°C to $+125^{\circ}\text{C}$
Operating Temperature Range	-55°C to $+125^{\circ}\text{C}$

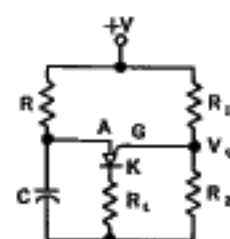
MECHANICAL SPECIFICATIONS



ELECTRICAL SPECIFICATIONS (at 25°C unless noted)†

Test	Symbol	Figure	Minimum	Typical	Maximum	Units	Test Conditions
SUBGROUP 1 Visual and Mechanical	—	—	—	—	—	—	T-25-09
SUBGROUP 2							
Gate-anode blocking current	I_{GAO}	2	—	2	10	nA	
Gate-cathode blocking current	I_{GKS}	3	—	5	100	nA	$V_{GA} = \text{Rating}$ $V_{GK} = \text{Rating}$
SUBGROUP 3							$R_G = 1 \text{ Meg}$ $R_G = 10K$ $\left\{ \begin{array}{l} V_s = 10V \\ V_s = 10V \end{array} \right.$ $R_G = 1 \text{ Meg}$ $R_G = 10K$ $\left\{ \begin{array}{l} V_s = 10V \\ V_s = 10V \end{array} \right.$ $R_G = 1 \text{ Meg}$ $R_G = 10K$ $\left\{ \begin{array}{l} V_s = 10V \\ V_s = 10V \end{array} \right.$ $R_G = 200\Omega$
Peak-point anode current	I_p	1	—	1	2	μA	
Peak-point offset voltage	V_T	1	0.2	0.26	1.6	V	
Valley-point anode current	I_V	1	70	15	50	μA	
SUBGROUP 4							$I_s = 50\text{mA}$
Forward on-state voltage	V_F	4	—	0.85	1.0	V	
Peak pulse voltage	V_o	5	9	12	—	V	
Peak pulse voltage rise time	t_r	5	—	50	80	ns	
SUBGROUP 5							$V_{GA} = \text{Rating}$ $R_G = 10K, V_s = 10V$ $R_G = 10K, V_s = 10V$
Gate-anode blocking current (125°C Test)	I_{GAO}	2	—	150	500	nA	
Valley-point anode current (125°C Test)	I_V	1	40	100	—	μA	
Peak-point anode current (—55°C Test)	I_p	1	—	7.5	10	μA	

† All values in table are JEDEC registered



a) Typical Circuit



b) Equivalent Test Circuit

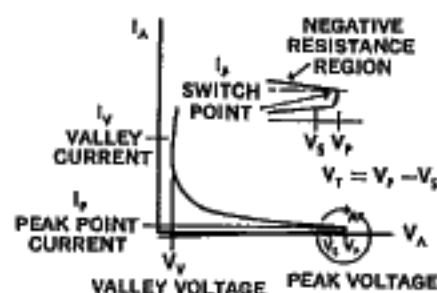


Figure 1

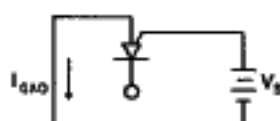


Figure 2

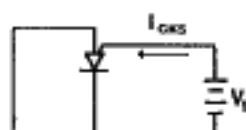


Figure 3

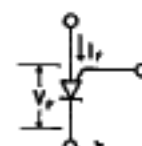


Figure 4

Notes: Conditions for oscillation

$$\frac{V_{GA} - V_F}{R} > I_p$$

$$\frac{V_{GA} - V_F}{R} < I_V$$

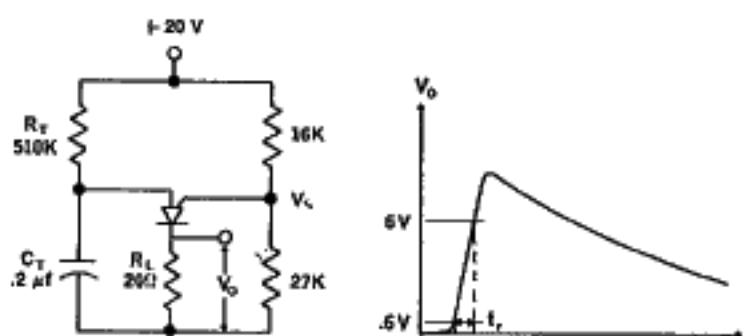
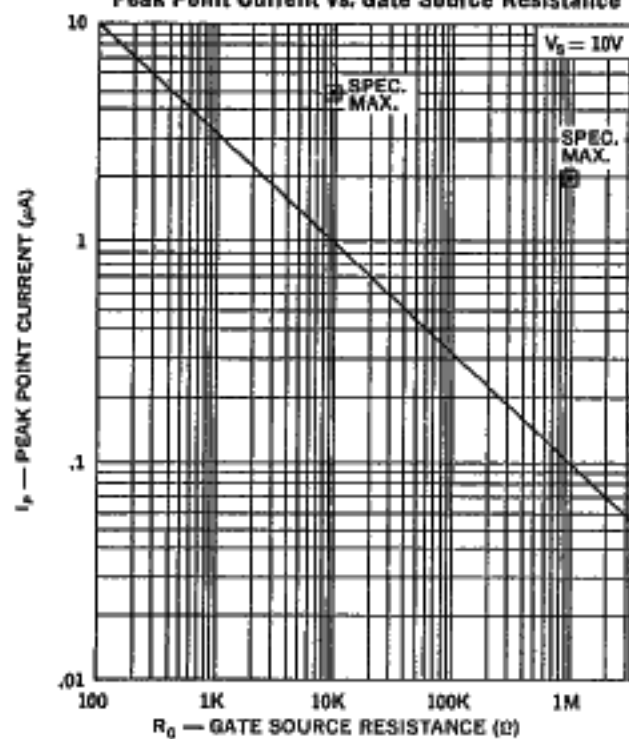


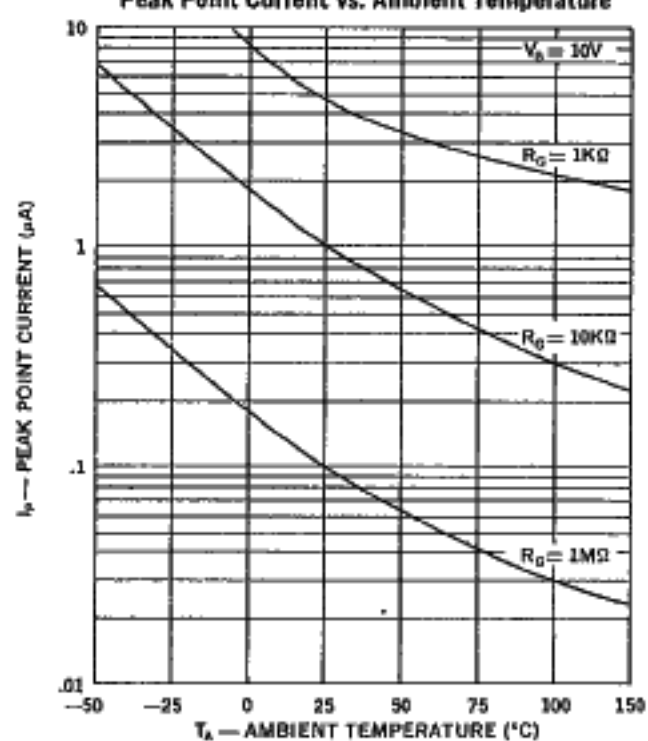
Figure 5

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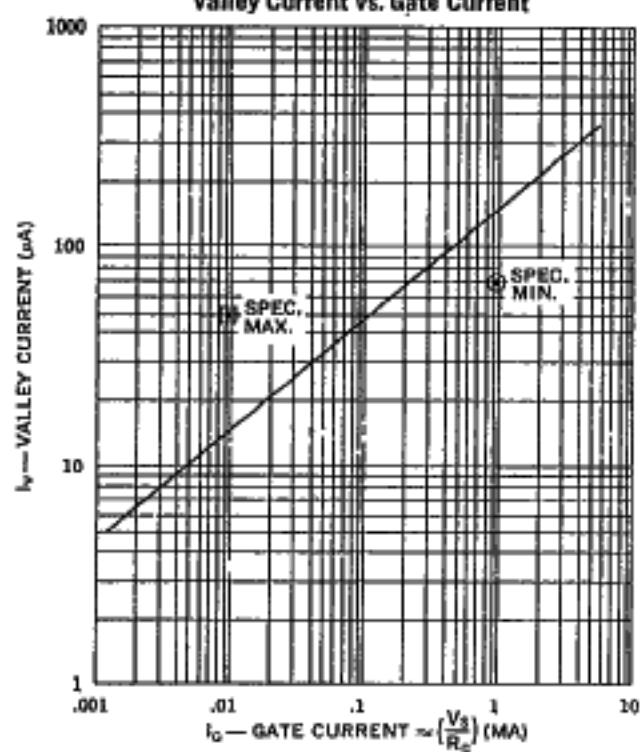
Peak Point Current vs. Gate Source Resistance



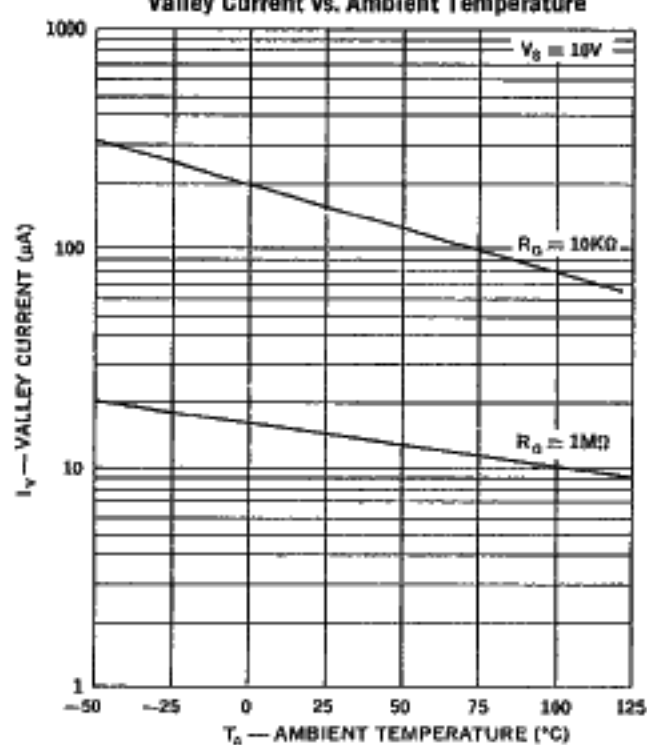
Peak Point Current vs. Ambient Temperature



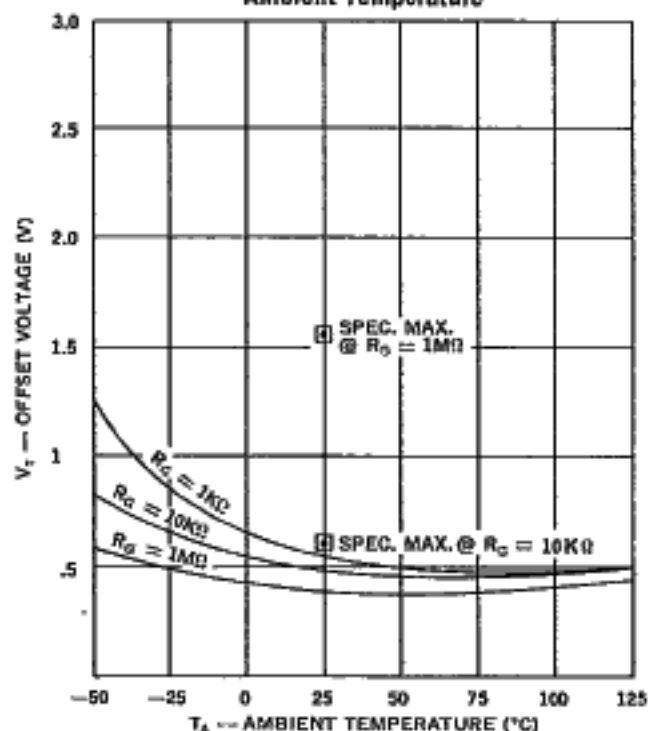
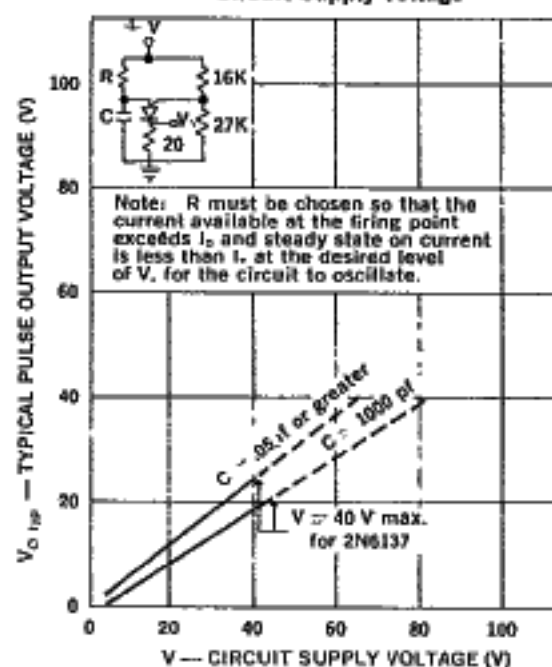
Valley Current vs. Gate Current



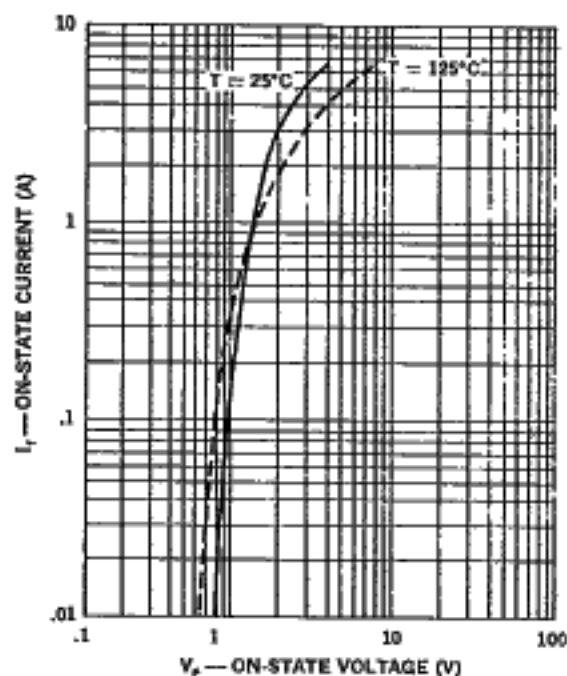
Valley Current vs. Ambient Temperature



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Offset Voltage vs.
Ambient TemperatureTypical Pulse Output Voltage vs.
Circuit Supply Voltage

Typical Current vs. On-State Voltage

Gate-Anode Blocking Current vs.
Ambient Temperature