Z0107MA

Sensitive Gate Triacs Series

Silicon Bidirectional Thyristors

Designed for use in solid state relays, MPU interface, TTL logic and any other light industrial or consumer application. Supplied in an inexpensive TO−92 package which is readily adaptable for use in automatic insertion equipment.

Features

- One−Piece, Injection−Molded Package
- Blocking Voltage to 600 V
- Sensitive Gate Triggering in Four Trigger Modes (Quadrants) for all possible Combinations of Trigger Sources, and especially for Circuits that Source Gate Drives
- All Diffused and Glassivated Junctions for Maximum Uniformity of Parameters and Reliability
- Improved Noise Immunity (dv/dt Minimum of 10 V/μsec at 110°C)
- Commutating di/dt of 1.6 A/msec at 110°C
- High Surge Current of 8 A
- These are Pb−Free Devices

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (T_J = −40 to +125°C)$^{(1)}$ Sine Wave 50 to 60 Hz, Gate Open	V_{DRM}, V_{RRM}	600	V
On-State RMS Current Full Cycle Sine Wave 50 to 60 Hz (T_C = 50°C)	$I_{T(RMS)}$	1.0	A
Peak Non−Repetitive Surge Current One Full Cycle, Sine Wave 60 Hz (T_C = 110°C)	I_{TSM}	8.0	A
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	0.35	A^2s
Average Gate Power (T_C = 80°C, t ≤ 8.3 ms)	$P_{G(AV)}$	1.0	W
Peak Gate Current (t ≤ 20 μs, T_J = +125°C)	I_{GM}	1.0	A
Operating Junction Temperature Range	T_J	−40 to +125	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C

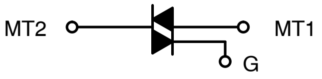
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

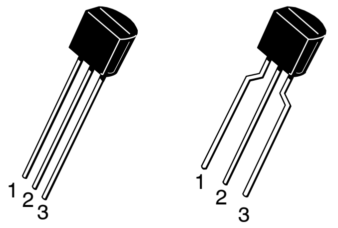
1. V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

ON Semiconductor

http://onsemi.com

TRIACS
1.0 AMPERE RMS
600 VOLTS



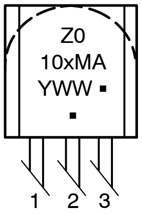


STRAIGHT LEAD
BULK PACK

BENT LEAD
TAPE & REEL
AMMO PACK

TO−92 (TO−226AA)
CASE 029
STYLE 12

MARKING DIAGRAM



x = 3,7,9
Y = Year
WW = Work Week
▪ = Pb−Free Package
(*Note: Microdot may be in either location)

PIN ASSIGNMENT	
1	Main Terminal 1
2	Gate
3	Main Terminal 2

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

THERMAL CHARACTERISTICS

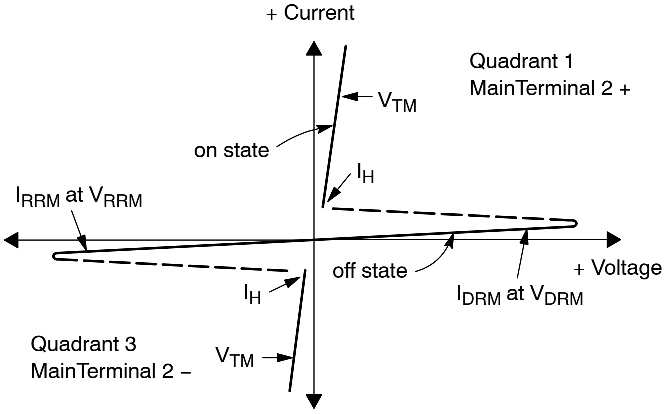
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	50	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	160	°C/W
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted; Electricals apply in both directions)

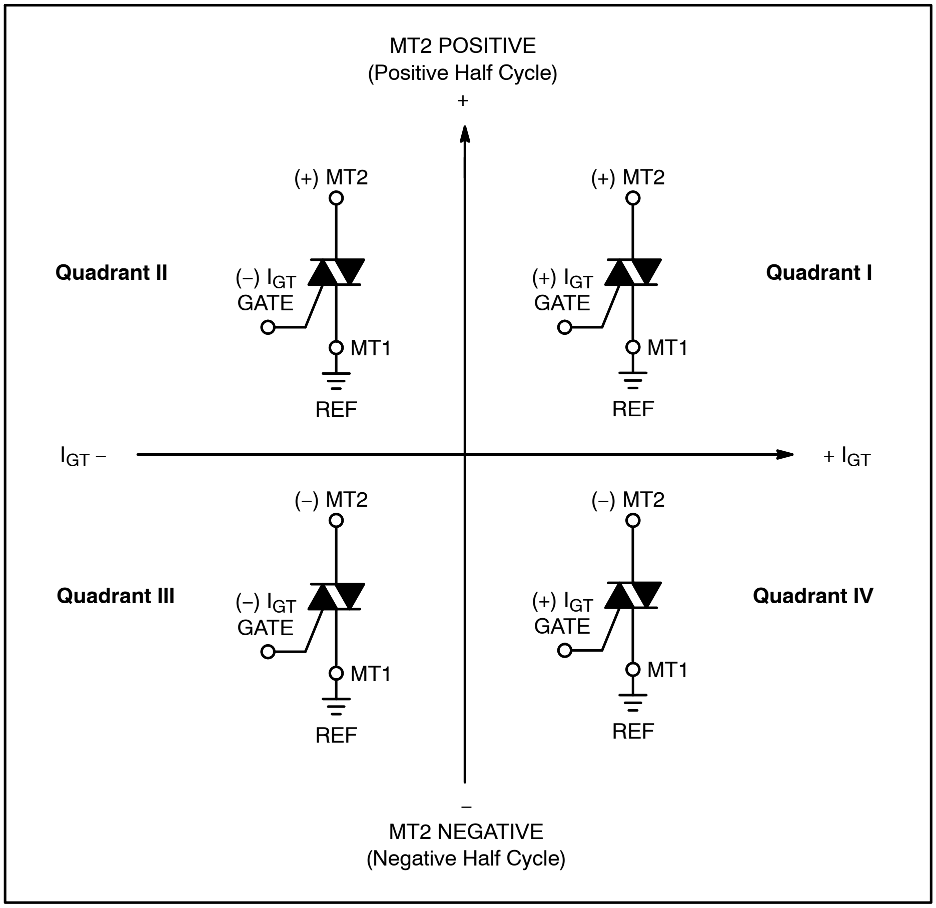
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Blocking Current (V_D = Rated V_{DRM}, V_{RRM}; Gate Open) T_J = 25°C	I_{DRM}, I_{RRM}	–	–	5.0	µA
T_J = +125°C		–	–	500	
ON CHARACTERISTICS					
Peak On−State Voltage (I_{TM} = ±1.4 A Peak; Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2.0%)	V_{TM}	–	–	1.56	V
Gate Trigger Current (Continuous dc) (V_D = 12 Vdc, R_L = 30 Ω)	I_{GT}				mA
MT2(+), G(+)		0.15	–	5.0	
MT2(+), G(−)		0.15	–	5.0	
MT2(−), G(−)		0.15	–	5.0	
MT2(−), G(+)		0.25	–	7.0	
Latching Current (V_D = 12 V, I_G = 1.2 x I_{GT})	I_L				mA
MT2(+), G(+) All Types		–	–	10	
MT2(+), G(−) All Types		–	–	20	
MT2(−), G(−) All Types		–	–	10	
MT2(−), G(+) All Types		–	–	10	
Gate Trigger Voltage (Continuous dc) (V_D = 12 Vdc, R_L = 30 Ω)	V_{GT}				V
MT2(+), G(+) All Types		–	–	1.3	
MT2(+), G(−) All Types		–	–	1.3	
MT2(−), G(−) All Types		–	–	1.3	
MT2(−), G(+) All Types		–	–	1.3	
Gate Non−Trigger Voltage (V_D = 12 V, R_L = 30 Ω, T_J = 125°C) All Four Quadrants	V_{GD}	0.2	–	1.3	V
Holding Current (V_D = 12 Vdc, Initiating Current = 50 mA, Gate Open)	I_H	–	–	10	mA
DYNAMIC CHARACTERISTICS					
Rate of Change of Commutating Current (V_D = 400 V, I_{TM} = 0.84 A, Commutating dv/dt = 1.5 V/µs, Gate Open, T_J = 110°C, f = 250 Hz, with Snubber)	di/dt(c)	1.6	–	–	A/ms
Critical Rate of Rise of Off−State Voltage (V_D = 67% Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 110°C)	dv/dt	20	60	–	V/µs
Repetitive Critical Rate of Rise of On−State Current, T_J = 125°C Pulse Width = 20 µs, IPK_{max} = 15 A, diG/dt = 1 A/µs, f = 60 Hz	di/dt	–	–	20	A/µs

Voltage Current Characteristic of Triacs (Bidirectional Device)

Symbol	Parameter
V_{DRM}	Peak Repetitive Forward Off State Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Reverse Off State Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Maximum On State Voltage
I_H	Holding Current



Quadrant Definitions for a Triac



All polarities are referenced to MT1.
With in−phase signals (using standard AC lines) quadrants I and III are used.

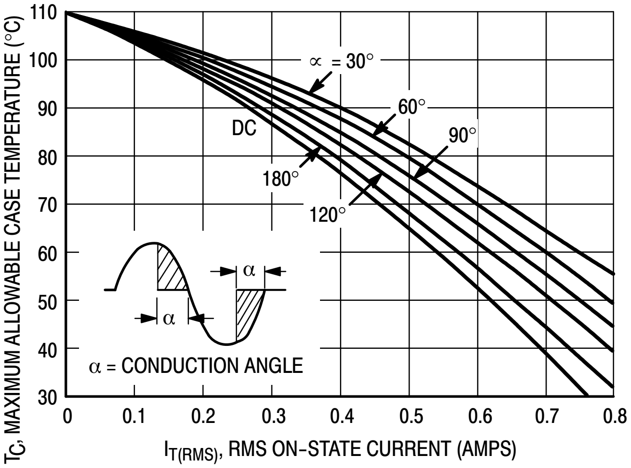


Figure 1. RMS Current Derating

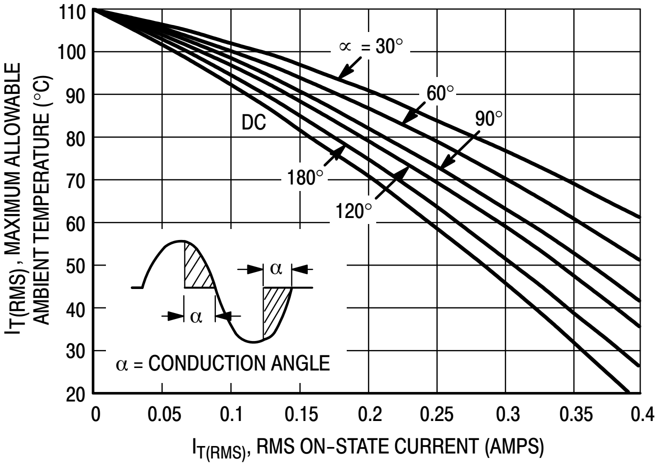


Figure 2. RMS Current Derating

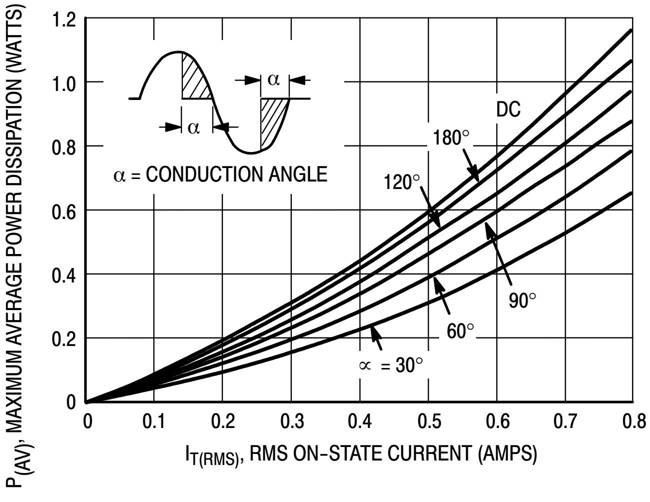


Figure 3. Power Dissipation

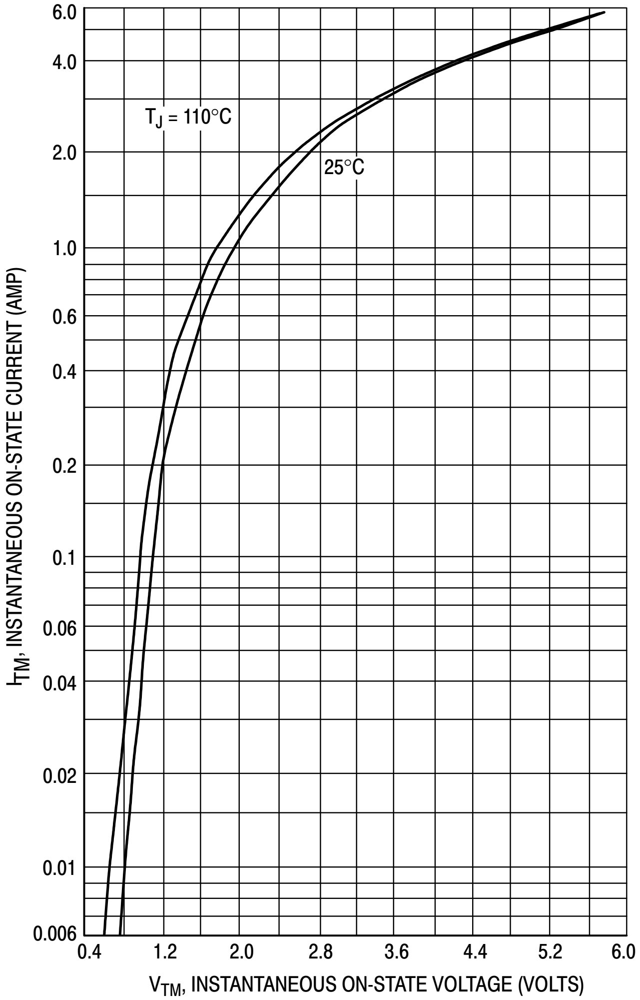


Figure 4. On−State Characteristics

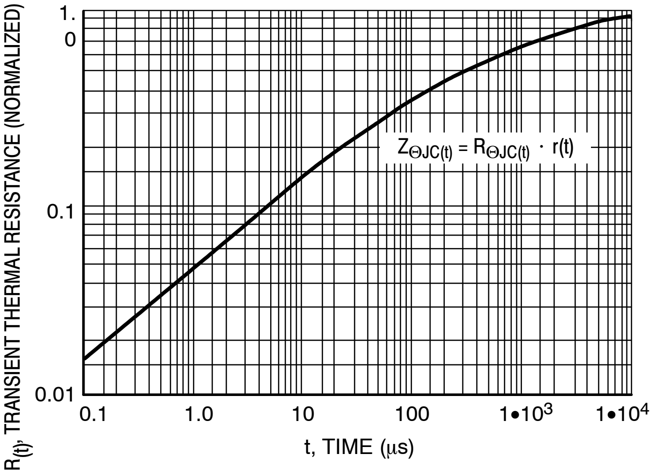


Figure 5. Transient Thermal Response

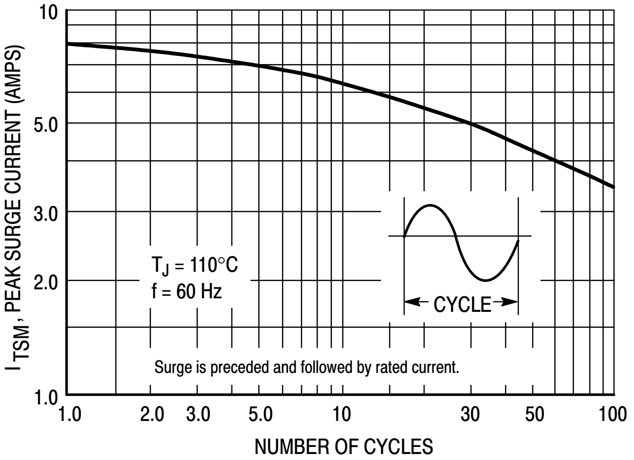


Figure 6. Maximum Allowable Surge Current

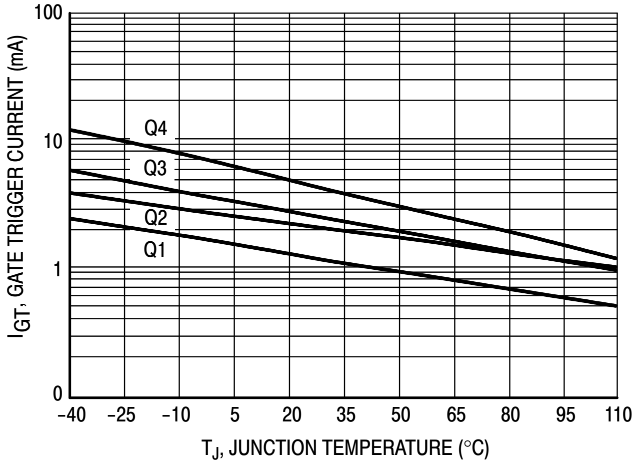


Figure 7. Typical Gate Trigger Current versus Junction Temperature

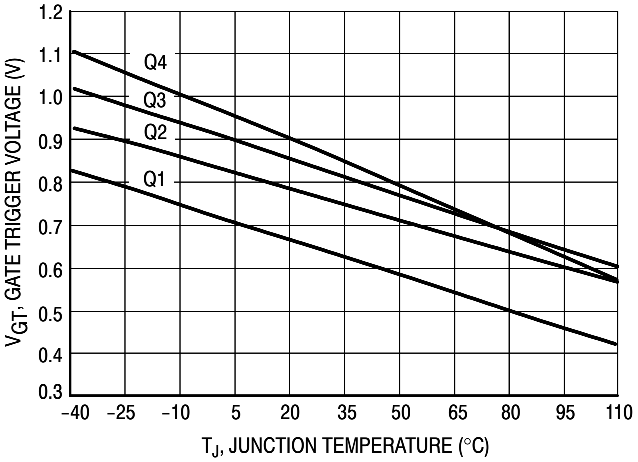


Figure 8. Typical Gate Trigger Voltage versus Junction Temperature

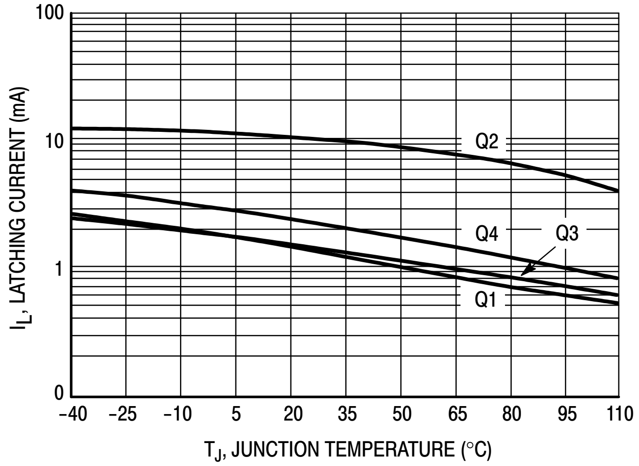


Figure 9. Typical Latching Current versus Junction Temperature

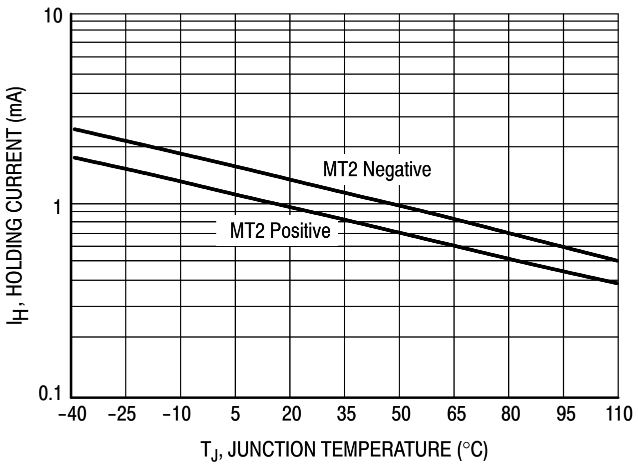
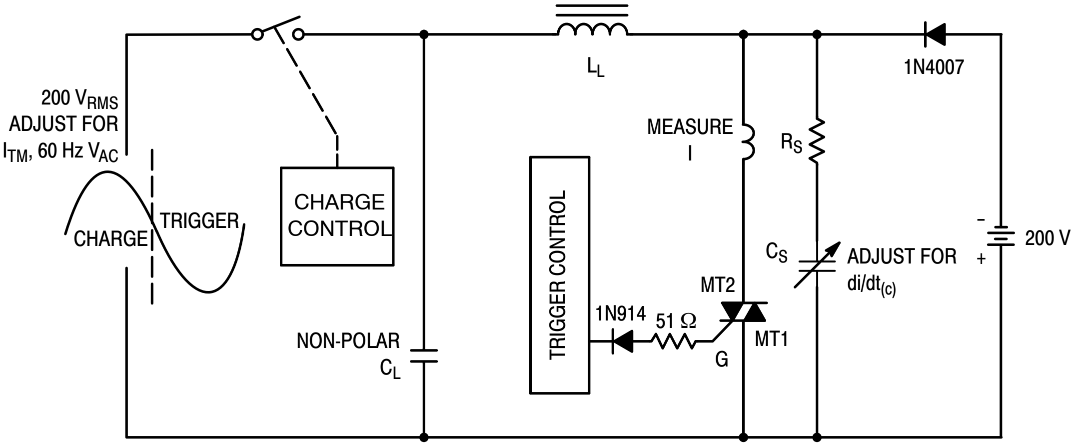


Figure 10. Typical Holding Current versus Junction Temperature



Note: Component values are for verification of rated $(di/dt)_c$. See AN1048 for additional information.

Figure 11. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Current $(di/dt)_c$

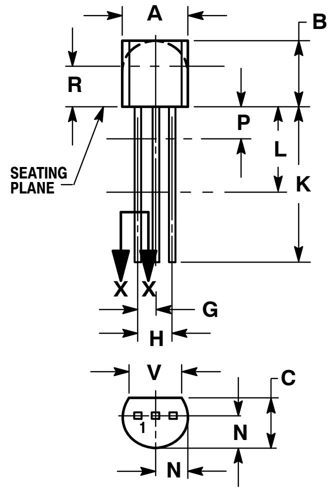
ORDERING & SHIPPING INFORMATION: Packaging Options, Device Suffix

U.S.	Europe Equivalent	Shipping†	Description of TO−92 Tape Orientation
	Z0107MARL1G	Radial Tape and Reel (2K/Reel)	Flat side of TO−92 and adhesive tape visible
Z0107MAG		Bulk in Box (5K/Box)	N/A, Bulk
Z0107MARLRPG		Radial Tape and Fan Fold Box (2K/Box)	Round side of TO−92 and adhesive tape visible
Z0107MARLRFG		Radial Tape and Fan Fold Box (2K/Box)	Round side of TO−92 and adhesive tape on reverse side

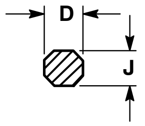
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

PACKAGE DIMENSIONS

TO−92 (TO−226AA)
CASE 029−11
ISSUE AM



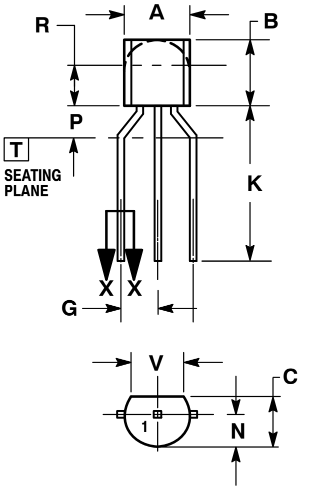
STRAIGHT LEAD
BULK PACK



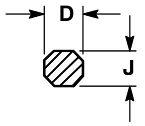
SECTION X−X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---



BENT LEAD
TAPE & REEL
AMMO PACK



SECTION X−X

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

	MILLIMETERS	
DIM	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. GATE
3. MAIN TERMINAL 2

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