

# 2N6344, 2N6349

Preferred Device

## Triacs

### Silicon Bidirectional Thyristors

Designed primarily for full-wave ac control applications, such as light dimmers, motor controls, heating controls and power supplies; or wherever full-wave silicon gate controlled solid-state devices are needed. Triac type thyristors switch from a blocking to a conducting state for either polarity of applied main terminal voltage with positive or negative gate triggering.

- Blocking Voltage to 800 Volts
- All Diffused and Glass Passivated Junctions for Greater Parameter Uniformity and Stability
- Small, Rugged, Thermowatt Construction for Low Thermal Resistance, High Heat Dissipation and Durability
- Gate Triggering Guaranteed in all Four Quadrants
- For 400 Hz Operation, Consult Factory
- Device Marking: Logo, Device Type, e.g., 2N6344, Date Code

#### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
*Peak Repetitive Off-State Voltage <sup>(1)</sup> ( $T_J = -40$ to $+110^\circ\text{C}$ , Sine Wave 50 to 60 Hz, Gate Open) 2N6344 2N6349	$V_{\text{DRM}}$ , $V_{\text{RRM}}$	600 800	Volts
*On-State RMS Current ( $T_C = +80^\circ\text{C}$ ) Full Cycle Sine Wave 50 to 60 Hz ( $T_C = +90^\circ\text{C}$ )	$I_{\text{T(RMS)}}$	8.0 4.0	Amps
*Peak Non-Repetitive Surge Current (One Full Cycle, Sine Wave 60 Hz, $T_C = +25^\circ\text{C}$ ) Preceded and followed by rated current	$I_{\text{TSM}}$	100	Amps
Circuit Fusing Consideration ( $t = 8.3$ ms)	$I^2t$	40	$\text{A}^2\text{s}$
*Peak Gate Power ( $T_C = +80^\circ\text{C}$ , Pulse Width = 2 $\mu\text{s}$ )	$P_{\text{GM}}$	20	Watts
*Average Gate Power ( $T_C = +80^\circ\text{C}$ , $t = 8.3$ ms)	$P_{\text{G(AV)}}$	0.5	Watt
*Peak Gate Current ( $T_C = +80^\circ\text{C}$ , Pulse Width = 2.0 $\mu\text{s}$ )	$I_{\text{GM}}$	2.0	Amps
*Peak Gate Voltage ( $T_C = +80^\circ\text{C}$ , Pulse Width = 2.0 $\mu\text{s}$ )	$V_{\text{GM}}$	10	Volts
*Operating Junction Temperature Range	$T_J$	$-40$ to $+125$	$^\circ\text{C}$
*Storage Temperature Range	$T_{\text{stg}}$	$-40$ to $+150$	$^\circ\text{C}$

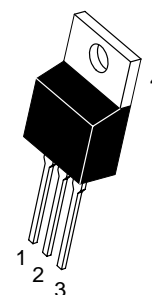
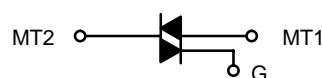
(1)  $V_{\text{DRM}}$  and  $V_{\text{RRM}}$  for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.



ON Semiconductor®

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**TRIACS**  
**8 AMPERES RMS**  
**600 thru 800 VOLTS**



**TO-220AB**  
**CASE 221A**  
**STYLE 4**

#### PIN ASSIGNMENT

1	Main Terminal 1
2	Main Terminal 2
3	Gate
4	Main Terminal 2

#### ORDERING INFORMATION

Device	Package	Shipping
2N6344	TO220AB	500/Box
2N6349	TO220AB	500/Box

Preferred devices are recommended choices for future use and best overall value.

# 2N6344, 2N6349

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
*Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.2	°C/W
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	°C

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted; Electricals apply in both directions)

Characteristic	Symbol	Min	Typ	Max	Unit
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## OFF CHARACTERISTICS

* Peak Repetitive Blocking Current ( $V_D = \text{Rated } V_{DRM}$ , $V_{RRM}$ ; Gate Open)	$I_{DRM}$ , $I_{RRM}$	—	—	10	$\mu\text{A}$
$T_J = 25^\circ\text{C}$ $T_J = 100^\circ\text{C}$		—	—	2.0	$\text{mA}$

## ON CHARACTERISTICS

* Peak On-State Voltage ( $I_{TM} = \pm 11 \text{ A Peak}$ ; Pulse Width = 1 to 2 ms, Duty Cycle $\leq 2\%$ )	$V_{TM}$	—	1.3	1.55	Volts
Gate Trigger Current (Continuous dc) ( $V_D = 12 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ )	$I_{GT}$				$\text{mA}$
Quadrant I: MT2(+), G(+) Both		—	12	50	
Quadrant II: MT2(+), G(−) 2N6349 only		—	12	75	
Quadrant III: MT2(−), G(−) Both		—	20	50	
Quadrant IV: MT2(−), G(+) 2N6349 only		—	35	75	
*MT2(+), G(+); MT2(−), G(−) $T_C = -40^\circ\text{C}$		—	—	100	
*MT2(+), G(−); MT2(−), G(+) $T_C = -40^\circ\text{C}$		—	—	125	
Gate Trigger Voltage (Continuous dc) ( $V_D = 12 \text{ Vdc}$ , $R_L = 100 \text{ Ohms}$ )	$V_{GT}$				Volts
Quadrant I: MT2(+), G(+) Both		—	0.9	2.0	
Quadrant II: MT2(+), G(−) 2N6349 only		—	0.9	2.5	
Quadrant III: MT2(−), G(−) Both		—	1.1	2.0	
Quadrant IV: MT2(−), G(+) 2N6349 only		—	1.4	2.5	
*MT2(+), G(+); MT2(−), G(−) $T_C = -40^\circ\text{C}$		—	—	2.5	
*MT2(+), G(−); MT2(−), G(+) $T_C = -40^\circ\text{C}$		—	—	3.0	
Gate Non-Trigger Voltage (Continuous dc) ( $V_D = \text{Rated } V_{DRM}$ , $R_L = 10 \text{ k Ohms}$ , $T_J = 100^\circ\text{C}$ )	$V_{GD}$				Volts
*MT2(+), G(+); MT2(−), G(−); MT2(+), G(−); MT2(−), G(−)		0.2	—	—	
* Holding Current ( $V_D = 12 \text{ Vdc}$ , Gate Open) (Initiating Current = $\pm 200 \text{ mA}$ )	$I_H$	—	6.0	40	$\text{mA}$
$T_C = 25^\circ\text{C}$ * $T_C = -40^\circ\text{C}$		—	—	75	
* Turn-On Time ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 11 \text{ A}$ , $I_{GT} = 120 \text{ mA}$ , Rise Time = $0.1 \mu\text{s}$ , Pulse Width = $2 \mu\text{s}$ )	$t_{gt}$	—	1.5	2.0	$\mu\text{s}$

## DYNAMIC CHARACTERISTICS

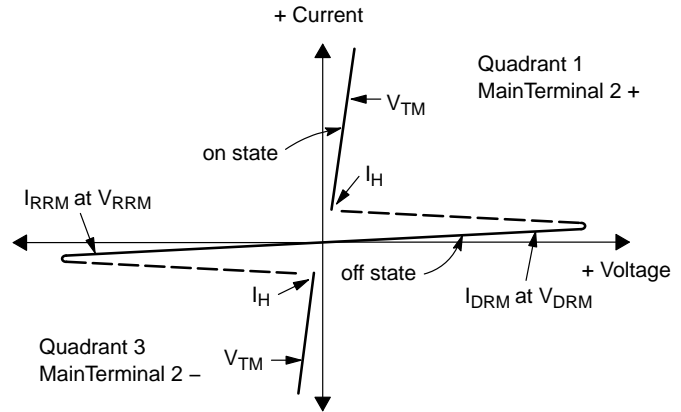
Critical Rate of Rise of Commutation Voltage ( $V_D = \text{Rated } V_{DRM}$ , $I_{TM} = 11 \text{ A}$ , Commutating $di/dt = 4.0 \text{ A/ms}$ , Gate Unenergized, $T_C = 80^\circ\text{C}$ )	$dv/dt(c)$	—	5.0	—	$\text{V}/\mu\text{s}$
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\*Indicates JEDEC Registered Data.

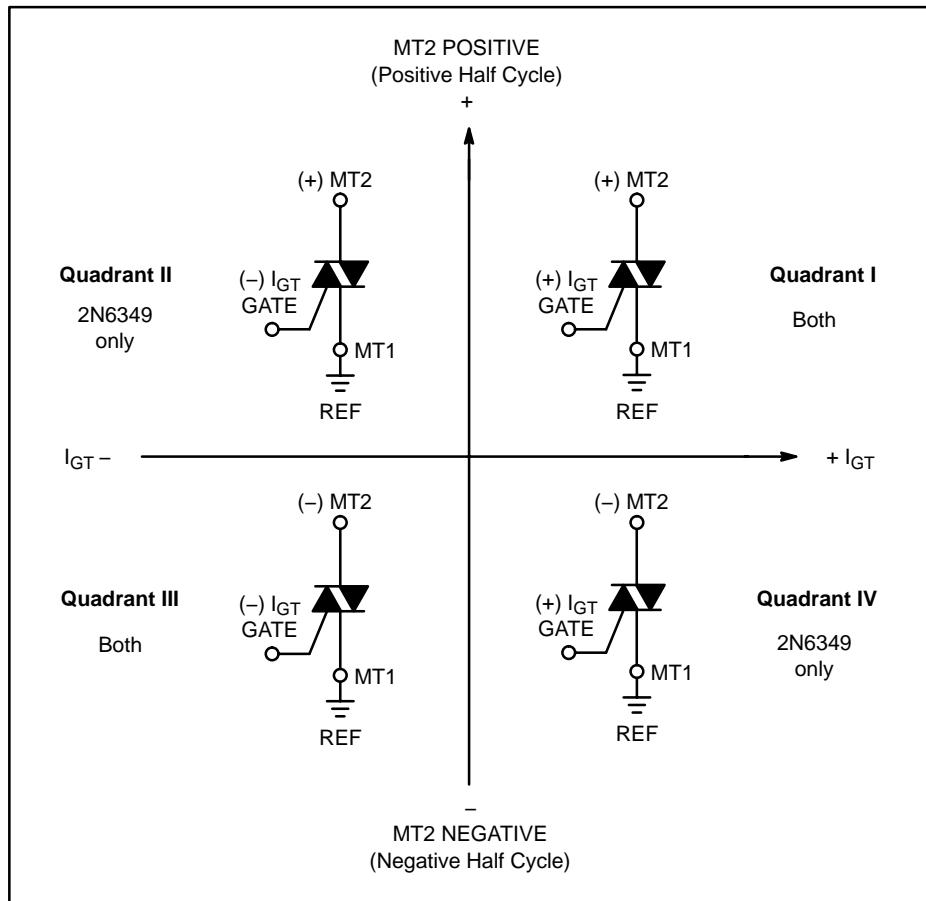
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### Voltage Current Characteristic of Triacs (Bidirectional Device)

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.

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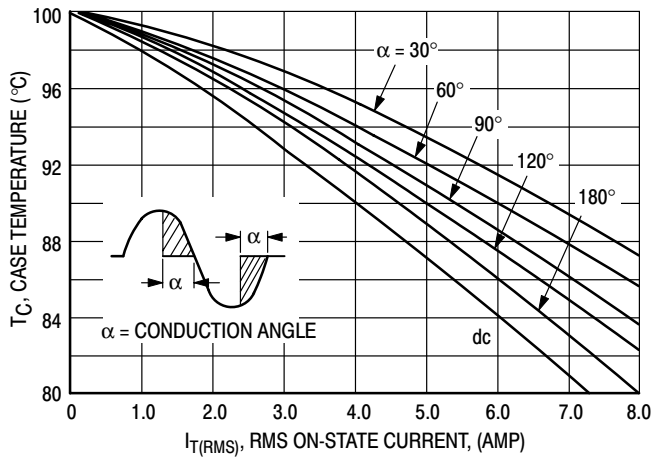


Figure 1. RMS Current Derating

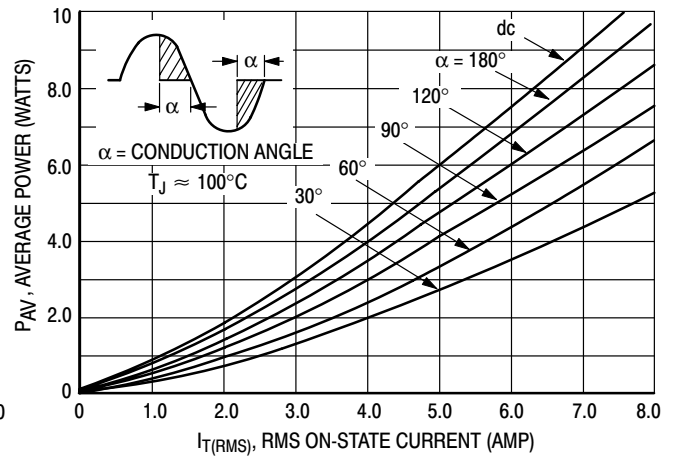


Figure 2. On-State Power Dissipation

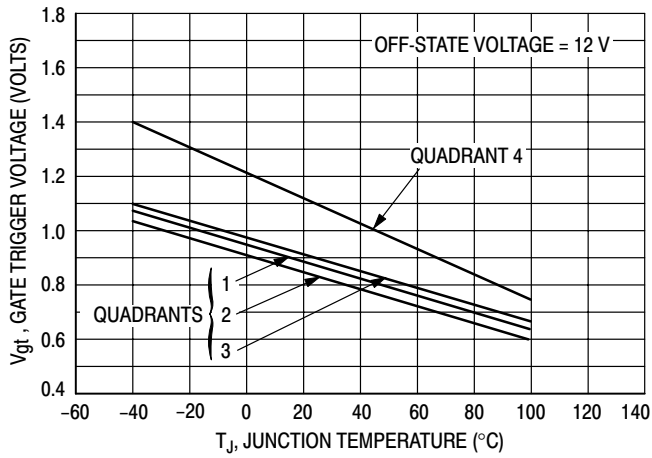


Figure 3. Typical Gate Trigger Voltage

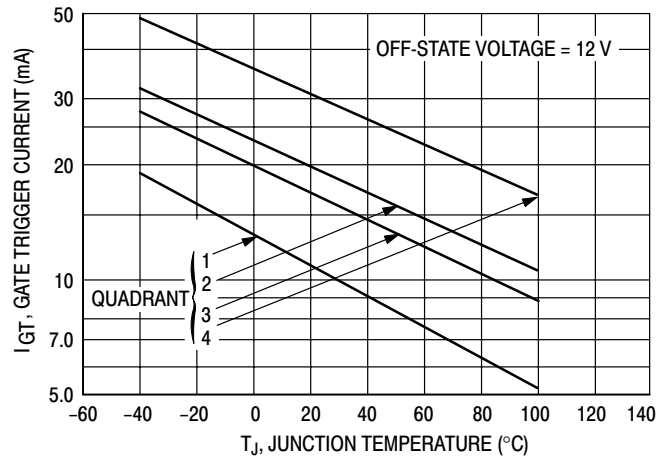


Figure 4. Typical Gate Trigger Current

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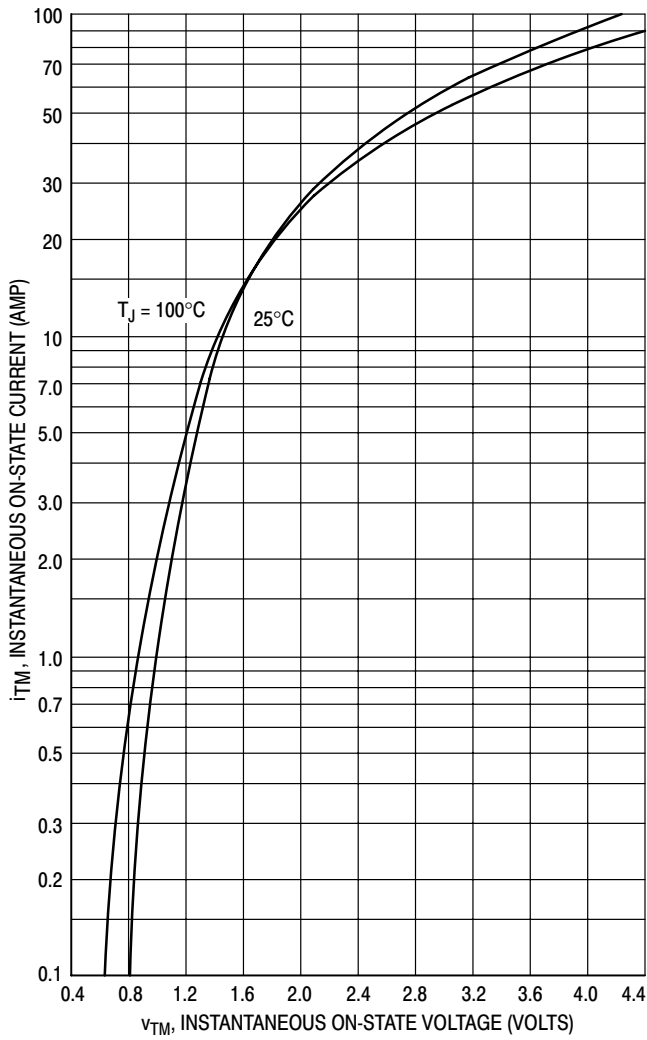


Figure 5. On-State Characteristics

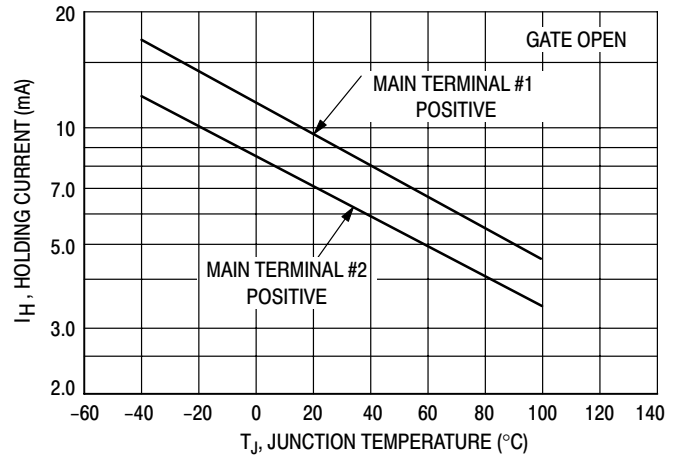


Figure 6. Typical Holding Current

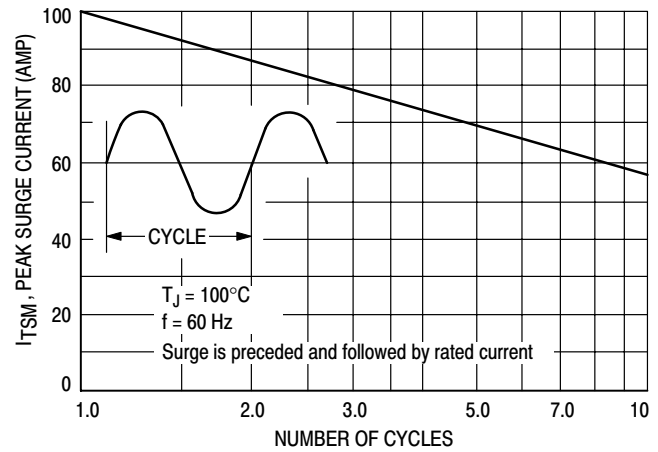


Figure 7. Maximum Non-Repetitive Surge Current

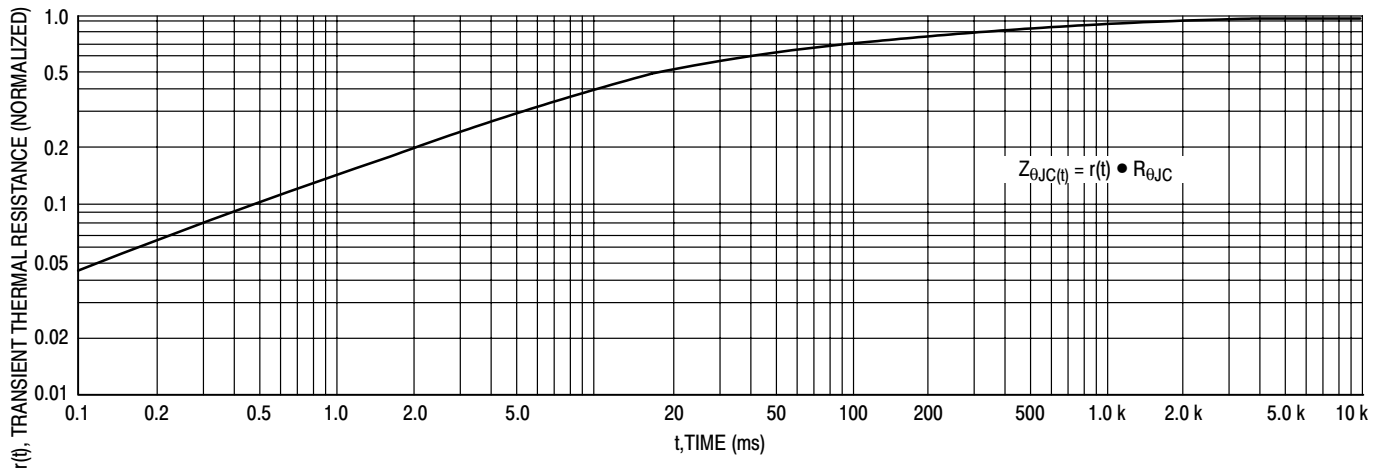
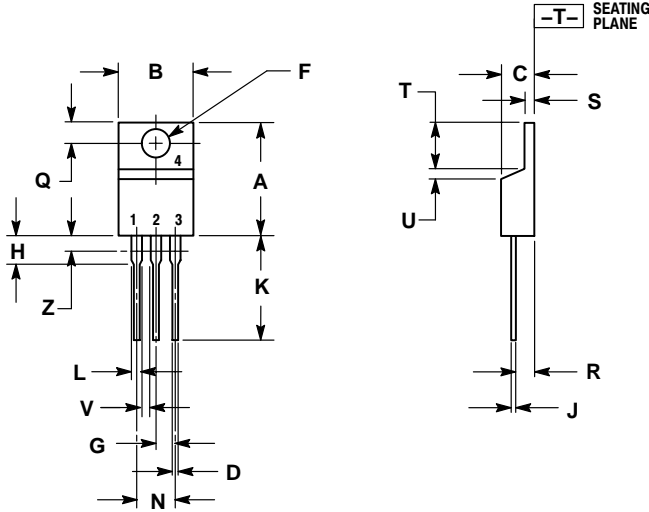


Figure 8. Typical Thermal Response

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## PACKAGE DIMENSIONS

TO-220AB  
CASE 221A-07  
ISSUE AA




### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.022	0.36	0.55
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

### STYLE 4:

- PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

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