ON Semiconductor

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NYT6-5D6DTG, NYT6-5D6DT4G

Sensitive Gate Triacs

Silicon Bidirectional Thyristors

Designed for high volume, low cost, industrial and consumer applications such as motor control; process control; temperature, light and speed control.

Features

- Passivated Die for Reliability and Uniformity
- Four−Quadrant Triggering
- Blocking Voltage to 600 V
- On−State Current Rating of 6.0 A RMS at 93°C
- Low Level Triggering and Holding Characteristics
- Epoxy Meets UL 94 V−0 @ 0.125 in
- These are Pb−Free Devices

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

Rating	Symbol	Value	Unit
Peak Repetitive Off−State Voltage (Note 1) (T_J = −40 to 110°C, Sine Wave, 50 to 60 Hz, Gate Open)	V_{DRM}, V_{RRM}	600	V
On−State RMS Current (Full Cycle Sine Wave, 60 Hz, T_C = 85°C)	$I_{T(RMS)}$	6.0	A
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, $T_{Jinitial}$ = 25°C)	I_{TSM}	60	A
Circuit Fusing Consideration (t = 8.3 msec)	I^2t	6.6	A^2sec
Peak Gate Power (Pulse Width ≤ 10 μsec, T_C = 93°C)	P_{GM}	2.0	W
Average Gate Power (t = 8.3 msec, T_C = 93°C)	$P_{G(AV)}$	1.0	W
Peak Gate Current (Pulse Width ≤ 20 μsec, T_C = 93°C)	I_{GM}	4.0	A
Peak Gate Voltage (Pulse Width ≤ 20 μsec, T_C = 93°C)	V_{GM}	5.0	V
Operating Junction Temperature Range	T_J	−40 to 110	°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 device are exceeded.

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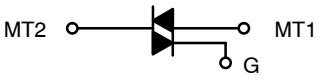
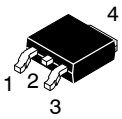
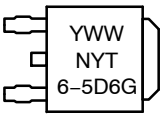
TRIACS
6.0 AMPERES RMS
600 VOLTS

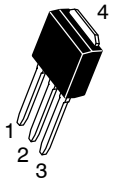


MARKING DIAGRAMS

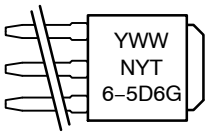


DPAK
CASE 369C
STYLE 6





IPAK
CASE 369D
STYLE 6



Y = Year
WW = Work Week
NYT6−5D6 = Device Code
G = Pb−Free Package

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

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, − Junction−to−Case − Junction−to−Ambient − Junction−to−Ambient (Note 2)	$R_{\theta JC}$ $R_{\theta JA}$ $R_{\theta JA}$	3.5 88 80	°C/W
Maximum Lead Temperature for Soldering Purposes (Note 3)	T_L	260	°C

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Forward or Reverse Blocking Current (VAK = Rated V_{DRM} or V_{RRM}; Gate Open)	T_J = 25°C T_J = 110°C	I_{DRM}, I_{RRM}	− −	− −	0.001 0.5	mA
ON CHARACTERISTICS						
Forward On−State Voltage (I_{TM} = ±8.5 A)		V_{TM}	−	−	1.6	V
Gate Trigger Current (Continuous dc) (V_D = 12 V, R_L = 30 Ω) MT2(+), G(+) MT2(+), G(−) MT2(−), G(−) MT2(−), G(+)		I_{GT}	 − − − −	 − − − −	 5.0 5.0 5.0 10	mA
Gate Trigger Voltage (V_D = 12 V, R_L = 30 Ω) MT2(+), G(+) MT2(+), G(−) MT2(−), G(−) MT2(−), G(+)		V_{GT}	 − − − −	 − − − −	 1.3 1.3 1.3 1.3	V
Gate Non−Trigger Voltage (Continuous dc) − (V_D = 12 V, R_L = 30 Ω, T_J = 110°C) All Four Quadrants		V_{GD}	0.2	0.4	−	V
Holding Current (V_D = 12 V, Initiating Current = ±100 mA)		I_H	−	−	20	mA
Latching Current (V_D = 12 V, I_G = 60 mA) MT2(+), G(+) MT2(+), G(−) MT2(−), G(−) MT2(−), G(+)		I_L	 − − − −	 − − −	 30 30 30 30	mA
DYNAMIC CHARACTERISTICS						
Rate of Change of Commutating Current (V_D = 200 V, I_{TM} = 1.8 A, Commutating dv/dt = 1.0 V/μsec, T_J = 110°C, f = 250 Hz, CL = 5.0 μfd, LL = 80 mH, RS = 56 Ω, CS = 0.03 μfd) With snubber		di/dt(c)	−	1.5	−	A/ms
Critical Rate of Rise of Off−State Voltage (V_D = 0.67 X Rated V_{DRM}, Exponential Waveform, Gate Open, T_J = 110°C)		dv/dt	60	−	−	V/μs
Critical Rate of Rise of On−State Current (T_J = 110°C, f = 120 Hz, I_G = 2 x I_{GT}, tr ≤ 100 ns)		dI/dt	−	−	50	A/μs

2. These ratings are applicable when surface mounted on the minimum pad sizes recommended.
3. 1/8″ from case for 10 seconds.
4. Pulse Test: Pulse Width ≤ 2.0 msec, Duty Cycle ≤ 2%.

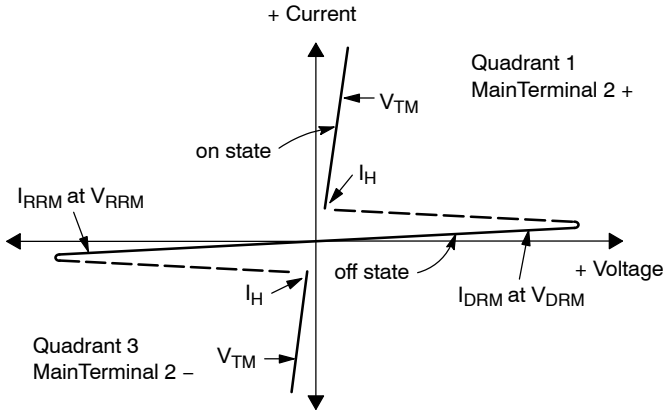
ORDERING INFORMATION

Device	Package Type	Package	Shipping†
NYT6−5D6DTG	IPAK (Pb−Free)	369D	75 Units / Rail
NYT6−5D6DT4G	DPAK (Pb−Free)	369C	2500 / Tape & Reel

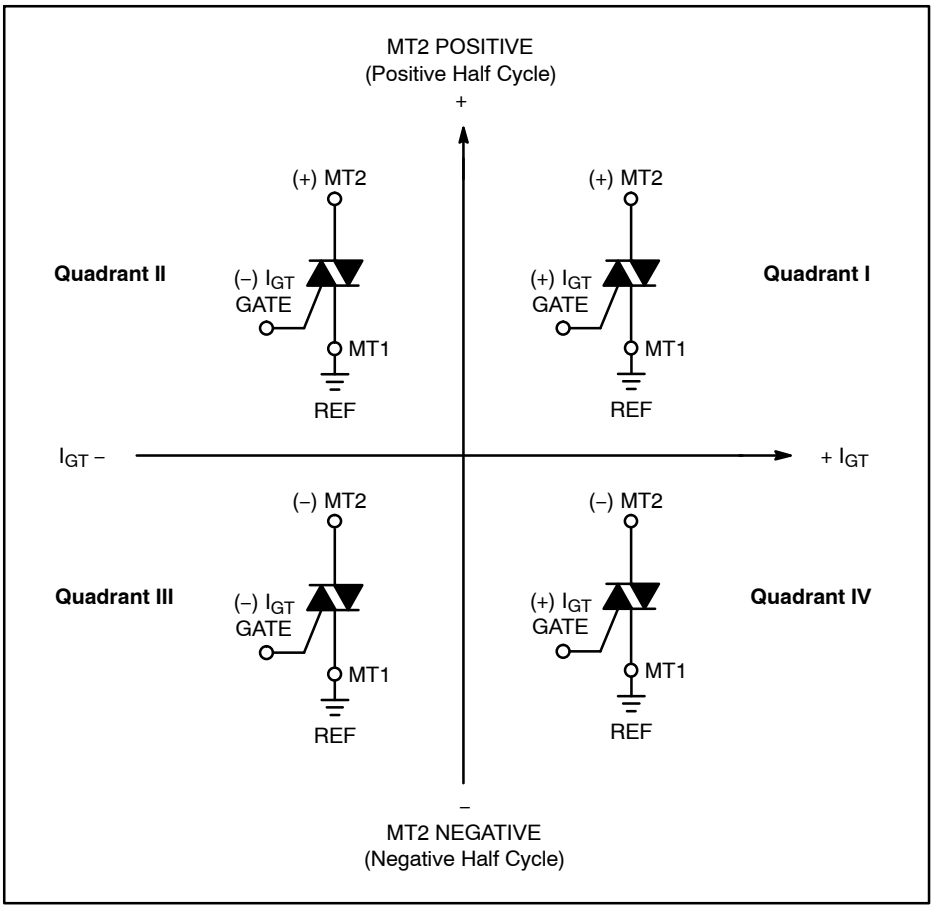
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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.

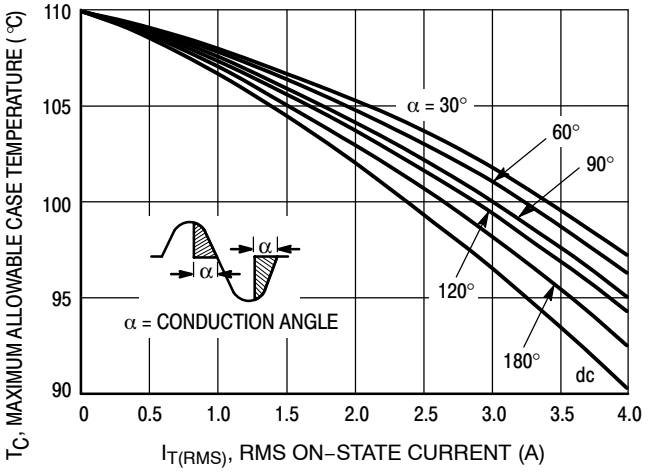


Figure 1. RMS Current Derating

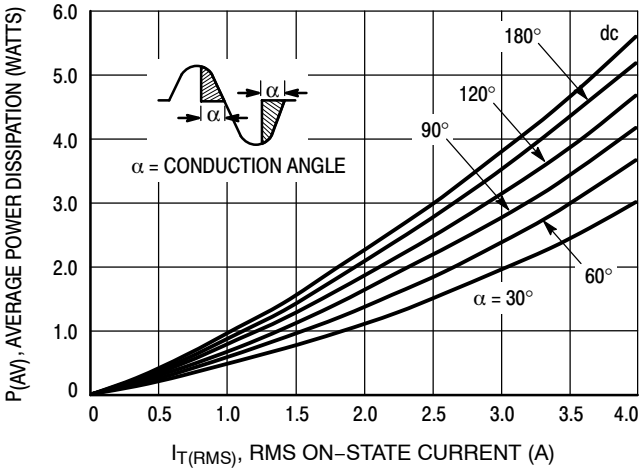


Figure 2. On−State Power Dissipation

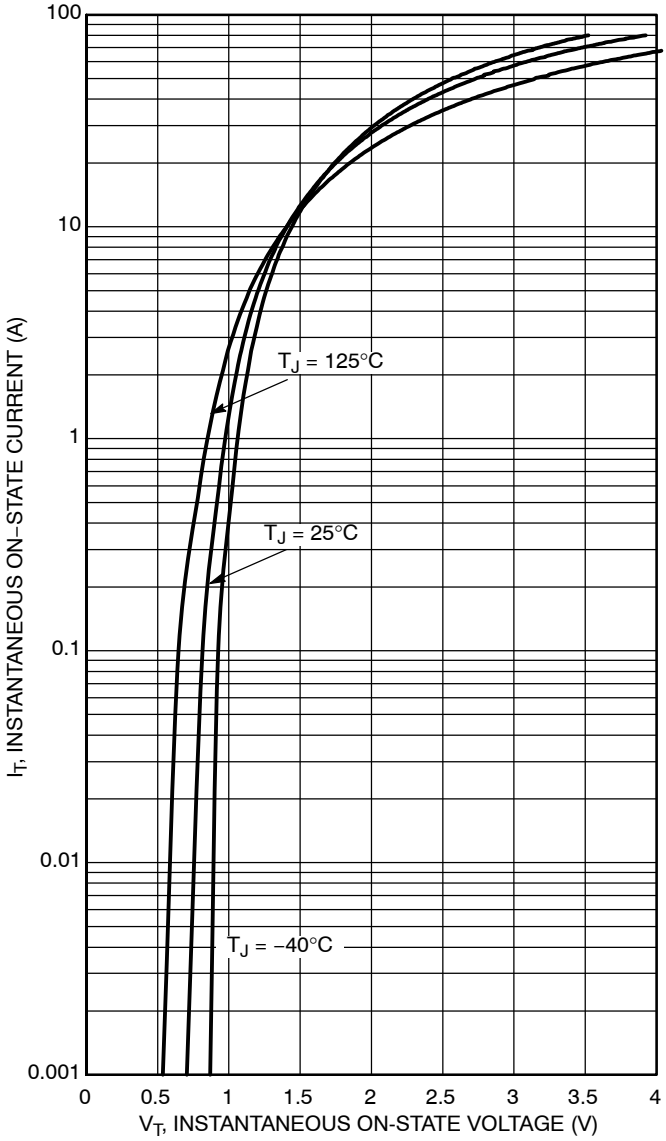


Figure 3. Maximum On−State Voltage Characteristics

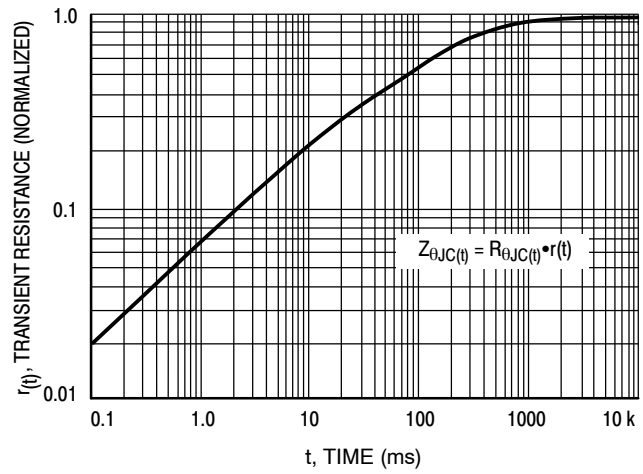


Figure 4. Transient Thermal Response

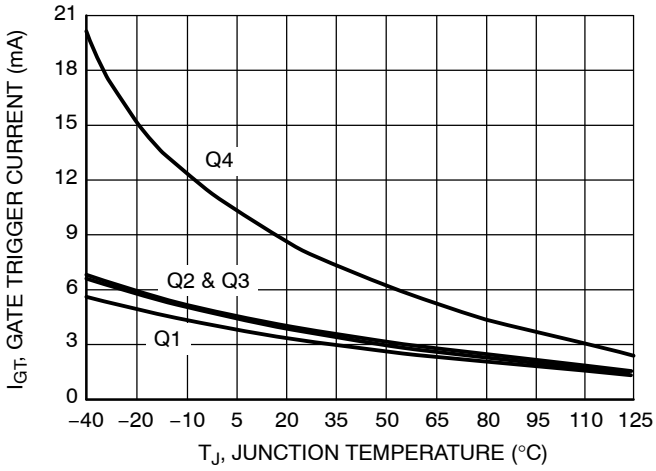


Figure 5. Typical Gate Trigger Current

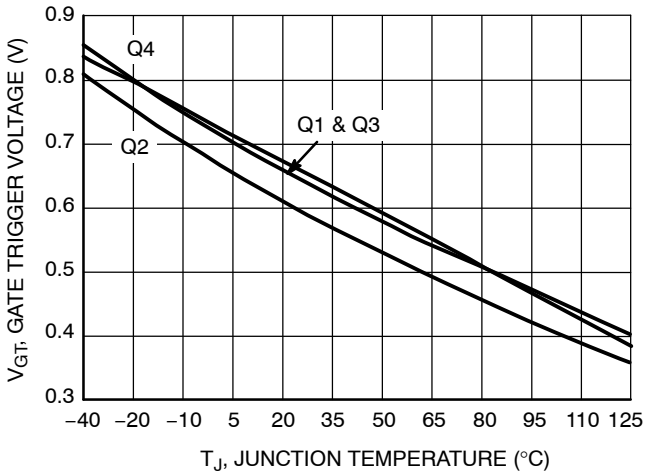


Figure 6. Typical Gate Trigger Voltage

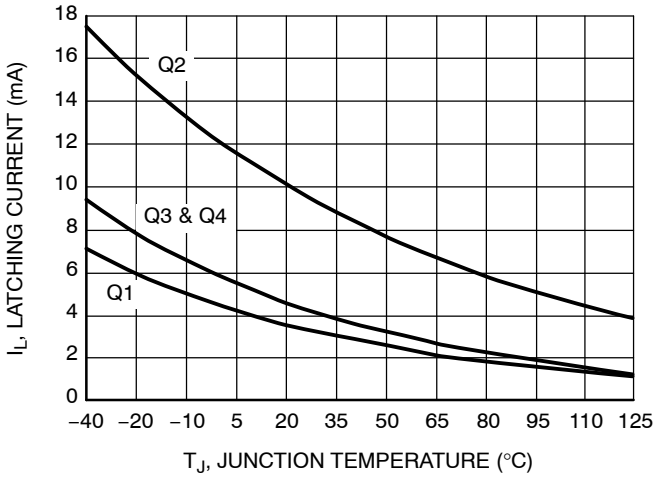


Figure 7. Typical Latching Current

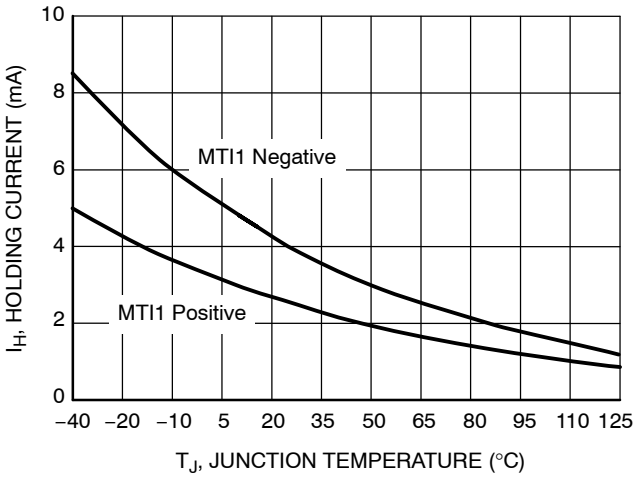
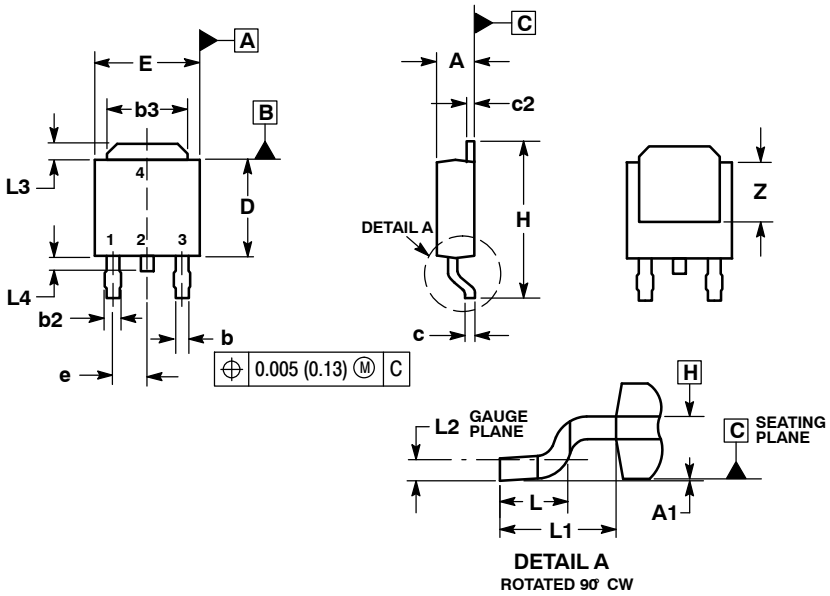


Figure 8. Typical Holding Current

PACKAGE DIMENSIONS

DPAK (SINGLE GAUGE)
CASE 369C
ISSUE D

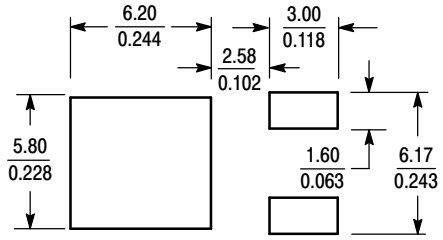


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.030	0.045	0.76	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.108 REF		2.74 REF	
L2	0.020 BSC		0.51 BSC	
L3	0.035	0.050	0.89	1.27
L4	−−−	0.040	−−−	1.01
Z	0.155	−−−	3.93	−−−

STYLE 6:
PIN 1. MT1
2. MT2
3. GATE
4. MT2

SOLDERING FOOTPRINT*

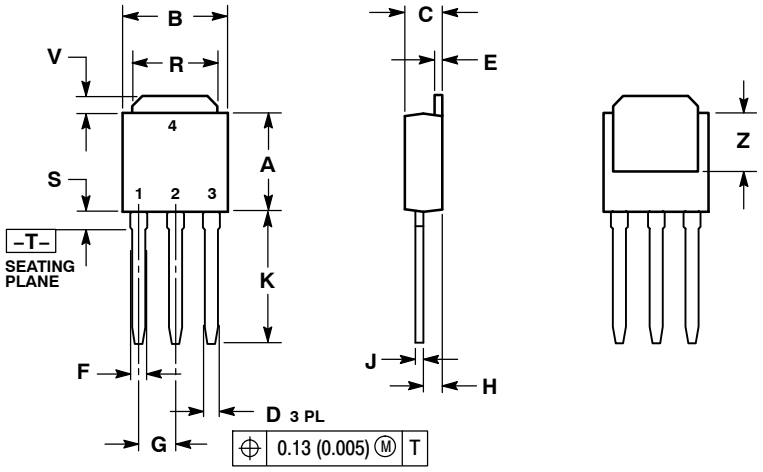


SCALE 3:1 (mm / inches)

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PACKAGE DIMENSIONS

IPAK
CASE 369D
ISSUE C



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.235	0.245	5.97	6.35
B	0.250	0.265	6.35	6.73
C	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
E	0.018	0.023	0.46	0.58
F	0.037	0.045	0.94	1.14
G	0.090 BSC		2.29 BSC	
H	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.350	0.380	8.89	9.65
R	0.180	0.215	4.45	5.45
S	0.025	0.040	0.63	1.01
V	0.035	0.050	0.89	1.27
Z	0.155	−−−	3.93	−−−

STYLE 6:
PIN 1. MT1
2. MT2
3. GATE
4. MT2

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

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