

# NYC222STT1G, NYC226STT1G, NYC228STT1G



ON Semiconductor®

http://onsemi.com

## Sensitive Gate Silicon Controlled Rectifiers

### Reverse Blocking Thyristors

Designed and tested for repetitive peak operation required for CD ignition, fuel ignitors, flash circuits, motor controls and low-power switching applications.

#### Features

- Blocking Voltage to 600 V
- High Surge Current – 15 A
- Very Low Forward “On” Voltage at High Current
- Low-Cost Surface Mount SOT–223 Package
- These are Pb–Free Devices

#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off–State Voltage (Note 1) (R <sub>GK</sub> = 1K, T <sub>J</sub> = –40 to +110°C, Sine Wave, 50 to 60 Hz, Gate Open)	V <sub>DRM</sub> , V <sub>RRM</sub>	50 400 600	V
On-State Current RMS (180° Conduction Angles, T <sub>C</sub> = 80°C)	I <sub>T(RMS)</sub>	1.5	A
Peak Non-repetitive Surge Current, @T <sub>A</sub> = 25°C, (1/2 Cycle, Sine Wave, 60 Hz)	I <sub>TSM</sub>	15	A
Circuit Fusing Considerations (t = 8.3 ms)	I <sup>2</sup> t	0.9	A <sup>2</sup> s
Forward Peak Gate Power (Pulse Width ≤ 1.0 μsec, T <sub>A</sub> = 25°C)	P <sub>GM</sub>	0.5	W
Forward Average Gate Power (t = 8.3 msec, T <sub>A</sub> = 25°C)	P <sub>G(AV)</sub>	0.1	W
Forward Peak Gate Current (Pulse Width ≤ 1.0 μs, T <sub>A</sub> = 25°C)	I <sub>FGM</sub>	0.2	A
Reverse Peak Gate Voltage (Pulse Width ≤ 1.0 μs, T <sub>A</sub> = 25°C)	V <sub>RGM</sub>	5.0	V
Operating Junction Temperature Range @ Rated V <sub>RRM</sub> and V <sub>DRM</sub>	T <sub>J</sub>	–40 to +110	°C
Storage Temperature Range	T <sub>stg</sub>	–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<sub>DRM</sub> and V<sub>RRM</sub> for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

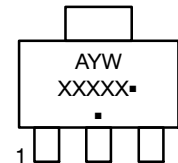
SCRs  
1.5 AMPERES RMS  
400 thru 600 VOLTS



#### MARKING DIAGRAM



SOT–223  
CASE 318E  
STYLE 11



A = Assembly Location  
Y = Year  
W = Work Week  
XXXXX = Device Code  
▪ = Pb–Free Package

(Note: Microdot may be in either location)

#### PIN ASSIGNMENT

Pin	Assignment
1	K (Cathode)
2	A (Anode)
3	G (Gate)
4	A (Anode)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NYC222STT1G	SOT–223 (Pb–Free)	1000 /Tape & Reel
NYC226STT1G	SOT–223 (Pb–Free)	1000 /Tape & Reel
NYC228STT1G	SOT–223 (Pb–Free)	1000 /Tape & Reel

<sup>†</sup>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.

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## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient PCB Mounted	$R_{\theta JA}$	156	$^{\circ}C/W$
Thermal Resistance, Junction-to-Tab Measured on MT2 Tab Adjacent to Epoxy	$R_{\theta JT}$	25	$^{\circ}C/W$
Maximum Device Temperature for Soldering Purposes for 10 Secs Maximum	$T_L$	260	$^{\circ}C$

## ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}C$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Peak Repetitive Forward or Reverse Blocking Current ( $V_{AK} = \text{Rated } V_{DRM}/V_{RRM}$ ; $R_{GK} = 1000 \Omega$ )	$I_{DRM}, I_{RRM}$	$T_C = 25^{\circ}C$	-	-	10	$\mu A$
		$T_C = 110^{\circ}C$	-	-	200	$\mu A$

### ON CHARACTERISTICS

Peak Forward On-State Voltage (Note 2) ( $I_{TM} = 2.2 \text{ A Peak}$ )	$V_{TM}$	-	1.2	1.7	V	
Gate Trigger Current (dc) (Note 3) ( $V_{AK} = 7 \text{ Vdc}$ , $R_L = 100 \Omega$ )	$I_{GT}$	$T_C = 25^{\circ}C$	-	30	200	$\mu A$
		$T_C = -40^{\circ}C$	-	-	500	
Gate Trigger Voltage (dc) (Note 3) ( $V_{AK} = 7 \text{ Vdc}$ , $R_L = 100 \Omega$ )	$V_{GT}$	$T_C = 25^{\circ}C$	-	-	0.8	V
		$T_C = -40^{\circ}C$	-	-	1.2	
Gate Non-Trigger Voltage ( $V_{AK} = V_{DRM}$ , $R_L = 100 \Omega$ )	$V_{GD}$	0.1	-	-	V	
Holding Current ( $V_{AK} = 12 \text{ V}$ , $R_{GK} = 1000 \Omega$ ) Initiating Current = 200 mA	$I_H$	$T_C = 25^{\circ}C$	-	2.0	5.0	mA
		$T_C = -40^{\circ}C$	-	-	10	

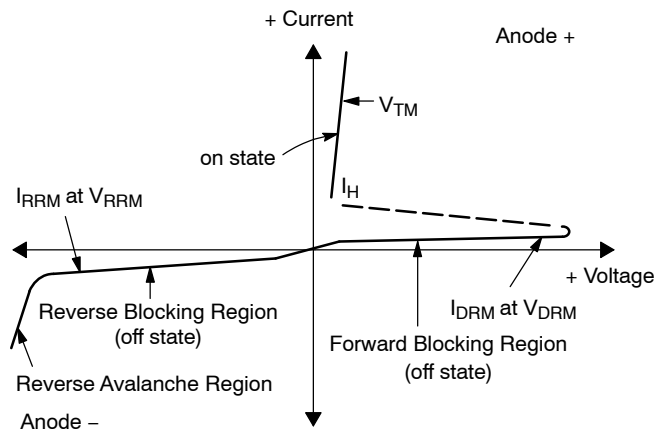
### DYNAMIC CHARACTERISTICS

Critical Rate of Rise of Off-State Voltage ( $T_C = 110^{\circ}C$ )	$dv/dt$	-	25	-	V/ $\mu s$
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2. Pulse Width = 1.0 ms, Duty Cycle  $\leq 1\%$ .
3.  $R_{GK}$  Current not included in measurement.

## Voltage Current Characteristic of SCR

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



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## CURRENT DERATING

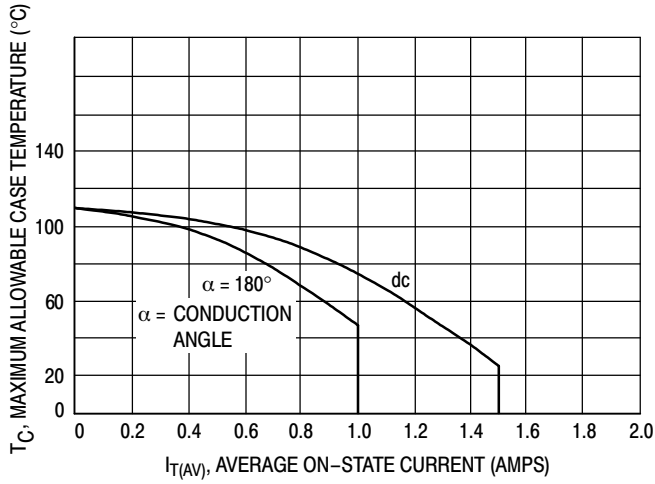


Figure 1. Maximum Case Temperature

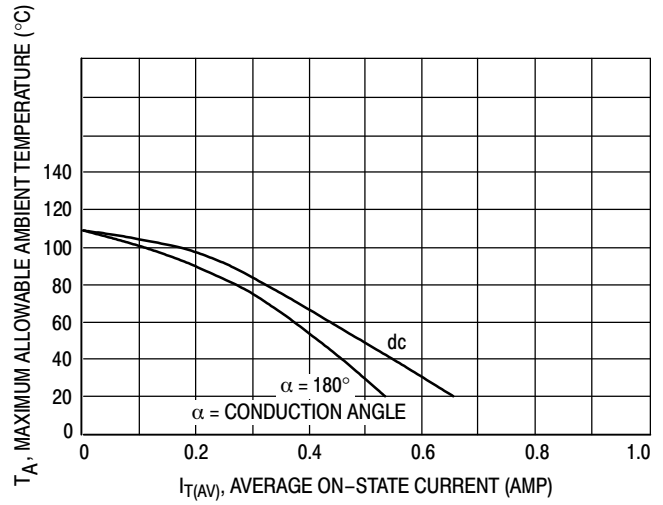


Figure 2. Maximum Ambient Temperature

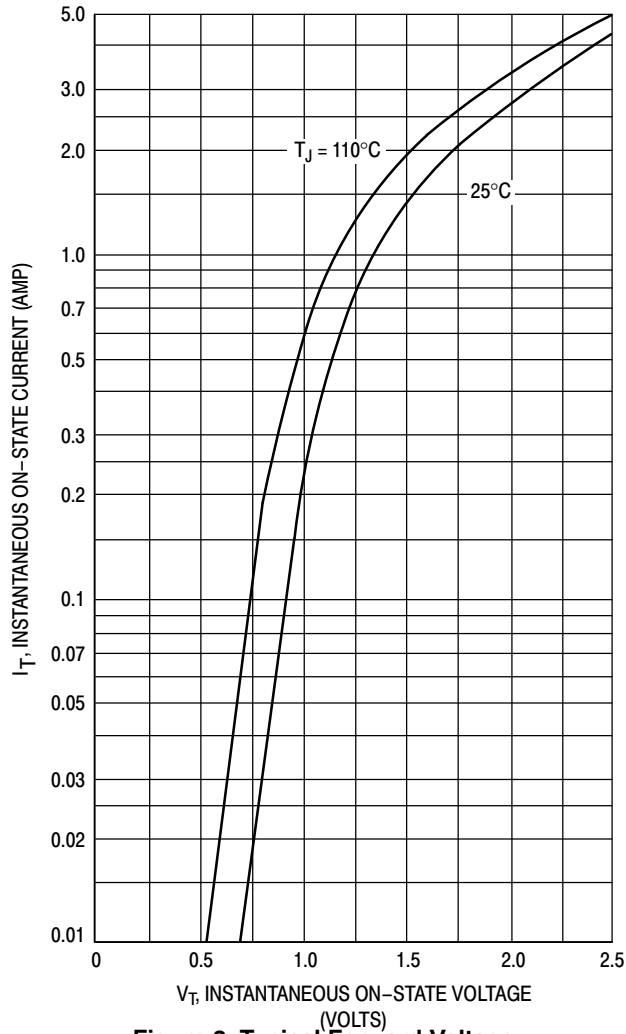


Figure 3. Typical Forward Voltage

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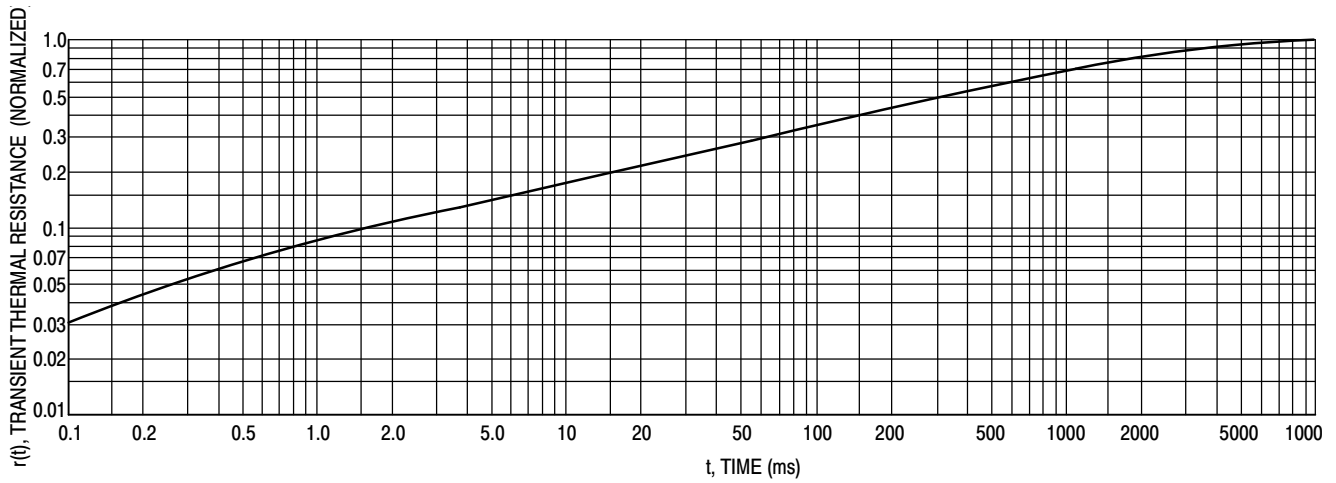


Figure 4. Thermal Response

## TYPICAL CHARACTERISTICS

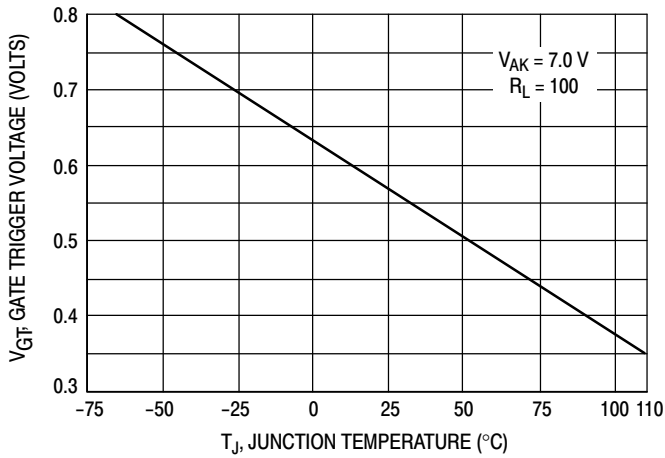


Figure 5. Typical Gate Trigger Voltage

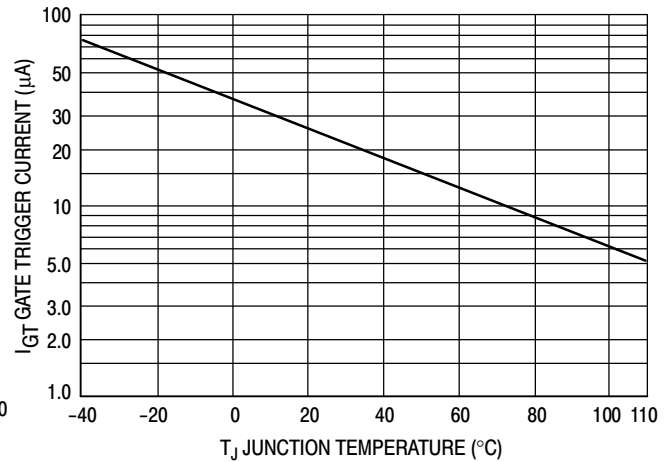


Figure 6. Typical Gate Trigger Current

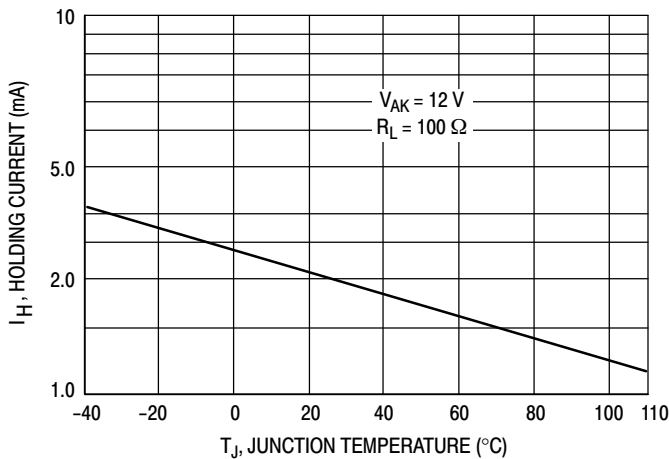


Figure 7. Typical Holding Current

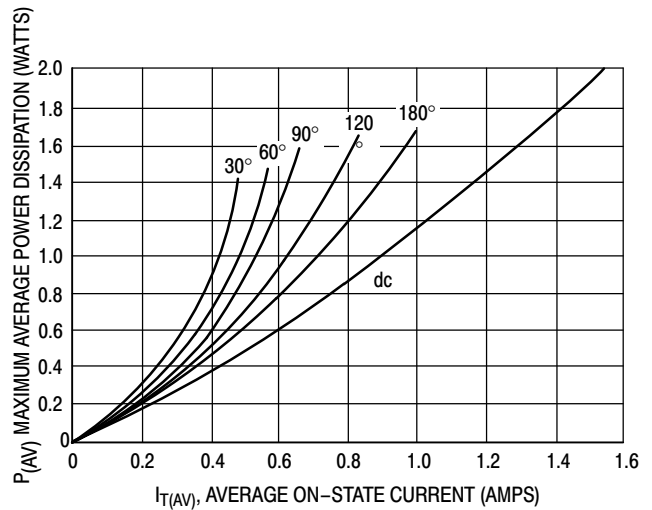
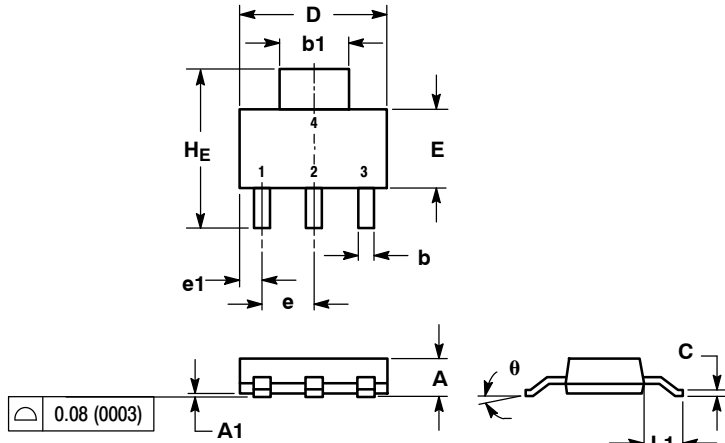


Figure 8. Power Dissipation

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## PACKAGE DIMENSIONS

SOT-223 (TO-261)  
CASE 318E-04  
ISSUE M



NOTES:

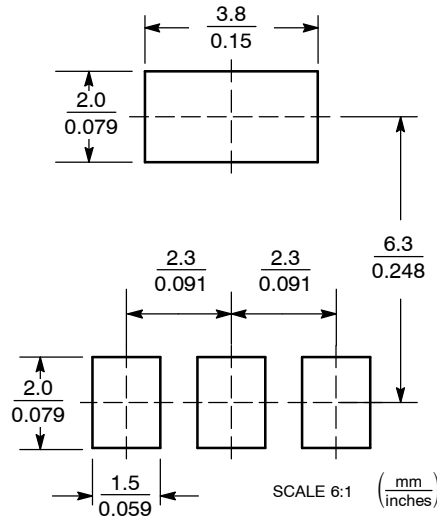
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.63	1.75	0.060	0.064	0.068
A1	0.02	0.06	0.10	0.001	0.002	0.004
b	0.60	0.75	0.89	0.024	0.030	0.035
b1	2.90	3.06	3.20	0.115	0.121	0.126
c	0.24	0.29	0.35	0.009	0.012	0.014
D	6.30	6.50	6.70	0.249	0.256	0.263
E	3.30	3.50	3.70	0.130	0.138	0.145
e	2.20	2.30	2.40	0.087	0.091	0.094
e1	0.85	0.94	1.05	0.033	0.037	0.041
L1	1.50	1.75	2.00	0.060	0.069	0.078
HE	6.70	7.00	7.30	0.264	0.276	0.287
θ	0°	-	10°	0°	-	10°

STYLE 11:

1. MT 1
2. MT 2
3. GATE
4. MT 2

### SOLDERING FOOTPRINT\*



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

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