



**THE DATASHEET OF  
NTS12120MFST1G**



# NTS12120MFS, NRVTS12120MFS

## Very Low Forward Voltage Trench-based Schottky Rectifier

### Features

- Fine Lithography Trench-based Schottky Technology for Very Low Forward Voltage and Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- Low Thermal Resistance
- High Surge Capability
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These are Pb-Free and Halide-Free Devices

### Typical Applications

- Switching Power Supplies including Notebook / Netbook Adapters, ATX and Flat Panel Display
- High Frequency and DC-DC Converters
- Freewheeling and OR-ing diodes
- Reverse Battery Protection
- LED Lighting
- Instrumentation

### Mechanical Characteristics:

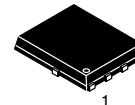
- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94-0 @ 0.125 in.
- Lead Finish: 100% Matte Sn (Tin)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Device Meets MSL 1 Requirements



ON Semiconductor®

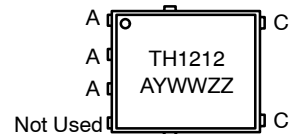
<http://onsemi.com>

## TRENCH SCHOTTKY RECTIFIERS 12 AMPERES 120 VOLTS



SO-8 FLAT LEAD  
CASE 488AA  
STYLE 2

### MARKING DIAGRAM



TH1212 = Specific Device Code  
A = Assembly Location  
Y = Year  
W = Work Week  
ZZ = Lot Traceability

### ORDERING INFORMATION

Device	Package	Shipping†
NTS12120MFST1G	SO-8 FL (Pb-Free)	1500 / Tape & Reel
NTS12120MFST3G	SO-8 FL (Pb-Free)	5000 / Tape & Reel
NRVTS12120MFST1G	SO-8 FL (Pb-Free)	1500 / Tape & Reel
NRVTS12120MFST3G	SO-8 FL (Pb-Free)	5000 / Tape & Reel

†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.

# NTS12120MFS, NRVTS12120MFS

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	120	V
Average Rectified Forward Current (Rated $V_R$ , $T_C = 138^\circ\text{C}$ )	$I_{F(AV)}$	12	A
Peak Repetitive Forward Current, (Rated $V_R$ , Square Wave, 20 kHz, $T_C = 136^\circ\text{C}$ )	$I_{FRM}$	24	A
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	$I_{FSM}$	200	A
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	-55 to +150	$^\circ\text{C}$
Unclamped Inductive Switching Energy (10 mH Inductor, Non-repetitive)	$E_{AS}$	100	mJ
ESD Rating (Human Body Model)		3B	
ESD Rating (Machine Model)		M4	

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.

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Typ	Max	Unit
Thermal Resistance, Junction-to-Case, Steady State (Assumes 600 mm <sup>2</sup> 1 oz. copper bond pad, on a FR4 board)	$R_{\theta JC}$	2.0	-	$^\circ\text{C/W}$

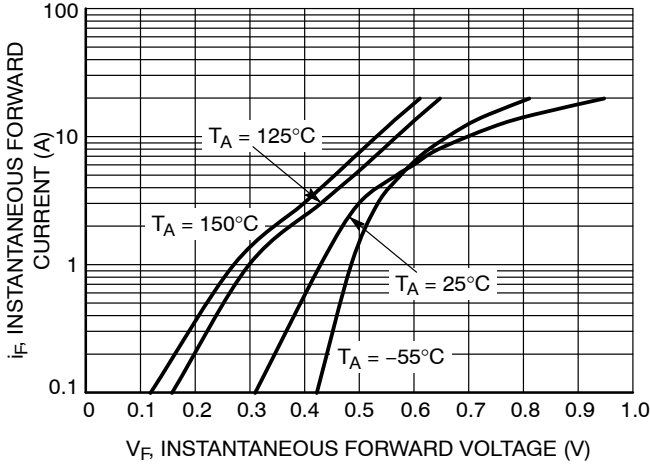
## ELECTRICAL CHARACTERISTICS

Rating	Symbol	Typ	Max	Unit
Instantaneous Forward Voltage (Note 1) ( $I_F = 6\text{ A}$ , $T_J = 25^\circ\text{C}$ ) ( $I_F = 12\text{ A}$ , $T_J = 25^\circ\text{C}$ )  ( $I_F = 6\text{ A}$ , $T_J = 125^\circ\text{C}$ ) ( $I_F = 12\text{ A}$ , $T_J = 125^\circ\text{C}$ )	$V_F$	0.587 0.63  0.510 0.587	- 0.83  - 0.68	V
Instantaneous Reverse Current (Note 1) ( $V_R = 90\text{ V}$ , $T_J = 25^\circ\text{C}$ ) (Rated dc Voltage, $T_J = 25^\circ\text{C}$ )  ( $V_R = 90\text{ V}$ , $T_J = 125^\circ\text{C}$ ) (Rated dc Voltage, $T_J = 125^\circ\text{C}$ )	$I_R$	3.4 14.5  3.5 9.2	- 75  - 40	$\mu\text{A}$ $\mu\text{A}$  mA mA

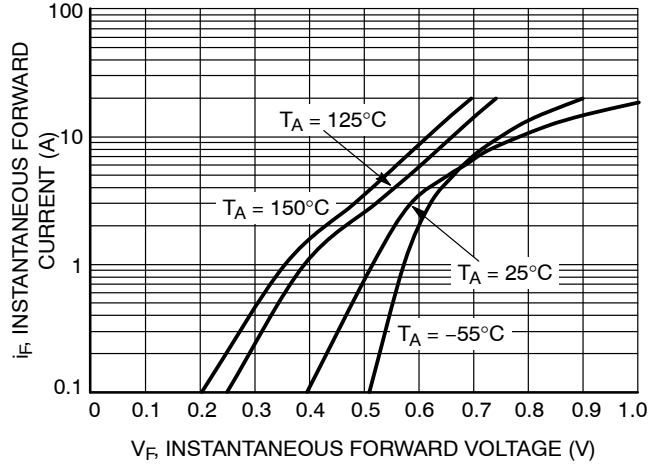
1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# NTS12120MFS, NRVTS12120MFS

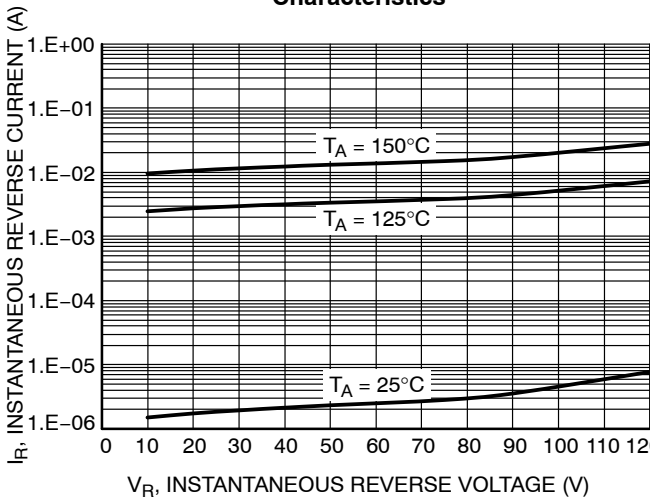
## TYPICAL CHARACTERISTICS



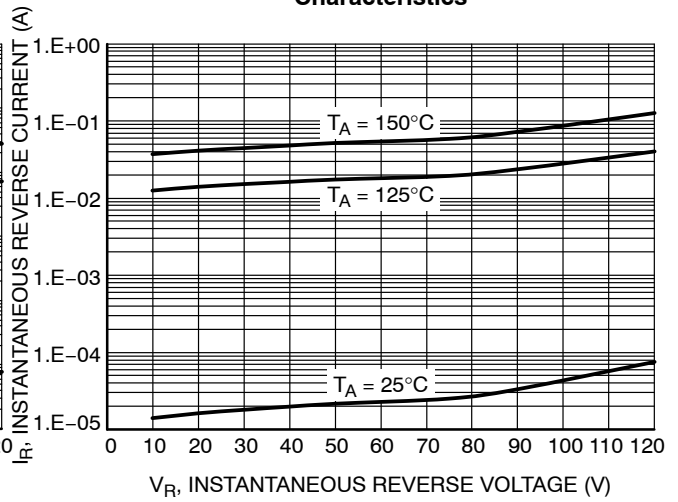
**Figure 1. Typical Instantaneous Forward Characteristics**



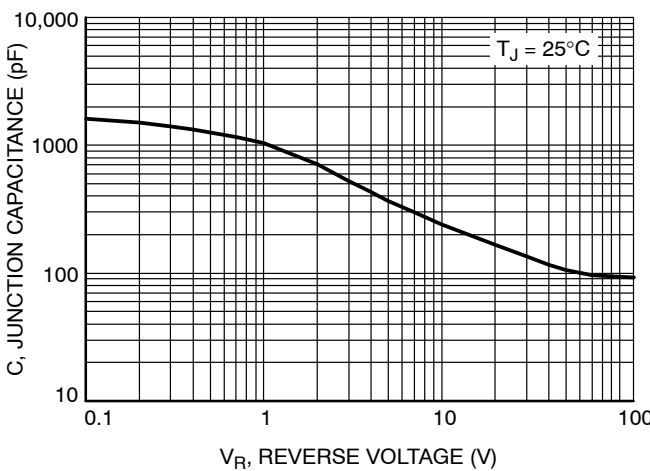
**Figure 2. Maximum Instantaneous Forward Characteristics**



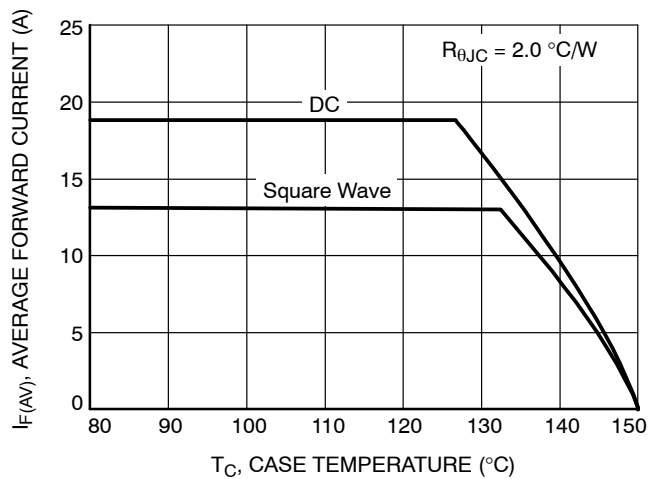
**Figure 3. Typical Reverse Characteristics**



**Figure 4. Maximum Reverse Characteristics**



**Figure 5. Typical Junction Capacitance**



**Figure 6. Current Derating**

TYPICAL CHARACTERISTICS

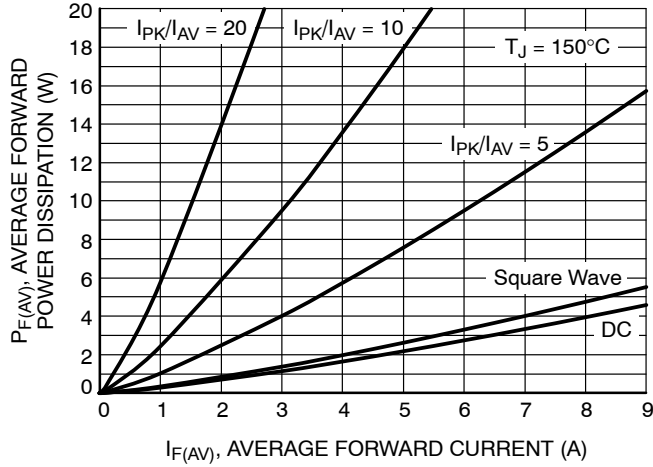


Figure 7. Forward Power Dissipation

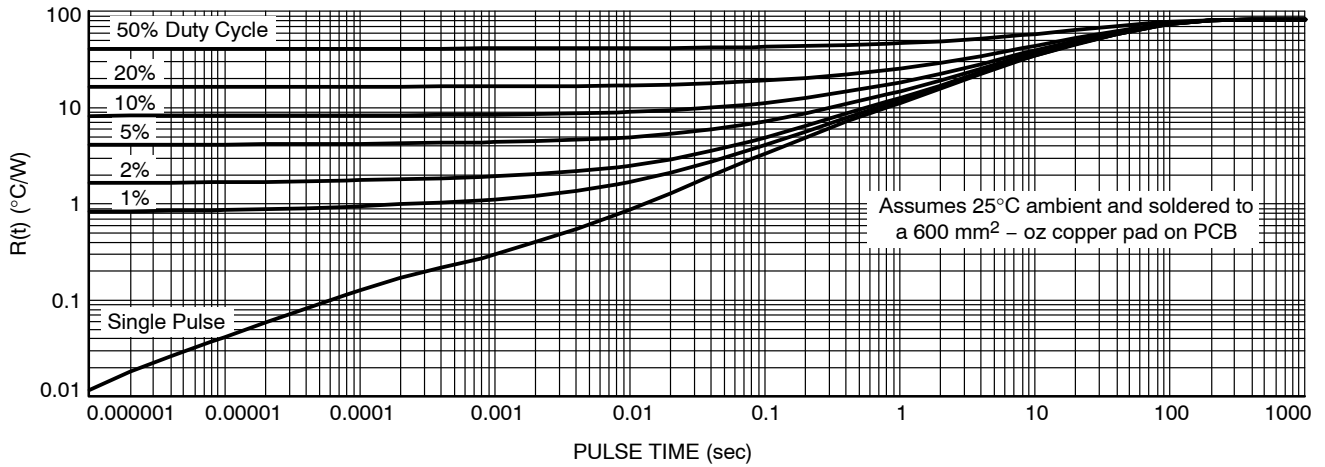


Figure 8. Thermal Characteristics

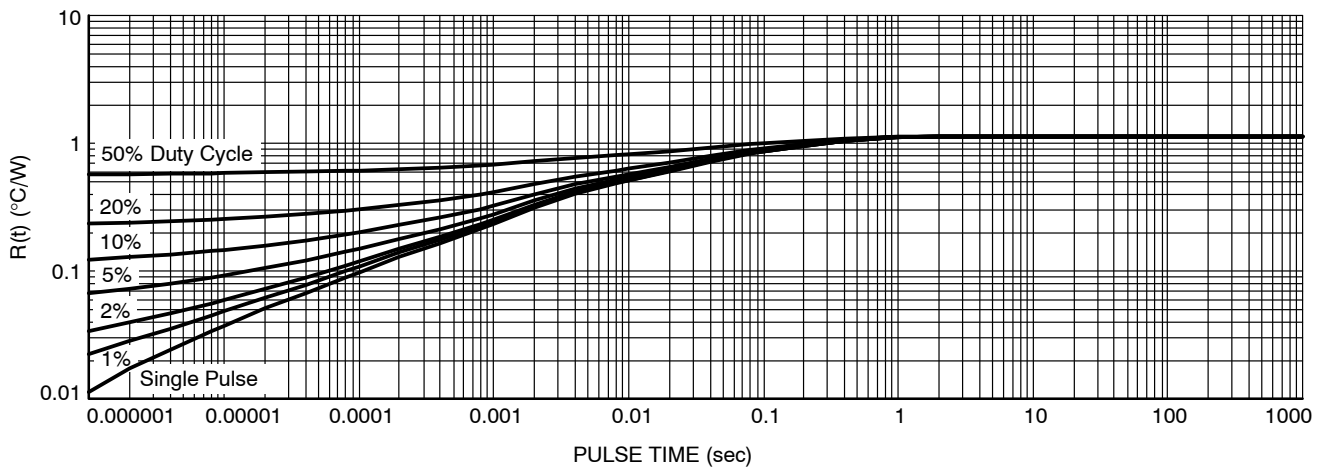


Figure 9. Typical Transient Thermal Response Characteristics, Junction-to-Case

# MECHANICAL CASE OUTLINE

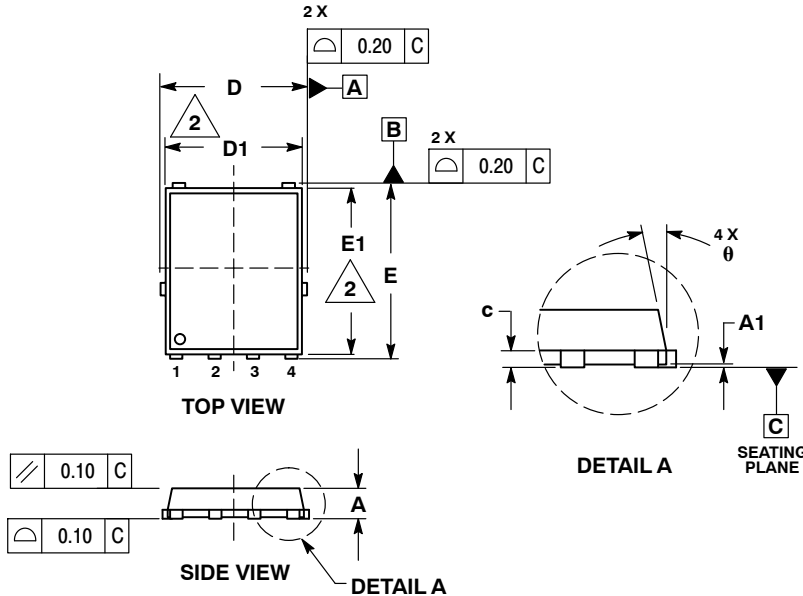
## PACKAGE DIMENSIONS



1  
SCALE 2:1

DFN5 5x6, 1.27P  
(SO-8FL)  
CASE 488AA  
ISSUE N

DATE 25 JUN 2018

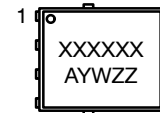


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

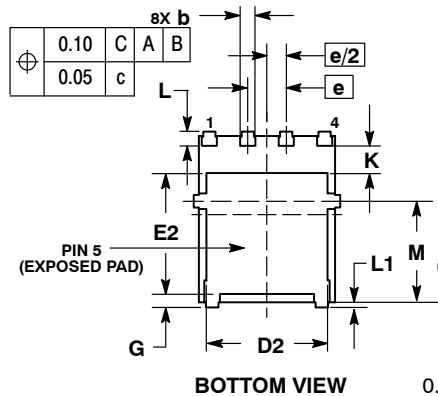
MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
K	1.20	1.35	1.50
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0°	---	12°

### GENERIC MARKING DIAGRAM\*

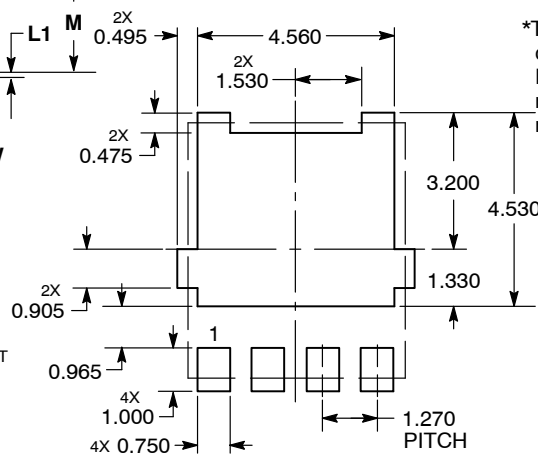


- XXXXXX = Specific Device Code
- A = Assembly Location
- Y = Year
- W = Work Week
- ZZ = Lot Traceability

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



### RECOMMENDED SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

- STYLE 1:  
PIN 1. SOURCE  
2. SOURCE  
3. SOURCE  
4. GATE  
5. DRAIN
- STYLE 2:  
PIN 1. ANODE  
2. ANODE  
3. ANODE  
4. NO CONNECT  
5. CATHODE

\*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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DESCRIPTION:	DFN5 5x6, 1.27P (SO-8FL)	PAGE 1 OF 1

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