NTS12120MFS, NRVTS12120MFS

Very Low Forward Voltage Trench-based Schottky Rectifier

ON Semiconductor®

http://onsemi.com

TRENCH SCHOTTKY RECTIFIERS
12 AMPERES
120 VOLTS

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Features

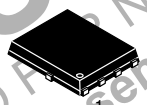
- Fine Lithography Trench−based Schottky Technology for Very Low Forward Voltage and Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- Low Thermal Resistance
- High Surge Capability
- 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

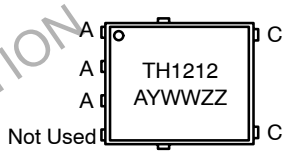
Mechanical Characteristics:

- 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



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.

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August, 2024 − Rev. 2
Publication Order Number:
NTS12120MFS/D

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°C)	$I_{F(AV)}$	12	A
Peak Repetitive Forward Current, (Rated V_R, Square Wave, 20 kHz, T_C = 136°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	°C
Operating Junction Temperature	T_J	−55 to +150	°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^2 1 oz. copper bond pad, on a FR4 board)	$R_{\theta JC}$	2.0	–	°C/W

ELECTRICAL CHARACTERISTICS

Rating	Symbol	Typ	Max	Unit
Instantaneous Forward Voltage (Note 1)	V_F			V
(I_F = 6 A, T_J = 25°C)		0.587	–	
(I_F = 12 A, T_J = 25°C)		0.63	0.83	
(I_F = 6 A, T_J = 125°C)		0.510	–	
(I_F = 12 A, T_J = 125°C)		0.587	0.68	
Instantaneous Reverse Current (Note 1)	I_R			
(V_R = 90 V, T_J = 25°C)		3.4	–	μA
(Rated dc Voltage, T_J = 25°C)		14.5	75	μA
(V_R = 90 V, T_J = 125°C)		3.5	–	mA
(Rated dc Voltage, T_J = 125°C)		9.2	40	mA

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

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TYPICAL CHARACTERISTICS

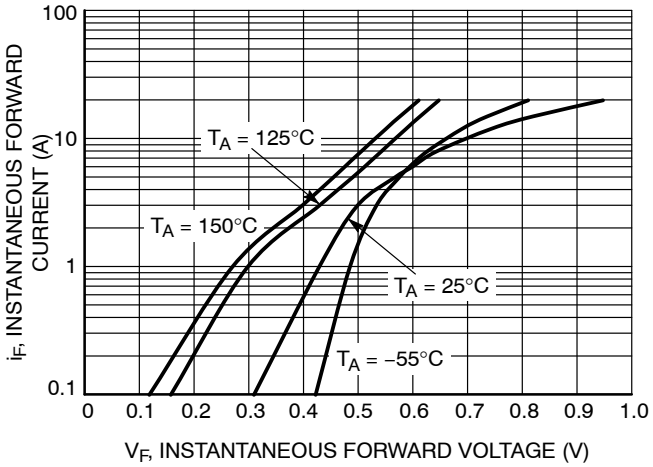

Figure 1. Typical Instantaneous Forward Characteristics

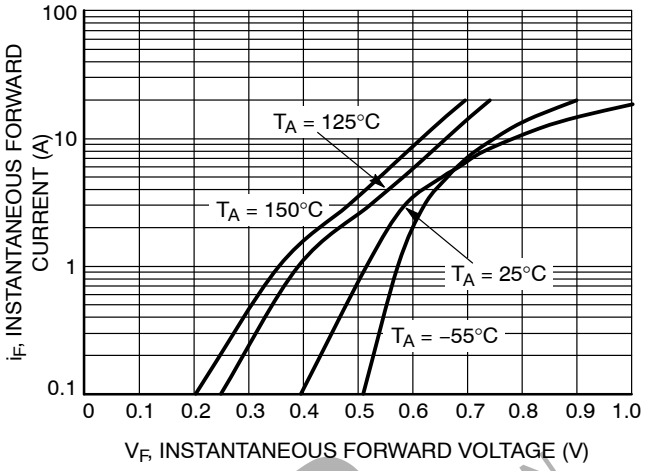

Figure 2. Maximum Instantaneous Forward Characteristics

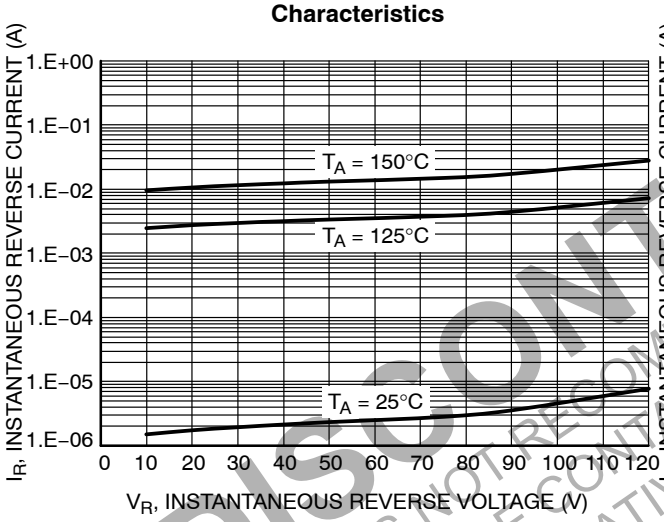

Figure 3. Typical Reverse Characteristics

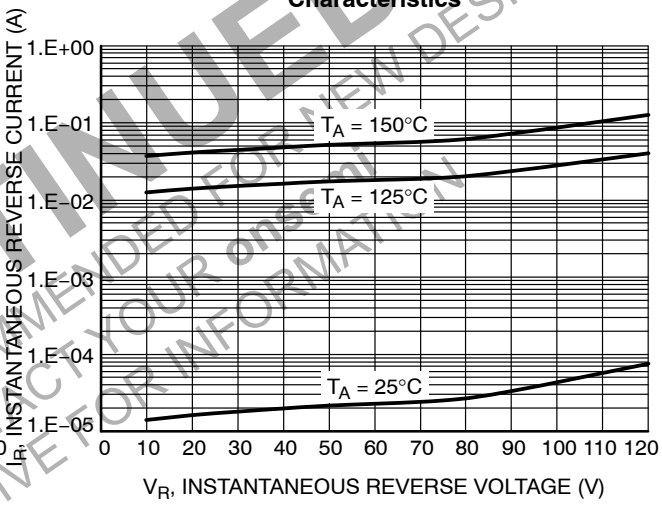

Figure 4. Maximum Reverse Characteristics

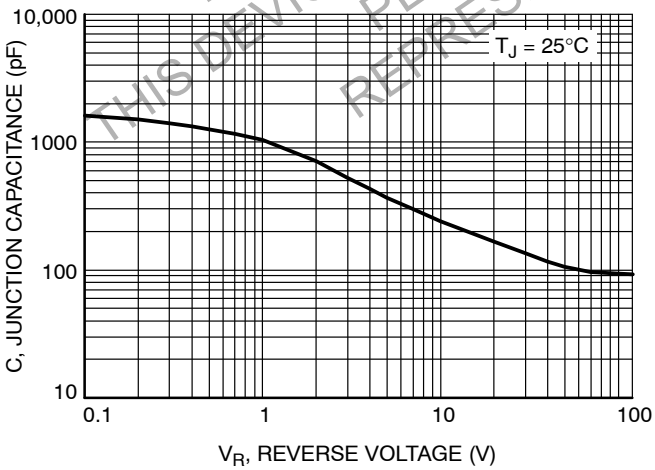

Figure 5. Typical Junction Capacitance

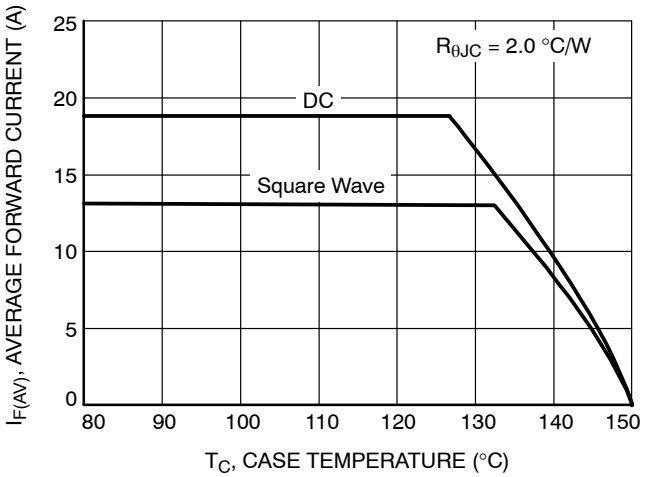

Figure 6. Current Derating

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TYPICAL CHARACTERISTICS

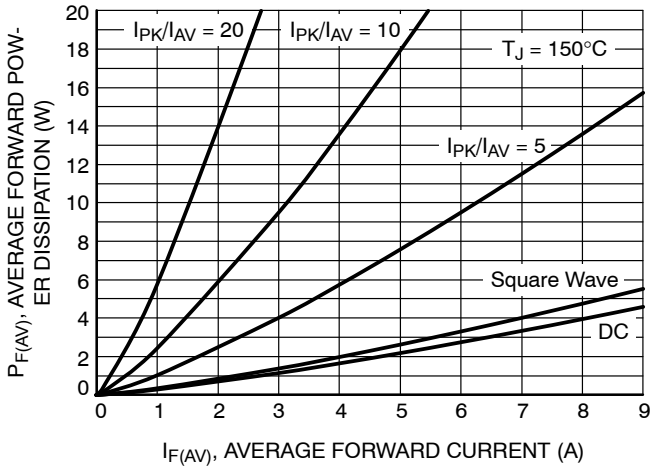

Figure 7. Forward Power Dissipation

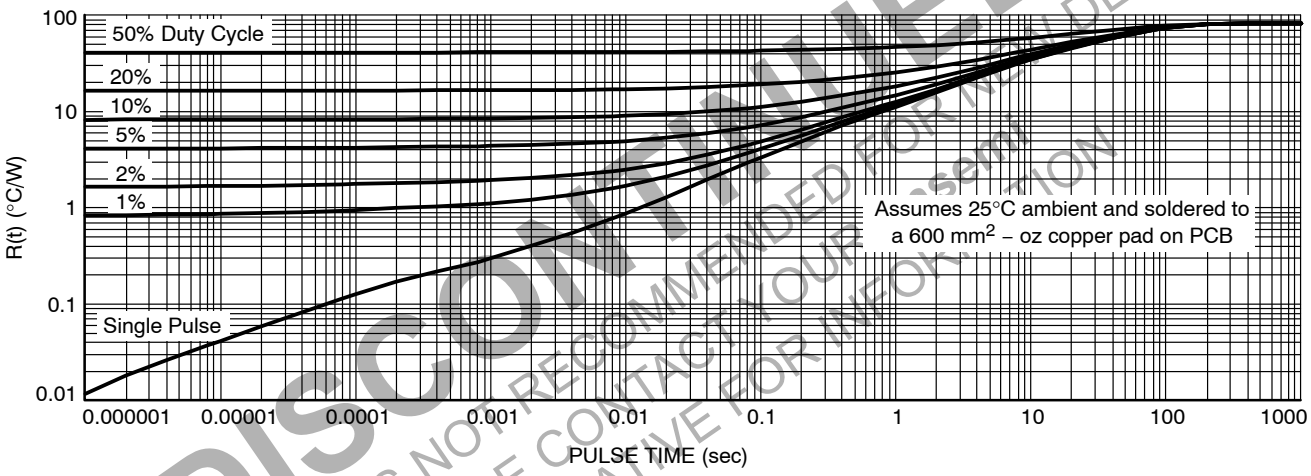

Figure 8. Thermal Characteristics

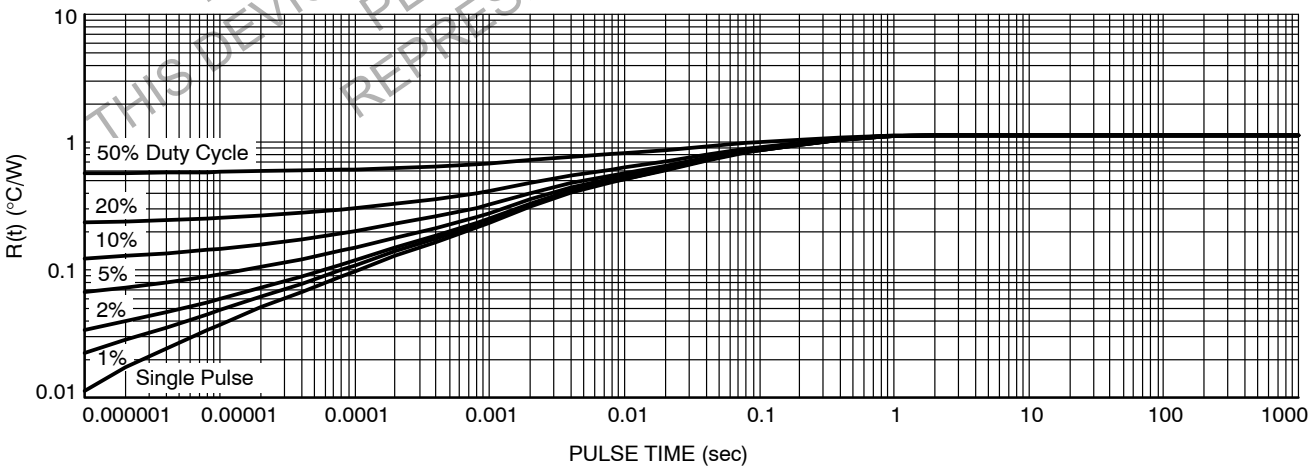

Figure 9. Typical Transient Thermal Response Characteristics, Junction−to−Case

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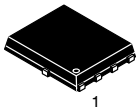
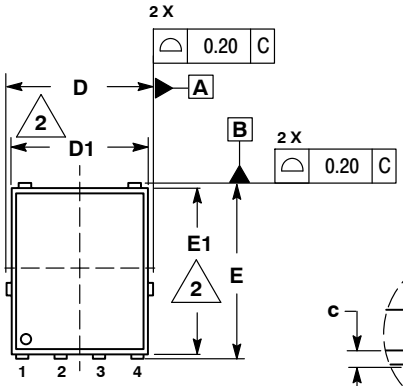


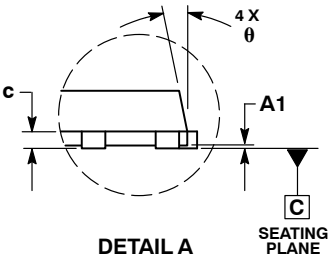
SCALE 2:1

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

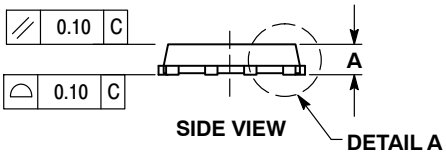
DATE 25 JUN 2018



TOP VIEW



DETAIL A

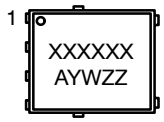


SIDE VIEW

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.

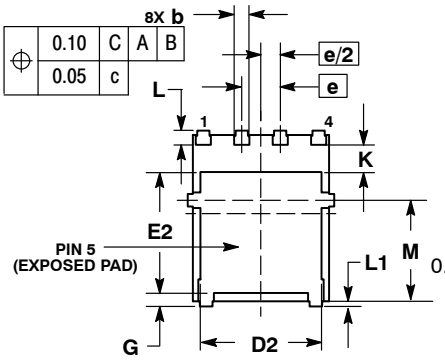
DIM	MILLIMETERS MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	–––	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
K	1.20	1.35	1.50
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ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

GENERIC MARKING DIAGRAM*



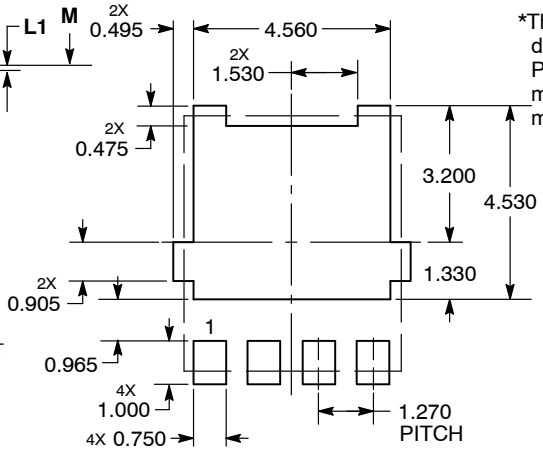
XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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.



BOTTOM VIEW

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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