

# NTSV20H120ECT

## Low Leakage Trench-based Schottky Rectifier

### Exceptionally Low Leakage



ON Semiconductor®

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#### Features

- Fine Lithography Trench-based Schottky Technology for Low Forward Voltage and Very 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
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

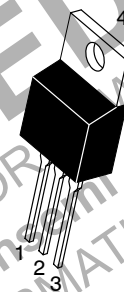
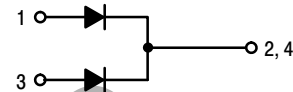
#### Typical Applications

- 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
- Instrumentation

#### Mechanical Characteristics

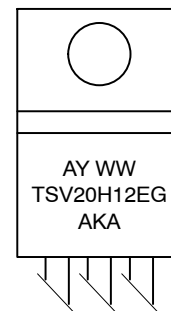
- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94-0 @ 0.125 in
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Maximum for 10 sec

#### PIN CONNECTIONS



TO-220AB  
CASE 221A  
STYLE 6

#### MARKING DIAGRAM



TSV20H12EG = Specific Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
AKA = Polarity Designator  
G = Pb-Free Package

#### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# NTSV20H120ECT

## MAXIMUM RATINGS

| Rating                                                                                                                                                                | Symbol                                 | Value       | Unit             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                                                                                | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$        | 120         | V                |
| Average Rectified Forward Current<br>(Rated $V_R$ , $T_C = 124^\circ\text{C}$ )<br>(Rated $V_R$ , $T_C = 139^\circ\text{C}$ )                                         | $I_{F(AV)}$<br>Per device<br>Per diode | 20<br>10    | A                |
| Peak Repetitive Forward Current<br>(Rated $V_R$ , Square Wave, 20 kHz, $T_C = 122^\circ\text{C}$ )<br>(Rated $V_R$ , Square Wave, 20 kHz, $T_C = 137^\circ\text{C}$ ) | $I_{FRM}$<br>Per device<br>Per diode   | 40<br>20    | A                |
| Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz)                                                            | $I_{FSM}$                              | 125         | A                |
| Operating Junction Temperature                                                                                                                                        | $T_J$                                  | -40 to +175 | $^\circ\text{C}$ |
| Storage Temperature                                                                                                                                                   | $T_{stg}$                              | -40 to +175 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## THERMAL CHARACTERISTICS

| Rating                                                                | Symbol                             | Value     | Unit                                     |
|-----------------------------------------------------------------------|------------------------------------|-----------|------------------------------------------|
| Typical Thermal Resistance<br>Junction-to-Case<br>Junction-to-Ambient | $R_{\theta JC}$<br>$R_{\theta JA}$ | 1.7<br>50 | $^\circ\text{C/W}$<br>$^\circ\text{C/W}$ |

## ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

| Rating                                                                                                                                                                                                                                                                     | Symbol | Typ                                 | Max                       | Unit                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------------|---------------------------|------------------------------------------------|
| Maximum Instantaneous Forward Voltage (Note 1)<br>( $I_F = 5\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $I_F = 10\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br><br>( $I_F = 5\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $I_F = 10\text{ A}$ , $T_J = 125^\circ\text{C}$ ) | $V_F$  | 0.692<br>0.89<br><br>0.564<br>0.652 | -<br>1.0<br><br>-<br>0.71 | V                                              |
| Maximum Instantaneous Reverse Current (Note 1)<br>( $V_R = 90\text{ V}$ , $T_J = 25^\circ\text{C}$ )<br>( $V_R = 90\text{ V}$ , $T_J = 125^\circ\text{C}$ )<br><br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )         | $I_R$  | 0.89<br>1.5<br><br>2.0<br>2.4       | -<br>-<br><br>25<br>12    | $\mu\text{A}$<br>mA<br><br>$\mu\text{A}$<br>mA |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

## ORDERING INFORMATION

| Device         | Package               | Shipping        |
|----------------|-----------------------|-----------------|
| NTSV20H120ECTG | TO-220AB<br>(Pb-Free) | 50 Units / Rail |

TYPICAL CHARACTERISTICS

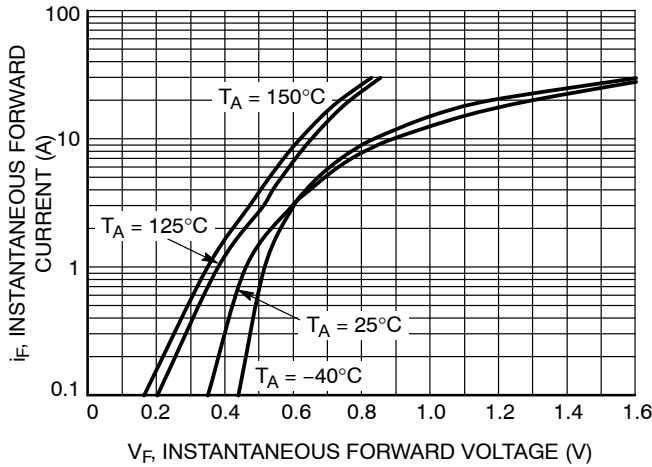


Figure 1. Typical Instantaneous Forward Characteristics

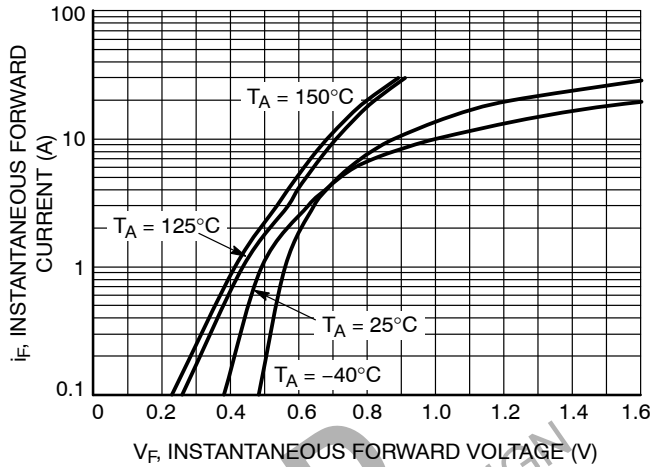


Figure 2. Maximum Instantaneous Forward Characteristics

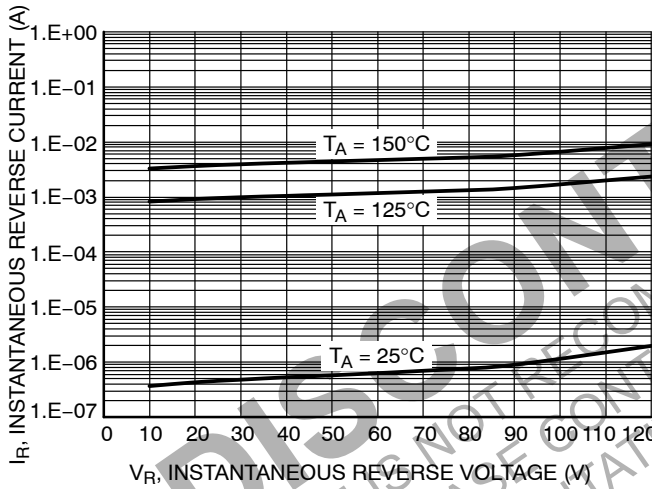


Figure 3. Typical Reverse Characteristics

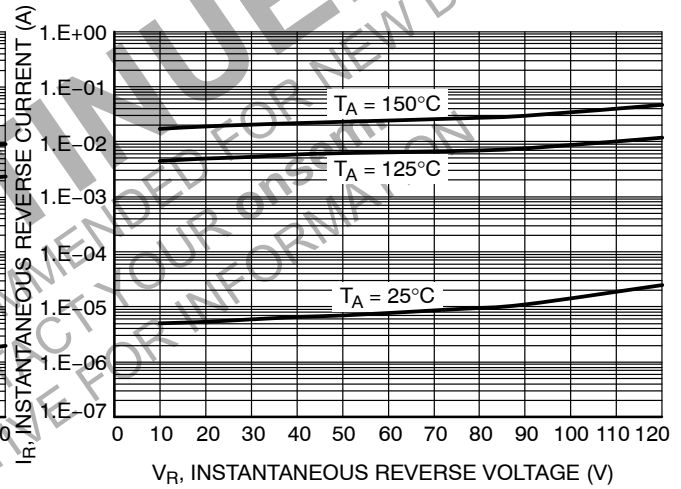


Figure 4. Maximum Reverse Characteristics

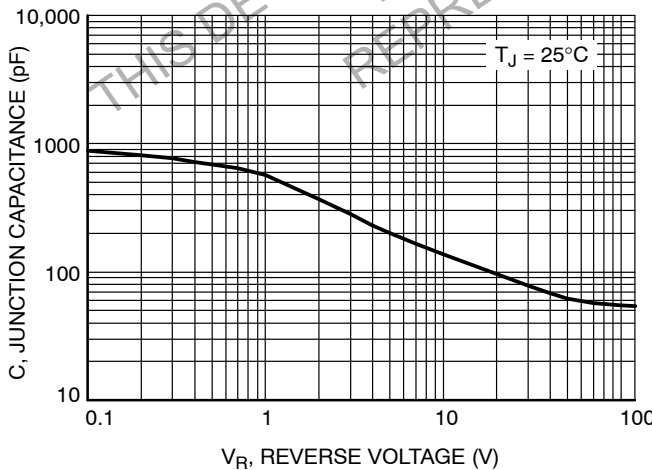


Figure 5. Typical Junction Capacitance

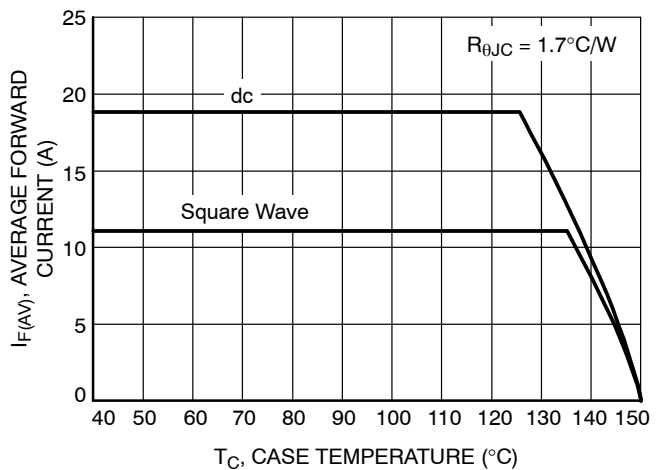


Figure 6. Current Derating per Leg

# NTSV20H120ECT

## TYPICAL CHARACTERISTICS

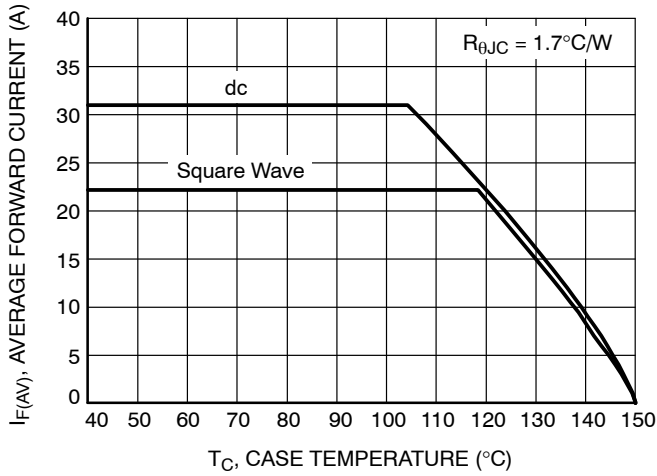


Figure 7. Current Derating, Device

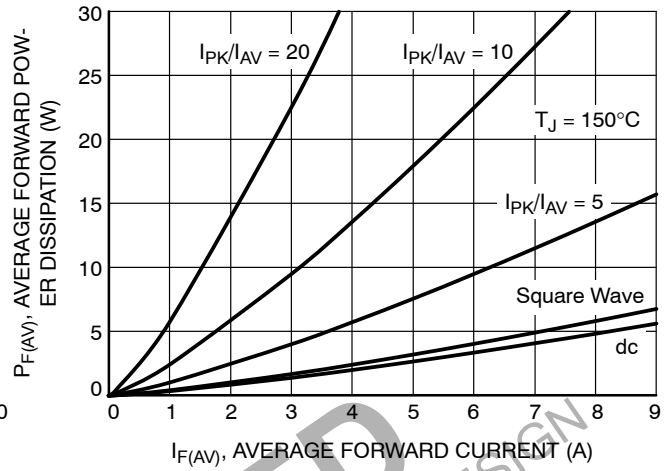


Figure 8. Forward Power Dissipation

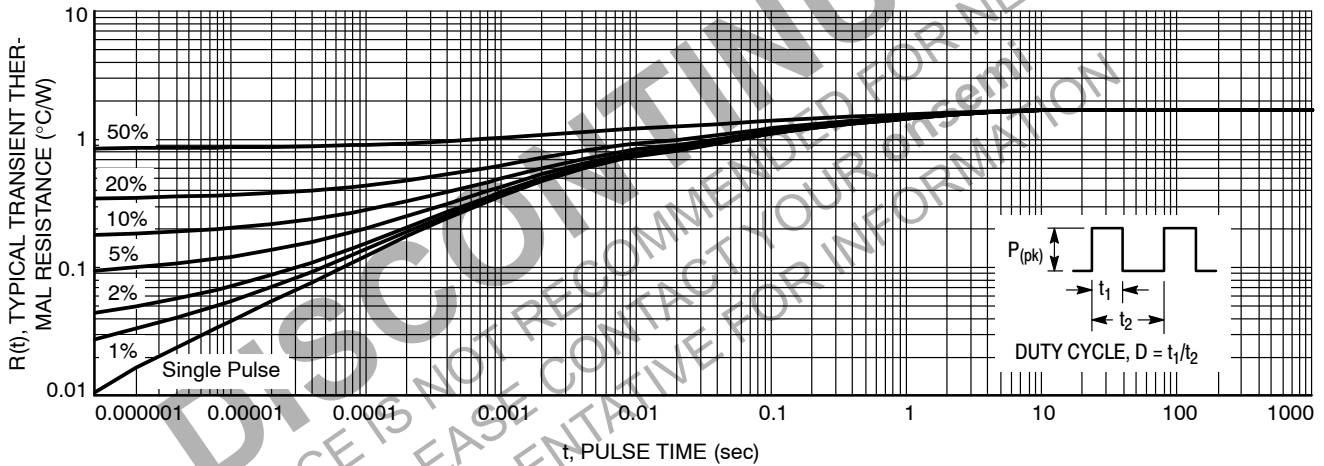
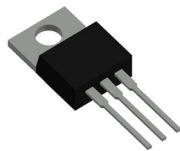


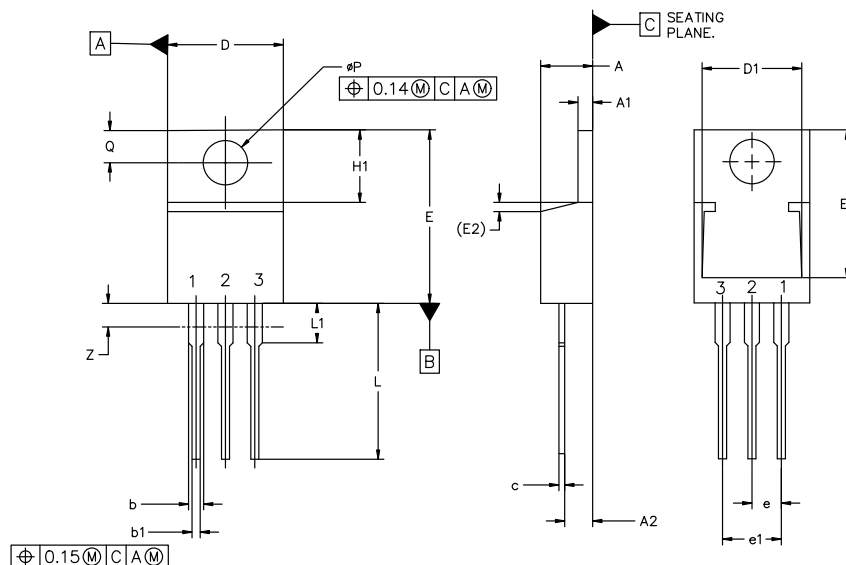
Figure 9. Typical Transient Thermal Response



TO-220-3 10.10x15.12x4.45, 2.54P

CASE 221A  
ISSUE AL

DATE 05 FEB 2025



| MILLIMETERS |          |       |       |
|-------------|----------|-------|-------|
| DIM         | MIN      | NOM   | MAX   |
| A           | 4.07     | 4.45  | 4.83  |
| A1          | 1.15     | 1.28  | 1.41  |
| A2          | 2.04     | 2.42  | 2.79  |
| b           | 1.15     | 1.34  | 1.52  |
| b1          | 0.64     | 0.80  | 0.96  |
| c           | 0.36     | 0.49  | 0.61  |
| D           | 9.66     | 10.10 | 10.53 |
| D1          | 8.43     | 8.63  | 8.83  |
| E           | 14.48    | 15.12 | 15.75 |
| E1          | 12.58    | 12.78 | 12.98 |
| E2          | 1.27 REF |       |       |

| MILLIMETERS |       |       |       |
|-------------|-------|-------|-------|
| DIM         | MIN   | NOM   | MAX   |
| e           | 2.42  | 2.54  | 2.66  |
| e1          | 4.83  | 5.08  | 5.33  |
| H1          | 5.97  | 6.22  | 6.47  |
| L           | 12.70 | 13.49 | 14.27 |
| L1          | 2.80  | 3.45  | 4.10  |
| Q           | 2.54  | 2.79  | 3.04  |
| φP          | 3.60  | 3.85  | 4.09  |
| Z           | ---   | ---   | 3.48  |

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 2:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR  
4. EMITTER

STYLE 3:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE

STYLE 4:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. MAIN TERMINAL 2

STYLE 5:  
PIN 1. GATE  
2. DRAIN  
3. SOURCE  
4. DRAIN

STYLE 6:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

STYLE 7:  
PIN 1. CATHODE  
2. ANODE  
3. CATHODE  
4. ANODE

STYLE 8:  
PIN 1. CATHODE  
2. ANODE  
3. EXTERNAL TRIP/DELAY  
4. ANODE

STYLE 9:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 10:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN  
4. SOURCE

STYLE 11:  
PIN 1. DRAIN  
2. SOURCE  
3. GATE  
4. SOURCE

STYLE 12:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. NOT CONNECTED

|                  |                                  |                                                                                                                                                                                  |
|------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | TO-220-3 10.10x15.12x4.45, 2.54P | PAGE 1 OF 1                                                                                                                                                                      |

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