

US1A THRU US1M

SURFACE MOUNT ULTRAFAST RECTIFIERS



VOLTAGE: 50~1000 Volts

CURRENT: 1.0 Amperes

SMA(DO-214AC)

Marking and Polarity

FEATURES

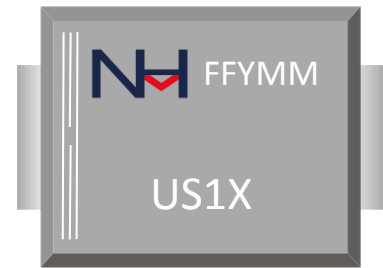
- The plastic package carries Underwriters Laboratory Flammability Classification 94V-0
- Idea for printed circuit board
- Glass passivated Junction chip
- Low reverse leakage
- High forward surge current capability
- High temperature soldering guaranteed 250°C/10 seconds at terminals

MECHANICAL DATA

- **Case:** Molded Plastic
- **Epoxy:** UL 94V-0 rate flame retardant
- **Polarity :** Polarity symbol marking on body
- **Mounting position:** Any
- **Weight:** App. 0.063 grams (0.0022 ounce)

TYPICAL APPLICATIONS

- For use in low voltage ,high frequency inverters ,DC/DC converters,LED driver, free wheeling ,and polarity protection applications



Remark:

- (1).NH=niuhang trademark;
- (2).FF=Production line,According to actual changes; YMM=Period code,According to actual changes;
- (3).US1X=Modle;X=A,B,D,G,J,K,M
- (4).White edge=Polarity mark

Maximum Ratings (Ratings at 25°C ambient temperature unless otherwise specified.)

| Parameter | Symbol | US 1A | US 1B | US 1D | US 1G | US 1J | US 1K | US 1M | Unit | |
|--|-------------|-------------|-------|-------|-------|-------|-------|-------|------|----|
| Maximum repetitive peak reverse voltage | V_{RRM} | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V | |
| Maximum RMS voltage | V_{RMS} | 35 | 70 | 140 | 280 | 420 | 560 | 700 | V | |
| Maximum DC blocking voltage | V_{DC} | 50 | 100 | 200 | 400 | 600 | 800 | 1000 | V | |
| Maximum average forward rectified current(see fig.1) | $I_{F(AV)}$ | 1.0 | | | | | | | A | |
| Peak forward surge current 8.3ms single half sine-wave superimposed on rated load (JEDEC method at rated TL) | I_{FSM} | 30 | | | | | | | A | |
| Maximum instantaneous forward voltage at 1.0 A (Note 1) | V_F | 1 | 1.4 | | 1.7 | | | | V | |
| Maximum instantaneous reversecurrent at rated DC blockingvoltage (Note 2) | I_{RRM} | 5 100 | | | | | | | uA | |
| Maximum Reverse Recovery Time (Note 3) | T_{RR} | 50 | | | | 75 | | | | nS |
| Typical junction capacitance (Note 4) | C_J | 15 | | | | | | | pF | |
| Operating junction and Storage temperature range | T_J | -55 to +150 | | | | | | | °C | |
| Storage temperature range | T_{STG} | -55 to +150 | | | | | | | | |

Thermal Characteristics (Ratings at 25°C ambient temperature unless otherwise specified)

| Parameter | Symbol | US1A THRU US1M | Unit |
|-------------------------------------|-----------------|----------------|------|
| Typical thermal resistance (Note 5) | $R_{\theta JA}$ | 50 | °C/W |
| | $R_{\theta JL}$ | 15 | |

Note: 1.Pulse test: 300 μs pulse width,1% duty cycle

2.Pulse test: pulse width≤40ms

3. Reverse Recovery Time test condition: IF=0.5A, IR=1.0A, IRR=0.25A

4.Measured at 1MHz and applied reverse voltage of 4.0V D.C.

5.Thermal resistance from junction to lead vertical P.C.B. mounted , 0.375"(9.5mm)lead length

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RATING AND CHARACTERISTIC CURVES

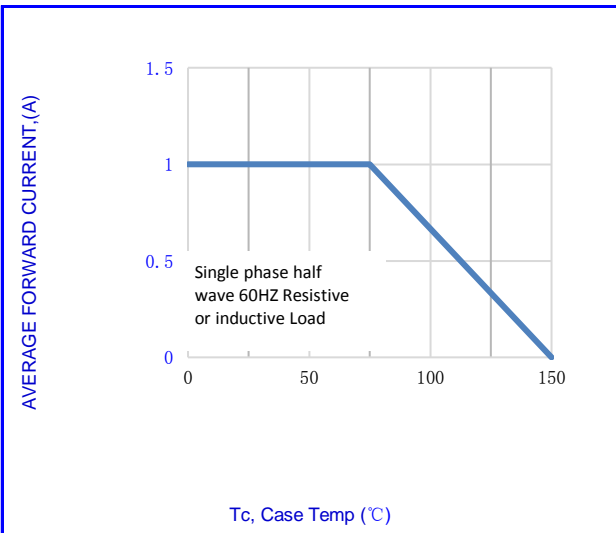


Fig.1-FORWARD CURRENT DERATING CURVE

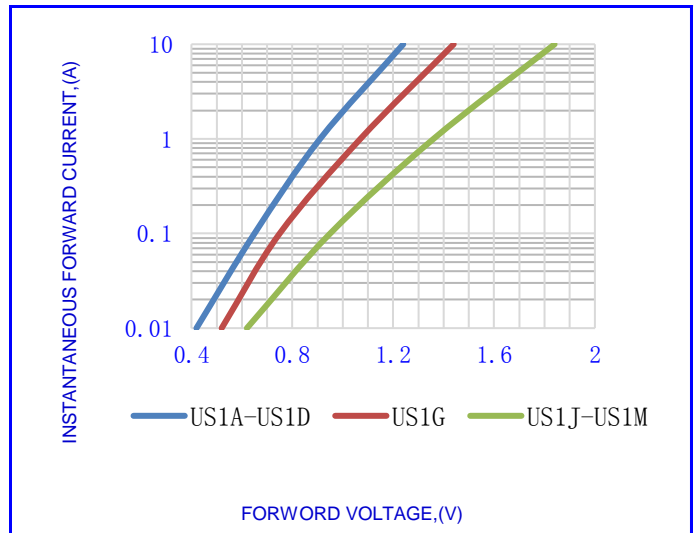


Fig.2- TYPICAL INSTANTANEOUS FORWARD

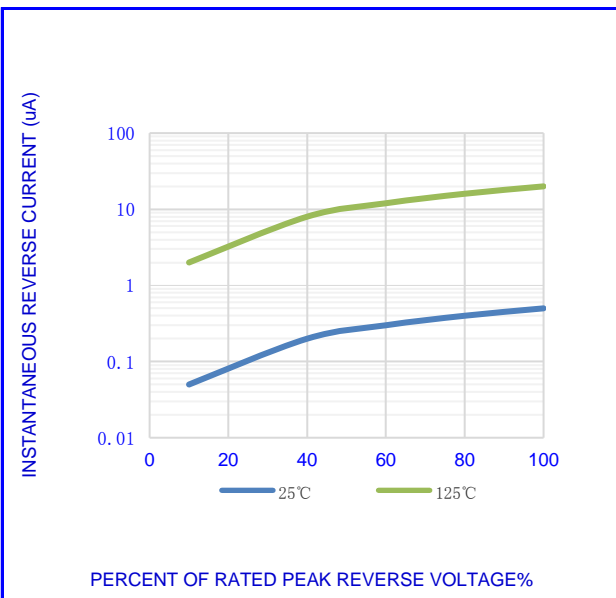


Fig.3- TYPICAL REVERSE CHARACTERISTICS

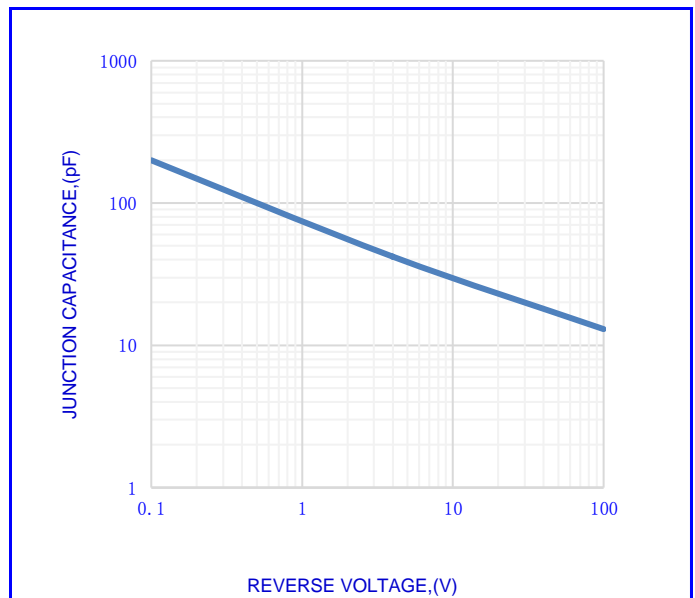


Fig.4- TYPICAL JUNCTION CAPACITANCE

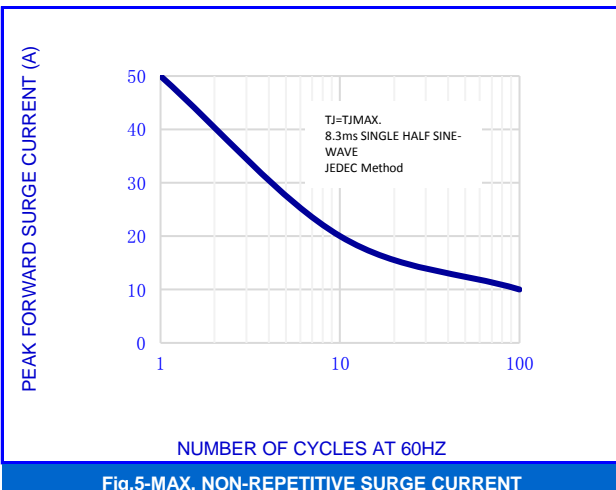


Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

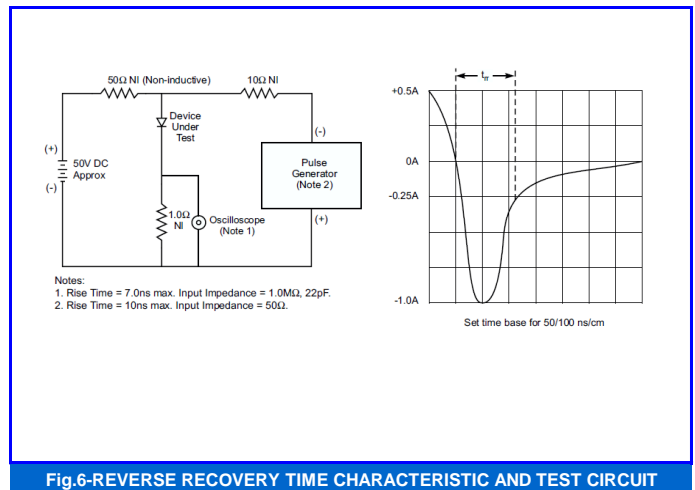


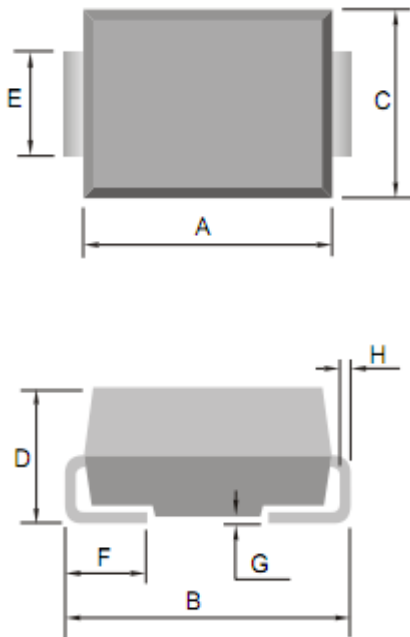
Fig.6-REVERSE RECOVERY TIME CHARACTERISTIC AND TEST CIRCUIT

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OUTLINE DRAWINGS

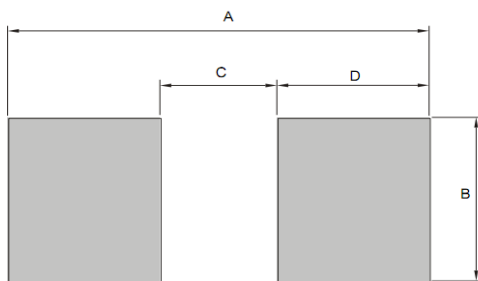
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| OUTLINE DIMENSIONS | | | | | | |
|--------------------|------------|------|-------|--------|------|-------|
| Dim. | Milimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.000 | - | 4.600 | 0.181 | - | 0.157 |
| B | 4.700 | - | 5.280 | 0.185 | - | 0.208 |
| C | 2.400 | - | 2.800 | 0.094 | - | 0.110 |
| D | 1.900 | - | 2.400 | 0.075 | - | 0.094 |
| E | 1.300 | - | 1.500 | 0.051 | - | 0.059 |
| F | 0.760 | - | 1.520 | 0.030 | - | 0.060 |
| G | 0.100 | - | 0.250 | 0.004 | - | 0.010 |
| H | 0.150 | - | 0.305 | 0.006 | - | 0.012 |

RECOMMENDED LAYOUT DRAWINGS

SMA(DO-214AC)



| RECOMMENDED MOUNTING PAD DIMENSIONS | | | | | | |
|-------------------------------------|------------|-------|------|--------|-------|------|
| Dim. | Milimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | - | 5.800 | - | - | 0.228 | - |
| B | - | 2.060 | - | - | 0.081 | - |
| C | - | 1.660 | - | - | 0.065 | - |
| D | - | 2.070 | - | - | 0.082 | - |

PACKING INFORMATION

SMA(DO-214AC)

| Package Method | Reel Size (mm) | Quantity (pcs/reel) | Inner Box Size | Quantity (pcs/Inner Box) | Carton Size LxWxH(mm) | Quantity (pcs/carton) |
|----------------|----------------|---------------------|----------------|--------------------------|-----------------------|-----------------------|
| Tape Reel | Φ330 | 5000 | 340x340x45 | 10000 | 360x360x470 | 100000 |

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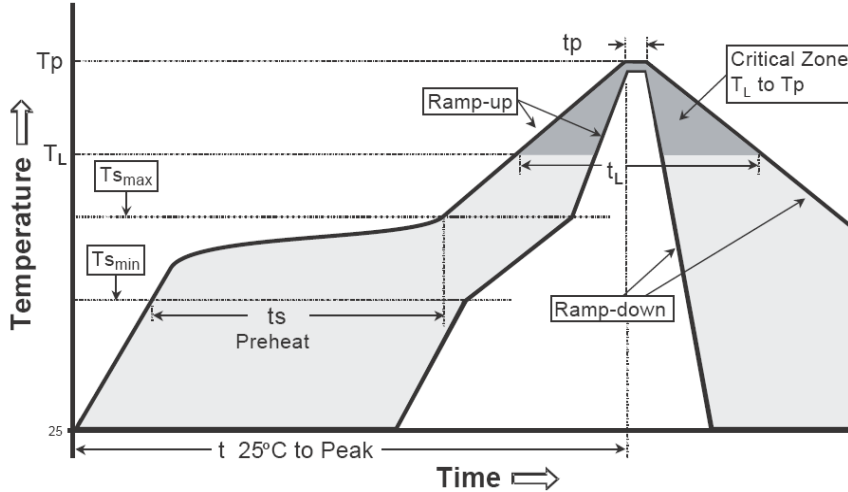
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Recommended wave soldering condition

| | | |
|-----------------|------------------|-----------------|
| Product | Peak Temperature | Soldering Time |
| Pb-free devices | 260 +0/-5 °C | 5 +1/-1 seconds |

Recommended temperature profile for IR reflow



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|--|----------------------------------|----------------------------------|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat -Temperature Min(TS min) -Temperature Max(TS max) -Time(ts min to ts max) | 100°C 150°C 60-120 seconds | 150°C 200°C 60-180 seconds |
| Time maintained above: -Temperature (TL) - Time (tL) | 183°C 60-150 seconds | 217°C 60-150 seconds |
| Peak Temperature(TP) | 240 +0/-5 °C | 260 +0/-5 °C |
| Time within 5°C of actual peak temperature(tp) | 10-30 seconds | 20-40 seconds |
| Ramp down rate | 6°C/second max. | 6°C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |

Note : All temperatures refer to topside of the package, measured on the package body surface.

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