

ES2K

Super Fast Recovery Rectifiers



Voltage: 800 Volts

Current: 2 A

Package: SMA

Features

- NH'S Super Fast Recovery Rectifiers Chip Technology
- Low Switching Loss For High Efficiency
- Low Leakage Current For High Reliability
- Super Fast Switching Speed

Mechanical Data

- **Case:** Molded With UL-94 ClassV-0 Recognized, RoHS-Compliant
- **Polarity:** Look At The Diagram And Polarity On The Right
- **Terminals:** Tin Plated Leads,Solderable Per J-STD-002 And JESD22-B102

Typical Applications

- Switch Mode Power Supplies (SMPS)
- Fast Chargers
- LED Driver And Monitor Lighting
- Automotive Electronics And Charging Posts

Diagram:



Polarity:



Single Phase,Half Wave,60Hz,Resistive Or Inductive Load.For Capacitive Load,Derate Current By 20%

Maximum Ratings (Ta=25°C Unless Otherwise Specified)

| Parameter                                 | Test Conditions                                          | Symbol      | Ratings | Unit               |
|-------------------------------------------|----------------------------------------------------------|-------------|---------|--------------------|
| Maximum Repetitive Peak Reverse Voltage   |                                                          | $V_{RRM}$   | 800     | V                  |
| Maximum RMS Voltag                        |                                                          | $V_{RMS}$   | 560     | V                  |
| Maximum DC Blocking Voltage               |                                                          | $V_{DC}$    | 800     | V                  |
| Maximum Average Forward Rectified Current |                                                          | $I_{F(AV)}$ | 2       | A                  |
| Peak Forward Surge Current                | 8.3ms Single Half Sine-wave<br>Superimposed On Rate Load | $I_{FSM}$   | 50      | A                  |
| Current Squared Time                      | $t < 8.3ms$                                              | $I^2t$      | 10.4    | A <sup>2</sup> sec |

Electrical Characteristics (Ta=25°C Unless Otherwise Specified )

| Parameter                                               | Test Conditions             | Symbol    | Ratings |      |      | Unit |
|---------------------------------------------------------|-----------------------------|-----------|---------|------|------|------|
|                                                         |                             |           | Min.    | Typ. | Max. |      |
| Instaneous Forward Voltage Per Diode                    | IF=2A                       | $V_F$     | --      | 1.7  | 1.85 | V    |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | Ta=25°C ,VR=VRRM            | $I_{RRM}$ | --      | 1    | 5    | uA   |
|                                                         | Ta=125°C ,VR=VRRM*80%       |           | --      | 25   | 200  | uA   |
| Typical Junction Capacitance                            | 4 V,1MHz                    | $C_J$     | --      | 12   | --   | pF   |
| Maximum Reverse Recovery Time                           | IF=0.5A, IR=1.0A, IRR=0.25A | $T_{rr}$  | --      | 30   | 35   | nS   |

Thermal Characteristics (Ta=25°C Unless Otherwise Specified )

| Parameter                                                   | Test Conditions                                        | Symbol           | Ratings |    |     | Unit |
|-------------------------------------------------------------|--------------------------------------------------------|------------------|---------|----|-----|------|
| Operating Junction Temperature Range                        |                                                        | T <sub>J</sub>   | -55     | to | 150 | ℃    |
| Storage Temperature Range                                   |                                                        | T <sub>STD</sub> | -55     | to | 150 |      |
| Thermal Resistance Junction To Ambient<br>With Steady-State | Still Air Environment<br>With Ta=25℃                   | R <sub>θJA</sub> | 75      |    |     | ℃/W  |
| Thermal Resistance Junction-Case<br>With Steady-State       | Device Mounted On<br>1 in2 FR-4 Board With 2oz. Copper | R <sub>θJC</sub> | 20      |    |     |      |

Notes: 1.Pulse Test: 300 Us Pulse Width,1% Duty Cycle

ES2K

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### Typical Characteristics Curves

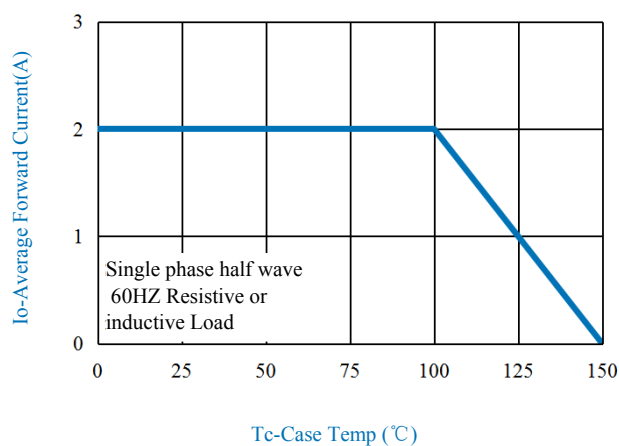


Fig.1-Forward Current Derating Curve

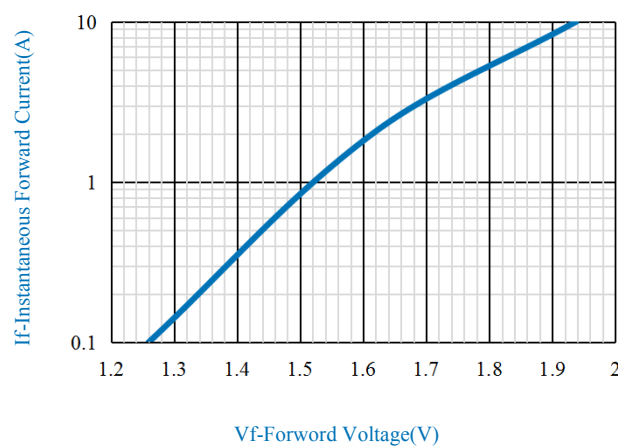


Fig.2-Typical Instantaneous Forward

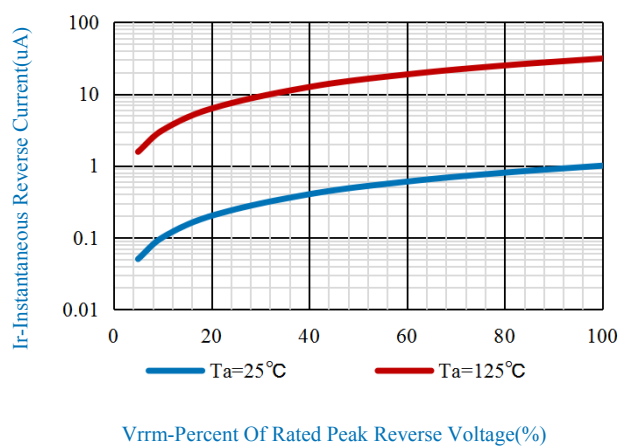


Fig.3-Typical Reverse Characteristics

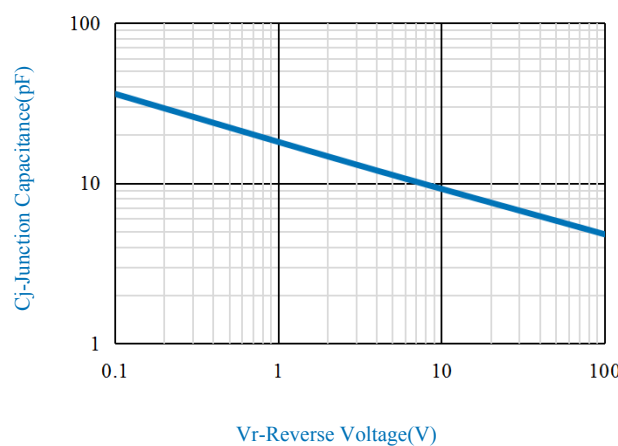


Fig.4-Typical Junction Capacitance

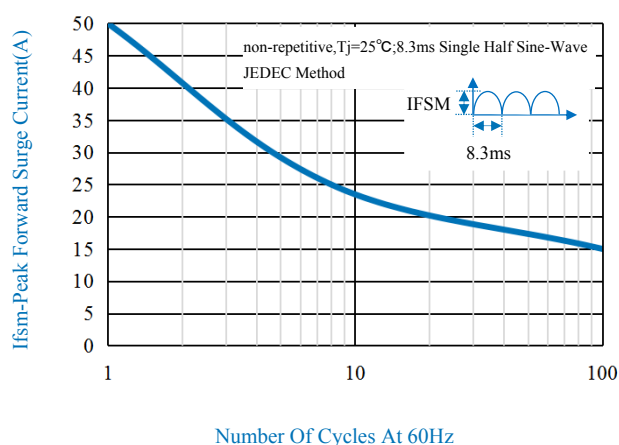


Fig.5-Max. Non-Repetitive Surge Current

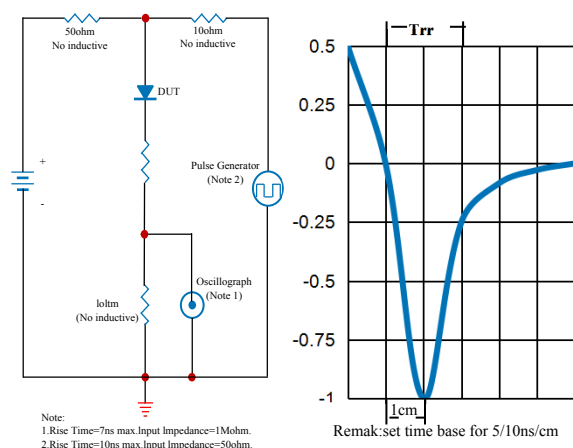


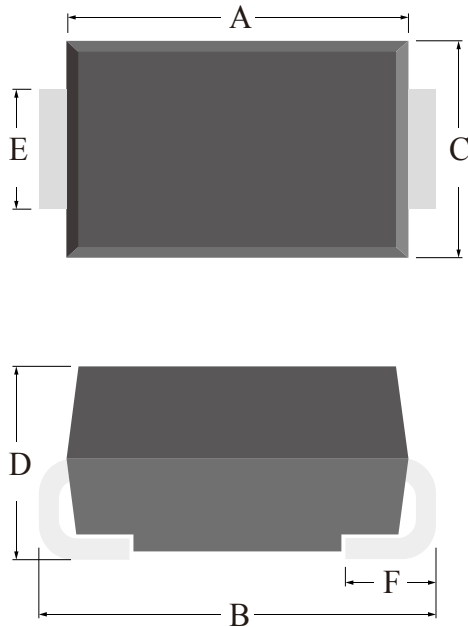
Fig.6-Reverse Recovery Time Characteristic And Test Circuit

ES2K

Super Fast Recovery Rectifiers



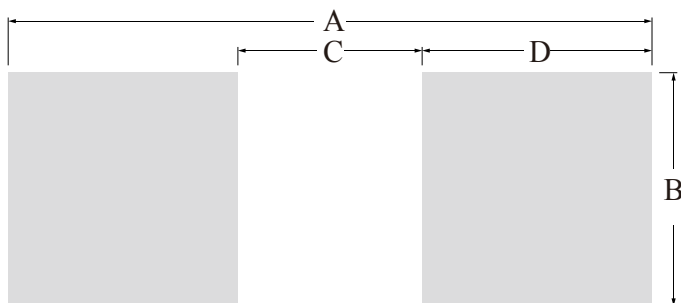
## OUTLINE DRAWINGS



## SMA

| OUTLINE DIMENSIONS |            |      |      |        |      |        |
|--------------------|------------|------|------|--------|------|--------|
| Dim.               | Milimeters |      |      | Inches |      |        |
|                    | Min.       | Typ. | Max. | Min.   | Typ. | Max.   |
| A                  | 4.00       | -    | 4.60 | 0.1575 | -    | 1.8110 |
| B                  | 4.70       | -    | 5.28 | 1.8504 | -    | 2.0787 |
| C                  | 2.40       | -    | 2.85 | 0.9449 | -    | 1.1220 |
| D                  | 1.90       | -    | 2.58 | 0.7480 | -    | 1.0157 |
| E                  | 1.30       | -    | 1.60 | 0.5118 | -    | 0.6299 |
| F                  | 0.76       | -    | 1.52 | 0.2992 | -    | 0.5984 |

## RECOMMEDND LAYOUT DRAWINGS



## SMA

| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 5.80 | -    | -      | 2.2835 | -    |
| B                  | -          | 2.06 | -    | -      | 0.8110 | -    |
| C                  | -          | 1.66 | -    | -      | 0.6535 | -    |
| D                  | -          | 2.07 | -    | -      | 0.8150 | -    |

ES2K

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MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark

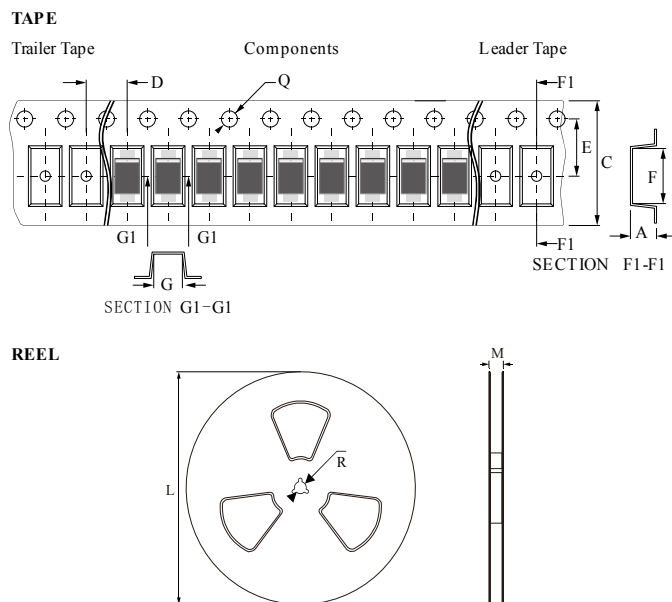
FF=Product Line Code,According To Actual Changes

YWW=Date Code,According To Actual Changes

ES2K=Model

White band denotes cathode

PACKAGING



SMA

| OUTLINE DIMENSIONS |            |      |        |        |      |        |
|--------------------|------------|------|--------|--------|------|--------|
| Dim.               | Milimeters |      |        | Inches |      |        |
|                    | Min.       | Typ. | Max.   | Min.   | Typ. | Max.   |
| TAPE               |            |      |        |        |      |        |
| A                  | 2.45       | -    | 2.65   | 0.0965 | -    | 0.1043 |
| C                  | 11.70      | -    | 12.30  | 0.4606 | -    | 0.4843 |
| D                  | 3.80       | -    | 4.20   | 0.1496 | -    | 0.1654 |
| E                  | 5.30       | -    | 5.70   | 0.2087 | -    | 0.2244 |
| F                  | 5.13       | -    | 5.53   | 0.2020 | -    | 0.2177 |
| G                  | 2.69       | -    | 2.89   | 0.1059 | -    | 0.1138 |
| Q Φ                | 1.40       | -    | 1.60   | 0.0551 | -    | 0.0630 |
| REEL               |            |      |        |        |      |        |
| L                  | 328.00     | -    | 332.00 | 12.913 | -    | 13.071 |
| R                  | 12.00      | -    | 14.00  | 0.4724 | -    | 0.5512 |
| M                  | 15.00      | -    | 17.00  | 0.5906 | -    | 0.6693 |

PACKING INFORMATION

| Package Type | Package Code | Product Weight Approx(g/Pcs) | Package Method | Quantity (Pcs/Min. Pack.) | Quantity (Pcs/Inner Box) | Quantity (Pcs/Carton) |
|--------------|--------------|------------------------------|----------------|---------------------------|--------------------------|-----------------------|
| SMA          | P1           | 0.063                        | 13" Reel       | 5000                      | 10000                    | 80000                 |
| SMA          | P2           | 0.063                        | 13" Reel       | 5000                      | 10000                    | 100000                |

ES2K

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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 (T <sub>smax</sub> to T <sub>p</sub> )                                                      | 3°C/second max.                  | 3°C/second max.                  |
|  | Preheat-Temperature Min (T <sub>S</sub> min)<br>-Temperature Max (T <sub>S</sub> max)<br>-Time(ts min to ts max) | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-180 seconds |
|  | Time maintained above:<br>-Temperature (T <sub>L</sub> )<br>- Time (t <sub>L</sub> )                             | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
|  | Peak Temperature(T <sub>P</sub> )                                                                                | 240 +0/-5 °C                     | 260 +0/-5 °C                     |
|  | Time within 5°C of actual peak temperature (t <sub>p</sub> )                                                     | 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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ES2K

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Specification Revision History

| Rev.        | Date       | Changed Items | Pre-Changed Content | Changed Content |
|-------------|------------|---------------|---------------------|-----------------|
| A/1         | 2014-10-20 | First Issue   |                     |                 |
| Blank Below |            |               |                     |                 |