

**MB24S THRU MB220S**  
Schottky Barrier Bridge Rectifiers



|                 |              |                 |           |                 |     |
|-----------------|--------------|-----------------|-----------|-----------------|-----|
| <b>Voltage:</b> | 40~200 Volts | <b>Current:</b> | 2 Amperes | <b>Package:</b> | MBS |
|-----------------|--------------|-----------------|-----------|-----------------|-----|

**Features**

- NH'S Plane Schottky Barrier Chip Technology
- Low Forward Voltage Drop For High Efficiency
- Low Power Loss For High Reliability
- High Frequency Switching Speed

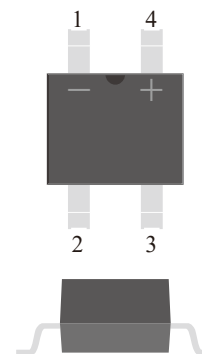
**Mechanical Data**

- **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

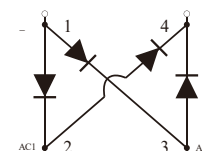
**Typical Applications**

- 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      | MB 24S | MB 245S | MB 26S | MB 28S | MB 210S | MB 215S | MB 220S | Unit               |
|-------------------------------------------|-------------------------------------------------------|-------------|--------|---------|--------|--------|---------|---------|---------|--------------------|
| Maximum Repetitive Peak Reverse Voltage   |                                                       | $V_{RRM}$   | 40     | 45      | 60     | 80     | 100     | 150     | 200     | V                  |
| Maximum RMS Voltag                        |                                                       | $V_{RMS}$   | 28     | 32      | 42     | 56     | 70      | 105     | 140     | V                  |
| Maximum DC Blocking Voltage               |                                                       | $V_{DC}$    | 40     | 45      | 60     | 80     | 100     | 150     | 200     | V                  |
| Maximum Average Forward Rectified Current |                                                       | $I_{F(AV)}$ | 2      |         |        |        |         |         |         | A                  |
| Peak Forward Surge Current Per Diode      | 8.3ms Single Half Sine-wave Superimposed On Rate Load | $I_{FSM}$   | 50     |         |        |        |         |         |         | A                  |
| Current Squared Time Per Diode            | $t < 8.3ms$                                           | $I^2t$      | 10.4   |         |        |        |         |         |         | A <sup>2</sup> sec |

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

| Parameter                                               | Test Conditions                                                | Symbol    | MB 24S | MB 245S | MB 26S | MB 28S | MB 210S | MB 215S | MB 220S | Unit |
|---------------------------------------------------------|----------------------------------------------------------------|-----------|--------|---------|--------|--------|---------|---------|---------|------|
| Instanteous Forward Voltage Per Diode                   | $I_F = 2.0 A$                                                  | $V_F$     | 0.55   |         | 0.70   | 0.85   |         | 0.90    |         | V    |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | Ta=25°C , $V_R = V_{RRM}$<br>Ta=110°C , $V_R = V_{RRM} * 80\%$ | $I_{RRM}$ | 100    |         | 80     | 50     |         | 10      |         | uA   |
|                                                         |                                                                |           | 10     |         | 8      | 5      |         | 3       |         | mA   |
| Typical Junction Capacitance Per Diode                  | 4 V,1MHz                                                       | $C_J$     | 100    |         | 90     | 80     |         | 50      |         | pF   |

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

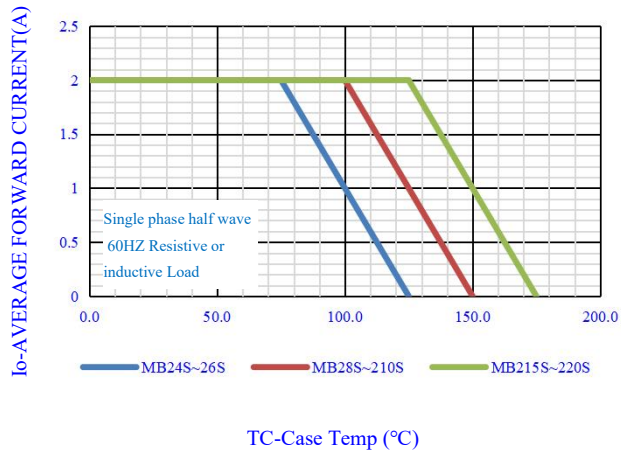
| Parameter                                                | Test Conditions                                     | Symbol           | MB 24S  | MB 245S | MB 26S | MB 28S  | MB 210S | MB 215S | MB 220S | Unit |     |
|----------------------------------------------------------|-----------------------------------------------------|------------------|---------|---------|--------|---------|---------|---------|---------|------|-----|
| Operating Junction Temperature Range                     |                                                     | T <sub>J</sub>   | -55~125 |         |        | -55~150 |         | -55~175 |         | ℃    |     |
| Storage Temperature Range                                |                                                     | T <sub>STD</sub> | -55~125 |         |        | -55~150 |         | -55~175 |         |      |     |
| Thermal Resistance Junction To Ambient With Steady-State | Still Air Environment With Ta=25℃                   | R <sub>θJA</sub> | 75.0    |         |        |         |         |         |         |      | ℃/W |
| Thermal Resistance Junction-Case With Steady-State       | Device Mounted On 1 in2 FR-4 Board With 2oz. Copper | R <sub>θJC</sub> | 20.0    |         |        |         |         |         |         |      |     |

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

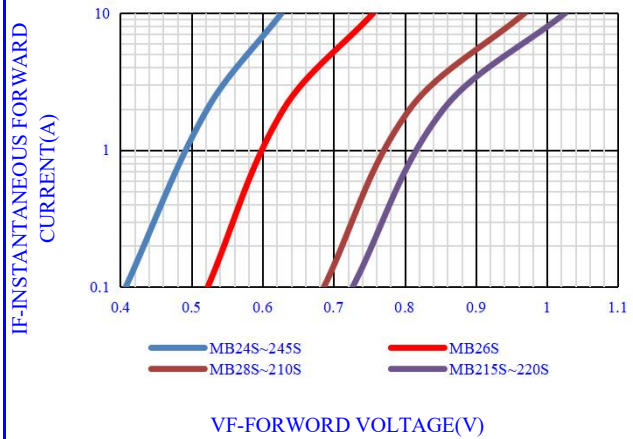
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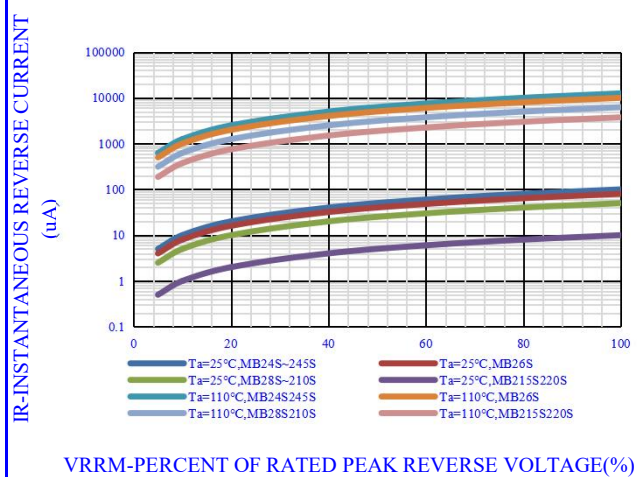
**Typical Characteristics Curves**



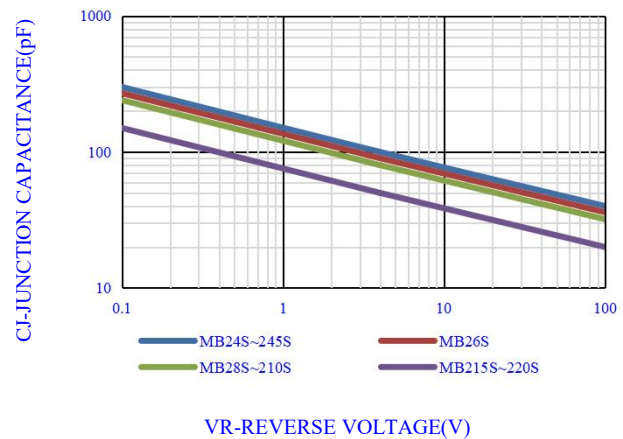
**Fig.1-FORWARD CURRENT DERATING CURVE**



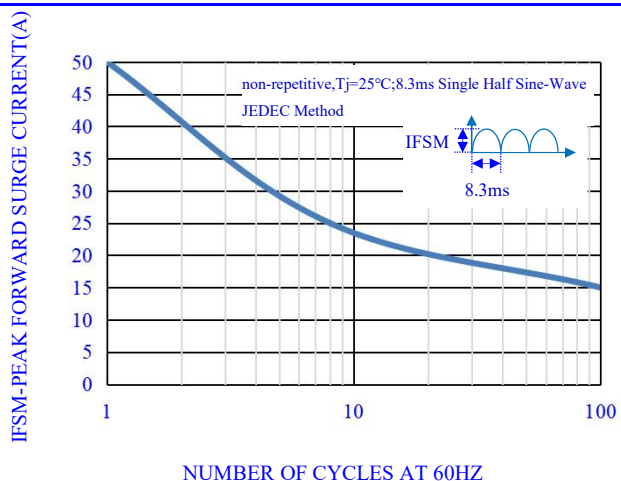
**Fig.2- TYPICAL INSTANTANEOUS FORWARD**



**Fig.3- TYPICAL REVERSE CHARACTERISTICS**



**Fig.4- TYPICAL JUNCTION CAPACITANCE**

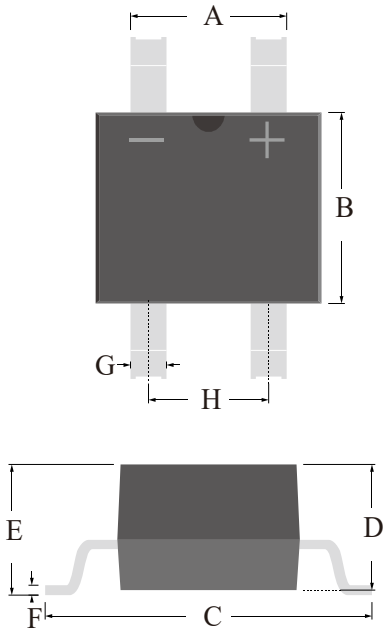


**Fig.5-MAX. NON-REPETITIVE SURGE CURRENT**

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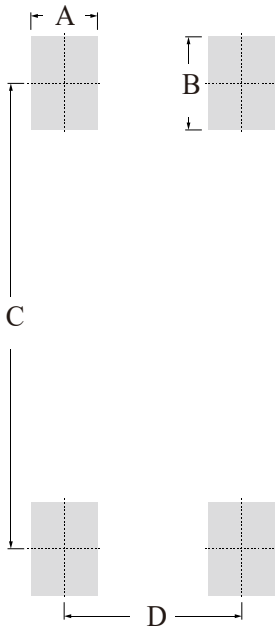
OUTLINE DRAWINGS



MBS

| OUTLINE DIMENSIONS |            |      |      |        |      |        |
|--------------------|------------|------|------|--------|------|--------|
| Dim.               | Milimeters |      |      | Inches |      |        |
|                    | Min.       | Typ. | Max. | Min.   | Typ. | Max.   |
| A                  | 4.50       | -    | 4.90 | 0.1772 | -    | 0.1929 |
| B                  | 3.60       | -    | 4.00 | 0.1417 | -    | 0.1575 |
| C                  | 6.60       | -    | 7.00 | 0.2598 | -    | 0.2756 |
| D                  | 2.30       | -    | 2.70 | 0.0906 | -    | 0.1063 |
| E                  | -          | -    | 2.90 | -      | -    | 0.1142 |
| F                  | 0.15       | -    | 0.35 | 0.0059 | -    | 0.0138 |
| G                  | 0.45       | -    | 1.05 | 0.0177 | -    | 0.0413 |
| H                  | 2.20       | -    | 2.80 | 0.0866 | -    | 0.1102 |

RECOMMEDND LAYOUT DRAWINGS



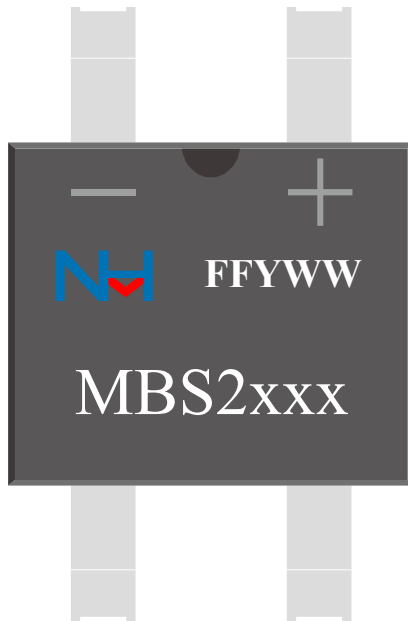
MBS

| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 0.90 | -    | -      | 0.0354 | -    |
| B                  | -          | 1.84 | -    | -      | 0.0724 | -    |
| C                  | -          | 6.00 | -    | -      | 0.2362 | -    |
| D                  | -          | 2.40 | -    | -      | 0.0945 | -    |

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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  
MBS2xxx=Model,4S,45S,6S,8S,100S,150S,200S  
+ -=Polarity Mark

**PACKING INFORMATION**

| Package Type | Package Code | Product Weight Approx(g/Pcs) | Package Method | Quantity (Pcs/Min. Pack.) | Quantity (Pcs/Inner Box) | Quantity (Pcs/Carton) |
|--------------|--------------|------------------------------|----------------|---------------------------|--------------------------|-----------------------|
| MBS          | P1           | 0.12                         | 13" Reel       | 3000                      | 6000                     | 30000                 |
| MBS          | P2           | 0.12                         | 13" Reel       | 3000                      | 6000                     | 60000                 |

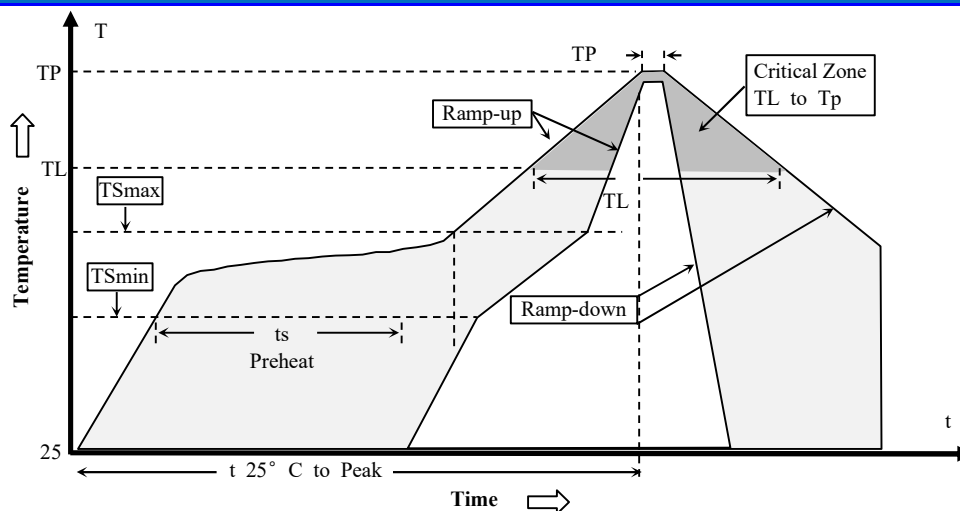
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**Recommended wave soldering condition**

| 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<br>-Temperature Min(TS min)<br>-Temperature Max(TS 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 (TL)<br>- Time (tL)                                 | 183°C<br>60-150 seconds          | 217°C<br>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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