

**MBR1040DCT THRU MBR10200DCT**

**Schottky Barrier Rectifiers**



**Voltage:** 40~200 Volts

**Current:** 10 Amperes

**Package:** TO-220AB

**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

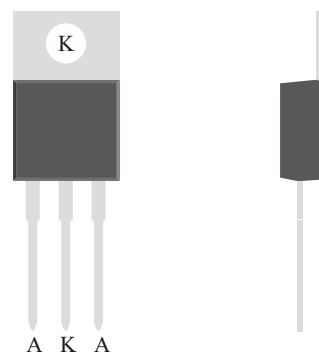
**Mechanical Data**

- **Case:** Molded With UL-94 Class V-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

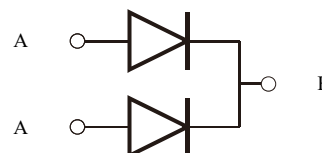
**Typical Applications**

- 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      | MBR10<br>40DCT | MBR10<br>45DCT | MBR10<br>60DCT | MBR10<br>80DCT | MBR10<br>100DCT | MBR10<br>150DCT | MBR10<br>200DCT | Unit               |
|-------------------------------------------|----------------------------------------------------------|-------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|--------------------|
| Maximum Repetitive Peak Reverse Voltage   |                                                          | $V_{RRM}$   | 40             | 45             | 60             | 80             | 100             | 150             | 200             | V                  |
| Maximum RMS Voltage                       |                                                          | $V_{RMS}$   | 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 | Per Diode<br>Total device                                | $I_{F(AV)}$ | 5<br>10        |                |                |                |                 |                 |                 | A                  |
| Peak Forward Surge Current Per Diode      | 8.3ms Single Half Sine-wave<br>Superimposed On Rate Load | $I_{FSM}$   | 120            |                |                |                |                 |                 |                 | A                  |
| Current Squared Time Per Diode            | $t < 8.3ms$                                              | $I^2t$      | 59.8           |                |                |                |                 |                 |                 | A <sup>2</sup> sec |
| Maximum Mounting Torque                   | M3 screw                                                 | $T_{MM}$    | 1.1            |                |                |                |                 |                 |                 | N.m                |

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

| Parameter                                               | Test Conditions                                              | Symbol    | MBR10<br>40DCT | MBR10<br>45DCT | MBR10<br>60DCT | MBR10<br>80DCT | MBR10<br>100DCT | MBR10<br>150DCT | MBR10<br>200DCT | Unit     |
|---------------------------------------------------------|--------------------------------------------------------------|-----------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|----------|
| Instantaneous Forward Voltage Per Diode                 | $I_F = 5.0 A$                                                | $V_F$     | 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<br>10      | 80<br>8        | 50<br>5        | 10<br>3        |                 |                 |                 | uA<br>mA |
| Typical Junction Capacitance Per Diode                  | 4 V, 1MHz                                                    | $C_J$     | 350            | 280            | 220            | 100            |                 |                 |                 | pF       |

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

| Parameter                                                   | Test Conditions                                     | Symbol           | MBR10<br>40DCT | MBR10<br>45DCT | MBR10<br>60DCT | MBR10<br>80DCT | MBR10<br>100DCT | MBR10<br>150DCT | MBR10<br>200DCT | Unit |
|-------------------------------------------------------------|-----------------------------------------------------|------------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|------|
| Operating Junction Temperature Range                        |                                                     | T <sub>J</sub>   | -55~150        |                |                |                |                 | -55~175         |                 | ℃    |
| Storage Temperature Range                                   |                                                     | T <sub>STD</sub> | -55~150        |                |                |                |                 | -55~175         |                 |      |
| Thermal Resistance Junction To Ambient<br>With Steady-State | Still Air Environment<br>With Ta=25℃                | R <sub>θJA</sub> | 60.0           |                |                |                |                 |                 |                 | ℃/W  |
| Thermal Resistance Junction-Case<br>With Steady-State       | Device Mounted On<br>75mm x 45mm x 2.5mm Alu. Heat. | R <sub>θJC</sub> | 2.5            |                |                |                |                 |                 |                 |      |

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

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Typical Characteristics Curves

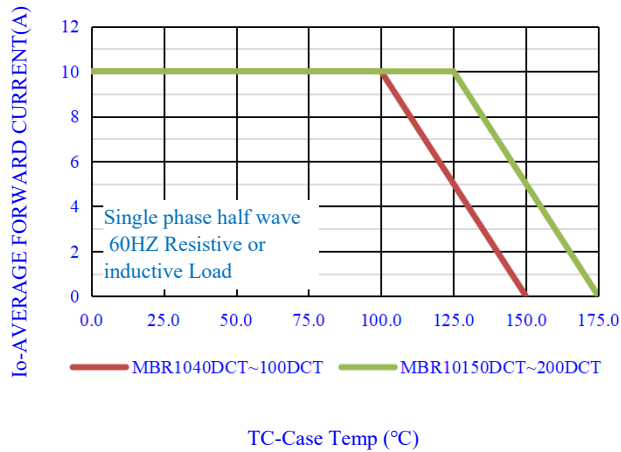


Fig.1-FORWARD CURRENT DERATING CURVE

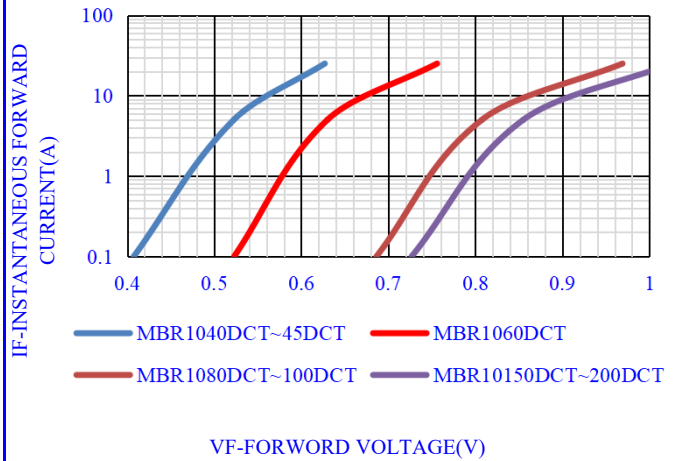


Fig.2- TYPICAL INSTANTANEOUS FORWARD

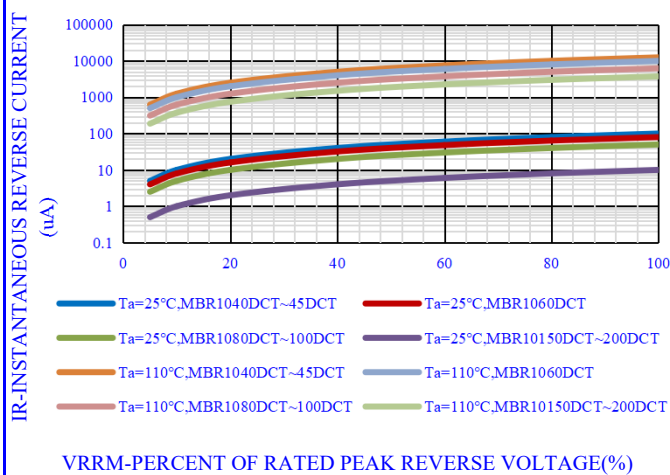


Fig.3- TYPICAL REVERSE CHARACTERISTICS

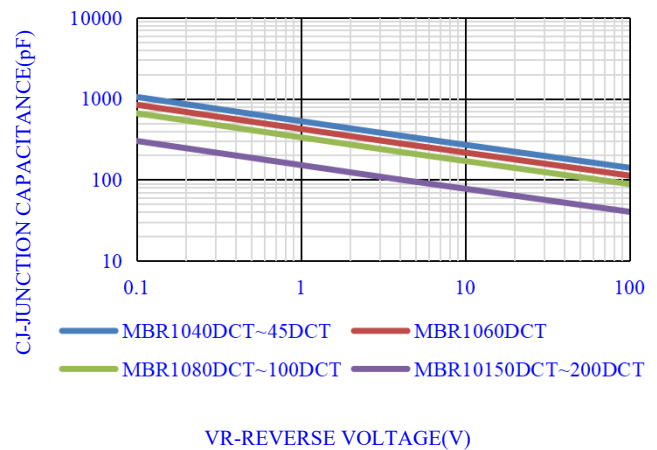


Fig.4- TYPICAL JUNCTION CAPACITANCE

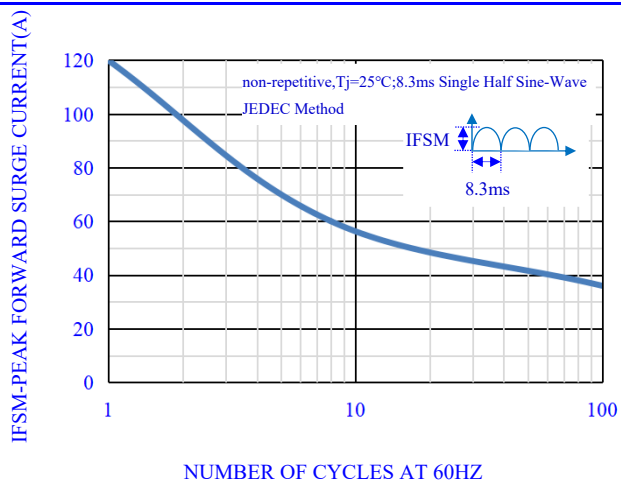


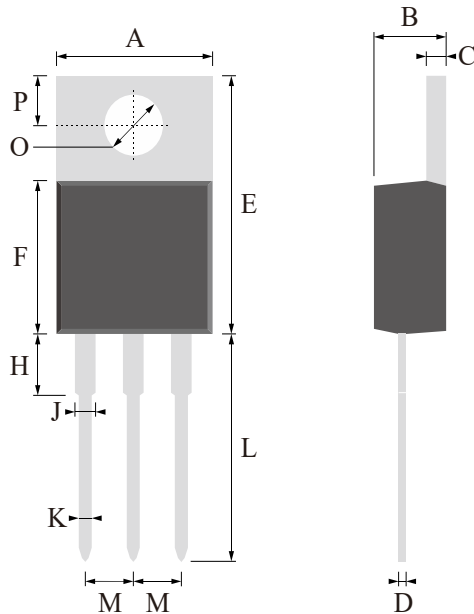
Fig.5-MAX. NON-REPETITIVE SURGE CURRENT

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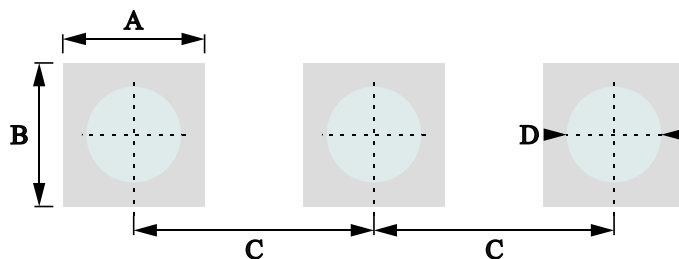
**OUTLINE DRAWINGS**



**TO-220AB**

| OUTLINE DIMENSIONS |            |      |       |        |      |        |
|--------------------|------------|------|-------|--------|------|--------|
| Dim.               | Milimeters |      |       | Inches |      |        |
|                    | Min.       | Typ. | Max.  | Min.   | Typ. | Max.   |
| A                  | 9.25       | -    | 10.75 | 0.3642 | -    | 0.4232 |
| B                  | 1.10       | -    | 1.65  | 0.0433 | -    | 0.0650 |
| C                  | 4.15       | -    | 4.95  | 0.1634 | -    | 0.1949 |
| D                  | 0.25       | -    | 0.65  | 0.0098 | -    | 0.0256 |
| E                  | 14.50      | -    | 16.70 | 0.5709 | -    | 0.6575 |
| F                  | 8.40       | -    | 9.95  | 0.3307 | -    | 0.3917 |
| L                  | 12.15      | -    | 14.30 | 0.4783 | -    | 0.5630 |
| H                  | 3.00       | -    | 3.80  | 0.1181 | -    | 0.1496 |
| J                  | 1.05       | -    | 1.60  | 0.0413 | -    | 0.0630 |
| K                  | 0.65       | -    | 0.95  | 0.0256 | -    | 0.0374 |
| M                  | 2.10       | -    | 2.90  | 0.0827 | -    | 0.1142 |
| O                  | 3.20       | -    | 4.10  | 0.1260 | -    | 0.1614 |
| P                  | 2.45       | -    | 3.10  | 0.0965 | -    | 0.1220 |

**RECOMMEDND LAYOUT DRAWINGS**



**TO-220AB**

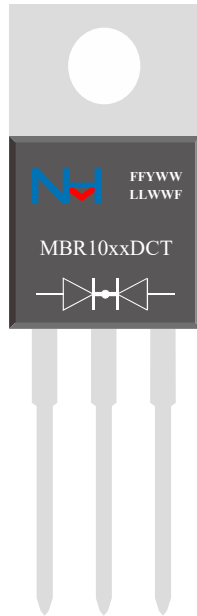
| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 1.60 | -    | -      | 0.0630 | -    |
| B                  | -          | 1.60 | -    | -      | 0.0630 | -    |
| C                  | -          | 2.54 | -    | -      | 0.1000 | -    |
| D                  | -          | 1.00 | -    | -      | 0.0394 | -    |

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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  
LLWWF=Inernal Code,According To Actual Changes  
MBR10xxDCT=Model,x=xx=40,45,60,80,100,150,200

PACKING INFORMATION

| Package Type | Package Code | Product Weight<br>Approx(g/Pcs) | Package Method | Quantity<br>(Pcs/Min. Pack.) | Quantity<br>(Pcs/Inner Box) | Quantity<br>(Pcs/Carton) |
|--------------|--------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|
| TO-220AB     | P1           | 2.057                           | Tube           | 50                           | 1000                        | 5000                     |

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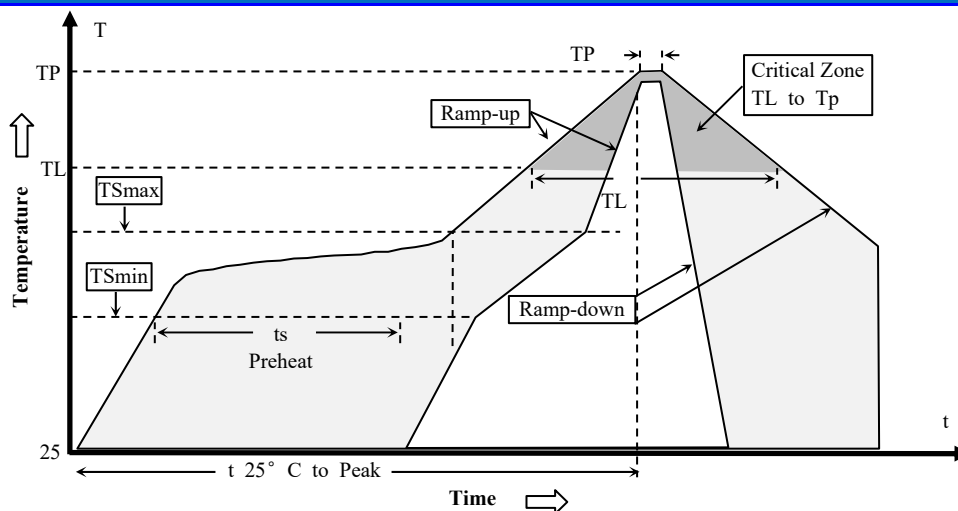
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**Recommended wave soldering condition**

| 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 (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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