

**MBR40L120FCT**

Low Vf Schottky Barrier Rectifiers



**Voltage:** 120 Volts

**Current:** 40 A

**Package:** TO-220F

**Features**

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

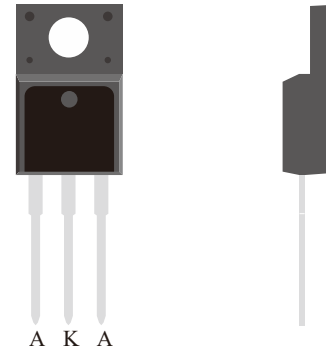
**Mechanical Data**

- **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

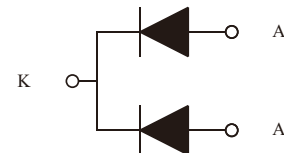
**Typical Applications**

- 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      | Ratings  | Unit               |
|-------------------------------------------|----------------------------------------------------------|-------------|----------|--------------------|
| Maximum Repetitive Peak Reverse Voltage   |                                                          | $V_{RRM}$   | 120      | V                  |
| Maximum RMS Voltag                        |                                                          | $V_{RMS}$   | 84       | V                  |
| Maximum DC Blocking Voltage               |                                                          | $V_{DC}$    | 120      | V                  |
| Maximum Average Forward Rectified Current | Per Diode<br>Total device                                | $I_{F(AV)}$ | 20<br>40 | A                  |
| Peak Forward Surge Current Per Diode      | 8.3ms Single Half Sine-wave<br>Superimposed On Rate Load | $I_{FSM}$   | 250      | A                  |
| Current Squared Time Per Diode            | $t < 8.3ms$                                              | $I^2t$      | 259.4    | 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    | Ratings  |             |             | Unit     |
|---------------------------------------------------------|--------------------------------------------------------------------|-----------|----------|-------------|-------------|----------|
|                                                         |                                                                    |           | Min.     | Typ.        | Max.        |          |
| Instaneous Forward Voltage Per Diode                    | Ta=25°C<br>Ta=100°C<br>I <sub>F</sub> = 20.0 A                     | $V_F$     | --<br>-- | 0.9<br>0.86 | 0.95<br>0.9 | V        |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | Ta=25°C ,V <sub>R</sub> =VRRM<br>Ta=90°C ,V <sub>R</sub> =VRRM*80% | $I_{RRM}$ | --<br>-- | 30<br>1     | 120<br>10   | uA<br>mA |
| Typical Junction Capacitance Per Diode                  | 4 V,1MHz                                                           | $C_J$     | --       | 850         | --          | pF       |

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

| Parameter                                                   | Test Conditions                                     | Symbol          | Ratings    | Unit |
|-------------------------------------------------------------|-----------------------------------------------------|-----------------|------------|------|
| Operating Junction Temperature Range                        |                                                     | $T_J$           | -55 to 150 | °C   |
| Storage Temperature Range                                   |                                                     | $T_{STD}$       | -55 to 150 |      |
| Thermal Resistance Junction To Ambient<br>With Steady-State | Still Air Environment<br>With Ta=25°C               | $R_{\theta JA}$ | 62.5       | °C/W |
| Thermal Resistance Junction-Case<br>With Steady-State       | Device Mounted On<br>75mm x 45mm x 2.5mm Alu. Heat. | $R_{\theta JC}$ | 3.0        |      |

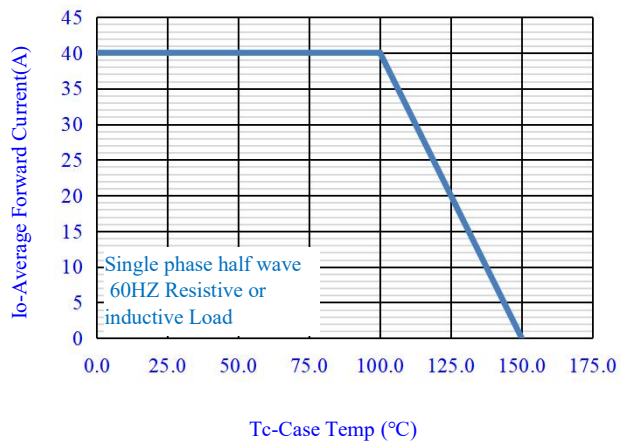
Notes: 1.Pulse Test: 300 Us Pulse Width,1% Duty Cycle

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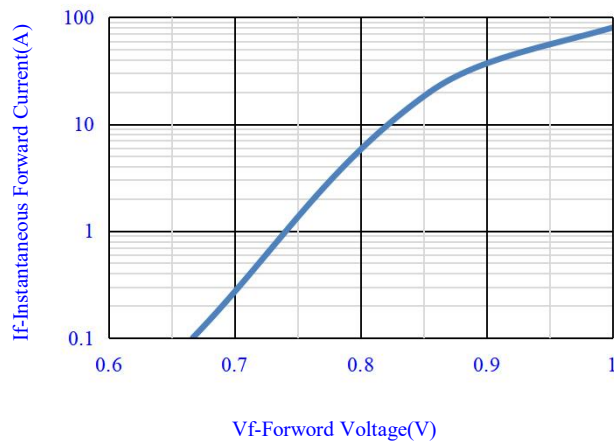
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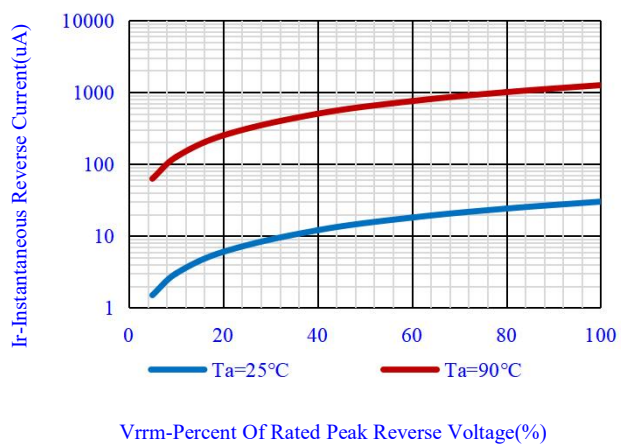
**Typical Characteristics Curves**



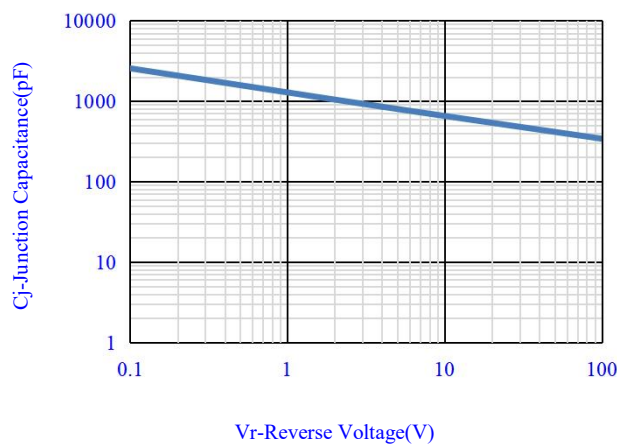
**Fig.1-Forward Current Derating Curve**



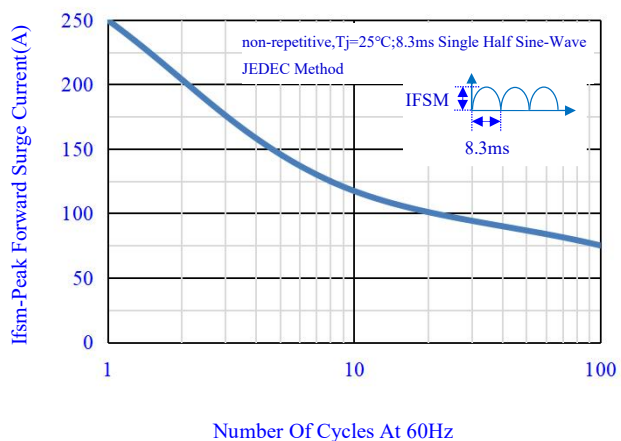
**Fig.2-Typical Instantaneous Forward**



**Fig.3-Typical Reverse Characteristics**



**Fig.4-Typical Junction Capacitance**



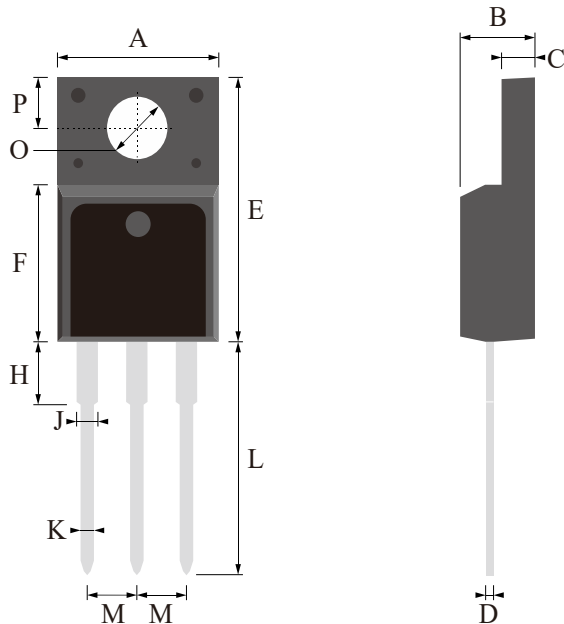
**Fig.5-Max. Non-Repetitive Surge Current**

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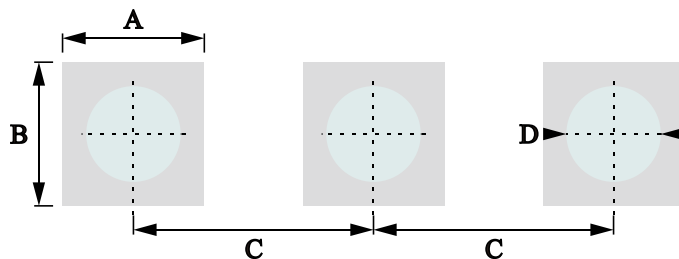
**OUTLINE DRAWINGS**



**TO-220F**

| OUTLINE DIMENSIONS |            |      |       |        |      |        |
|--------------------|------------|------|-------|--------|------|--------|
| Dim.               | Milimeters |      |       | Inches |      |        |
|                    | Min.       | Typ. | Max.  | Min.   | Typ. | Max.   |
| A                  | 9.25       | -    | 10.75 | 0.3642 | -    | 0.4232 |
| B                  | 2.30       | -    | 2.90  | 0.0906 | -    | 0.1142 |
| C                  | 4.20       | -    | 5.20  | 0.1654 | -    | 0.2047 |
| D                  | 0.35       | -    | 0.75  | 0.0138 | -    | 0.0295 |
| E                  | 14.80      | -    | 16.80 | 0.5827 | -    | 0.6614 |
| F                  | 8.25       | -    | 9.75  | 0.3248 | -    | 0.3839 |
| L                  | 12.15      | -    | 14.15 | 0.4783 | -    | 0.5571 |
| H                  | 2.40       | -    | 3.00  | 0.0945 | -    | 0.1181 |
| J                  | 1.10       | -    | 1.50  | 0.0433 | -    | 0.0591 |
| K                  | 0.60       | -    | 1.00  | 0.0236 | -    | 0.0394 |
| M                  | 2.20       | -    | 3.00  | 0.0866 | -    | 0.1181 |
| O                  | 2.70       | -    | 3.50  | 0.1063 | -    | 0.1378 |
| P                  | 2.25       | -    | 2.85  | 0.0886 | -    | 0.1122 |

**RECOMMEDND LAYOUT DRAWINGS**



**TO-220F**

| 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                                                                                                                                                                                                 |                                 |                |                              |                             |                          |  |  |              |              |                                 |                |                              |                             |                          |         |    |       |      |    |      |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|--|--|--------------|--------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|---------|----|-------|------|----|------|------|
|                                                                                                                                                                                                                                                                                                                    | <p>NH=Niuhan Trademark</p> <p>FF=Product Line Code,According To Actual Changes</p> <p>YWW=Date Code,According To Actual Changes</p> <p>LLWWF=Inernal Code,According To Actual Changes</p> <p>MBR40L120FCT=Model</p> |                                 |                |                              |                             |                          |  |  |              |              |                                 |                |                              |                             |                          |         |    |       |      |    |      |      |
| <table><tr><th colspan="7">PACKING INFORMATION</th></tr><tr><th>Package Type</th><th>Package Code</th><th>Product Weight<br/>Approx(g/Pcs)</th><th>Package Method</th><th>Quantity<br/>(Pcs/Min. Pack.)</th><th>Quantity<br/>(Pcs/Inner Box)</th><th>Quantity<br/>(Pcs/Carton)</th></tr><tr><td>TO-220F</td><td>P1</td><td>2.048</td><td>Tube</td><td>50</td><td>1000</td><td>5000</td></tr></table> |                                                                                                                                                                                                                     | 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-220F | P1 | 2.048 | Tube | 50 | 1000 | 5000 |
| 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-220F                                                                                                                                                                                                                                                                                                                                                                                              | P1                                                                                                                                                                                                                  | 2.048                           | Tube           | 50                           | 1000                        | 5000                     |  |  |              |              |                                 |                |                              |                             |                          |         |    |       |      |    |      |      |

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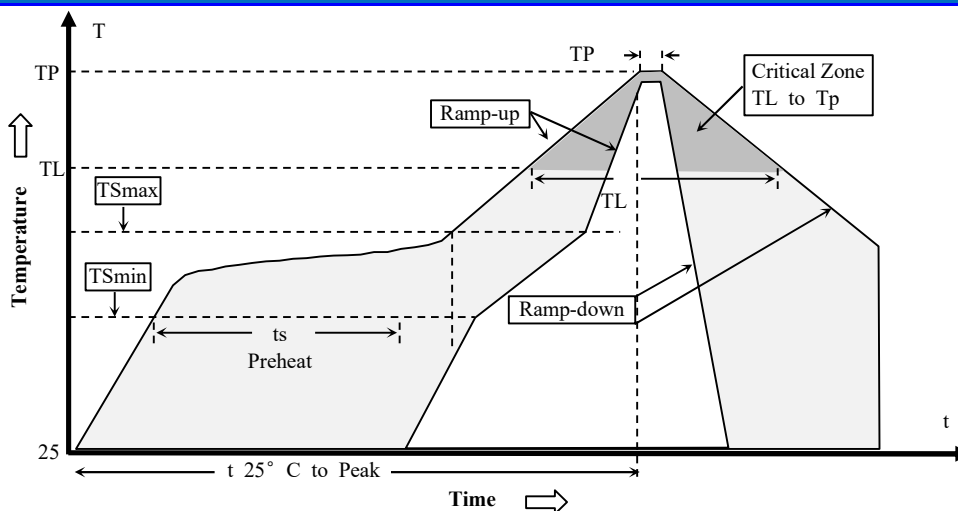
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**Recommended wave soldering condition**

| 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<br>(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<br>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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