

International
IR Rectifier

40HF(R) SERIES

STANDARD RECOVERY DIODES

Stud Version

Features

- High surge current capability
- Stud cathode and stud anode version
- Leaded version available
- Types up to 1600V V_{RRM}

40 A

Typical Applications

- Battery charges
- Converters
- Power supplies
- Machine tool controls
- Welding

Major Ratings and Characteristics

| Parameters | 40HF(R) | | Units |
|-----------------|-------------|-------------|------------------|
| | 10 to 120 | 140, 160 | |
| $I_{F(AV)}$ | 40 | 40 | A |
| @ T_C | 140 | 110 | °C |
| $I_{F(RMS)}$ | 62 | | A |
| I_{FSM} | @ 50Hz | 570 | A |
| | @ 60Hz | 595 | A |
| I^2t | @ 50Hz | 1600 | A ² s |
| | @ 60Hz | 1450 | A ² s |
| V_{RRM} range | 100 to 1200 | 1400, 1600 | V |
| T_J range | - 65 to 190 | - 65 to 160 | °C |



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ELECTRICAL SPECIFICATIONS

Voltage Ratings

| Type number | Voltage Code | V_{RRM} , maximum repetitive peak reverse voltage V | V_{RSM} , maximum non-repetitive peak reverse voltage V | I_{RRM} max. @ $T_J = T_{J \text{ max.}}$ mA |
|-------------|--------------|--|--|--|
| 40HF(R) | 10 | 100 | 200 | 9 |
| | 20 | 200 | 300 | |
| | 40 | 400 | 500 | |
| | 60 | 600 | 700 | |
| | 80 | 800 | 900 | |
| | 100 | 1000 | 1100 | |
| | 120 | 1200 | 1300 | |
| | 140 | 1400 | 1500 | 4.5 |
| 160 | 1600 | 1700 | | |

Forward Conduction

| Parameter | 40HF(R) | | Units | Conditions | | |
|--|-----------|----------|-------------------|--|---------------------------|--|
| | 10 to 120 | 140, 160 | | | | |
| $I_{F(AV)}$ Max. average forward current @ Case temperature | 40 | 40 | A | 180° conduction, half sine wave | | |
| $I_{F(RMS)}$ Max. RMS forward current | 140 | 110 | °C | | | |
| $I_{F(RMS)}$ Max. RMS forward current | 62 | | A | | | |
| I_{FSM} Max. peak, one-cycle forward, non-repetitive surge current | 570 | | A | t = 10ms | No voltage reappplied | Sinusoidal half wave, Initial $T_J = T_{J \text{ max.}}$ |
| | 595 | | | t = 8.3ms | 100% V_{RRM} reappplied | |
| | 480 | | | t = 10ms | 100% V_{RRM} reappplied | |
| | 500 | | | t = 8.3ms | 100% V_{RRM} reappplied | |
| I^2t Maximum I^2t for fusing | 1600 | | A ² s | t = 10ms | No voltage reappplied | |
| | 1450 | | | t = 8.3ms | 100% V_{RRM} reappplied | |
| | 1150 | | | t = 10ms | 100% V_{RRM} reappplied | |
| | 1050 | | | t = 8.3ms | 100% V_{RRM} reappplied | |
| I^2vt Maximum I^2vt for fusing | 16000 | | A ² /s | t = 0.1 to 10ms, no voltage reappplied | | |
| $V_{F(TO)}$ Value of threshold voltage (up to 1200V) | 0.65 | | V | $T_J = T_{J \text{ max.}}$ | | |
| $V_{F(TO)}$ Value of threshold voltage (for 1400V, 1600V) | 0.76 | | V | $T_J = T_{J \text{ max.}}$ | | |
| r_f Value of forward slope resistance (up to 1200V) | 4.29 | | mΩ | $T_J = T_{J \text{ max.}}$ | | |
| r_f Value of forward slope resistance (for 1400V, 1600V) | 3.8 | | | $T_J = T_{J \text{ max.}}$ | | |
| V_{FM} Max. forward voltage drop | 1.30 | 1.50 | V | $I_{pk} = 125A, T_J = 25^\circ C, t_p = 400\mu s$ rectangular wave | | |

Thermal and Mechanical Specifications

| Parameter | 40HF(R) | | Units | Conditions |
|---|----------------|------------|----------|--|
| | 10 to 120 | 140 to 160 | | |
| T _J Max. junction operating temperature range | -65 to 190 | -65 to 160 | °C | |
| T _{stg} Max. storage temperature range | -65 to 190 | -65 to 160 | | |
| R _{thJC} Max. thermal resistance, junction to case | 0.95 | | K/W | DC operation |
| R _{thCS} Max. thermal resistance, case to heatsink | 0.25 | | | Mounting surface, smooth, flat and greased |
| T Max. allowed mounting torque ±10% | 2.3 - 3.4 | | Nm | Not lubricated threads |
| | 20 - 30 | | lbf · in | |
| wt Approximate weight | 17 (0.6) | | g (oz) | unleaded device |
| Case style | DO-203AB (DO5) | | | See Outline Table |

ΔR_{thJC} Conduction

(The following table shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC)

| Conduction angle | Sinusoidal conduction | Rectangular conduction | Units | Conditions |
|------------------|-----------------------|------------------------|-------|--------------------------------------|
| 180° | 0.14 | 0.10 | K/W | T _J = T _J max. |
| 120° | 0.16 | 0.17 | | |
| 90° | 0.21 | 0.22 | | |
| 60° | 0.30 | 0.31 | | |
| 30° | 0.50 | 0.50 | | |

Ordering Information Table

| Device Code | | | | | | | | | | | |
|--|--|-----------|------------|----------|------------|----------|---|---|---|---|---|
| | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">40</td> <td style="padding: 5px;">HF</td> <td style="padding: 5px;">R</td> <td style="padding: 5px;">160</td> <td style="padding: 5px;">M</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> </tr> </table> | 40 | HF | R | 160 | M | ① | ② | ③ | ④ | ⑤ |
| 40 | HF | R | 160 | M | | | | | | | |
| ① | ② | ③ | ④ | ⑤ | | | | | | | |
| <p>1 - 40 = Standard device 41 = Not isolated lead 42 = Isolated lead with silicone sleeve (Red = Reverse polarity) (Blue = Normal polarity)</p> <p>2 - Standard diode</p> <p>3 - None = Stud Normal Polarity (Cathode to Stud) R = Stud Reverse Polarity (Anode to Stud)</p> <p>4 - Voltage code: Code x 10 = V_{RRM} (See Voltage Ratings table)</p> <p>5 - None = Stud base DO-203AB (DO-5) 1/4" 28UNF-2A M = Stud base DO-203AB (DO-5) M6 X 1</p> | | | | | | | | | | | |

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Outlines Table





Fig. 1 - Current Ratings Characteristics

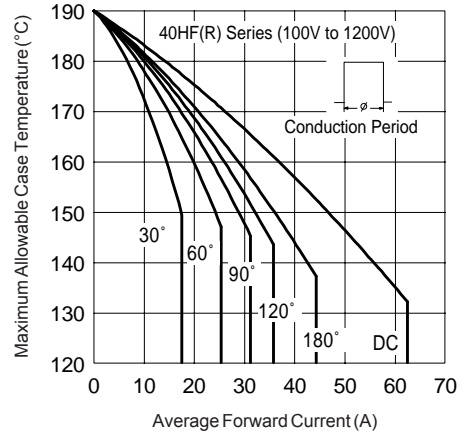


Fig. 2 - Current Ratings Characteristics



Fig. 3 - Current Ratings Characteristics

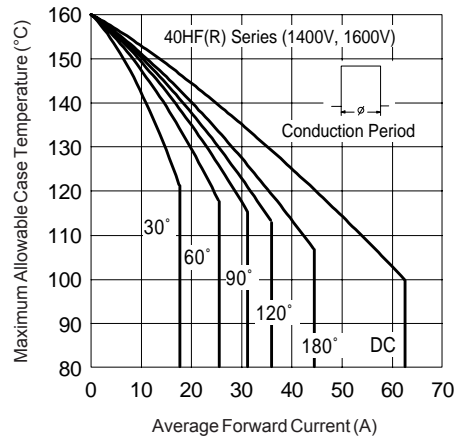


Fig. 4 - Current Ratings Characteristics



Fig. 5 - Forward Power Loss Characteristics

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Fig. 6 - Forward Power Loss Characteristics



Fig. 7 - Forward Power Loss Characteristics



Fig. 8 - Forward Power Loss Characteristics



Fig. 9 - Maximum Non-Repetitive Surge Current



Fig. 10 - Maximum Non-Repetitive Surge Current



Fig. 11 - Forward Voltage Drop Characteristics (up to 1200V)

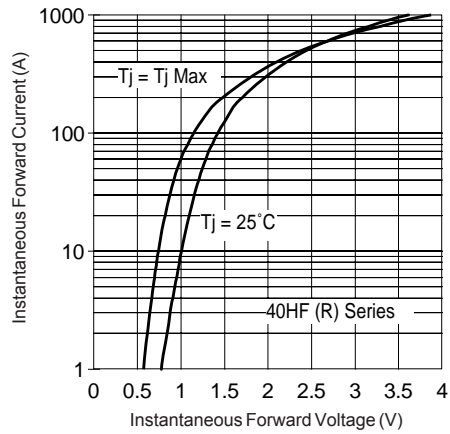


Fig. 12 - Forward Voltage Drop Characteristics (for 1400V, 1600V)

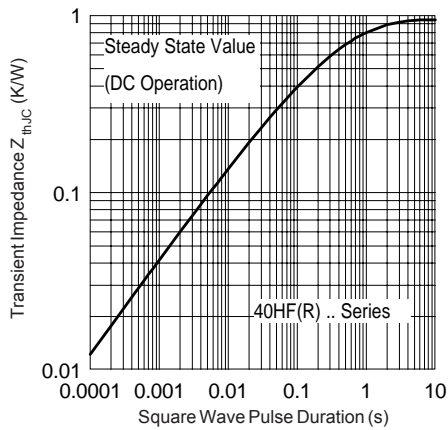


Fig. 13 - Thermal Impedance $Z_{th,JC}$ Characteristics

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Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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