

Bulletin I2030 rev. A 11/94

International  
**IOR** Rectifier

**45L(R)..D SERIES**

**STANDARD RECOVERY DIODES**

**Stud Version**

Features

- Diffused diode
- High current carrying capability
- High voltage ratings up to 1600V
- High surge current capabilities
- Stud cathode and stud anode version

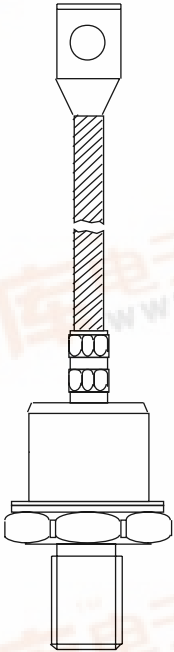
Typical Applications

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications

Major Ratings and Characteristics

| Parameters       | 45L(R)..D    | Units             |
|------------------|--------------|-------------------|
| $I_{F(AV)}$      | 150          | A                 |
| @ $T_C$          | 150          | °C                |
| $I_{F(RMS)}$     | 235          | A                 |
| $I_{FSM}$ @ 50Hz | 3570         | A                 |
| @ 60Hz           | 3740         | A                 |
| $I^2t$ @ 50Hz    | 64           | KA <sup>2</sup> s |
| @ 60Hz           | 58           | KA <sup>2</sup> s |
| $V_{RRM}$ range  | 1200 to 1600 | V                 |
| $T_J$            | - 40 to 200  | °C                |

150A



case style  
DO-205AC (DO-30)



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### ELECTRICAL SPECIFICATIONS

#### Voltage Ratings

| Type number | Voltage Code | $V_{RRM}$ , maximum repetitive peak reverse voltage<br>V | $V_{RSM}$ , maximum non-repetitive peak rev. voltage<br>V | $I_{RRM}$ max.<br>@ $T_J = T_J$ max.<br>mA |
|-------------|--------------|----------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------|
| 45L(R)..D   | 120          | 1200                                                     | 1440                                                      | 40                                         |
|             | 160          | 1600                                                     | 1920                                                      |                                            |

#### Forward Conduction

| Parameter     |                                                               | 45L(R)..D | Units              | Conditions                                                                        |                |                                                       |  |
|---------------|---------------------------------------------------------------|-----------|--------------------|-----------------------------------------------------------------------------------|----------------|-------------------------------------------------------|--|
| $I_{F(AV)}$   | Max. average forward current<br>@ Case temperature            | 150       | A                  | 180° conduction, half sine wave                                                   |                |                                                       |  |
|               |                                                               | 150       | °C                 |                                                                                   |                |                                                       |  |
| $I_{F(RMS)}$  | Max. RMS forward current                                      | 235       | A                  | DC @ 142°C case temperature                                                       |                |                                                       |  |
| $I_{FSM}$     | Max. peak, one-cycle forward,<br>non-repetitive surge current | 3570      | A                  | t = 10ms                                                                          | No voltage     | Sinusoidal half wave,<br><br>Initial $T_J = T_J$ max. |  |
|               |                                                               | 3740      |                    | t = 8.3ms                                                                         | reapplied      |                                                       |  |
|               |                                                               | 3000      |                    | t = 10ms                                                                          | 100% $V_{RRM}$ |                                                       |  |
|               |                                                               | 3140      |                    | t = 8.3ms                                                                         | reapplied      |                                                       |  |
| $I^2t$        | Maximum $I^2t$ for fusing                                     | 64        | KA <sup>2</sup> s  | t = 10ms                                                                          | No voltage     |                                                       |  |
|               |                                                               | 58        |                    | t = 8.3ms                                                                         | reapplied      |                                                       |  |
|               |                                                               | 45        |                    | t = 10ms                                                                          | 100% $V_{RRM}$ |                                                       |  |
|               |                                                               | 41        |                    | t = 8.3ms                                                                         | reapplied      |                                                       |  |
| $I^2\sqrt{t}$ | Maximum $I^2\sqrt{t}$ for fusing                              | 640       | KA <sup>2</sup> √s | t = 0.1 to 10ms, no voltage reapplied                                             |                |                                                       |  |
| $V_{F(TO)1}$  | Low level value of threshold voltage                          | 0.67      | V                  | $(16.7\% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}, T_J = T_J$ max. |                |                                                       |  |
| $V_{F(TO)2}$  | High level value of threshold voltage                         | 0.83      |                    | $(I > \pi \times I_{F(AV)}), T_J = T_J$ max.                                      |                |                                                       |  |
| $r_{f1}$      | Low level value of forward slope resistance                   | 1.42      | mΩ                 | $(16.7\% \times \pi \times I_{F(AV)}) < I < \pi \times I_{F(AV)}, T_J = T_J$ max. |                |                                                       |  |
| $r_{f2}$      | High level value of forward slope resistance                  | 0.91      |                    | $(I > \pi \times I_{F(AV)}), T_J = T_J$ max.                                      |                |                                                       |  |
| $V_{FM}$      | Max. forward voltage drop                                     | 1.33      | V                  | $I_{pk} = 471A, T_J = 25^\circ C, t_p = 10ms$ sinusoidal wave                     |                |                                                       |  |

### Thermal and Mechanical Specifications

| Parameter                                            | 45L(R)..D        | Units | Conditions                                 |
|------------------------------------------------------|------------------|-------|--------------------------------------------|
| $T_j$ Max. junction operating temperature            | -40 to 200       | °C    |                                            |
| $T_{stg}$ Max. storage temperature range             | -40 to 200       |       |                                            |
| $R_{thJC}$ Max. thermal resistance, junction to case | 0.25             | K/W   | DC operation                               |
| $R_{thCS}$ Max. thermal resistance, case to heatsink | 0.10             |       | Mounting surface, smooth, flat and greased |
| $T$ Max. allowed mounting torque +0 -20%             | 17               | Nm    | Not lubricated threads                     |
|                                                      | 14.5             |       | Lubricated threads                         |
| wt Approximate weight                                | 130              | g     |                                            |
| Case style                                           | DO-205AC (DO-30) |       | See Outline Table                          |

### $\Delta R_{thJC}$ 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°             | 0.031                 | 0.023                  | K/W   | $T_j = T_{j \text{ max.}}$ |
| 120°             | 0.038                 | 0.040                  |       |                            |
| 90°              | 0.048                 | 0.053                  |       |                            |
| 60°              | 0.071                 | 0.075                  |       |                            |
| 30°              | 0.120                 | 0.121                  |       |                            |

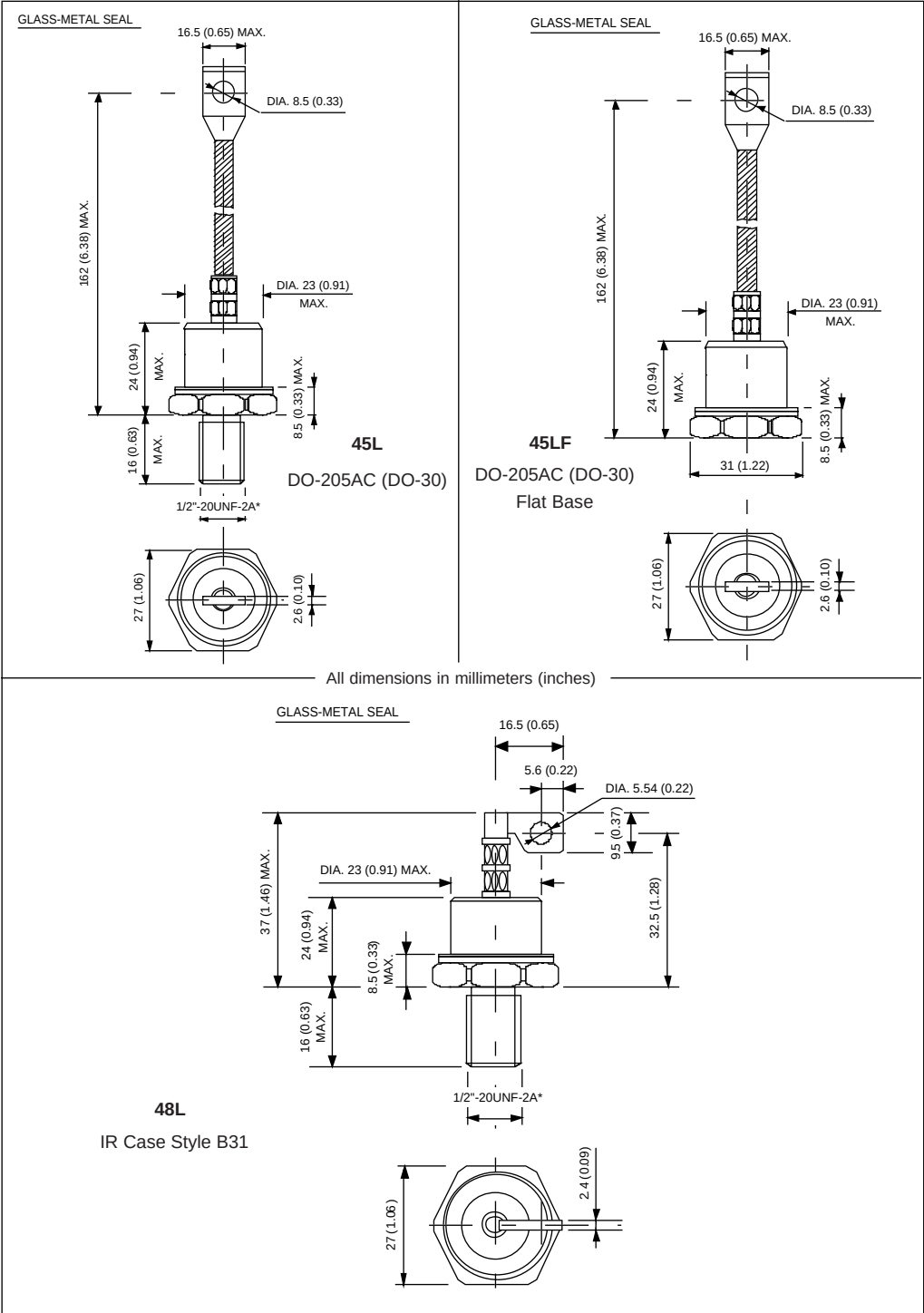
### Ordering Information Table

| Device Code |                                                                                                        |   |   |   |       |
|-------------|--------------------------------------------------------------------------------------------------------|---|---|---|-------|
|             | 45                                                                                                     | L | F | R | 160 D |
|             | ①                                                                                                      | ② | ③ | ④ | ⑤ ⑥   |
| <b>1</b>    | - 45 = Standard version<br>- 47 = Version with Pinch Bolt (only flat base)<br>- 48 = Flag Top Terminal |   |   |   |       |
| <b>2</b>    | - L = Essential Part Number                                                                            |   |   |   |       |
| <b>3</b>    | - F = Flat Base<br>- None = Normal Stud                                                                |   |   |   |       |
| <b>4</b>    | - R = Stud Reverse Polarity (Anode to Stud)<br>- None = Stud Normal Polarity (Cathode to Stud)         |   |   |   |       |
| <b>5</b>    | - Voltage code: Code x 10 = $V_{RRM}$ (See Voltage Ratings table)                                      |   |   |   |       |
| <b>6</b>    | - D = Diffused diode                                                                                   |   |   |   |       |

45L(R)..D Series

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Outline Table



Outline Table

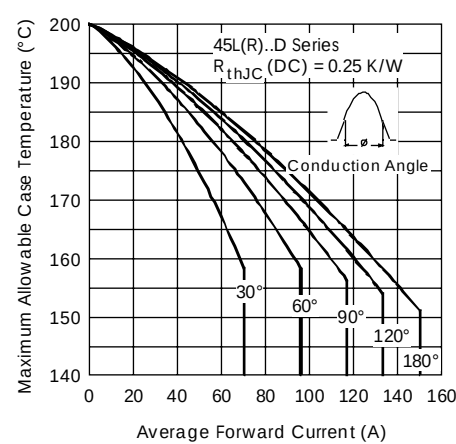
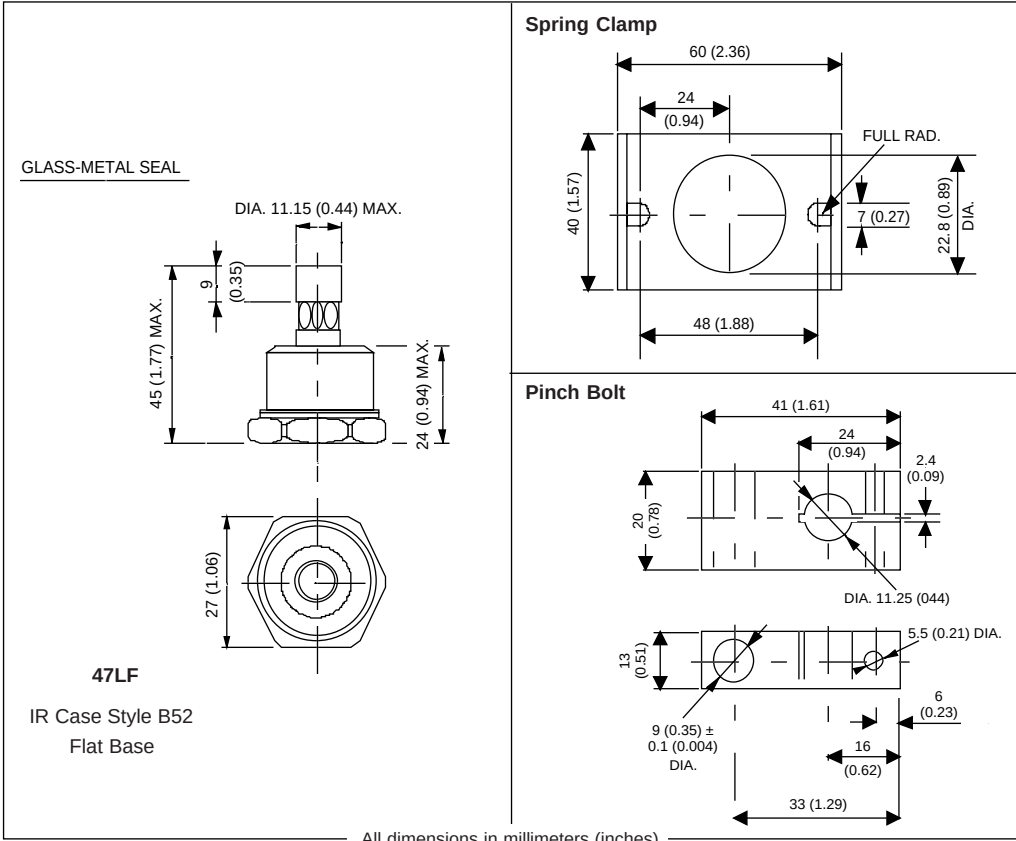


Fig. 1 - Current Ratings Characteristics

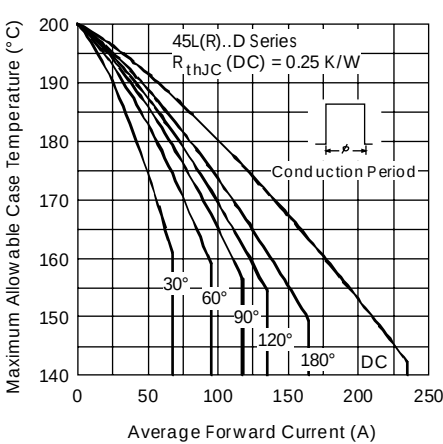


Fig. 2 - Current Ratings Characteristics

## 45L(R)..D Series

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International  
**IRF** Rectifier

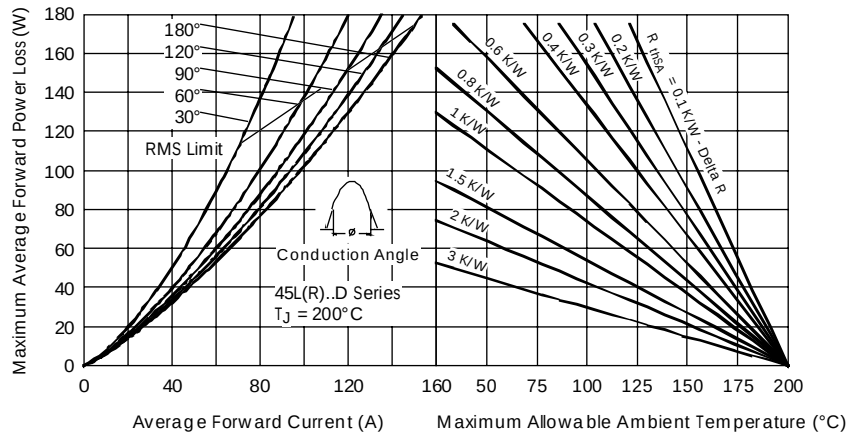


Fig. 3 - Forward Power Loss Characteristics

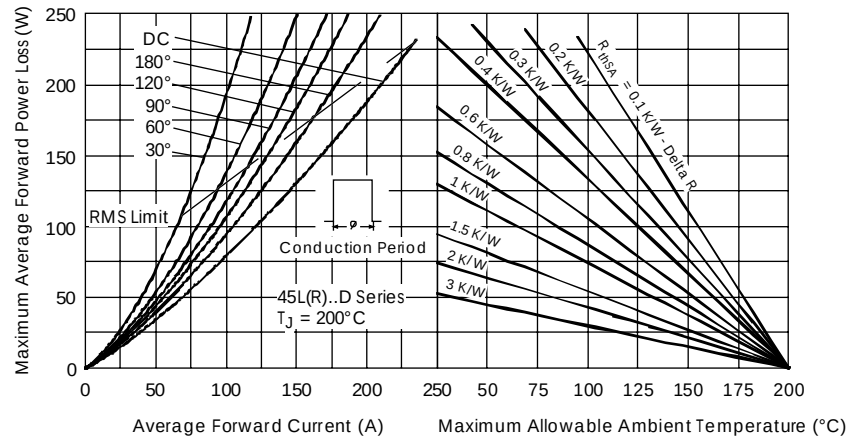


Fig. 4 - Forward Power Loss Characteristics

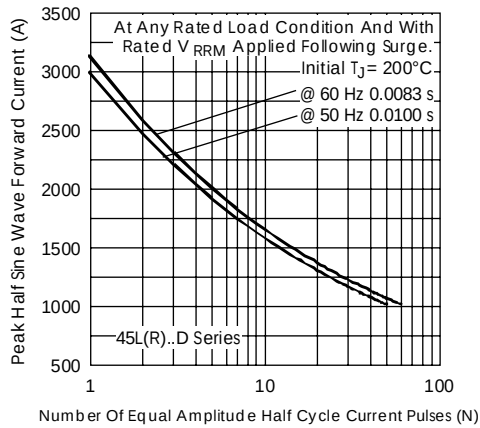


Fig. 5 - Maximum Non-Repetitive Surge Current

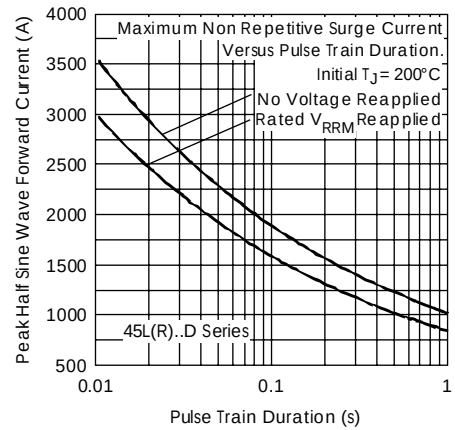


Fig. 6 - Maximum Non-Repetitive Surge Current

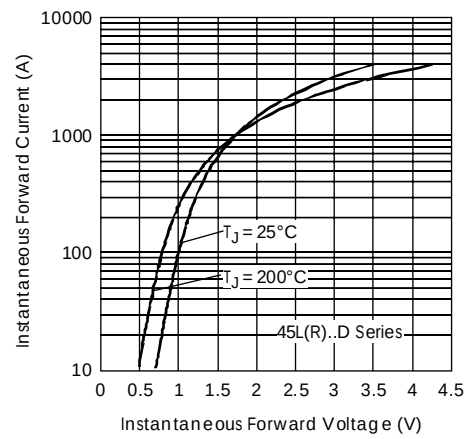


Fig. 7 - Forward Voltage Drop Characteristics

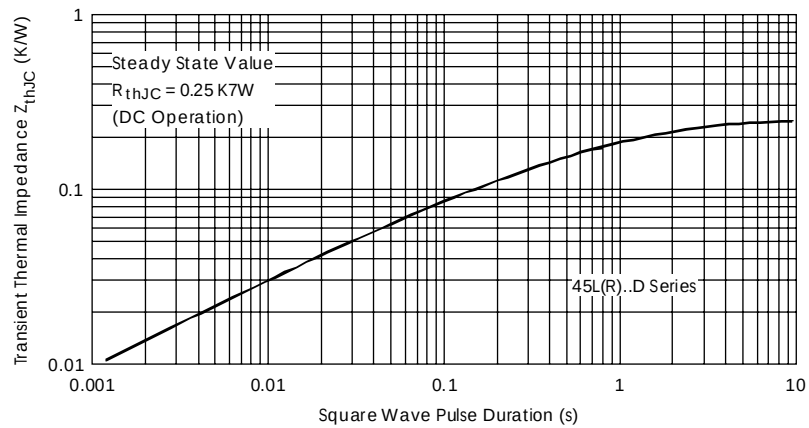


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristic