

## Standard Recovery Diodes (Stud Version), 150 A



DO-205AA (DO-8)

### FEATURES

- Alloy diode
- High current carrying capability
- High surge current capabilities
- Stud cathode and stud anode version
- RoHS compliant
- Designed and qualified for industrial level



**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

- Battery chargers
- Welders
- Machine tool controls
- High power drives
- Medium traction applications
- Freewheeling diodes

### PRODUCT SUMMARY

|             |       |
|-------------|-------|
| $I_{F(AV)}$ | 150 A |
|-------------|-------|

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES      | UNITS             |
|--------------|-----------------|-------------|-------------------|
| $I_{F(AV)}$  |                 | 150         | A                 |
|              | $T_C$           | 150         | °C                |
| $I_{F(RMS)}$ |                 | 235         | A                 |
| $I_{FSM}$    | 50 Hz           | 3570        | A                 |
|              | 60 Hz           | 3740        |                   |
| $I^2t$       | 50 Hz           | 64          | kA <sup>2</sup> s |
|              | 60 Hz           | 58          |                   |
| $V_{RRM}$    | Range           | 100 to 600  | V                 |
| $T_J$        |                 | - 40 to 200 | °C                |

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

| TYPE NUMBER                   | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ MAXIMUM AT $T_J = 175$ °C<br>mA |
|-------------------------------|--------------|--|--|---|
| 45L(R)<br>150K(R)<br>150KS(R) | 10           | 100  | 200  | 35  |
|                               | 20           | 200  | 300  |   |
|                               | 30           | 300  | 400  |   |
|                               | 40           | 400  | 500  |   |
|                               | 60           | 600  | 720  |   |

# 45L(R), 150K(R), 150KS(R) Series



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| FORWARD CONDUCTION  |               |   |                            |        |                    |                   |
|---|---------------|---|----------------------------|--------|--------------------|-------------------|
| PARAMETER   | SYMBOL        | TEST CONDITIONS   |                            | VALUES | UNITS              |                   |
| Maximum average forward current at case temperature           | $I_{F(AV)}$   | 180° conduction, half sine wave   |                            | 150    | A                  |                   |
|   |               |   |                            | 150    | °C                 |                   |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  | DC at 142 °C case temperature   |                            | 235    | A                  |                   |
| Maximum peak, one cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms   | No voltage reappplied      | 3570   |                    |                   |
|   |               | t = 8.3 ms  |                            | 3740   |                    |                   |
|   |               | t = 10 ms   | 100 % $V_{RRM}$ reappplied | 3000   |                    |                   |
|   |               | t = 8.3 ms  |                            | 3140   |                    |                   |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms   | No voltage reappplied      | 64     |                    | kA <sup>2</sup> s |
|   |               | t = 8.3 ms  |                            | 58     |                    |                   |
|   |               | t = 10 ms   | 100 % $V_{RRM}$ reappplied | 45     |                    |                   |
|   |               | t = 8.3 ms  |                            | 41     |                    |                   |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reappplied   |                            | 640    | kA <sup>2</sup> √s |                   |
| Low level value of threshold voltage                          | $V_{F(TO)1}$  | (16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum |                            | 0.67   | V                  |                   |
| High level value of threshold voltage                         | $V_{F(TO)2}$  | (I > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum                                      |                            | 0.83   |                    |                   |
| Low level value of forward slope resistance                   | $r_{f1}$      | (16.7 % $\times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum |                            | 1.42   | mΩ                 |                   |
| High level value of forward slope resistance                  | $r_{f2}$      | (I > $\pi \times I_{F(AV)}$ ), $T_J = T_J$ maximum                                      |                            | 0.91   |                    |                   |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 471$ A, $T_J = 25$ °C, $t_p = 10$ ms sinusoidal wave                          |                            | 1.33   | V                  |                   |

| THERMAL AND MECHANICAL SPECIFICATIONS                    |                |   |  |                  |                     |
|--|----------------|---|--|------------------|---------------------|
| PARAMETER  | SYMBOL         | TEST CONDITIONS                               |  | VALUES           | UNITS               |
| Maximum junction operating and storage temperature range | $T_J, T_{Stg}$ |   |  | - 40 to 200      | °C                  |
| Maximum thermal resistance, junction to case             | $R_{thJC}$     | DC operation                                  |  | 0.25             | K/W                 |
| Maximum thermal resistance, case to heatsink             | $R_{thCS}$     | Mounting surface, smooth, flat and greased    |  | 0.10             |                     |
| Mounting torque<br>45L                                   | minimum        | Not lubricated threads                        |  | 14.1 (125)       | N · m<br>(lbf · in) |
|  | maximum        |   |  | 17.0 (150)       |                     |
|  | minimum        | Lubricated threads                            |  | 12.2 (108)       |                     |
|  | maximum        |   |  | 15.0 (132)       |                     |
| Mounting torque<br>150K<br>150KS                         | minimum        | Not lubricated threads                        |  | 11.3 (100)       | N · m<br>(lbf · in) |
|  | maximum        |   |  | 14.1 (125)       |                     |
|  | minimum        | Lubricated threads                            |  | 9.5 (85)         |                     |
|  | maximum        |   |  | 12.5 (110)       |                     |
| Approximate weight                                       |                |   |  | 100              | g                   |
|  |                |   |  | 3.5              | oz.                 |
| Case style   | 45L            | See dimensions - link at the end of datasheet |  | DO-205AC (DO-30) |                     |
|  | 150K-A         |   |  | DO-205AA (DO-8)  |                     |
|  | 150KS          |   |  | B-42             |                     |



# 45L(R), 150K(R), 150KS(R) Series

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| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                               |       |
|------------------------------|-----------------------|------------------------|-------------------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS               | UNITS |
| 180°                         | 0.031                 | 0.023                  | $T_J = T_{J \text{ maximum}}$ | K/W   |
| 120°                         | 0.038                 | 0.040                  |                               |       |
| 90°                          | 0.048                 | 0.053                  |                               |       |
| 60°                          | 0.071                 | 0.075                  |                               |       |
| 30°                          | 0.120                 | 0.121                  |                               |       |

**Note**

- The table above shows the increment of thermal resistance  $R_{thJC}$  when devices operate at different conduction angles than DC



Fig. 1 - Current Ratings Characteristics



Fig. 2 - Current Ratings Characteristics



Fig. 3 - Forward Power Loss Characteristics

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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



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

## ORDERING INFORMATION TABLES

|             |  |          |          |           |
|-------------|--|----------|----------|-----------|
| Device code | <b>45</b>  | <b>L</b> | <b>R</b> | <b>60</b> |
|             | ①  | ②        | ③        | ④         |
| <b>1</b>    | - 45 = Standard version  |          |          |           |
| <b>2</b>    | - L = Essential part number  |          |          |           |
| <b>3</b>    | - R = Stud reverse polarity (anode to stud)<br>None = Stud normal polarity (cathode to stud) |          |          |           |
| <b>4</b>    | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                  |          |          |           |

|             |  |          |          |          |           |          |
|-------------|--|----------|----------|----------|-----------|----------|
| Device code | <b>15</b>  | <b>0</b> | <b>K</b> | <b>R</b> | <b>60</b> | <b>A</b> |
|             | ①  | ②        | ③        | ④        | ⑤         | ⑥        |
| <b>1</b>    | - 15 = Essential part number   |          |          |          |           |          |
| <b>2</b>    | - 0 = Standard device  |          |          |          |           |          |
| <b>3</b>    | - Case style:<br>K = DO-205AA (DO-8)<br>KS = B-42  |          |          |          |           |          |
| <b>4</b>    | - R = Stud reverse polarity (anode to stud)<br>None = Stud normal polarity (cathode to stud) |          |          |          |           |          |
| <b>5</b>    | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                  |          |          |          |           |          |
| <b>6</b>    | - A = Essential part number for 150K (omitted for 150KS)                                     |          |          |          |           |          |

Note: For metric device M12 x 1.75 contact factory

| LINKS TO RELATED DOCUMENTS |   |
|----------------------------|---|
| Dimensions                 | <a href="http://www.vishay.com/doc?95314">http://www.vishay.com/doc?95314</a> |



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