

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



DO-8 (DO-205AA)

### FEATURES

- Alloy diode
- High current carrying capability
- High surge current capabilities
- Stud cathode and stud anode version
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### TYPICAL APPLICATIONS

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

### PRIMARY CHARACTERISTICS

|                       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 150 A           |
| Package               | DO-8 (DO-205AA) |
| Circuit configuration | Single          |

### 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 $T_J = 175\text{ °C}$<br>mA |
|----------------------------------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|
| VS-45L(R)<br>VS-150K(R)<br>VS-150KS(R) | 10           | 100                                                      | 200                                                          | 35                                               |
|                                        | 20           | 200                                                      | 300                                                          |                                                  |
|                                        | 30           | 300                                                      | 400                                                          |                                                  |
|                                        | 40           | 400                                                      | 500                                                          |                                                  |
|                                        | 60           | 600                                                      | 720                                                          |                                                  |



| FORWARD CONDUCTION                                            |                     |                                                                                                          |                                  |                                                                       |        |                    |
|---------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------|--------|--------------------|
| PARAMETER                                                     | SYMBOL              | TEST CONDITIONS                                                                                          |                                  |                                                                       | VALUES | UNITS              |
| Maximum average forward current at case temperature           | I <sub>F(AV)</sub>  | 180° conduction, half sine wave                                                                          |                                  |                                                                       | 150    | A                  |
|                                                               |                     |                                                                                                          |                                  |                                                                       | 150    | °C                 |
| Maximum RMS forward current                                   | I <sub>F(RMS)</sub> | DC at 142 °C case temperature                                                                            |                                  |                                                                       | 235    |                    |
| Maximum peak, one cycle forward, non-repetitive surge current | I <sub>FSM</sub>    | t = 10 ms                                                                                                | No voltage reapplied             | Sinusoidal half wave, initial T <sub>J</sub> = T <sub>J</sub> maximum | 3570   | A                  |
|                                                               |                     | t = 8.3 ms                                                                                               |                                  |                                                                       | 3740   |                    |
|                                                               |                     | t = 10 ms                                                                                                | 100 % V <sub>RRM</sub> reapplied |                                                                       | 3000   |                    |
|                                                               |                     | t = 8.3 ms                                                                                               |                                  |                                                                       | 3140   |                    |
| Maximum I <sup>2</sup> t for fusing                           | I <sup>2</sup> t    | t = 10 ms                                                                                                | No voltage reapplied             |                                                                       | 64     | kA <sup>2</sup> s  |
|                                                               |                     | t = 8.3 ms                                                                                               |                                  |                                                                       | 58     |                    |
|                                                               |                     | t = 10 ms                                                                                                | 100 % V <sub>RRM</sub> reapplied |                                                                       | 45     |                    |
|                                                               |                     | t = 8.3 ms                                                                                               |                                  |                                                                       | 41     |                    |
| Maximum I <sup>2</sup> √t for fusing                          | I <sup>2</sup> √t   | t = 0.1 to 10 ms, no voltage reapplied                                                                   |                                  |                                                                       | 640    | kA <sup>2</sup> √s |
| Low level value of threshold voltage                          | V <sub>F(TO)1</sub> | (16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum |                                  |                                                                       | 0.67   | V                  |
| High level value of threshold voltage                         | V <sub>F(TO)2</sub> | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum                                   |                                  |                                                                       | 0.83   |                    |
| Low level value of forward slope resistance                   | r <sub>f1</sub>     | (16.7 % × π × I <sub>F(AV)</sub> < I < π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum |                                  |                                                                       | 1.42   | mW                 |
| High level value of forward slope resistance                  | r <sub>f2</sub>     | (I > π × I <sub>F(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> maximum                                   |                                  |                                                                       | 0.91   |                    |
| Maximum forward voltage drop                                  | V <sub>FM</sub>     | I <sub>pk</sub> = 471 A, T <sub>J</sub> = 25 °C, t <sub>p</sub> = 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-30 (DO-205AC) |                     |
|                                                          | 150K-A         |                                               | DO-8 (DO-205AA)  |                     |
|                                                          | 150KS          |                                               | B-42             |                     |

| $\Delta R_{thJC}$ CONDUCTION |                       |                        |                     |       |
|------------------------------|-----------------------|------------------------|---------------------|-------|
| CONDUCTION ANGLE             | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS     | UNITS |
| 180°                         | 0.031                 | 0.023                  | $T_J = T_J$ 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

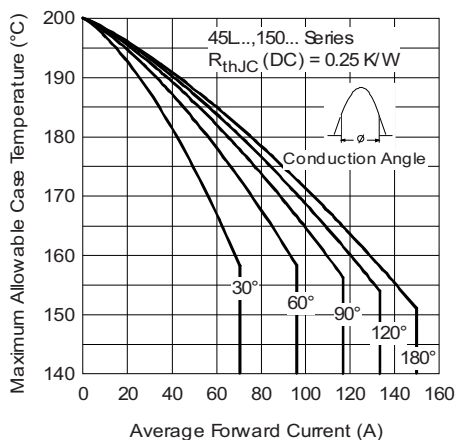


Fig. 1 - Current Ratings Characteristics

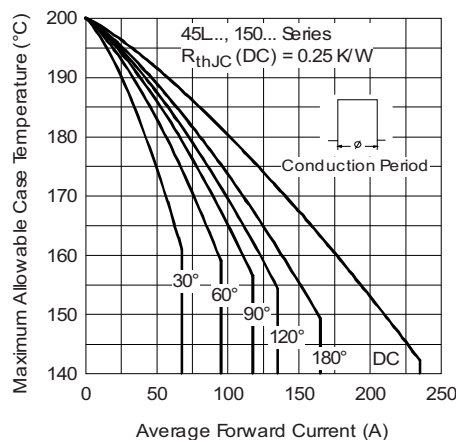


Fig. 2 - Current Ratings Characteristics

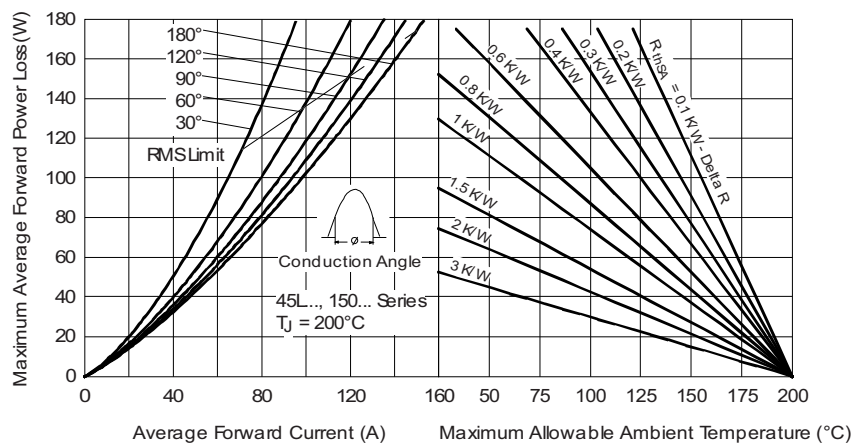


Fig. 3 - Forward Power Loss Characteristics

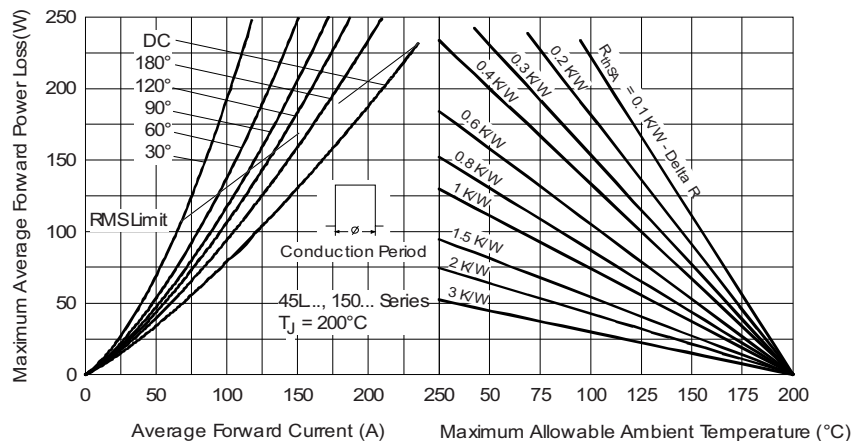


Fig. 4 - Forward Power Loss Characteristics

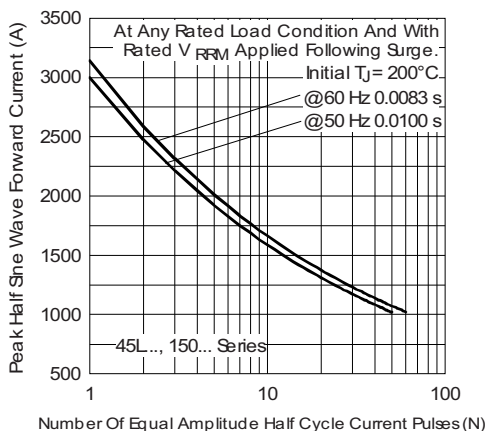


Fig. 5 - Maximum Non-Repetitive Surge Current

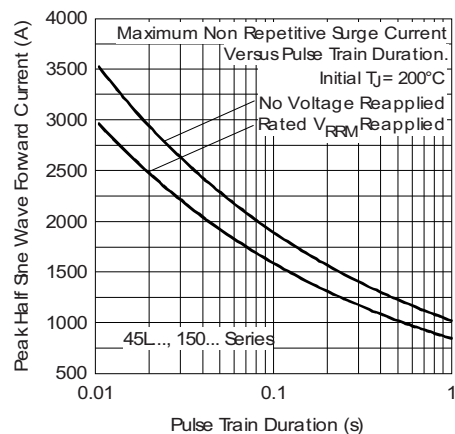


Fig. 6 - Maximum Non-Repetitive Surge Current

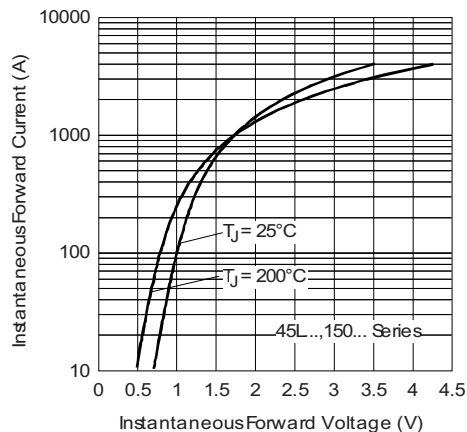


Fig. 7 - Forward Voltage Drop Characteristics

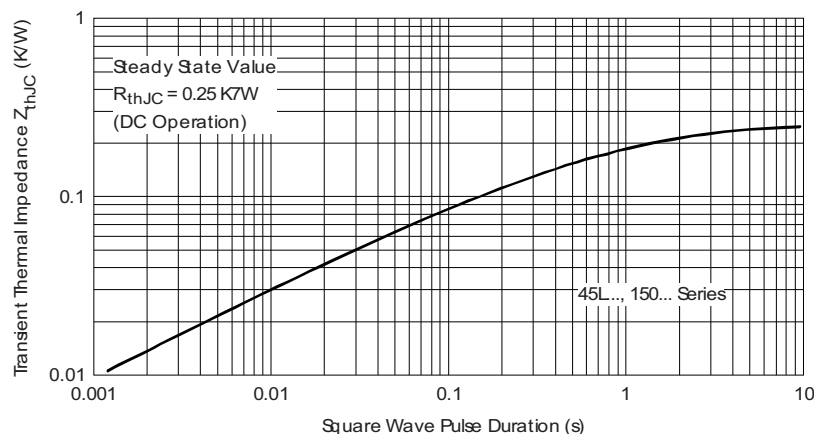


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics



## ORDERING INFORMATION TABLE

|             |                                                                                              |    |   |   |    |
|-------------|----------------------------------------------------------------------------------------------|----|---|---|----|
| Device code | VS-                                                                                          | 45 | L | R | 60 |
|             | 1                                                                                            | 2  | 3 | 4 | 5  |
| 1           | - Vishay Semiconductors product                                                              |    |   |   |    |
| 2           | - 45 = standard version                                                                      |    |   |   |    |
| 3           | - L = essential part number                                                                  |    |   |   |    |
| 4           | - R = stud reverse polarity (anode to stud)<br>None = stud normal polarity (cathode to stud) |    |   |   |    |
| 5           | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                  |    |   |   |    |

|             |                                                                                              |    |   |   |   |    |   |
|-------------|----------------------------------------------------------------------------------------------|----|---|---|---|----|---|
| Device code | VS-                                                                                          | 15 | 0 | K | R | 60 | A |
|             | 1                                                                                            | 2  | 3 | 4 | 5 | 6  | 7 |
| 1           | - Vishay Semiconductors product                                                              |    |   |   |   |    |   |
| 2           | - 15 = essential part number                                                                 |    |   |   |   |    |   |
| 3           | - 0 = standard device                                                                        |    |   |   |   |    |   |
| 4           | - Case style:<br>K = DO-8 (DO-205AA)<br>KS = B-42                                            |    |   |   |   |    |   |
| 5           | - R = stud reverse polarity (anode to stud)<br>None = stud normal polarity (cathode to stud) |    |   |   |   |    |   |
| 6           | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                  |    |   |   |   |    |   |
| 7           | - A = essential part number for 150K (omitted for 150KS)                                     |    |   |   |   |    |   |

### Note

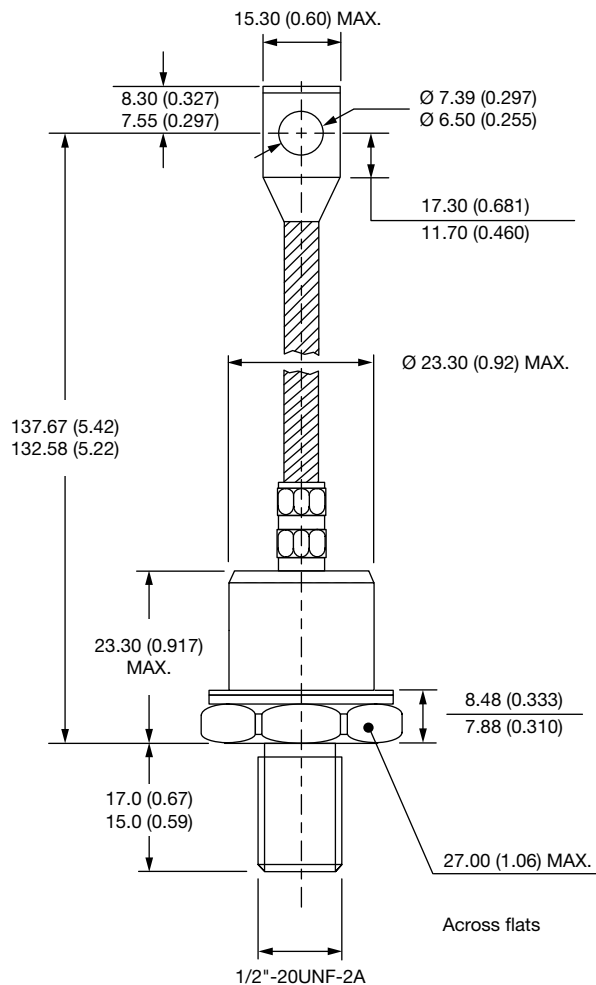
- For metric device M12 x 1.75 contact factory

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



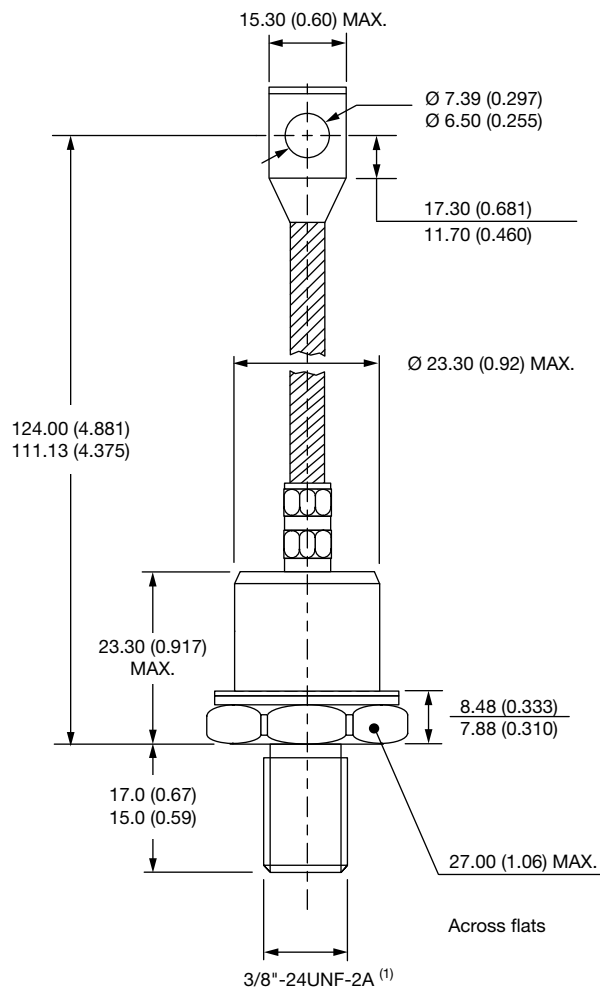
## DO-205AC (DO-30), DO-205AA (DO-8) and B-42 for 45L(R), 150K(R) and 150KS(R) Series

**DIMENSIONS FOR 45L(R) SERIES - DO-205AC (DO-30)** in millimeters (inches)





## DIMENSIONS FOR 150K(R) SERIES - DO-205AA (DO-8) in millimeters (inches)

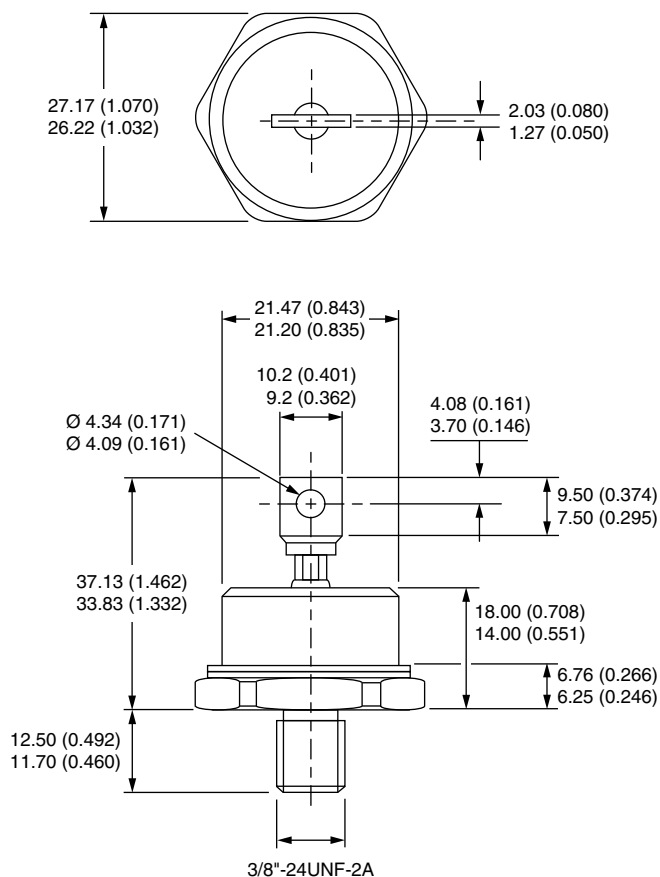


### Note

<sup>(1)</sup> For metric device M12 x 1.75 contact factory



## DIMENSIONS FOR 150KS(R) SERIES - B-42 in millimeters (inches)





## Disclaimer

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