

## Standard Recovery Diodes, (Stud Version), 320 A



DO-9 (DO-205AB)

### FEATURES

- Diffused diode
- Wide current range
- High voltage ratings up to 1200 V
- High surge current capabilities
- Stud cathode and stud anode version
- Hermetic metal case
- 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

- Welders
- Power supplies
- Machine tool controls
- High power drives
- Medium traction applications
- Battery charges
- Freewheeling diodes

### PRIMARY CHARACTERISTICS

|                       |                 |
|-----------------------|-----------------|
| $I_{F(AV)}$           | 320 A           |
| Package               | DO-9 (DO-205AB) |
| Circuit configuration | Single          |

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES      | UNITS             |
|--------------|-----------------|-------------|-------------------|
| $I_{F(AV)}$  |                 | 320         | A                 |
|              | $T_C$           | 100         | °C                |
| $I_{F(RMS)}$ |                 | 500         | A                 |
| $I_{FSM}$    | 50 Hz           | 4500        | A                 |
|              | 60 Hz           | 4700        |                   |
| $I^2t$       | 50 Hz           | 101         | kA <sup>2</sup> s |
|              | 60 Hz           | 92          |                   |
| $V_{RRM}$    | Range           | 600 to 1200 | V                 |
| $T_J$        |                 | -40 to +180 | °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 $T_J = T_J$ MAXIMUM<br>mA |
|--------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------|
| VS-240U(R).. | 60           | 600                                                      | 700                                                          | 15                                             |
|              | 80           | 800                                                      | 900                                                          |                                                |
|              | 100          | 1000                                                     | 1100                                                         |                                                |
|              | 120          | 1200                                                     | 1300                                                         |                                                |

**FORWARD CONDUCTION**

| PARAMETER                                                     | SYMBOL        | TEST CONDITIONS                                                |                           | VALUES | UNITS              |
|---------------------------------------------------------------|---------------|----------------------------------------------------------------|---------------------------|--------|--------------------|
| Maximum average forward current at case temperature           | $I_{F(AV)}$   | 180° conduction, half sine wave                                |                           | 320    | A                  |
| Maximum RMS forward current                                   | $I_{F(RMS)}$  | DC at 80 °C case temperature                                   |                           | 500    | °C                 |
| Maximum peak, one cycle forward, non-repetitive surge current | $I_{FSM}$     | t = 10 ms                                                      | No voltage reapplied      | 4500   | A                  |
|                                                               |               | t = 8.3 ms                                                     | No voltage reapplied      | 4700   |                    |
|                                                               |               | t = 10 ms                                                      | 100 % $V_{RRM}$ reapplied | 3800   |                    |
|                                                               |               | t = 8.3 ms                                                     | 100 % $V_{RRM}$ reapplied | 4000   |                    |
| Maximum $I^2t$ for fusing                                     | $I^2t$        | t = 10 ms                                                      | No voltage reapplied      | 101    | kA <sup>2</sup> s  |
|                                                               |               | t = 8.3 ms                                                     | No voltage reapplied      | 92     |                    |
|                                                               |               | t = 10 ms                                                      | 100 % $V_{RRM}$ reapplied | 72     |                    |
|                                                               |               | t = 8.3 ms                                                     | 100 % $V_{RRM}$ reapplied | 66     |                    |
| Maximum $I^2\sqrt{t}$ for fusing                              | $I^2\sqrt{t}$ | t = 0.1 to 10 ms, no voltage reapplied                         |                           | 1010   | kA <sup>2</sup> √s |
| Slope resistance                                              | $r_f$         | $T_J = T_J$ maximum                                            |                           | 0.6    | mΩ                 |
| Threshold voltage                                             | $V_{F(T0)}$   |                                                                |                           | 0.83   | V                  |
| Maximum forward voltage drop                                  | $V_{FM}$      | $I_{pk} = 750$ A, $T_J = 25$ °C, $t_p = 10$ ms sinusoidal wave |                           | 1.33   |                    |

**THERMAL AND MECHANICAL SPECIFICATIONS**

| PARAMETER                                                | SYMBOL         | TEST CONDITIONS                               | VALUES          | UNITS               |
|----------------------------------------------------------|----------------|-----------------------------------------------|-----------------|---------------------|
| Maximum junction operating and storage temperature range | $T_J, T_{Stg}$ |                                               | -40 to 180      | °C                  |
| Maximum thermal resistance, junction to case             | $R_{thJC}$     | DC operation                                  | 0.18            | K/W                 |
| Maximum thermal resistance, case to heatsink             | $R_{thCS}$     | Mounting surface, smooth, flat and greased    | 0.08            |                     |
| Maximum allowable mounting torque +0 -20 %               |                | Not lubricated threads                        | 37 (330)        | N · m<br>(lbf · in) |
|                                                          |                | Lubricated threads                            | 28 (250)        |                     |
| Approximate weight                                       |                |                                               | 250             | g                   |
| Case style                                               |                | See dimensions - link at the end of datasheet | DO-9 (DO-205AB) |                     |

 **$\Delta R_{thJC}$  CONDUCTION**

| CONDUCTION ANGLE | SINUSOIDAL CONDUCTION | RECTANGULAR CONDUCTION | TEST CONDITIONS     | UNITS |
|------------------|-----------------------|------------------------|---------------------|-------|
| 180°             | 0.019                 | 0.015                  | $T_J = T_J$ maximum | K/W   |
| 120°             | 0.023                 | 0.025                  |                     |       |
| 90°              | 0.030                 | 0.034                  |                     |       |
| 60°              | 0.045                 | 0.047                  |                     |       |
| 30°              | 0.076                 | 0.076                  |                     |       |

**Note**

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

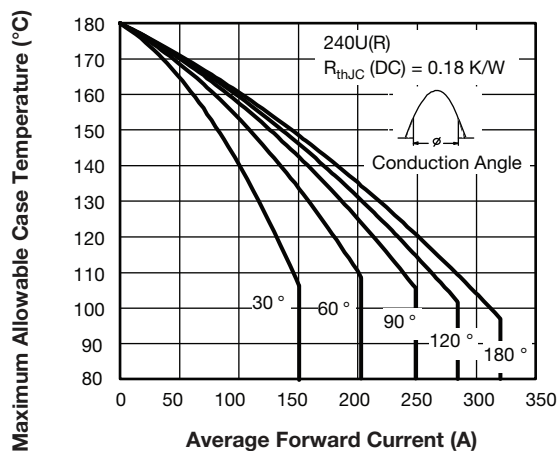


Fig. 1 - Current Ratings Characteristics

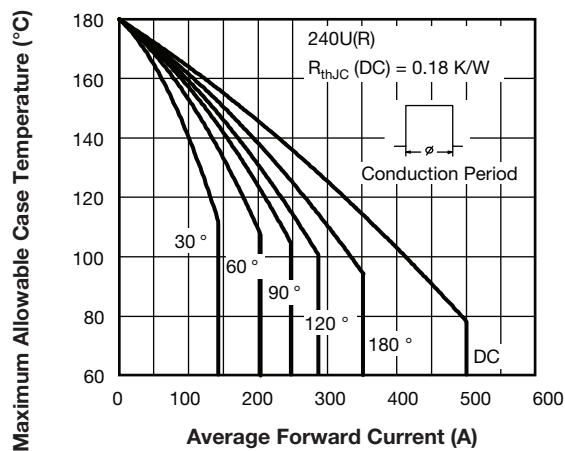


Fig. 2 - Current Ratings Characteristics

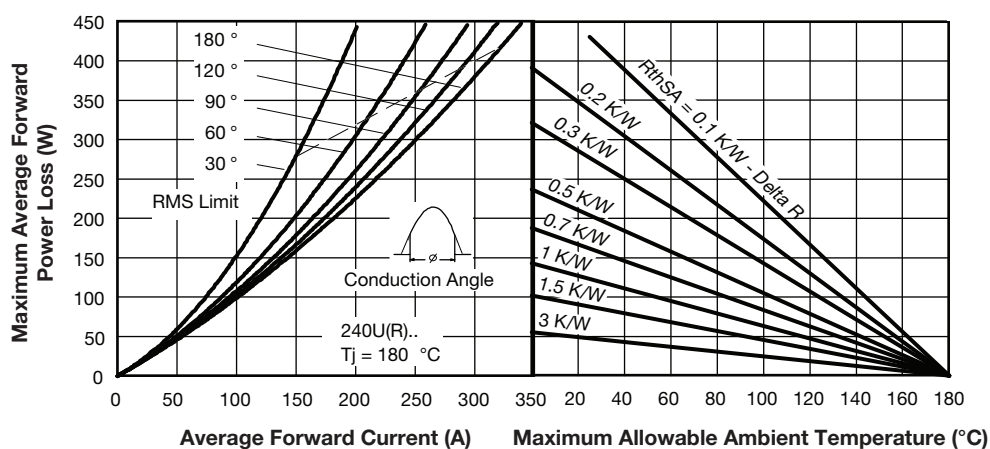


Fig. 3 - Forward Power Loss Characteristics

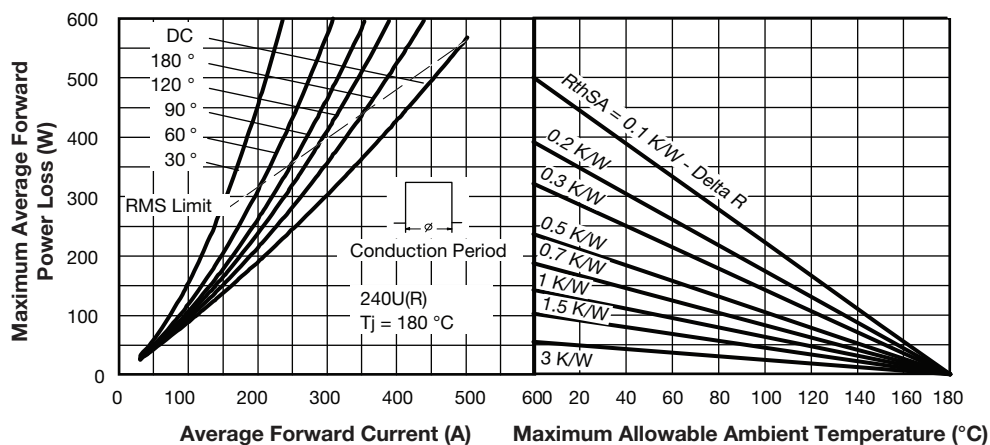


Fig. 4 - Forward Power Loss Characteristics

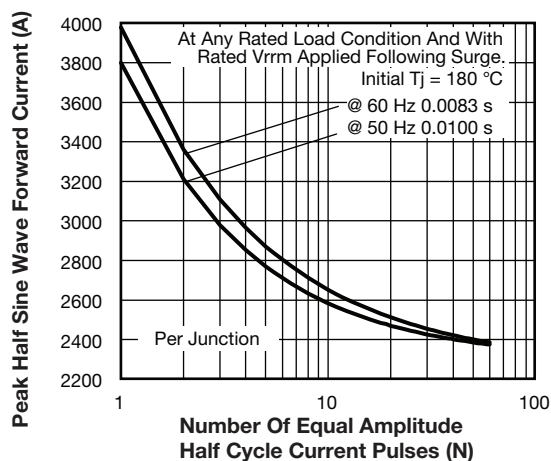


Fig. 5 - Maximum Non-Repetitive Surge Current

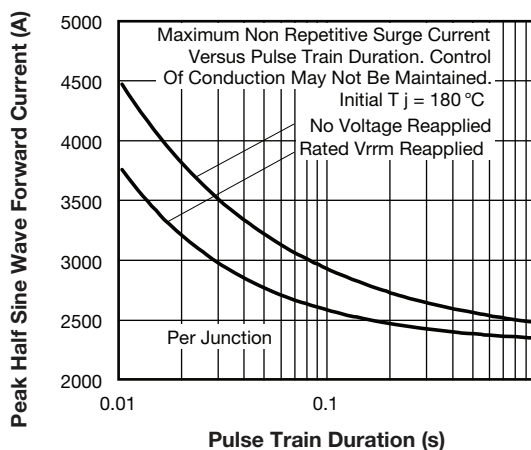


Fig. 6 - Maximum Non-Repetitive Surge Current

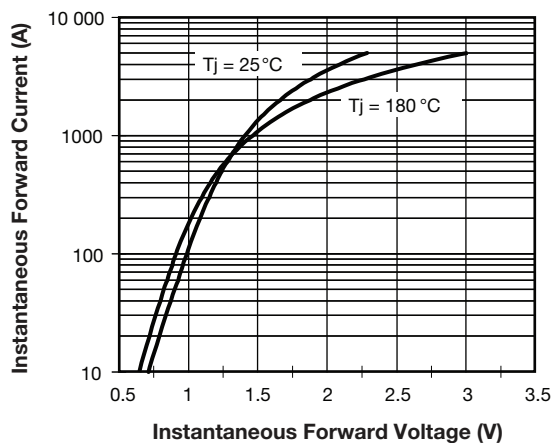
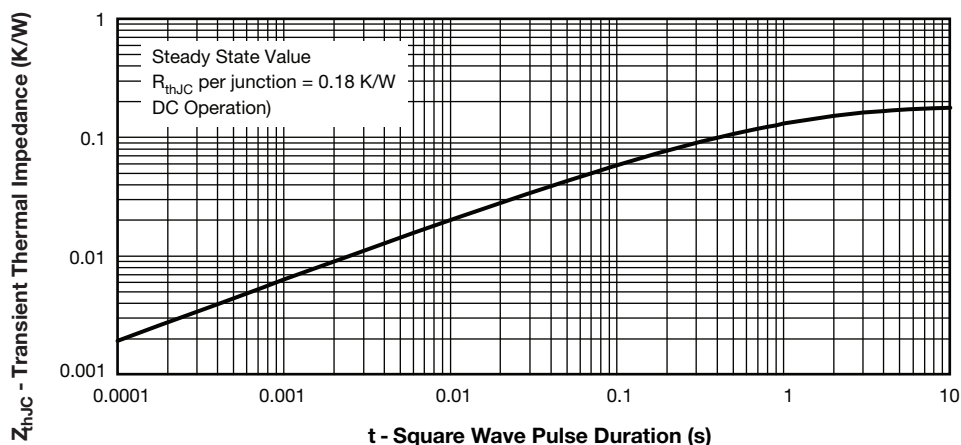


Fig. 7 - Forward Voltage Drop Characteristics


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



ORDERING INFORMATION TABLE

|             |                                                                                                  |    |   |   |   |    |   |
|-------------|--------------------------------------------------------------------------------------------------|----|---|---|---|----|---|
| Device code | VS-                                                                                              | 24 | 0 | U | R | 60 | D |
|             | 1                                                                                                | 2  | 3 | 4 | 5 | 6  | 7 |
| 1           | - Vishay Semiconductors product                                                                  |    |   |   |   |    |   |
| 2           | - 24 = essential part number                                                                     |    |   |   |   |    |   |
| 3           | - 0 = standard device                                                                            |    |   |   |   |    |   |
| 4           | - U = stud normal polarity (cathode to stud)                                                     |    |   |   |   |    |   |
| 5           | - • None = stud normal polarity (cathode to stud)<br>• R = stud reverse polarity (anode to stud) |    |   |   |   |    |   |
| 6           | - Voltage code x 10 = $V_{RRM}$ (see Voltage Ratings table)                                      |    |   |   |   |    |   |
| 7           | - Diffused diode                                                                                 |    |   |   |   |    |   |

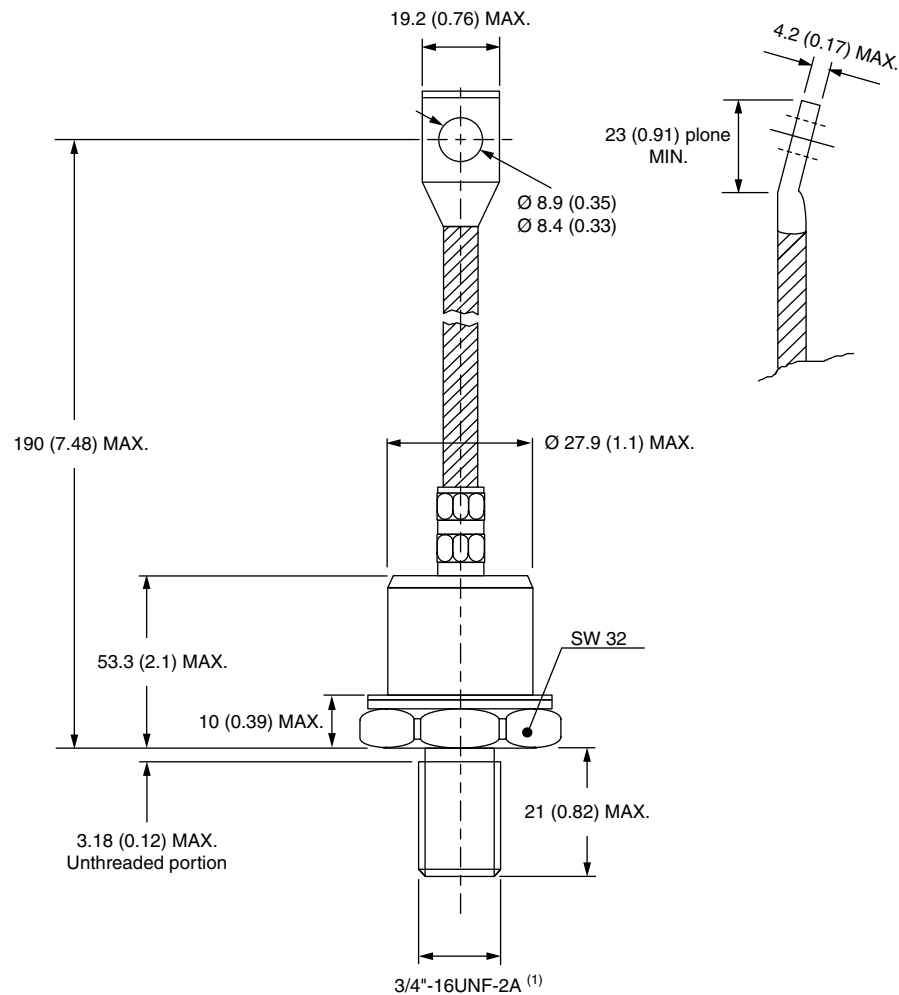
Note

- For metric device M16 x 1.5 contact factory

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95317">www.vishay.com/doc?95317</a> |

## DO-205AB (DO-9) for 240U(R) Series

**DIMENSIONS** in millimeters (inches)



**Note**

<sup>(1)</sup> For metric device M16 x 1.5 contact factory



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