



# 1N1183, 1N3765, 1N1183A, 1N2128A Series

Vishay High Power Products

## Power Silicon Rectifier Diodes, 35 A/40 A/60 A



### DESCRIPTION/FEATURES

- Low leakage current series
- Good surge current capability up to 1000 A
- Can be supplied to meet stringent military, aerospace and other high reliability requirements
- Compliant to RoHS directive 2002/95/EC



**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

|             |                |
|-------------|----------------|
| $I_{F(AV)}$ | 35 A/40 A/60 A |
|-------------|----------------|

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER     | TEST CONDITIONS | 1N1183                   | 1N3765                     | 1N1183A                  | 1N2128A                  | UNITS             |
|---------------|-----------------|--------------------------|----------------------------|--------------------------|--------------------------|-------------------|
| $I_{F(AV)}$   |                 | 35 <sup>(1)</sup>        | 35 <sup>(1)</sup>          | 40 <sup>(1)</sup>        | 60 <sup>(1)</sup>        | A                 |
|               | $T_C$           | 140 <sup>(1)</sup>       | 140 <sup>(1)</sup>         | 150 <sup>(1)</sup>       | 140 <sup>(1)</sup>       | °C                |
| $I_{FSM}$     | 50 Hz           | 480                      | 380                        | 765                      | 860                      | A                 |
|               | 60 Hz           | 500 <sup>(1)</sup>       | 400 <sup>(1)</sup>         | 800 <sup>(1)</sup>       | 900 <sup>(1)</sup>       |                   |
| $I^2t$        | 50 Hz           | 1140                     | 730                        | 2900                     | 3700                     | A <sup>2</sup> s  |
|               | 60 Hz           | 1040                     | 670                        | 2650                     | 3400                     |                   |
| $I^2\sqrt{t}$ |                 | 16 100                   | 10 300                     | 41 000                   | 52 500                   | A <sup>2</sup> √s |
| $V_{RRM}$     | Range           | 50 to 600 <sup>(1)</sup> | 700 to 1000 <sup>(1)</sup> | 50 to 600 <sup>(1)</sup> | 50 to 600 <sup>(1)</sup> | V                 |

#### Note

<sup>(1)</sup> JEDEC registered values

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

| TYPE NUMBER |         |         | $V_{RRM}$ , MAXIMUM REPETITIVE<br>PEAK REVERSE VOLTAGE<br>( $T_J = -65\text{ °C TO }200\text{ °C}^{(2)}$ )<br>V | $V_{RM}$ , MAXIMUM DIRECT<br>REVERSE VOLTAGE<br>( $T_J = -65\text{ °C TO }200\text{ °C}^{(2)}$ )<br>V |
|-------------|---------|---------|---|---|
| 1N1183      | 1N1183A | 1N2128A | 50 <sup>(1)</sup>   | 50 <sup>(1)</sup>   |
| 1N1184      | 1N1184A | 1N2129A | 100 <sup>(1)</sup>  | 100 <sup>(1)</sup>  |
| 1N1185      | 1N1185A | 1N2130A | 150 <sup>(1)</sup>  | 150 <sup>(1)</sup>  |
| 1N1186      | 1N1186A | 1N2131A | 200 <sup>(1)</sup>  | 200 <sup>(1)</sup>  |
| 1N1187      | 1N1187A | 1N2133A | 300 <sup>(1)</sup>  | 300 <sup>(1)</sup>  |
| 1N1188      | 1N1188A | 1N2135A | 400 <sup>(1)</sup>  | 400 <sup>(1)</sup>  |
| 1N1189      | 1N1189A | 1N2137A | 500 <sup>(1)</sup>  | 500 <sup>(1)</sup>  |
| 1N1190      | 1N1190A | 1N2138A | 600 <sup>(1)</sup>  | 600 <sup>(1)</sup>  |
| 1N3765      |         |         | 700 <sup>(1)</sup>  | 700 <sup>(1)</sup>  |
| 1N3766      |         |         | 800 <sup>(1)</sup>  | 800 <sup>(1)</sup>  |
| 1N3767      |         |         | 900 <sup>(1)</sup>  | 900 <sup>(1)</sup>  |
| 1N3768      |         |         | 1000 <sup>(1)</sup>   | 1000 <sup>(1)</sup>   |

#### Notes

<sup>(1)</sup> JEDEC registered values

<sup>(2)</sup> For 1N1183 Series and 1N3765 Series  $T_C = -65\text{ °C to }190\text{ °C}$

- Basic type number indicates cathode to case. For anode to case, add "R" to part number, e.g., 1N1188R, 1N3766R, 1N1186AR, 1N2135AR

# 1N1183, 1N3765, 1N1183A, 1N2128A Series



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| FORWARD CONDUCTION   |                              |  |   |                    |                    |                    |                    |                   |   |
|--|------------------------------|--|---|--------------------|--------------------|--------------------|--------------------|-------------------|---|
| PARAMETER  | SYMBOL                       | TEST CONDITIONS                                      |   | 1N1183             | 1N3765             | 1N1183A            | 1N2128A            | UNITS             |   |
| Maximum average forward current at case temperature                  | $I_{F(AV)}$                  | 1-phase operation, 180° sinusoidal conduction        |   | 35 <sup>(1)</sup>  | 35 <sup>(1)</sup>  | 40 <sup>(1)</sup>  | 60 <sup>(1)</sup>  | A                 |   |
|  |                              |  |   | 140 <sup>(1)</sup> | 140 <sup>(1)</sup> | 150 <sup>(1)</sup> | 140 <sup>(1)</sup> | °C                |   |
| Maximum peak one cycle non-repetitive surge current                  | $I_{FSM}$                    | Half cycle 50 Hz sine wave or 6 ms rectangular pulse | Following any rated load condition and with rated $V_{RRM}$ applied                           | 480                | 380                | 765                | 860                | A                 |   |
|  |                              |  |   | 500 <sup>(1)</sup> | 400 <sup>(1)</sup> | 800 <sup>(1)</sup> | 900 <sup>(1)</sup> |                   |   |
|  |                              | Half cycle 60 Hz sine wave or 5 ms rectangular pulse | Following any rated load condition and with $\frac{1}{2} V_{RRM}$ applied following surge = 0 | 570                | 455                | 910                | 1000               |                   |   |
|  |                              |  |   | 595                | 475                | 950                | 1050               |                   |   |
| Maximum $I^2t$ for fusing  | $I^2t$                       | t = 10 ms  | With rated $V_{RRM}$ applied following surge, initial $T_J = T_J$ maximum                     | 1140               | 730                | 2900               | 3700               | A <sup>2</sup> s  |   |
|  |                              | t = 8.3 ms   |   | 1040               | 670                | 2650               | 3400               |                   |   |
| Maximum $I^2t$ for individual device fusing                          |                              | t = 10 ms  | With $V_{RRM} = 0$ following surge, initial $T_J = T_J$ maximum                               | 1610               | 1030               | 4150               | 5250               |                   |   |
|  |                              | t = 8.3 ms   |   | 1470               | 940                | 3750               | 4750               |                   |   |
| Maximum $I^2\sqrt{t}$ for individual device fusing                   | $I^2\sqrt{t}$ <sup>(2)</sup> | t = 0.1 to 10 ms, $V_{RRM} = 0$ following surge      |   | 16 100             | 10 300             | 41 500             | 52 500             | A <sup>2</sup> √s |   |
| Maximum peak forward voltage at maximum forward current ( $I_{FM}$ ) | $V_{FM}$                     | $T_J = 25$ °C  |   | 1.7 <sup>(1)</sup> | 1.8 <sup>(1)</sup> | 1.3 <sup>(1)</sup> | 1.3 <sup>(1)</sup> | V                 |   |
|  |                              |  |   | 110                | 110                | 126                | 188                | A                 |   |
| Maximum average reverse current                                      | $I_{R(AV)}$                  | $V_{RRM} = 700$                                      | Maximum rated $I_{F(AV)}$ and $T_C$   | -                  | 5.0 <sup>(1)</sup> | -                  | -                  | mA                |   |
|  |                              |  |   | $V_{RRM} = 800$    | -                  | 4.0 <sup>(1)</sup> | -                  |                   | - |
|  |                              |  |   | $V_{RRM} = 900$    | -                  | 3.0 <sup>(1)</sup> | -                  |                   | - |
|  |                              |  |   | $V_{RRM} = 1000$   | -                  | 2.0 <sup>(1)</sup> | -                  |                   | - |
|  |                              | Maximum rated $I_{F(AV)}$ , $V_{RRM}$ and $T_C$      | 10 <sup>(1)</sup>   | -                  | 2.5 <sup>(1)</sup> | 10 <sup>(1)</sup>  |                    |                   |   |

## Notes

<sup>(1)</sup> JEDEC registered values

<sup>(2)</sup>  $I^2t$  for time  $t_x = I^2\sqrt{t} \times \sqrt{t_x}$



# 1N1183, 1N3765, 1N1183A, 1N2128A Series

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| THERMAL AND MECHANICAL SPECIFICATIONS                 |            |   |                            |        |                    |                     |                     |
|---|------------|---|----------------------------|--------|--------------------|---------------------|---------------------|
| PARAMETER   | SYMBOL     | TEST CONDITIONS   | 1N1183                     | 1N3765 | 1N1183A            | 1N2128A             | UNITS               |
| Maximum operating case temperature range              | $T_C$      |   | - 65 to 190 <sup>(1)</sup> |        | - 65 to 200        |                     | °C                  |
| Maximum storage temperature range                     | $T_{Stg}$  |   | - 65 to 175 <sup>(1)</sup> |        | - 65 to 200        |                     |                     |
| Maximum internal thermal resistance, junction to case | $R_{thJC}$ | DC operation  | 1.00 <sup>(1)</sup>        |        | 1.1 <sup>(1)</sup> | 0.65 <sup>(1)</sup> | °C/W                |
| Thermal resistance, case to sink                      | $R_{thCS}$ | Mounting surface, smooth, flat and greased                  | 0.25                       |        |                    |                     |                     |
| Maximum allowable mounting torque (+ 0 %, - 10 %)     |            | Not lubricated thread, tightening on nut <sup>(2)</sup>     | 3.4 (30)                   |        |                    |                     | N · m<br>(lbf · in) |
|   |            | Lubricated thread, tightening on nut <sup>(2)</sup>         | 2.3 (20)                   |        |                    |                     |                     |
|   |            | Not lubricated thread, tightening on hexagon <sup>(3)</sup> | 4.2 (37)                   |        |                    |                     |                     |
|   |            | Lubricated thread, tightening on hexagon <sup>(3)</sup>     | 3.2 (28)                   |        |                    |                     |                     |
| Approximate weight                                    |            |   | 17                         |        |                    |                     | g                   |
|   |            |   | 0.6                        |        |                    |                     | oz.                 |
| Case style  |            | JEDEC   | DO-203AB (DO-5)            |        |                    |                     |                     |

### Notes

- (1) JEDEC registered values
- (2) Recommended for pass-through holes
- (3) Recommended for holed threaded heatsinks



Fig. 1 - Maximum Allowable Case Temperature vs. Average Forward Current, 1N1183 and 1N3765 Series



Fig. 2 - Typical Low Level Forward Power Loss vs. Average Forward Current (Sinusoidal Current Waveform), 1N1183 and 1N3765 Series

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Fig. 3 - Typical High Level Forward Power Loss vs. Average Forward Current (Sinusoidal Current Waveform), 1N1183 and 1N3765 Series



Fig. 6 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N1183A Series



Fig. 4 - Typical Forward Voltage vs. Forward Current, 1N1183 and 1N3765 Series



Fig. 7 - Maximum Low Level Forward Power Loss vs. Average Forward Current, 1N1183A Series



Fig. 5 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N1183 and 1N3765 Series



Fig. 8 - Maximum High Level Forward Power Loss vs. Average Forward Current, 1N1183A Series



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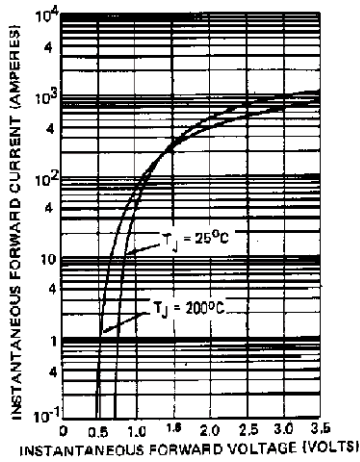


Fig. 9 - Maximum Forward Voltage vs. Forward Current, 1N1183A Series



Fig. 12 - Maximum Allowable Case Temperature vs. Average Forward Current, 1N2128A Series



Fig. 10 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N1183A Series



Fig. 13 - Maximum Low Level Forward Power Loss vs. Average Forward Current, 1N2128A Series



Fig. 11 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N2128A Series



Fig. 14 - Maximum High Level Forward Power Loss vs. Average Forward Current, 1N2128A Series

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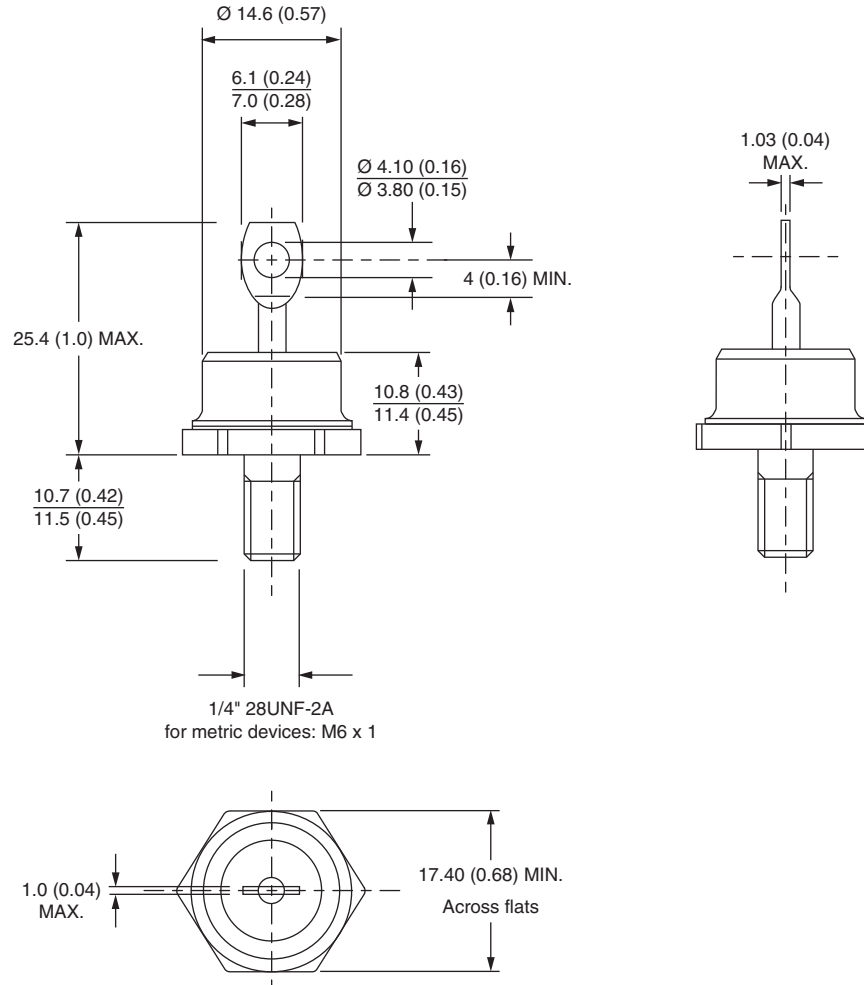


Fig. 15 - Maximum Forward Voltage vs. Forward Current, 1N2128A Series

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95360">www.vishay.com/doc?95360</a> |

## DO-203AB (DO-5) for 1N1183, 1N3765, 1N1183A, 1N2128A, 1N3208 Series

**DIMENSIONS** in millimeters (inches)





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