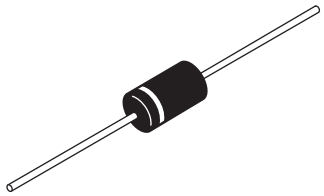
# Schottky Rectifier, 3.0 A



C-16


## FEATURES

- Low profile, axial leaded outline
- High frequency operation
- Very low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for commercial level
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)

Pb e3 RoHS COMPLIANT HALOGEN FREE Available

## DESCRIPTION

The VS-1N5820... axial leaded Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

| PRODUCT SUMMARY | |
|---|---|
| Package | DO-201AD (C-16) |
| $I_{F(AV)}$ | 3 A |
| $V_R$ | 20 V |
| $V_F$ at $I_F$ | See Electrical table |
| $I_{RM}$ max. | 20 mA at 100 °C |
| $T_J$ max. | 150 °C |
| Diode variation | Single die |
| $E_{AS}$ | See Electrical table |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 3.0 | A |
| $V_{RRM}$ | | 20 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 450 | A |
| $V_F$ | 3 Apk, $T_J$ = 25 °C | 0.475 | V |
| $T_J$ | Range | - 65 to 150 | °C |

| VOLTAGE RATINGS | | | | |
|---|---|---|---|---|
| PARAMETER | SYMBOL | VS-1N5820 | VS-1N5820-M3 | UNITS |
| Maximum DC reverse voltage | $V_R$ | 20 | 20 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_L$ = 114 °C, rectangular waveform With cooling fins | | 3.0 | A |
| Maximum peak one cycle non-repetitive surge current at $T_J$ = 25 °C | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 450 | |
| | | 10 ms sine or 6 ms rect. pulse | | 90 | |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| Maximum forward voltage drop | $V_{FM}$ (1) | 3 A | $T_J$ = 25 °C | 0.41 | 0.475 | V |
| | | 9.4 A | | 0.49 | 0.85 | |
| Maximum reverse leakage current | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 0.05 | 2.0 | mA |
| | | $T_J$ = 100 °C | | 8.1 | 20 | |
| Typical junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 °C | | 350 | - | pF |
| Typical series inductance | $L_S$ | Measured lead to lead 5 mm from package body | | 9.0 | - | nH |
| Maximum voltage rate of change | dV/dt | Rated $V_R$ | | - | 10 000 | V/µs |

**Note**

(1) Pulse width < 300 µs, duty cycle < 2 %

## THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|
| Maximum junction and storage temperature range | $T_J$ (1), $T_{Stg}$ | | - 65 to 150 | °C |
| Maximum thermal resistance, junction to lead | $R_{thJL}$ | With fin 20 x 20 (0.79 x 0.79) 1.0 thick | 34 | °C/W |
| Maximum thermal resistance, junction to ambient | $R_{thJA}$ | DC operation<br>Without cooling fin | 80 | |
| Approximate weight | | | 1.2 | g |
| | | | 0.042 | oz. |
| Marking device | | Case style C-16 | 1N5820 | |

**Note**

(1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink

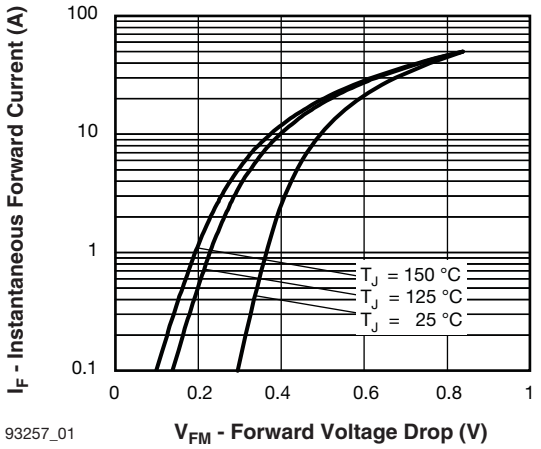



Fig. 1 - Maximum Forward Voltage Drop Characteristics

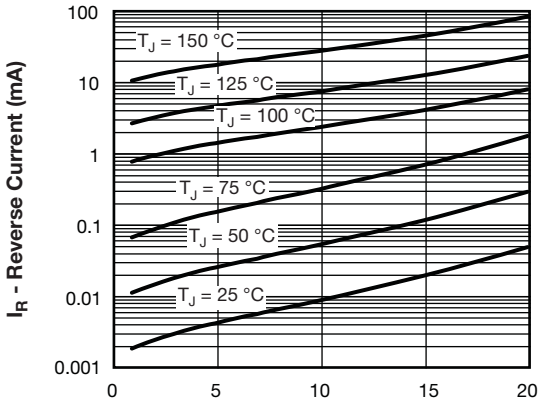



Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

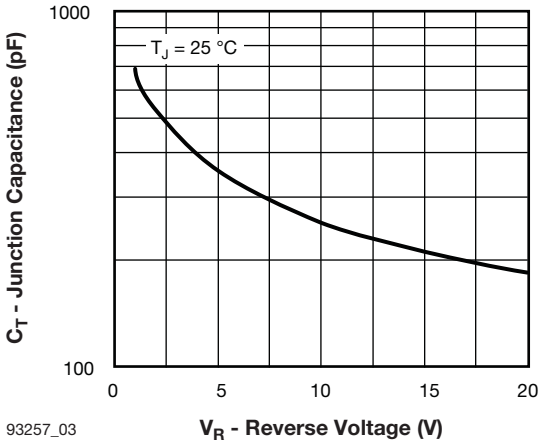



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

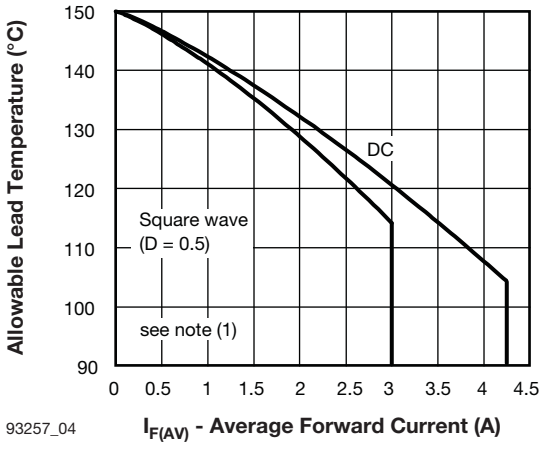



Fig. 4 - Typical Average Forward Current vs. Allowable Lead Temperature

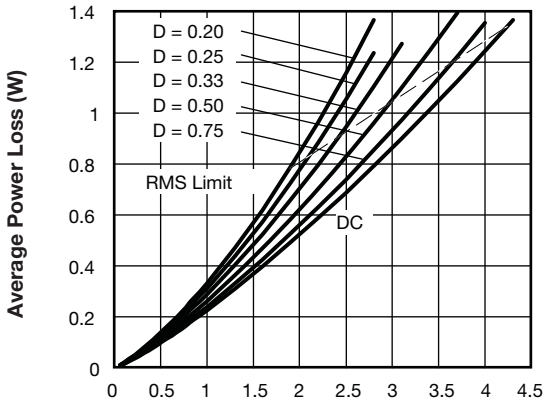



Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

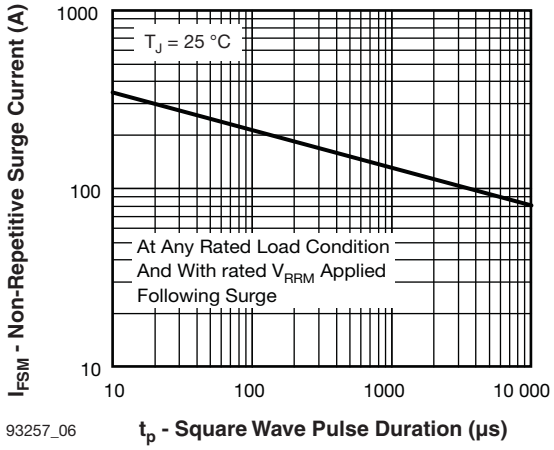


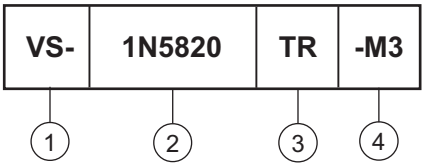

Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

**Note**

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6); $Pd_{REV}$ = Inverse power loss = $V_{R1} \times I_R$ (1 - D)

## ORDERING INFORMATION TABLE

Device code




1 - Vishay Semiconductors product

2 - Part number: 3 A, 20 V

3 - TR = Tape and reel package

None = Bulk package

4 - Environmental digit

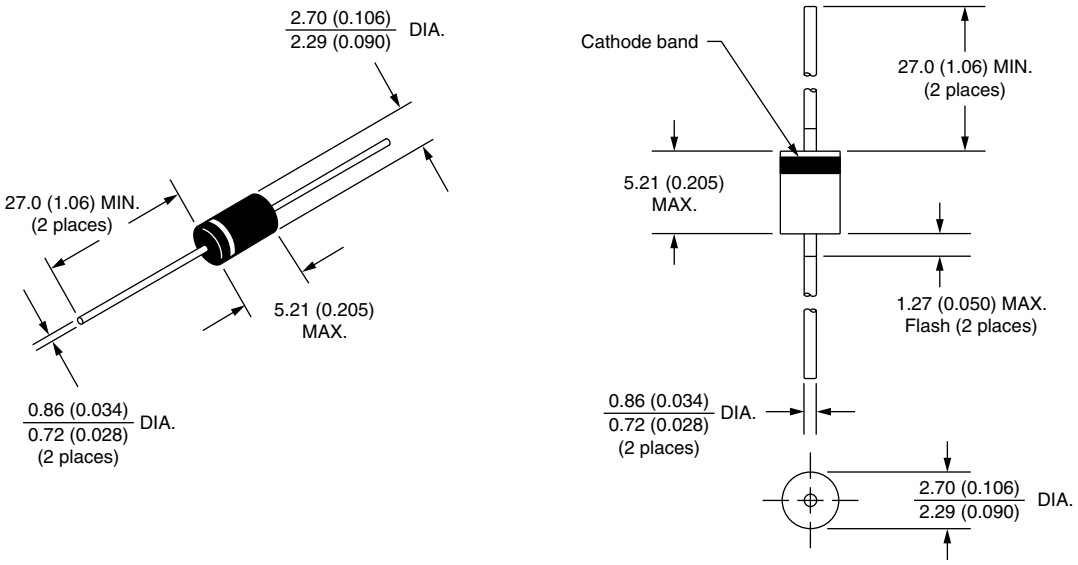
- None = Lead (Pb)-free and RoHS compliant
- -M3 = Halogen-free, RoHS compliant, and terminations lead (Pb)-free

| **ORDERING INFORMATION** (Example) | | | |
|---|---|---|---|
| **PREFERRED P/N** | **QUANTITY PER T/R** | **MINIMUM ORDER QUANTITY** | **PACKAGING DESCRIPTION** |
| VS-1N5820 | 500 | 500 | Bulk |
| VS-1N5820TR | 1200 | 1200 | Tape and reel |
| VS-1N5820-M3 | 500 | 500 | Bulk |
| VS-1N5820TR-M3 | 1200 | 1200 | Tape and reel |

| **LINKS TO RELATED DOCUMENTS** | |
|---|---|
| Dimensions | www.vishay.com/doc?95242 |
| Part marking information | www.vishay.com/doc?95304 |
| Packaging information | www.vishay.com/doc?95338 |

# Axial DO-204AL (DO-41)

**DIMENSIONS** in millimeters (inches)



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