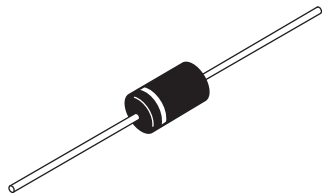


Schottky Rectifier, 3.0 A



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)



RoHS
COMPLIANT
HALOGEN
FREE
Available

| 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 |

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.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|------------------------------|-------------|-------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 3.0 | A |
| V_{RRM} | | 20 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 450 | A |
| V_F | 3 Apk, $T_J = 25 \text{ °C}$ | 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 $T_L = 114 \text{ °C}$, rectangular waveform With cooling fins | | 3.0 | A |
| Maximum peak one cycle non-repetitive surge current at $T_J = 25 \text{ °C}$ | 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 | |

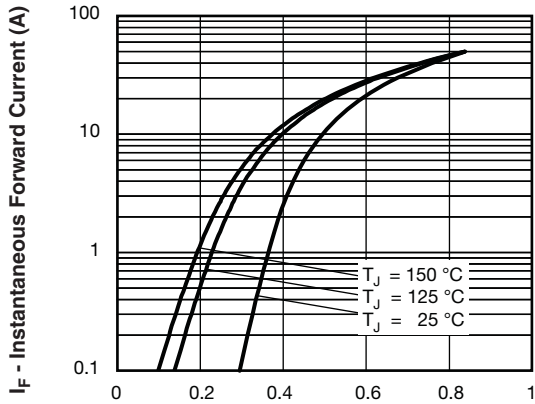


| ELECTRICAL SPECIFICATIONS | | | | | | |
|---------------------------------|----------------|--|----------------------------------|------|--------|------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | TYP. | MAX. | UNITS |
| Maximum forward voltage drop | $V_{FM}^{(1)}$ | 3 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.41 | 0.475 | V |
| | | 9.4 A | | 0.49 | 0.85 | |
| Maximum reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 0.05 | 2.0 | mA |
| | | $T_J = 100\text{ }^\circ\text{C}$ | | 8.1 | 20 | |
| Typical junction capacitance | C_T | $V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$ | | 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 |

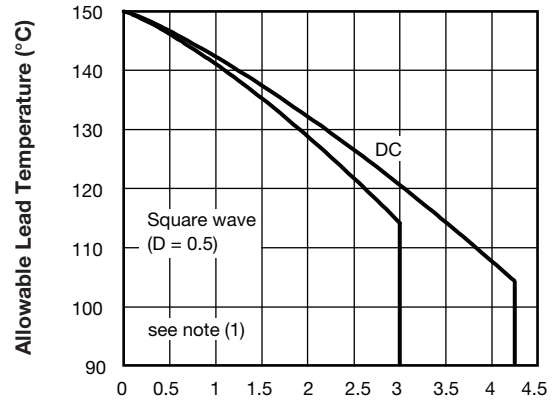
Note(1) Pulse width < 300 μs , duty cycle < 2 %

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

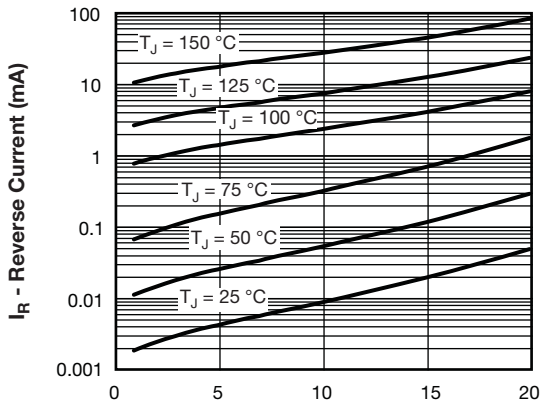
Note(1) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$ thermal runaway condition for a diode on its own heatsink



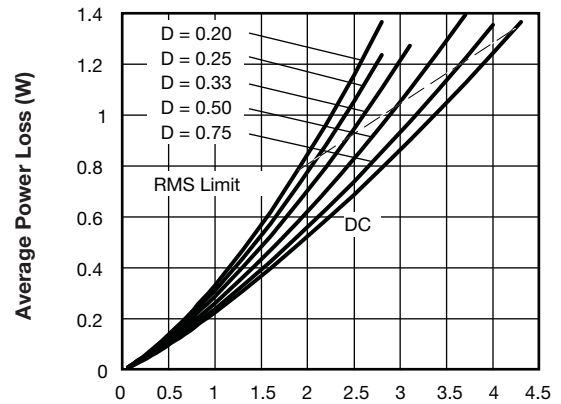
93257_01 **V_{FM} - Forward Voltage Drop (V)**
Fig. 1 - Maximum Forward Voltage Drop Characteristics



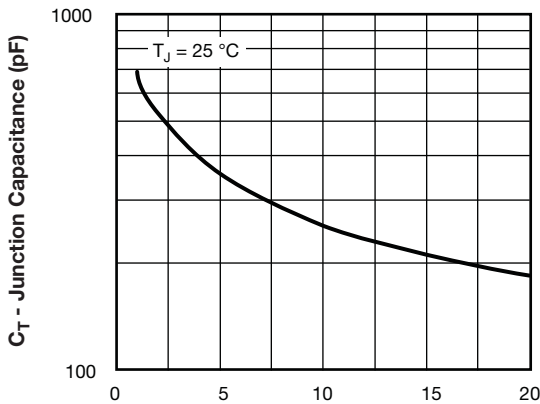
93257_04 **I_{F(AV)} - Average Forward Current (A)**
Fig. 4 - Typical Average Forward Current vs. Allowable Lead Temperature



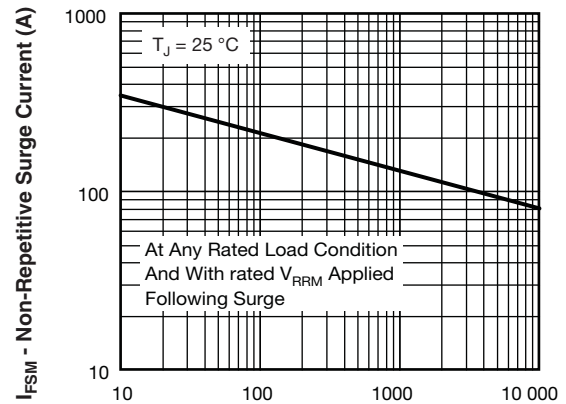
93257_02 **V_R - Reverse Voltage (V)**
Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage



93257_05 **Average Forward Current - I_{F(AV)} (A)**
Fig. 5 - Maximum Average Forward Current vs. Average Forward Current



93257_03 **V_R - Reverse Voltage (V)**
Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage



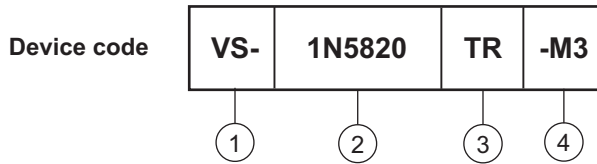
93257_06 **t_p - Square Wave Pulse Duration (µs)**
Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

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



- 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

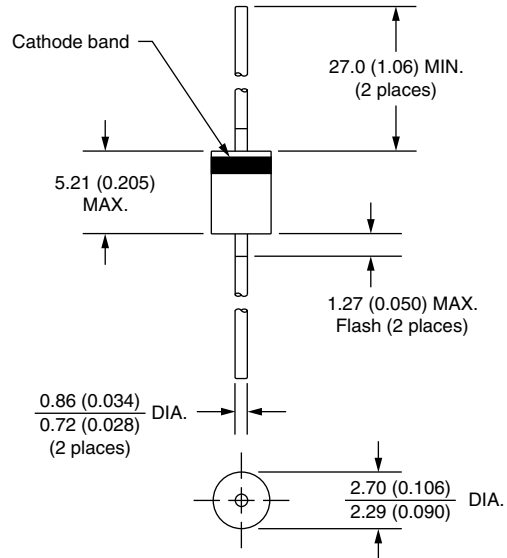
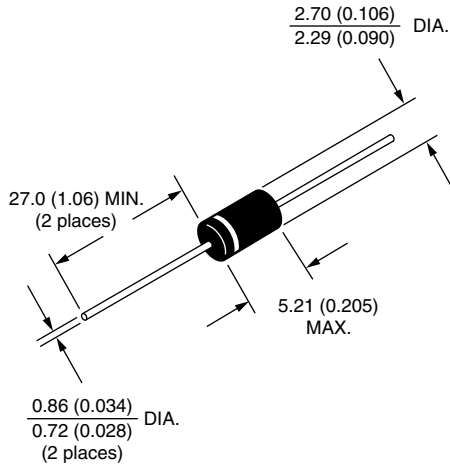
| ORDERING INFORMATION (Example) | | | |
|--------------------------------|------------------|------------------------|-----------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-1N5820 | 500 | 500 | Bulk |
| VS-1N5820TR | 1200 | 1200 | Tape and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