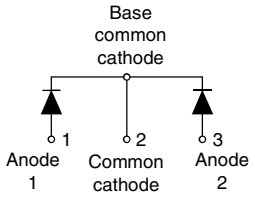
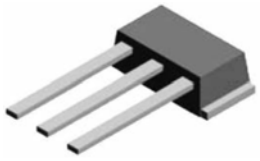
# Schottky Rectifier
# New Generation 3 D-61 Package, 2 x 40 A

**VS-88CNQ060APbF**

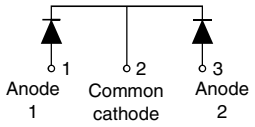
**D-61-8**




**VS-88CNQ060ASMPbF**

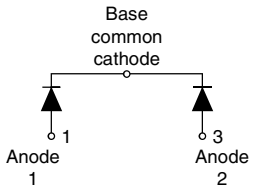


**D-61-8-SM**




**VS-88CNQ060ASLPbF**

**D-61-8-SL**




| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 2 x 40 A |
| $V_R$ | 60 V |
| $I_{RM}$ | 240 mA at 125 °C |

## FEATURES

Pb Available

RoHS* COMPLIANT

- 150 °C $T_J$ operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- New fully transfer-mold low profile, small footprint, high current package
- Through-hole versions are currently available for use in lead (Pb)-free applications (“PbF” suffix)
- Compliant to RoHS directive 2002/95/EC
- Designed and qualified for industrial level

## DESCRIPTION

The center tap Schottky rectifier module has been optimized for very low forward voltage drop with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. 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 | 80 | A |
| $V_{RRM}$ | | 60 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 5000 | A |
| $V_F$ | 40 Apk, $T_J$ = 125 °C (per leg) | 0.56 | V |
| $T_J$ | Range | - 55 to 150 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | VS-88CNQ060APbF | UNITS |
| Maximum DC reverse voltage | $V_R$ | 60 | V |
| Maximum working peak reverse voltage | $V_{RWM}$ | | |

* Pb containing terminations are not RoHS compliant, exemptions may apply

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|---|
| Maximum average forward current See fig. 5 | per leg | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 120 °C, rectangular waveform, rated $V_R$ | | 40 | A |
| | per device | | | | 80 | |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 | | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_R$ applied | 5000 | |
| | | | 10 ms sine or 6 ms rect. pulse | | 600 | |
| Non-repetitive avalanche energy per leg | | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 1 A, L = 0.57 mH | | 75 | mJ |
| Repetitive avalanche current per leg | | $I_{AR}$ | Current decaying linearly to zero in 1 µs Frequency limited by $T_J$ maximum $V_A$ = 1.5 x $V_R$ typical | | 1.0 | A |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop per leg | $V_{FM}$ (1) | 40 A | $T_J$ = 25 °C | 0.58 | V |
| | | 80 A | | 0.77 | |
| | | 40 A | $T_J$ = 125 °C | 0.56 | |
| | | 80 A | | 0.67 | |
| Typical reverse leakage current per leg See fig. 2 | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 0.64 | mA |
| | | $T_J$ = 125 °C | | 240 | |
| Maximum junction capacitance per leg | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 5200 | pF |
| Typical series inductance per leg | $L_S$ | Measured lead to lead 5 mm from package body | | 5.5 | 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 | | $T_J$, $T_{Stg}$ | | - 55 to 150 | °C |
| Maximum thermal resistance, junction to case | per leg | $R_{thJC}$ | DC operation | 0.85 | °C/W |
| | per package | | | 0.42 | |
| Typical thermal resistance, case to heatsink | | $R_{thCS}$ | Mounting surface, smooth and greased Device flatness < 5 mils | 0.30 | |
| Approximate weight | | | | 7.8 | g |
| | | | | 0.28 | oz. |
| Mounting torque | minimum | | | 40 (35) | kgf · cm (lbf · in) |
| | maximum | | | 58 (50) | |
| Marking device | | | Case style D-61 | 88CNQ060A | |
| | | | Case style D-61-8-SM | 88CNQ060ASM | |
| | | | Case style D-61-8-SL | 88CNQ060ASL | |

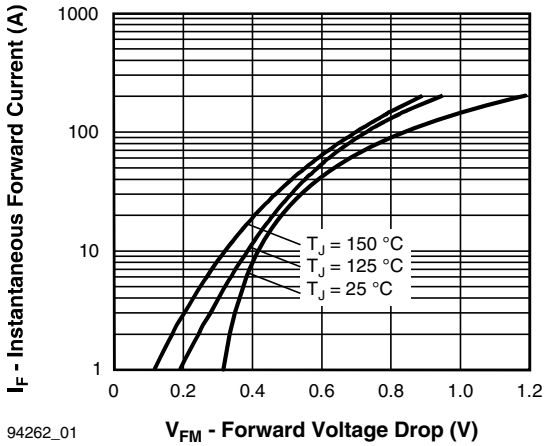



Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

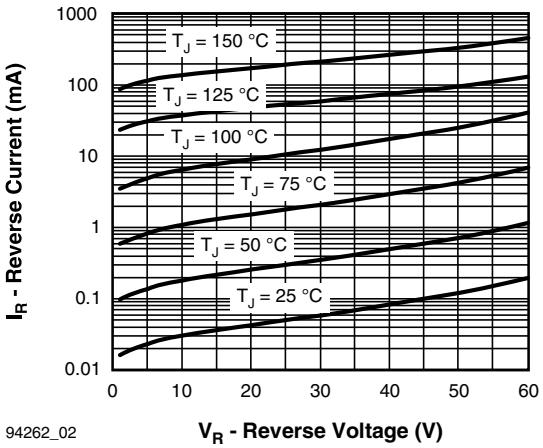



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

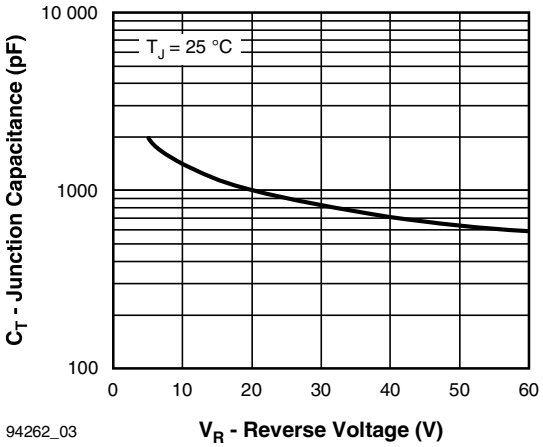



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

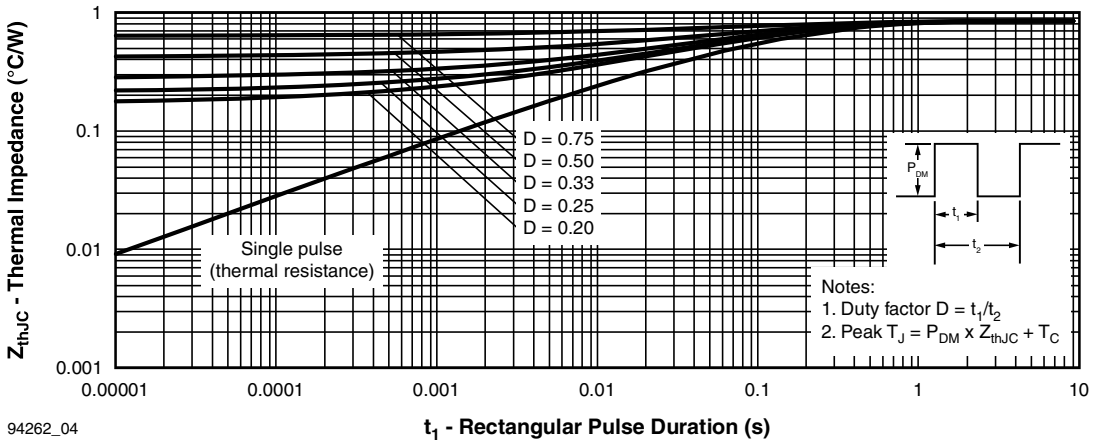



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

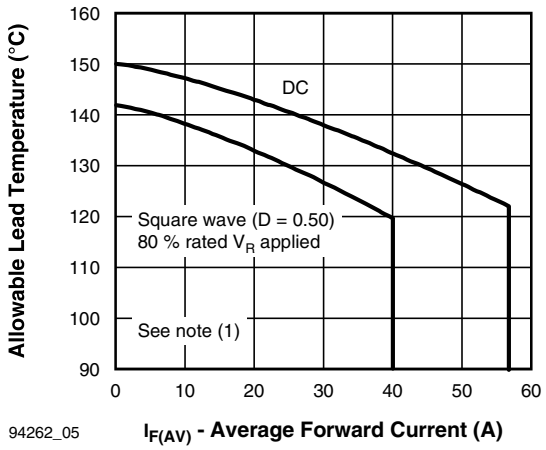



Fig. 5 - Maximum Allowable Lead Temperature vs. Average Forward Current

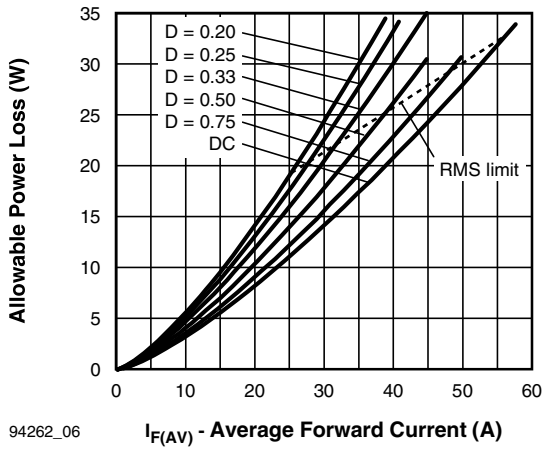



Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

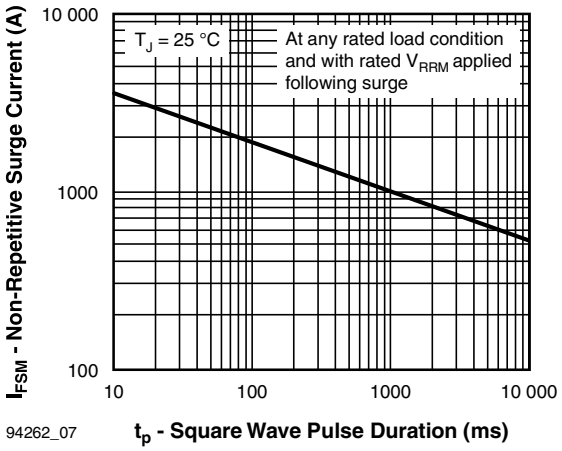



Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

**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); $I_R$ at $V_{R1}$ = 80 % rated $V_R$

## ORDERING INFORMATION TABLE

**Device code**

| VS- | 88 | C | N | Q | 060 | A | PbF |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

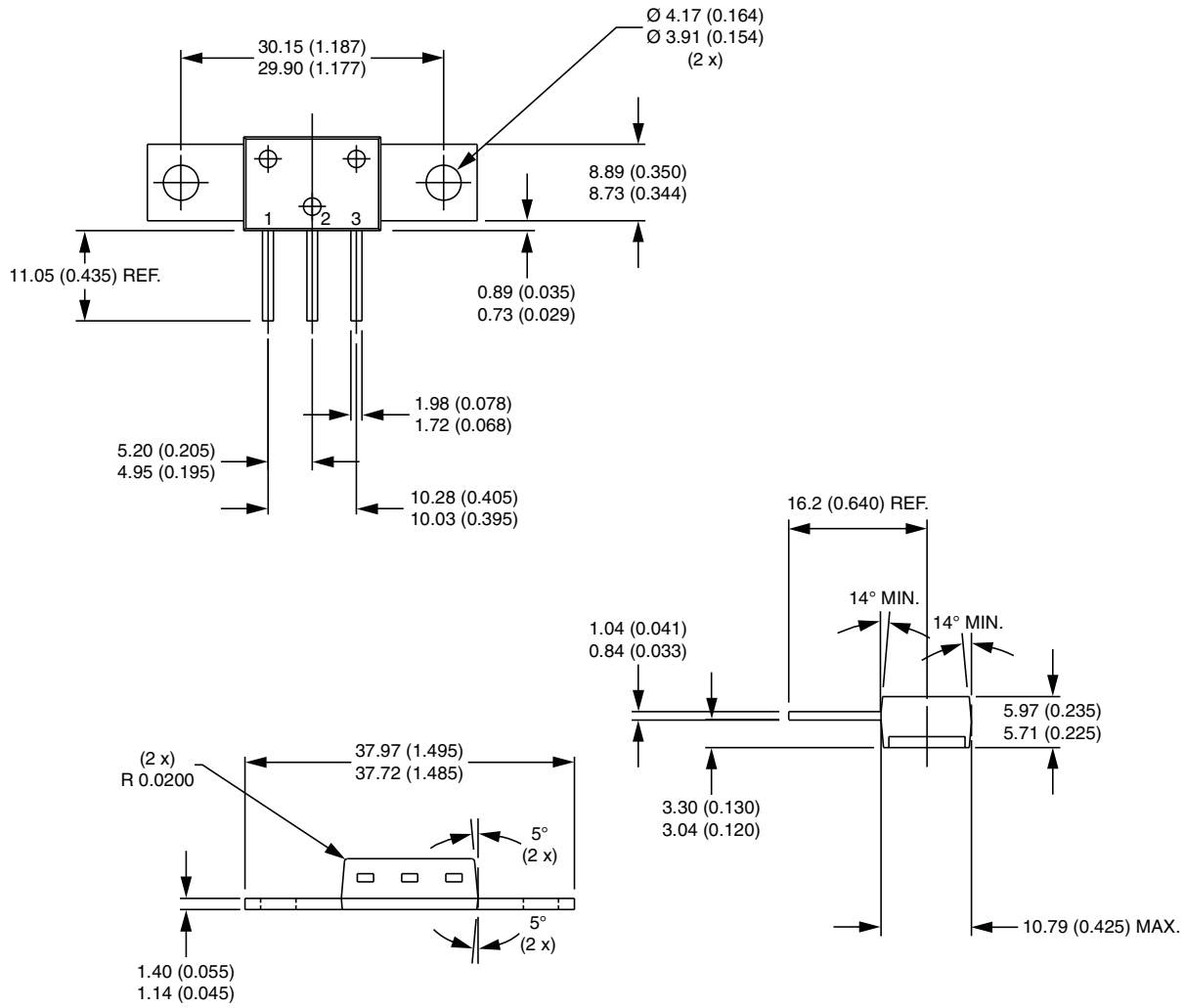
- 1 - HPP product suffix
- 2 - Current rating (80 A)
- 3 - Circuit configuration:
  C = Common cathode
- 4 - Package:
  N = D-61
- 5 - Schottky “Q” series
- 6 - Voltage ratings (060 = 60 V)
- 7 - Package style:
  - A = D-61-8
  - ASM = D-61-8-SM
  - ASL = D-61-8-SL
- 8 - • None = Standard production
  - PbF = Lead (Pb)-free

Standard pack quantity: A = 10 pieces; ASM/ASL = 20 pieces

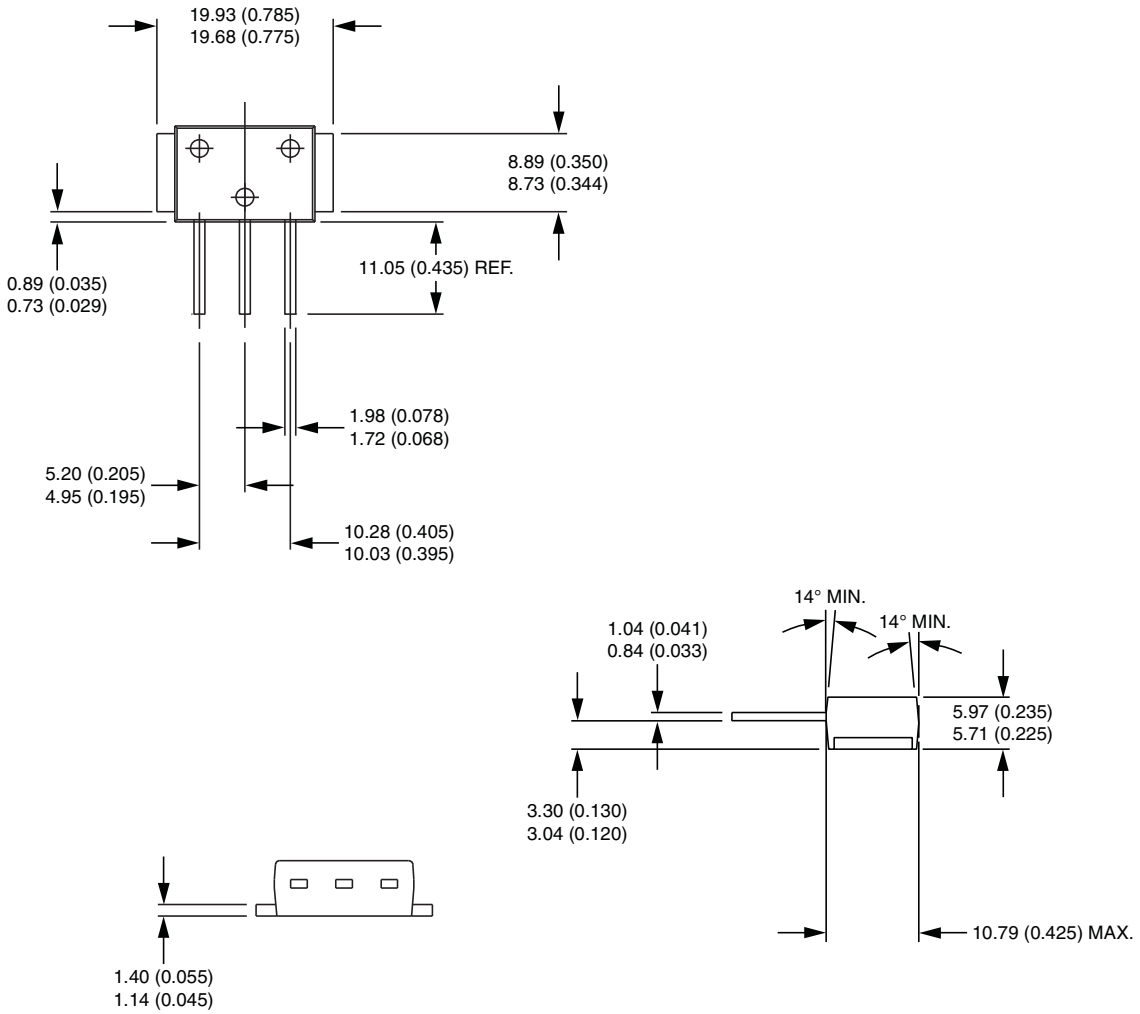
| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | www.vishay.com/doc?95354 |
| Part marking information | www.vishay.com/doc?95356 |

# D-61-8, D-61-8-SM, D-61-8-SL

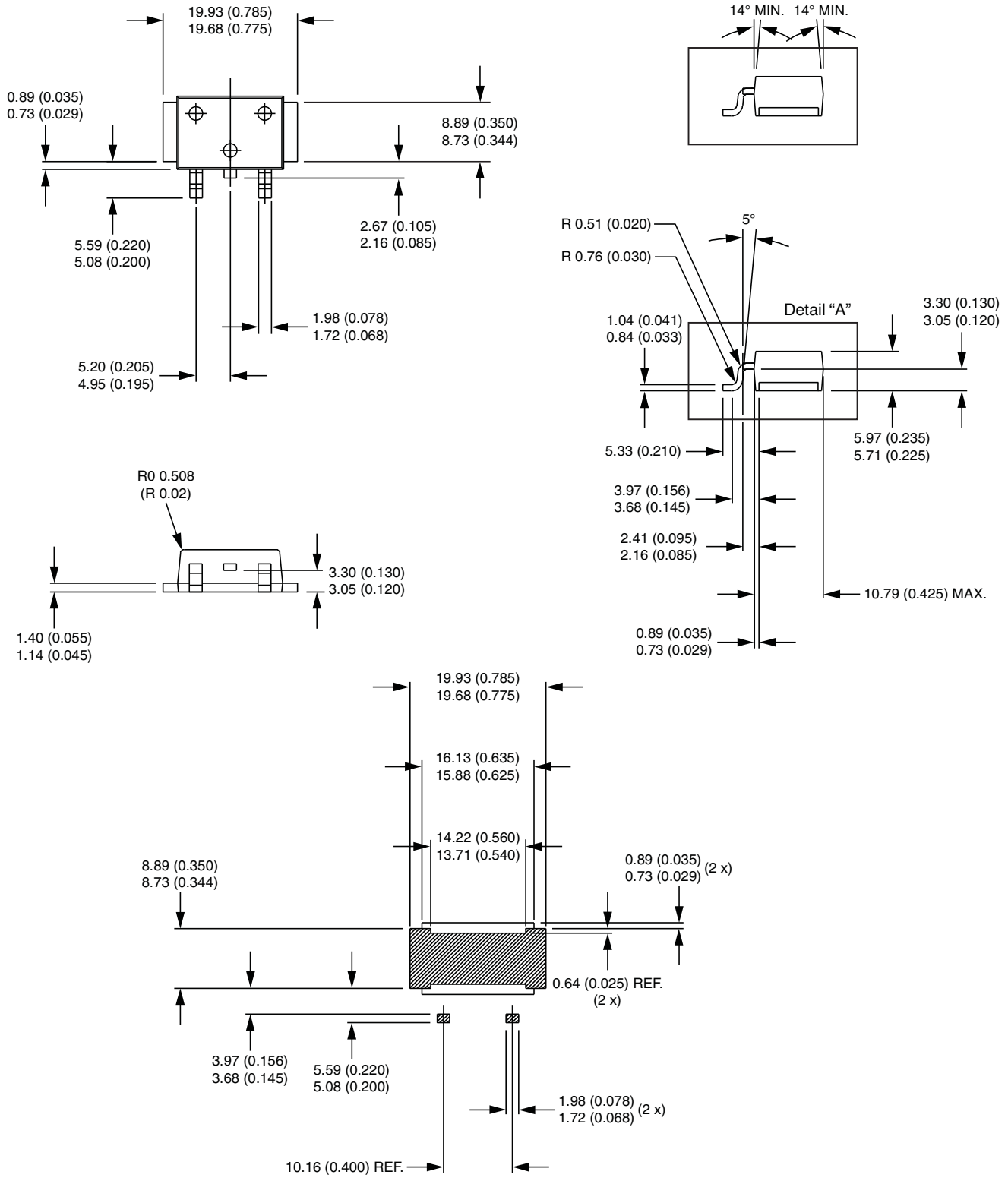
**DIMENSIONS - D-61-8** in millimeters (inches)



**DIMENSIONS - D-61-8-SM** in millimeters (inches)



**DIMENSIONS - D-61-8-SL** in millimeters (inches)



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