

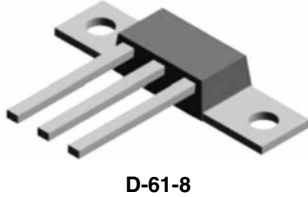


**THE DATASHEET OF  
VS-88CNQ060ASLPBF**

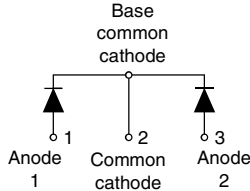


## Schottky Rectifier New Generation 3 D-61 Package, 2 x 40 A

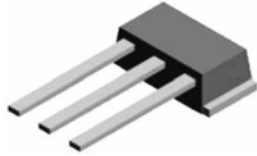
VS-88CNQ060APbF



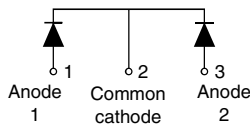
D-61-8



VS-88CNQ060ASMPbF



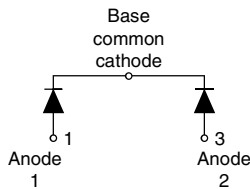
D-61-8-SM



VS-88CNQ060ASLPbF



D-61-8-SL



### FEATURES

- 150 °C T<sub>J</sub> 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



Available  
**RoHS\***  
COMPLIANT

### 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.

### PRODUCT SUMMARY

I <sub>F(AV)</sub>	2 x 40 A
V <sub>R</sub>	60 V
I <sub>RM</sub>	240 mA at 125 °C

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	80	A
V <sub>R</sub>		60	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	5000	A
V <sub>F</sub>	40 Apk, T <sub>J</sub> = 125 °C (per leg)	0.56	V
T <sub>J</sub>	Range	- 55 to 150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-88CNQ060APbF	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	60	V
Maximum working peak reverse voltage	V <sub>RWM</sub>		

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

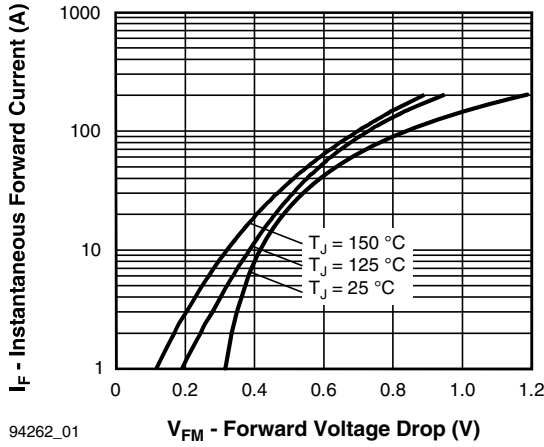
ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 120^\circ\text{C}$ , rectangular waveform, rated $V_R$		40	A
				80	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	$I_{FSM}$	5 $\mu\text{s}$ sine or 3 $\mu\text{s}$ 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	$E_{AS}$	$T_J = 25^\circ\text{C}$ , $I_{AS} = 1\text{ A}$ , $L = 0.57\text{ mH}$		75	mJ
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu\text{s}$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		1.0	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg	$V_{FM}^{(1)}$	40 A	$T_J = 25^\circ\text{C}$	0.58	V
		80 A		0.77	
		40 A	$T_J = 125^\circ\text{C}$	0.56	
		80 A		0.67	
Typical reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.64	mA
		$T_J = 125^\circ\text{C}$		240	
Maximum junction capacitance per leg	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25^\circ\text{C}$		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/ $\mu\text{s}$

### Note

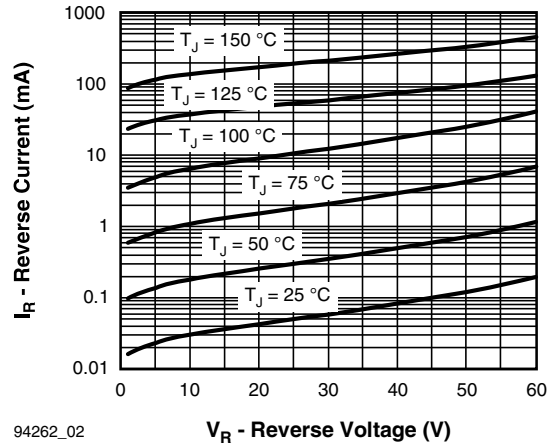
<sup>(1)</sup> Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$			- 55 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation		0.85	$^\circ\text{C/W}$
				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	



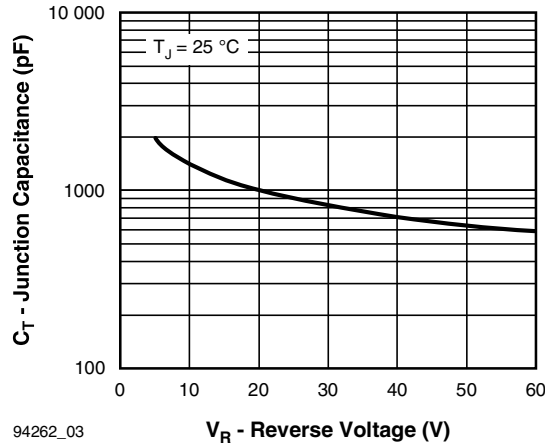
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Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)



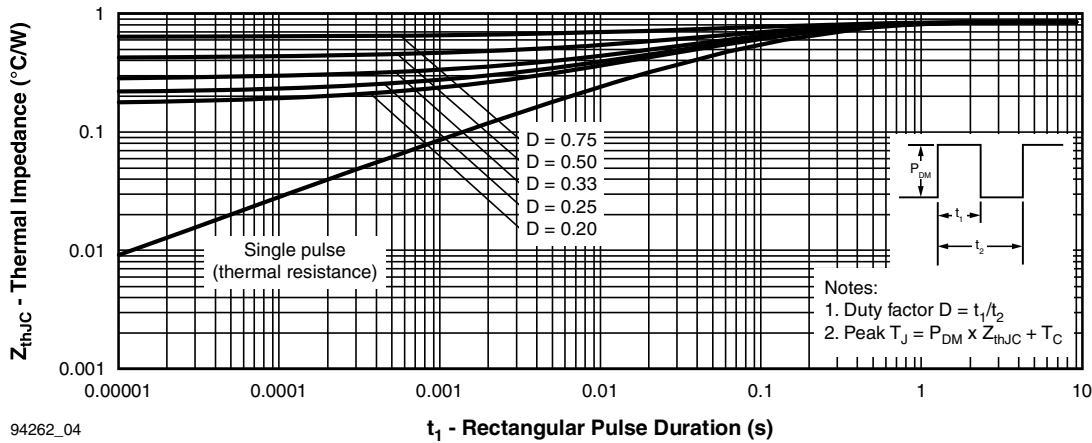
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Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)



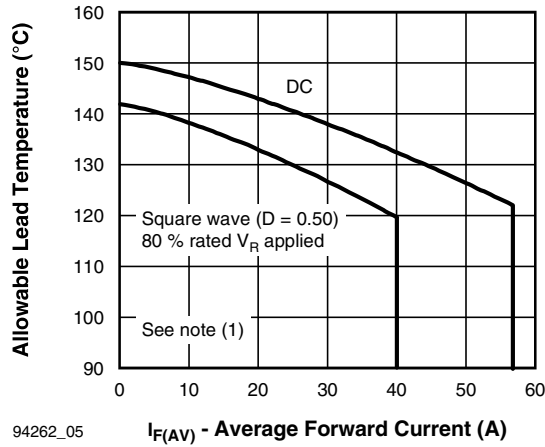
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Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)



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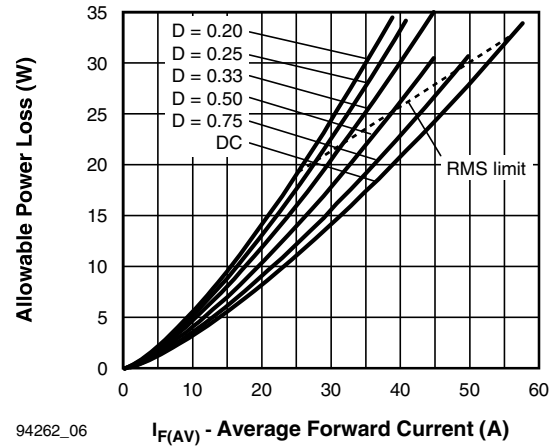
Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)



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$I_{F(AV)}$  - Average Forward Current (A)

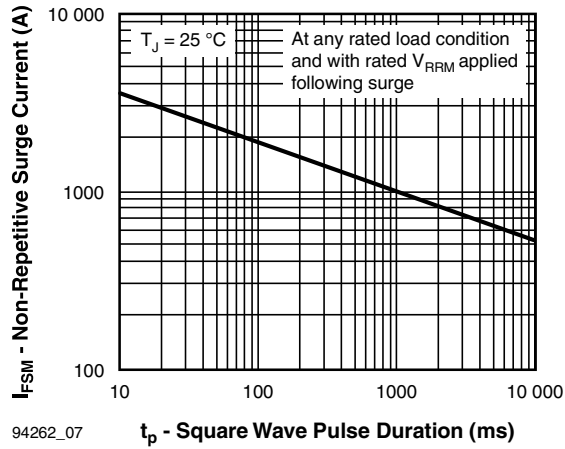
Fig. 5 - Maximum Allowable Lead Temperature vs. Average Forward Current



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$I_{F(AV)}$  - Average Forward Current (A)

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



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$t_p$  - Square Wave Pulse Duration (ms)

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

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;  
 $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  
 $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>88</b>	<b>C</b>	<b>N</b>	<b>Q</b>	<b>060</b>	<b>A</b>	<b>PbF</b>
	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

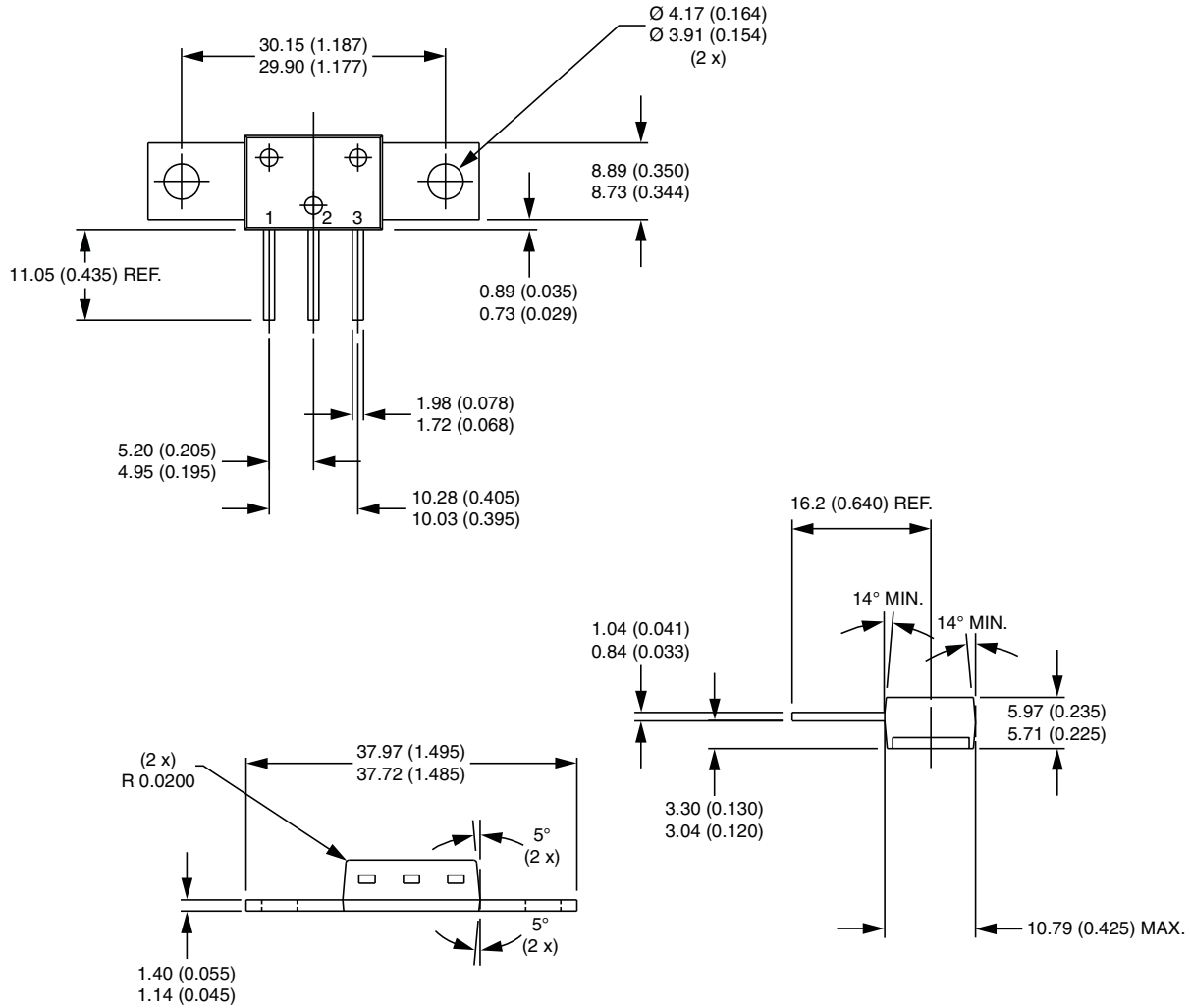
Standard pack quantity: A = 10 pieces; ASM/ASL = 20 pieces

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95354">www.vishay.com/doc?95354</a>
Part marking information	<a href="http://www.vishay.com/doc?95356">www.vishay.com/doc?95356</a>



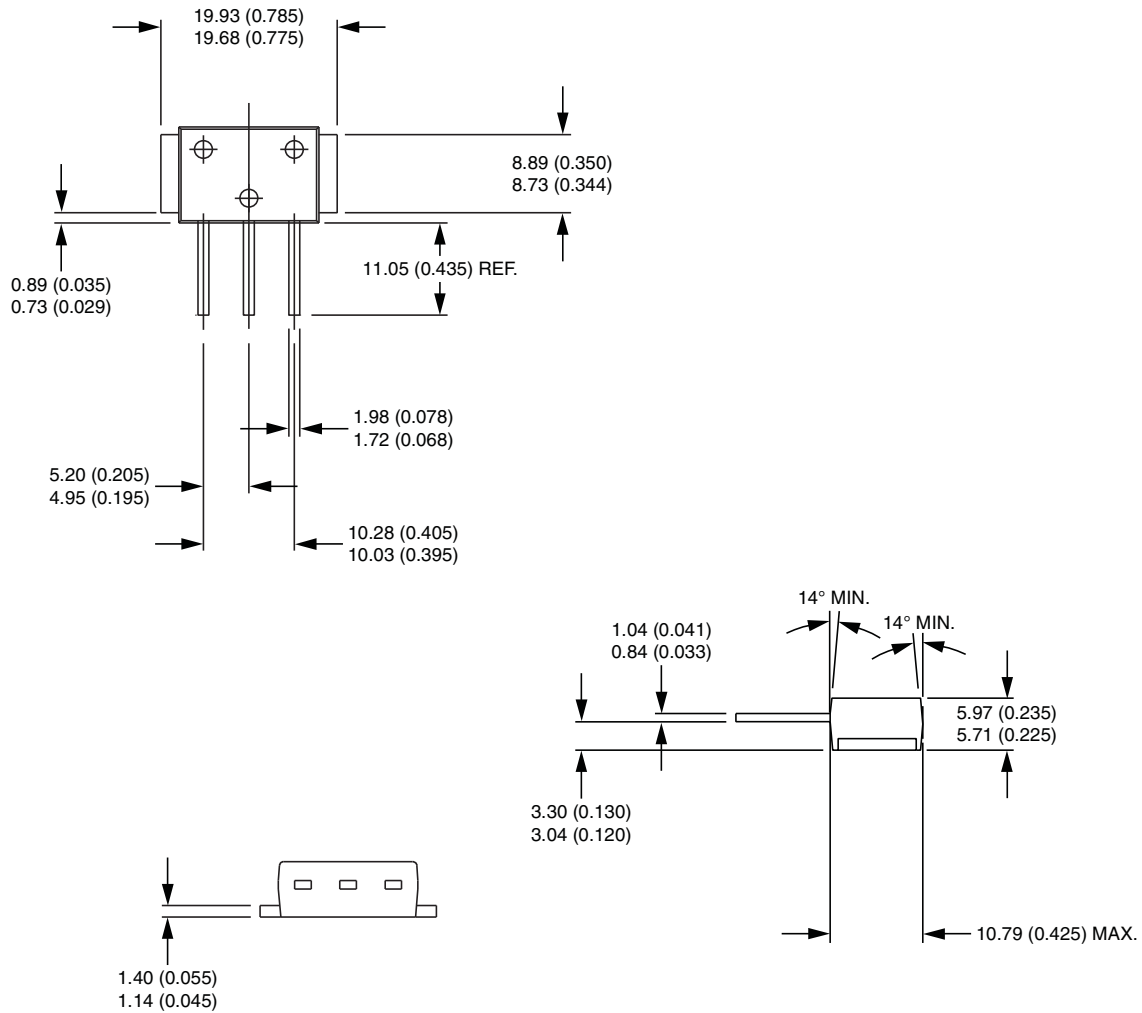
## D-61-8, D-61-8-SM, D-61-8-SL

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



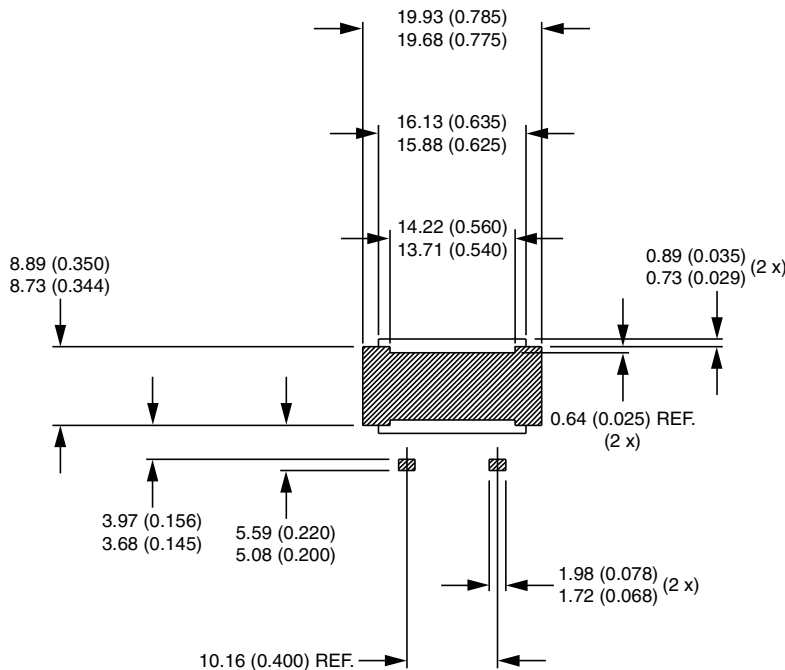
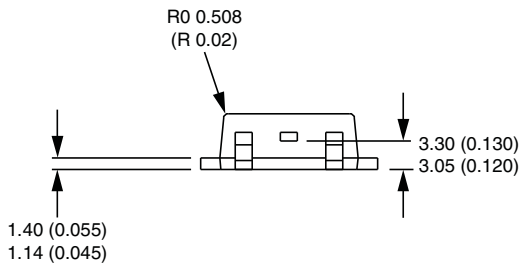
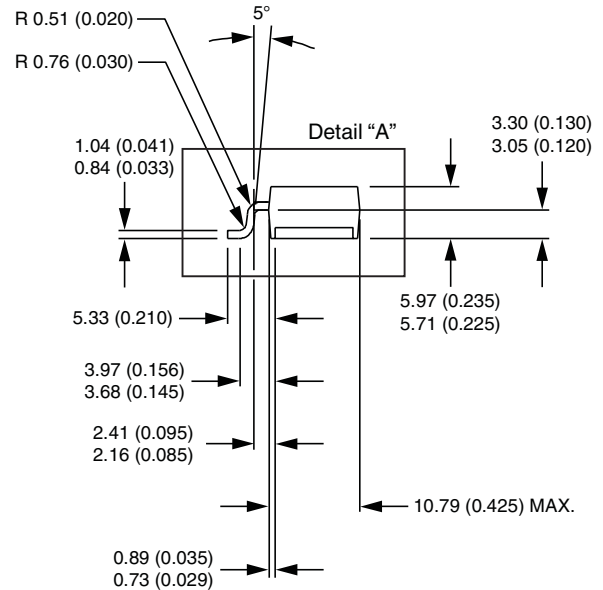
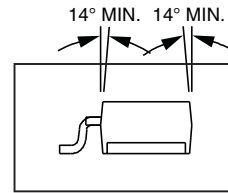
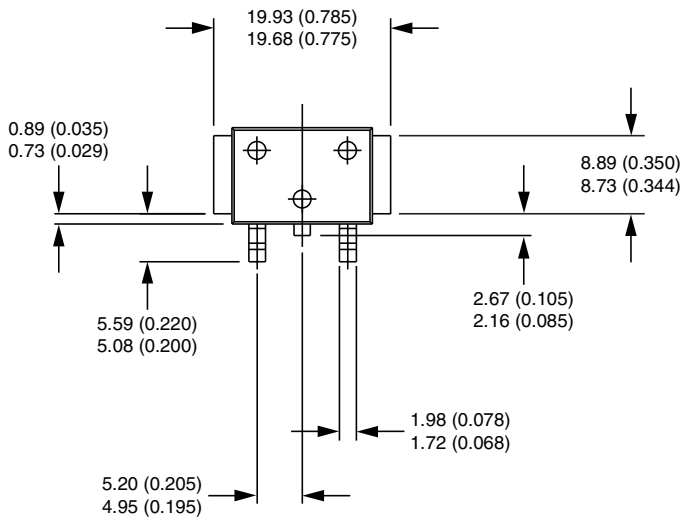


### DIMENSIONS - D-61-8-SM in millimeters (inches)





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





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