



**THE DATASHEET OF  
VS-80CNQ045ASMPBF**



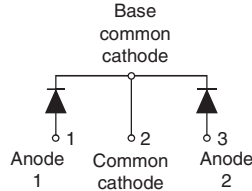


## High Performance Schottky Rectifier, New Generation 3, D-61 Package, 2 x 40 A

VS-80CNQ...APbF



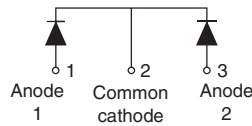
D-61-8



VS-80CNQ...ASMPbF



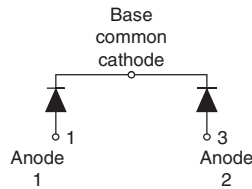
D-61-8-SM



VS-80CNQ...ASLPbF



D-61-8-SL



### FEATURES

- 150 °C T<sub>J</sub> operation
- Center tap module
- Very low forward voltage drop
- High frequency operation
- High power discrete
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- New fully transfer-mould low profile, small footprint, high current package
- Through-hole versions are currently available for use in lead (Pb)-free applications ("PbF" suffix)
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

### DESCRIPTION

The center tap Schottky rectifier module series 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

Package	D-61
I <sub>F(AV)</sub>	2 x 40 A
V <sub>R</sub>	35 V, 40 V, 45 V
V <sub>F</sub> at I <sub>F</sub>	0.51 V
I <sub>RM</sub> max.	250 mA at 125 °C
T <sub>J</sub> max.	150 °C
Diode variation	Common cathode
E <sub>AS</sub>	54 mJ

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	80	A
V <sub>RRM</sub>	Range	35 to 45	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	5800	A
V <sub>F</sub>	40 A <sub>pk</sub> , T <sub>J</sub> = 125 °C (per leg)	0.47	V
T <sub>J</sub>	Range	-55 to +150	°C

### VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-80CNQ035APbF	VS-80CNQ040APbF	VS-80CNQ045APbF	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	35	40	45	V
Maximum working peak reverse voltage	V <sub>RWM</sub>				



ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	per leg	50 % duty cycle at $T_C = 114\text{ }^\circ\text{C}$ , rectangular waveform	40	A
		per device		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 $V_{RRM}$ applied	5800	
		10 ms sine or 6 ms rect. pulse		750	
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25\text{ }^\circ\text{C}$ , $I_{AS} = 8\text{ A}$ , $L = 1.7\text{ mH}$		54	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		8	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	40 A	$T_J = 25\text{ }^\circ\text{C}$	0.52	V
		80 A		0.66	
		40 A	$T_J = 125\text{ }^\circ\text{C}$	0.47	
		80 A		0.61	
Maximum reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	5	mA
		$T_J = 125\text{ }^\circ\text{C}$		250	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.26	V
Forward slope resistance	$r_t$			3.93	$\text{m}\Omega$
Maximum junction capacitance per leg	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		2600	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	$\text{V}/\mu\text{s}$

**Note**

(1) 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, per leg junction to case per package	$R_{thJC}$	DC operation (see fig. 4)		0.85	$^\circ\text{C}/\text{W}$
		DC operation		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)	$\text{kgf} \cdot \text{cm}$ ( $\text{lbf} \cdot \text{in}$ )
		maximum		58 (50)	
Marking device	Case style D-61			80CNQ035A	
				80CNQ040A	
				80CNQ045A	
	Case style D-61-8-SM			80CNQ035ASM	
				80CNQ040ASM	
				80CNQ045ASM	
	Case style D-61-8-SL			80CNQ035ASL	
				80CNQ040ASL	
				80CNQ045ASL	

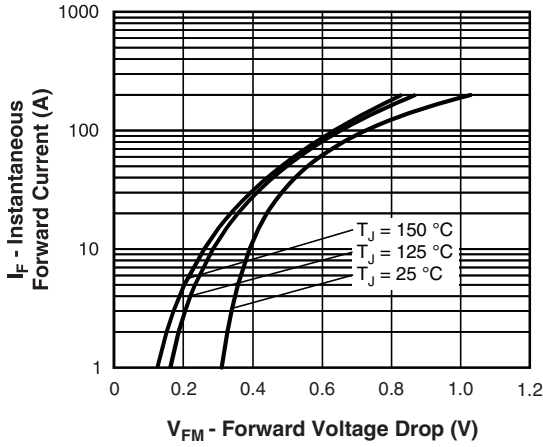


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

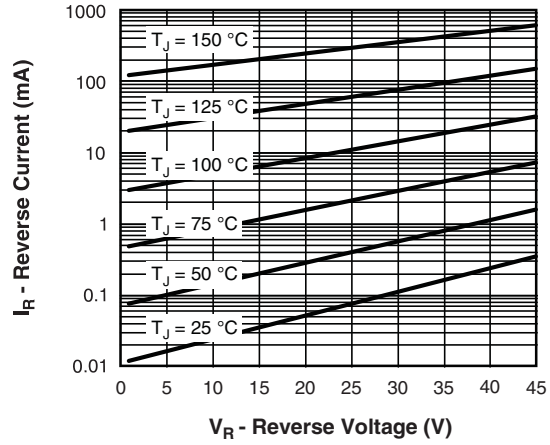


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

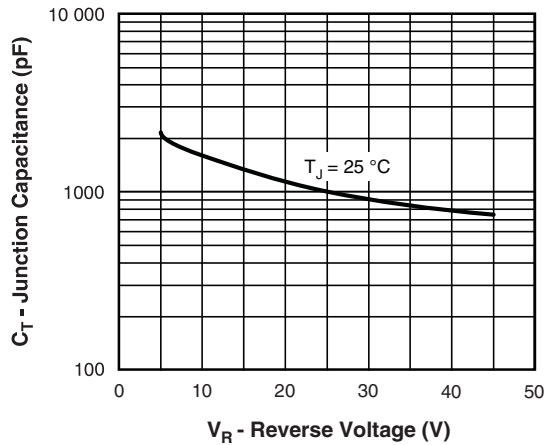


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

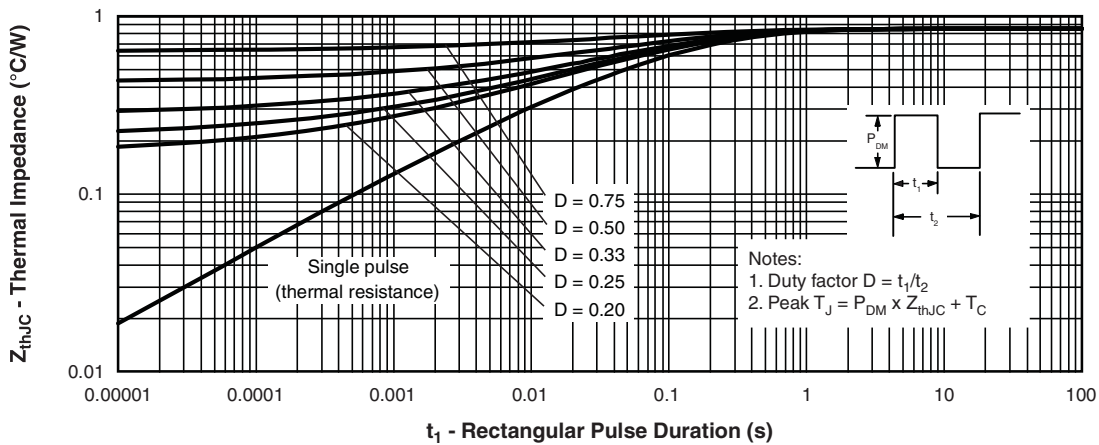


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

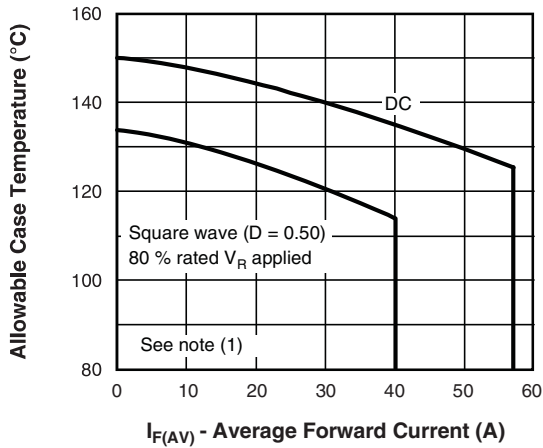


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

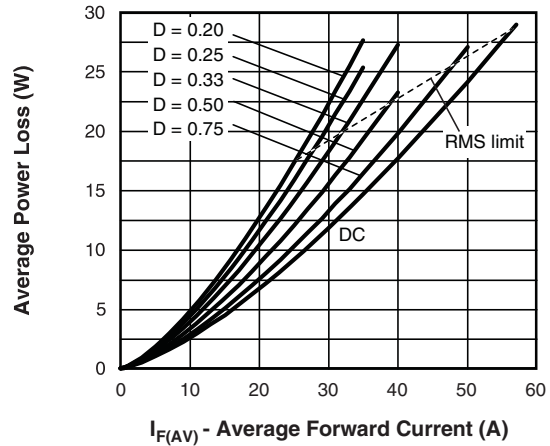


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

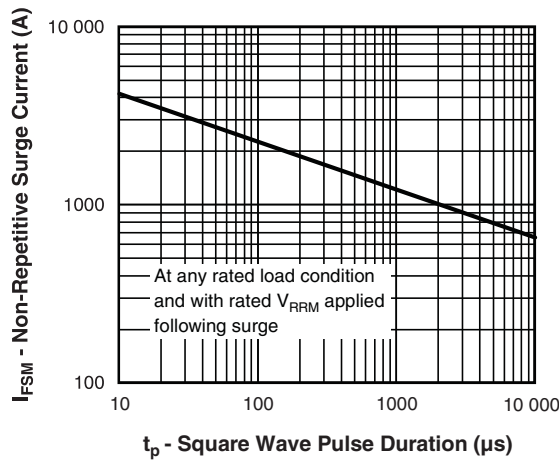


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

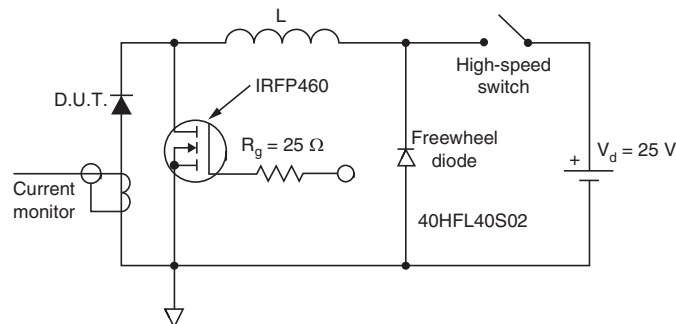


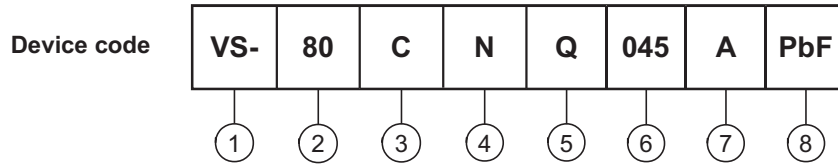
Fig. 8 - Unclamped Inductive Test Circuit

**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



- 1** - Vishay Semiconductors product
- 2** - Current rating (80 A)
- 3** - Circuit configuration:  
C = common cathode
- 4** - Package:  
N = D-61
- 5** - Schottky "Q" series
- 6** - Voltage ratings
 

035 = 35 V
040 = 40 V
045 = 45 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

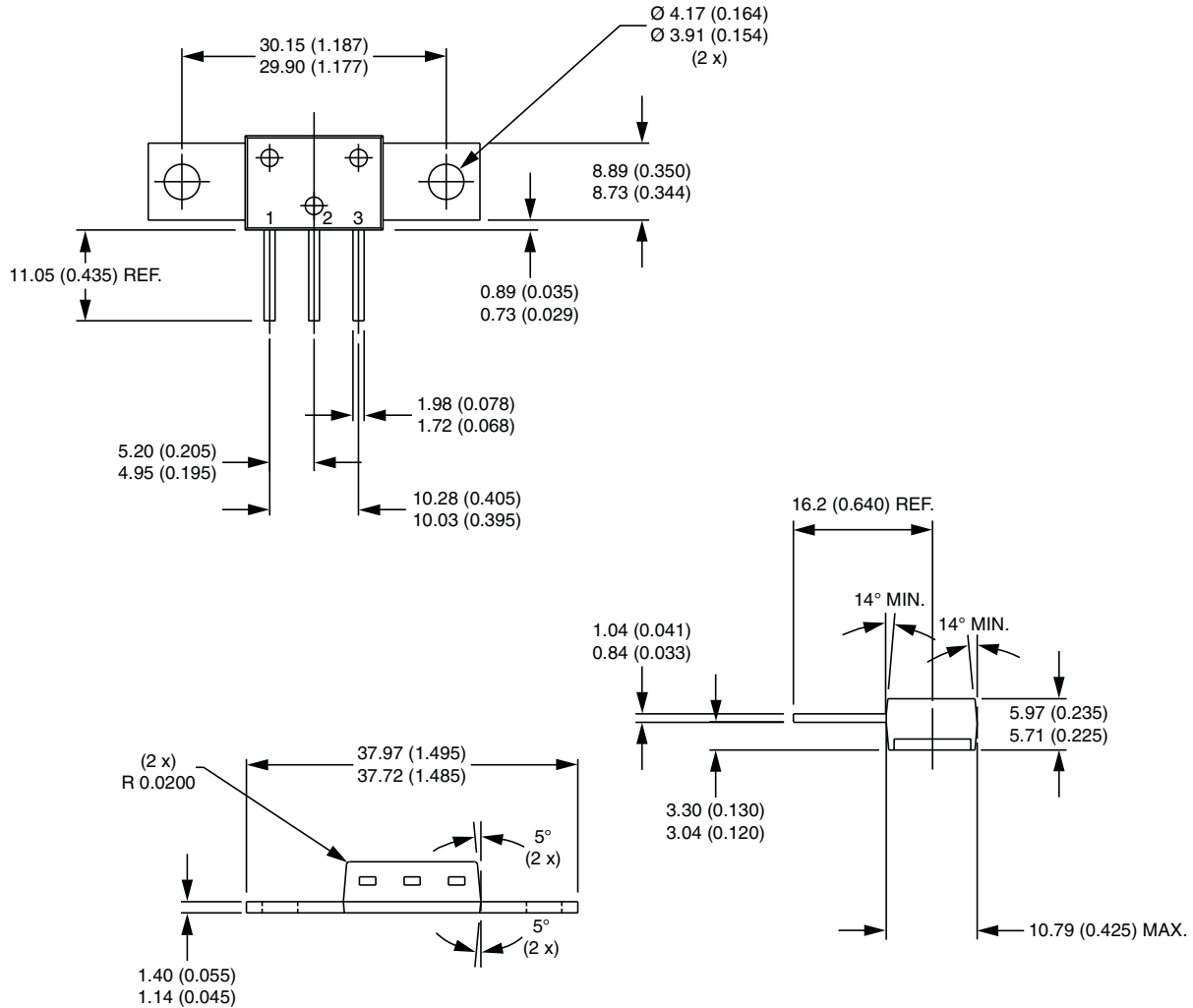
ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER REEL	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-80CNQ035PBF	10	200	Antistatic plastic tubes
VS-80CNQ035ASLPBF	20	400	Antistatic plastic tubes
VS-80CNQ035ASMPBF	20	400	Antistatic plastic tubes
VS-80CNQ040APBF	10	200	Antistatic plastic tubes
VS-80CNQ040ASLPBF	20	400	Antistatic plastic tubes
VS-80CNQ040ASMPBF	20	400	Antistatic plastic tubes
VS-80CNQ035APBF	10	200	Antistatic plastic tubes
VS-80CNQ035ASLPBF	20	400	Antistatic plastic tubes
VS-80CNQ035ASMPBF	20	400	Antistatic plastic tubes

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>



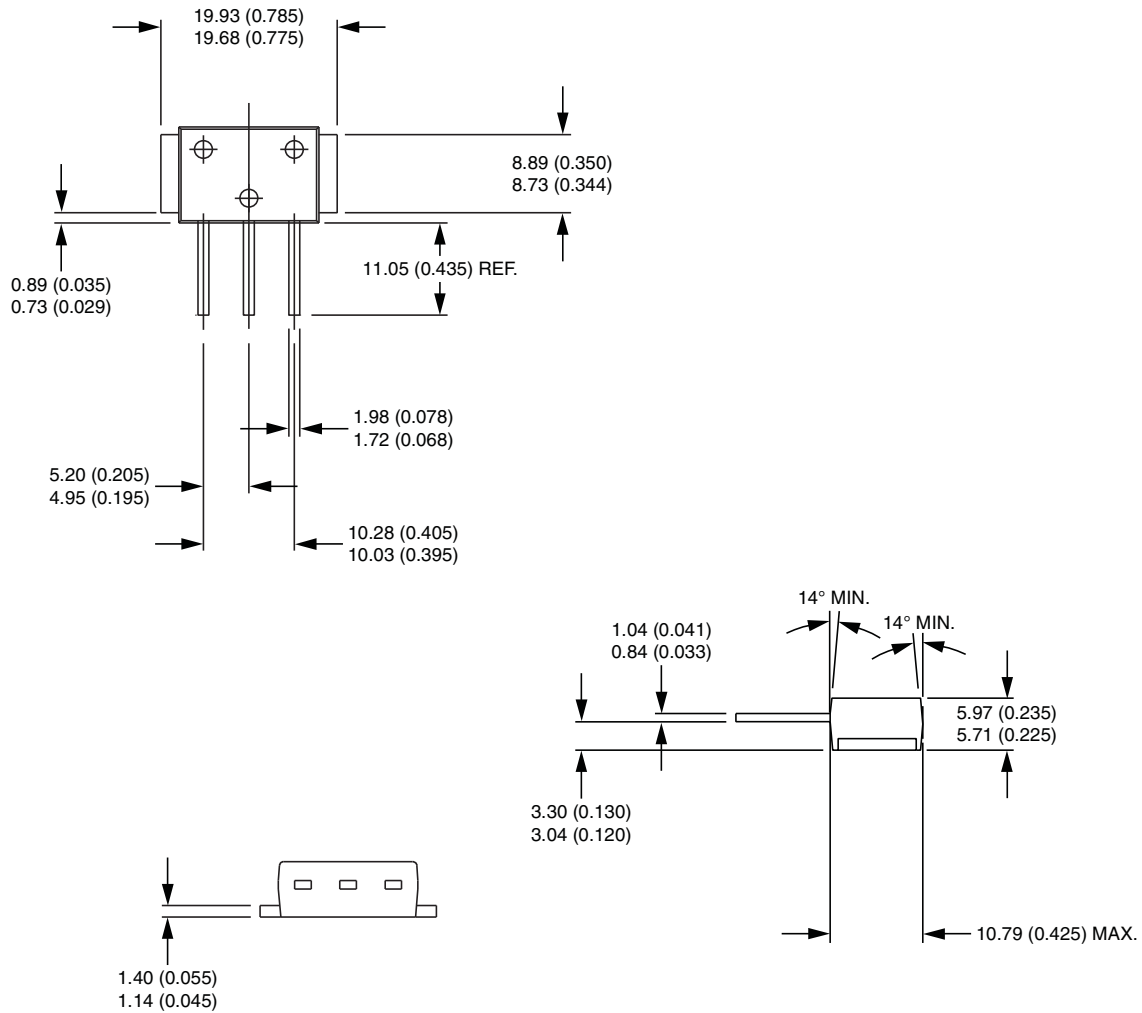
## D-61-8, D-61-8-SM, D-61-8-SL

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



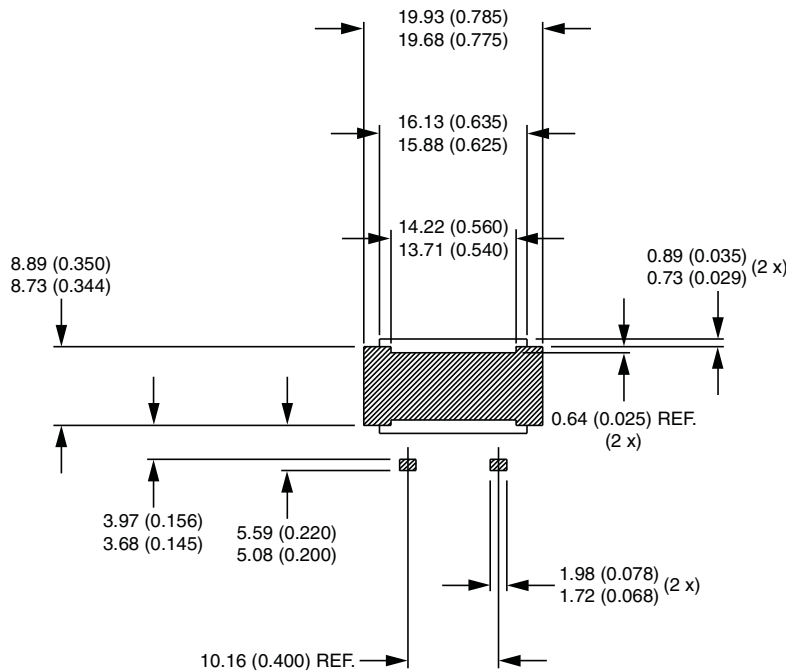
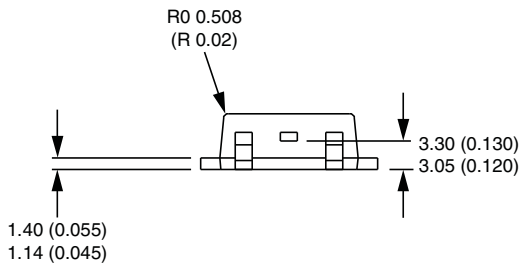
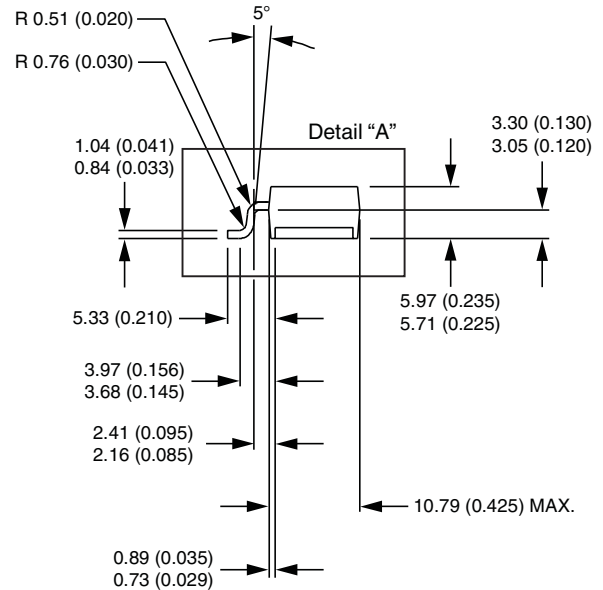
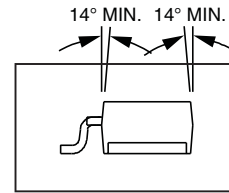
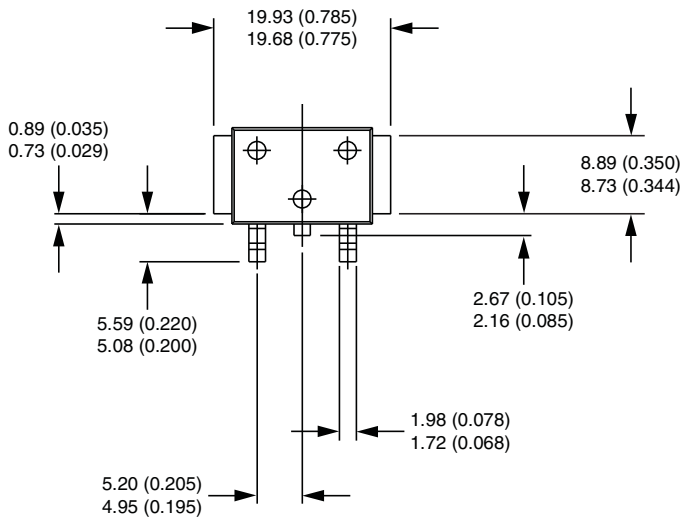


### DIMENSIONS - D-61-8-SM in millimeters (inches)





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





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