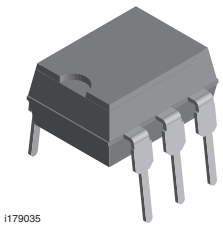
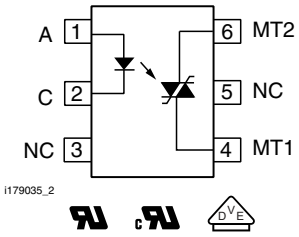
THE DATASHEET OF

IL440-6

Optocoupler, Phototriac Output, Low Input Current





FEATURES

- 400 V blocking voltage
- 5 mA maximum trigger current
- Isolation test voltage, 5300 V_{RMS}, t = 1 s
- Isolation materials per UL94
- Pin compatible with optocouplers:
  - IL440-4 MOC 3021
  - IL440-5 MOC 3022
  - IL440-6 MOC 3023
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The IL440 consists of a GaAs infrared emitter optically coupled to a silicon planar triac chip with a non-zero crossing network. The two semiconductors are assembled in a 6 pin dual-in-line plastic package. The IL440 can handle currents up to 100 mA RMS.

AGENCY APPROVALS

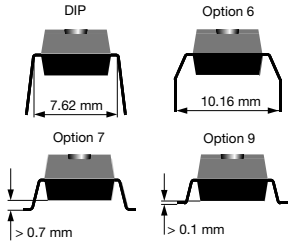
- UL1577, file no. E52744 system code H or J, double protection
- CSA 93751
- DIN EN 60747-5-5 (VDE 0884) available with option 1
- BSI IEC60950; IEC60065

APPLICATIONS

- High current triac driver
- Solid state relay
- Switch small AC loads

ORDERING INFORMATION

I	L	4	4	0	-	#	X	0	#	#	T
PART NUMBER						TRIGGER CURRENT BIN	PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED/PACKAGE	TRIGGER CURRENT, I_{FT}		
UL, cUL, BSI	**5 mA**	**10 mA**	**15 mA**
DIP-6	IL440-6	IL440-5	IL440-4
SMD-6, option 7	IL440-6X007	-	-
SMD-6, option 9	IL440-6X009T (1)	IL440-5X009	IL440-4X009T (1)
VDE, UL, cUL, BSI	**5 mA**	**10 mA**	**15 mA**
DIP-6, 400 mil, option 6	IL440-6X016	IL440-5X016	-
SMD-6, option 7	-	IL440-5X017T	IL440-4X017
SMD-6, option 9	IL440-6X019T	-	-

Note

(1) Also available in tubes, do not put T on the end.

ABSOLUTE MAXIMUM RATINGS [1] (T_{amb} = 25 °C, unless otherwise specified)					
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**VALUE**	**UNIT**
Input					
Reverse voltage			V_R	5	V
Forward current			I_F	60	mA
Surge current	P.W. < 10 µs		I_{FSM}	3	A
Power dissipation			P_{diss}	100	mW
Junction temperature			T_j	100	°C
Output					
Peak off-state voltage		IL440-4	V_{DRM}	400	V
		IL440-5	V_{DRM}	400	V
		IL440-6	V_{DRM}	400	V
On-state RMS current			$I_{D(RMS)}$	100	mA
Peak surge current	$t_p \leq 10$ ms		I_{FSM}	1.2	A
Peak on-state current	$t_p/T = 0.01 \leq 100$ µs		I_{DRM}	2	A
Power dissipation			P_{diss}	300	mW
Junction temperature			T_j	125	°C
Coupler					
Isolation voltage	t = 1 s		V_{ISO}	5300	V_{RMS}
Creepage distance				≥ 7	mm
Clearance distance				≥ 7	mm
Isolation resistance	V_{IO} = 500 V, T_{amb} = 25 °C		R_{IO}	$\geq 10^{12}$	Ω
	V_{IO} = 500 V, T_{amb} = 100 °C		R_{IO}	$\geq 10^{11}$	Ω
Total power dissipation			P_{tot}	330	mW
Storage temperature range			T_{stg}	- 55 to + 125	°C
Ambient temperature			T_{amb}	- 40 to + 100	°C
Junction temperature			T_j	100	°C
Lead soldering temperature [2]	2 mm from case, t < 10 s		T_{sld}	260	°C

Notes

(1) Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(2) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

ELECTRICAL CHARACTERISTICS [1] (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Input							
Forward voltage	I_F = 50 mA		V_F		1.25		V
Reverse voltage	I_R = 10 µA		V_R	5			V
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j		50		pF
Output [2]							
Off-state voltage	I_{DRM} = 500 nA	IL440-4	$V_{D(RMS)}$	400			V
		IL440-5		400			V
		IL440-6		400			V
Peak on-state voltage	I_{TM} = 100 mA, I_{FT} = 30 mA		V_{TM}		1.5	3	V
Trigger current 1	V_T = 6 V, R_L = 150 Ω	IL440-4	I_{FT1}		15		V
Trigger current 2		IL440-5	I_{FT2}		10		V
Trigger current 3		IL440-6	I_{FT3}		5		V
Critical rate of rise of off-state voltage	I_F = 0, V_D = 0.67 V_{DRM}		dV/dt_{cr}		50		V/µs
Critical rate of rise of on-state current commutation	I_F = 30 mA, V_D = 60 V_{RMS}		dV/dt_{crq}	0.13	0.25		V/µs
Coupler							
Holding current	$I_F \geq$ 10 mA, $V_S \geq$ 3 V		I_H		1		mA

Notes

(1) Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

(2) Off-state output terminal voltage (see table 1.)

MAXIMUM SAFETY RATINGS [1]						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT [2]						
Forward voltage		$I_{S, INPUT}$			130	mA
OUTPUT						
Power dissipation		$P_{S, OUTPUT}$			300	mW

Notes

(1) According to DIN EN 60747-5-5. This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits.

(2) The device is used for protective separation agains electrical shock within the maximum safety ratings. This must be ensured by protective circuits in the applications.

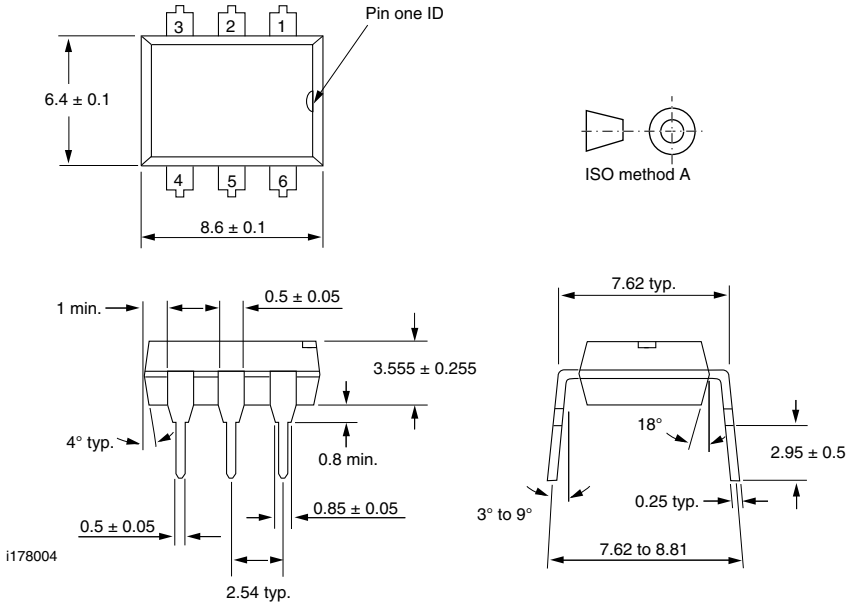
SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Climatic classification (according to IEC68 part 1)				55/100/21		
Pollution degree	DIN VDE 0109			2		
Comparative tracking index		CTI	175			
V_{IOTM}			8000			V_{peak}
V_{IORM}			890			V_{peak}
Insulation resistance at 25 °C	V_{IO} = 500 V	R_{IS}			$\geq 10^{12}$	Ω
Insulation resistance at T_S	V_{IO} = 500 V	R_{IS}			$\geq 10^{9}$	Ω
Insulation resistance at 100 °C	V_{IO} = 500 V	R_{IS}			$\geq 10^{11}$	Ω
Partial discharge test voltage	Method a, $V_{pd} = V_{IORM}$ x 1.875	V_{pd}			1669	V_{peak}
P_{SO}					500	mW
I_{SI}					250	mA
T_{SI}					175	°C

SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Clearance distance	Standard DIP-6		7			mm
Creepage distance	Standard DIP-6		7			mm
Clearance distance	400 mil DIP-6		8			mm
Creepage distance	400 mil DIP-6		8			mm

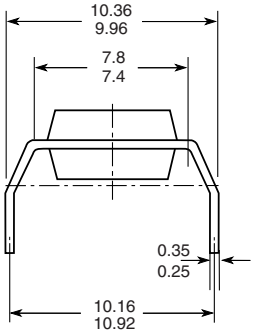
Note

- As per IEC60747-5-5, § 7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of prodective circuits.

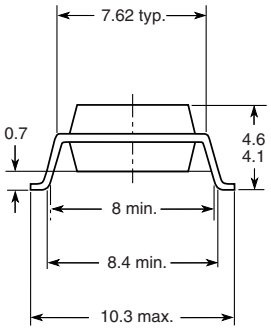
PACKAGE DIMENSIONS in millimeters



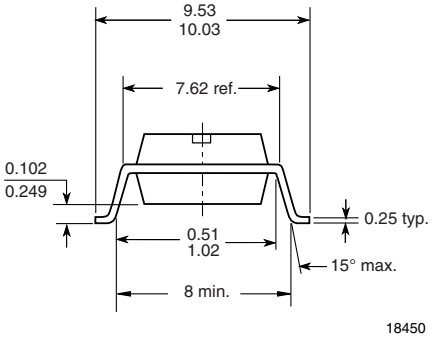
Option 6



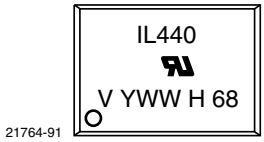
Option 7



Option 9

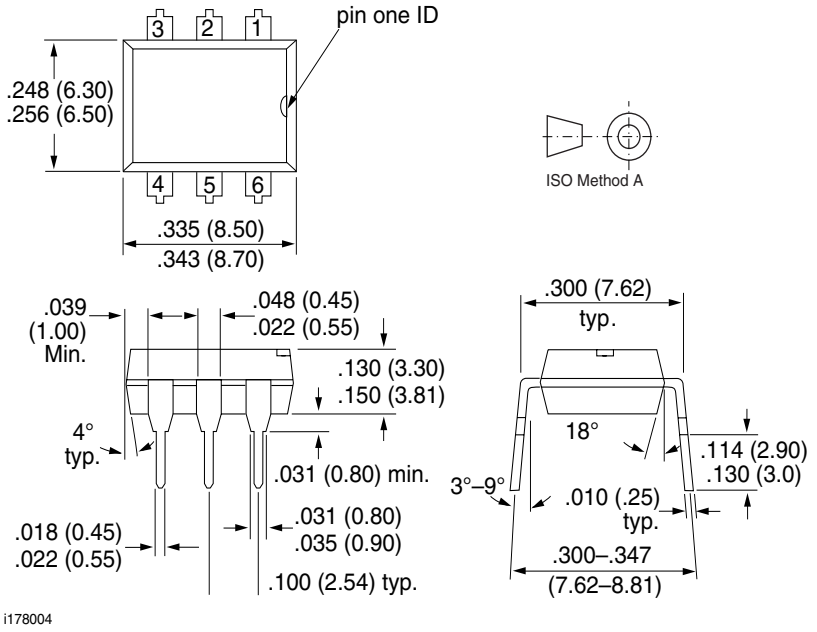


PACKAGE MARKING



DIP-6A

Package Dimensions in Inches (mm)



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operatingsystems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423

Footprints

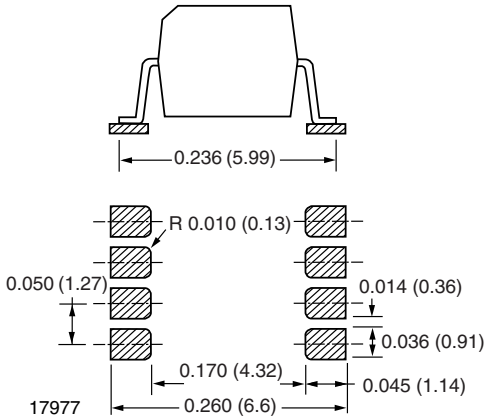


Fig. 1 - SO8A and DSO8A SMD

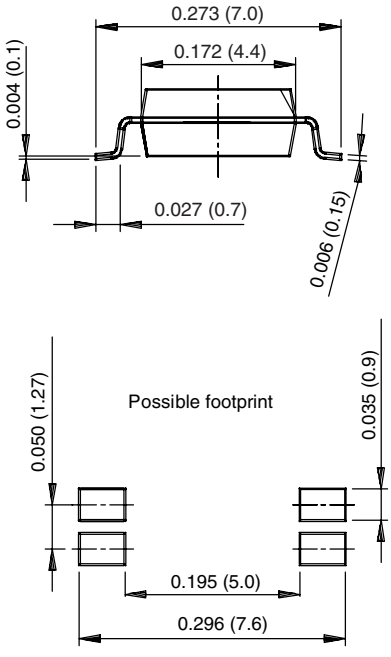


Fig. 2 - SOP-4, Miniflat

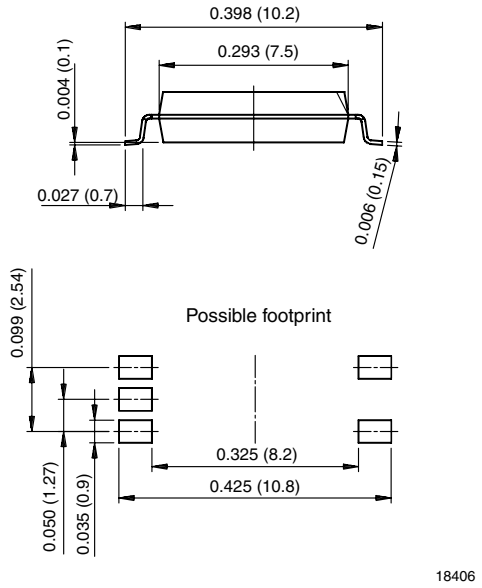


Fig. 3 - SOP-6, 5 Pin Wide Body

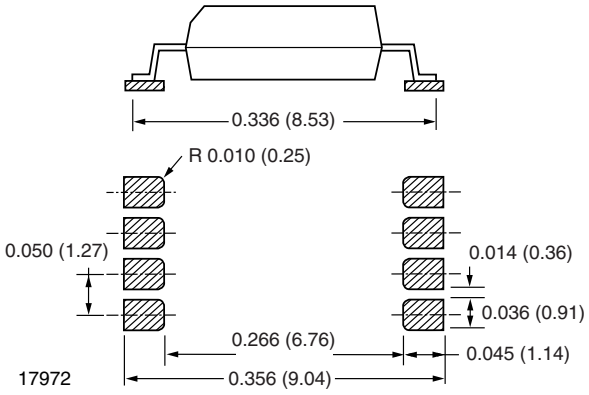


Fig. 4 - 8 Pin PCMCIA

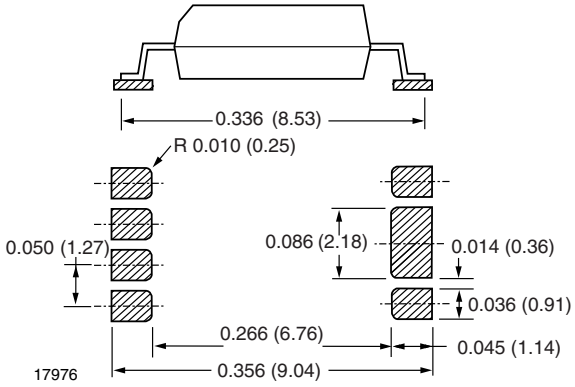


Fig. 5 - 8 Pin PCMCIA, Heat Sink

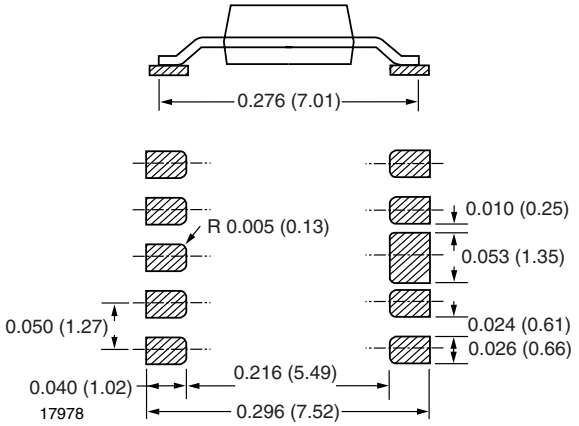


Fig. 6 - Mini Coupler

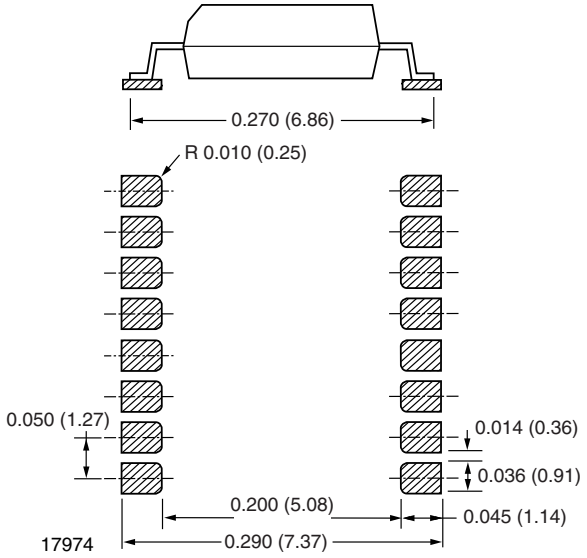


Fig. 7 - SOP-16

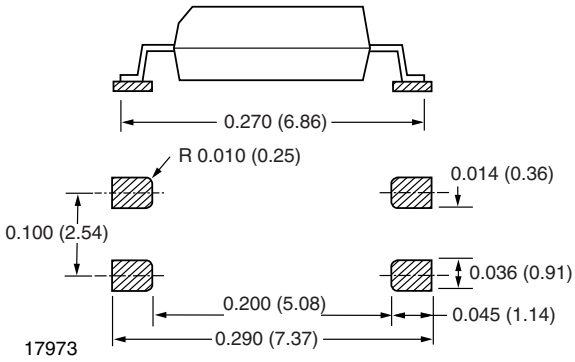


Fig. 8 - 4 Pin Mini-Flat

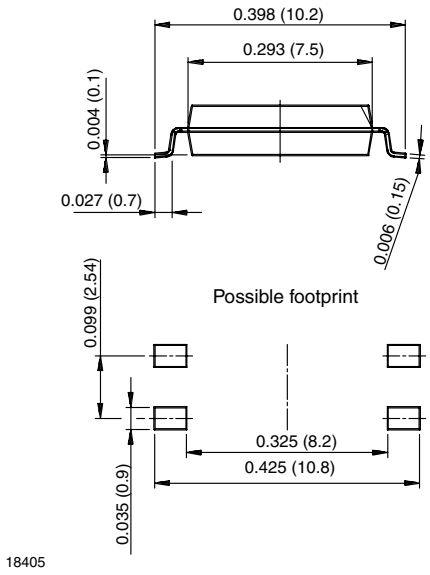


Fig. 9 - SOP-6, 4 Pin Wide Body

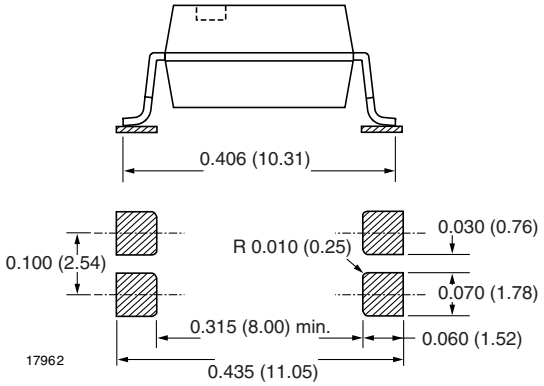


Fig. 10 - 4 Pin SMD Option 7

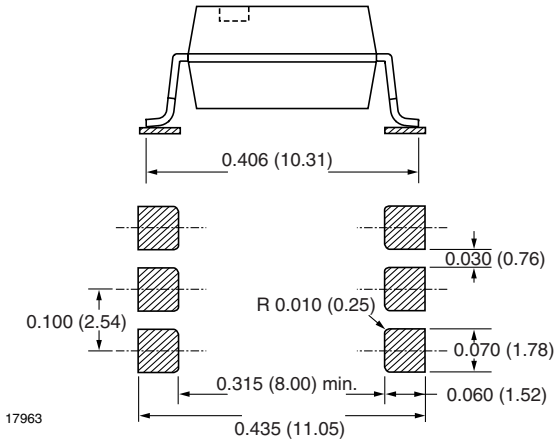


Fig. 11 - 6 Pin SMD Option 7

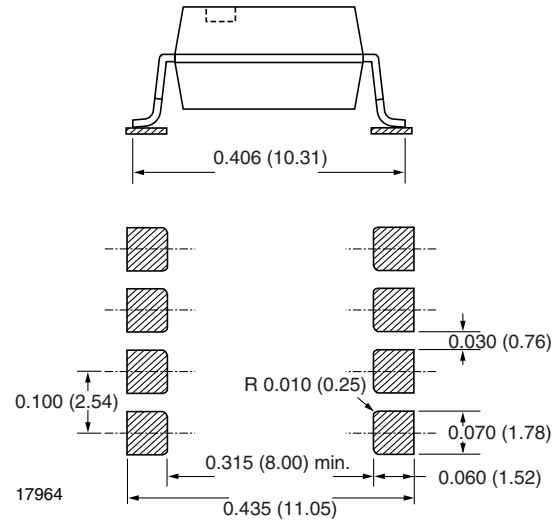


Fig. 12 - 8 Pin SMD Option 7

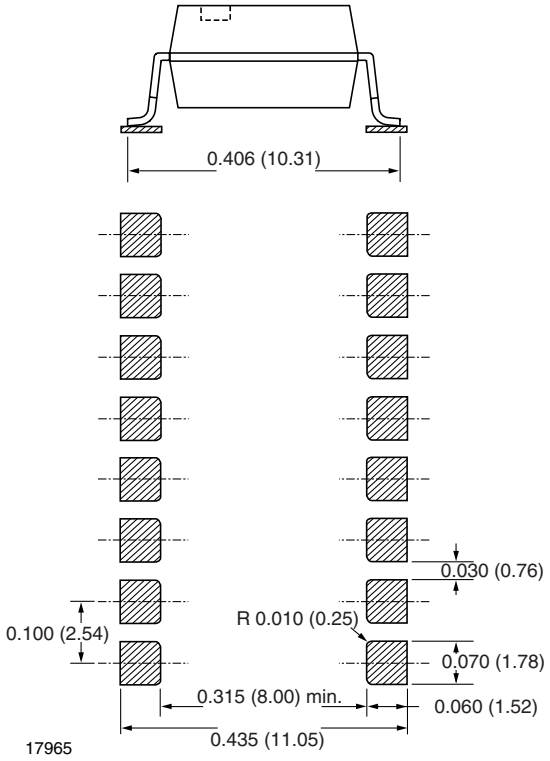


Fig. 13 - 16 Pin SMD Option 7

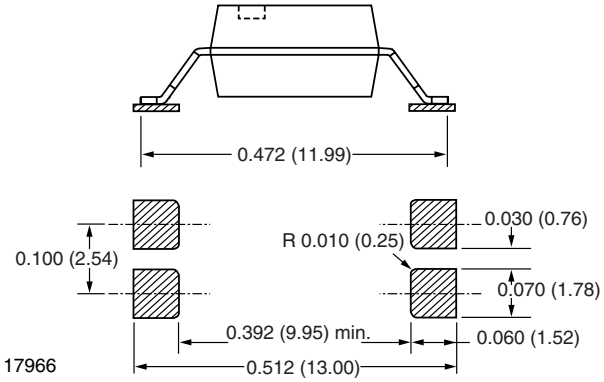


Fig. 14 - 4 Pin SMD Option 8

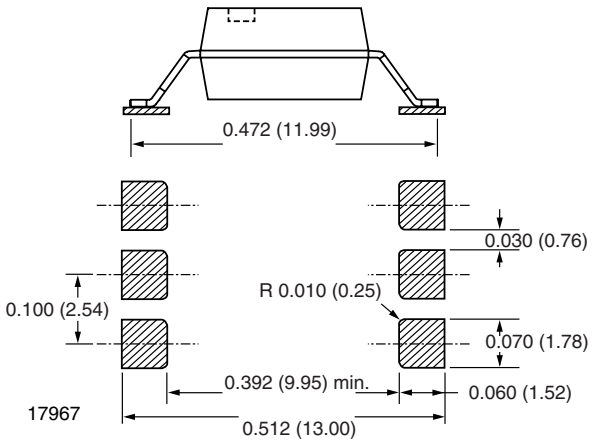


Fig. 15 - 6 Pin SMD Option 8

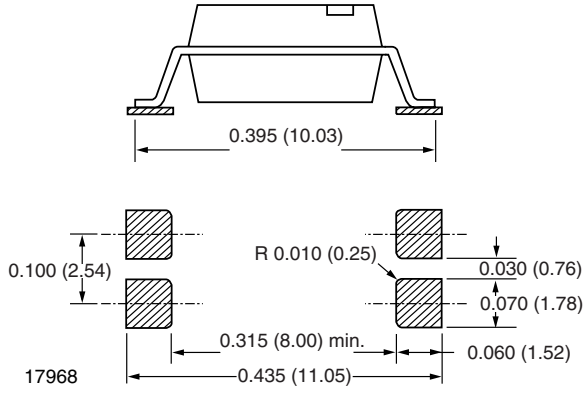


Fig. 16 - 4 Pin SMD Option 9

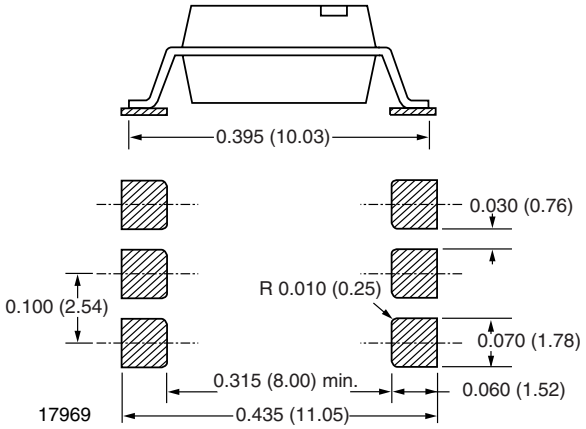


Fig. 17 - 6 Pin SMD Option 9

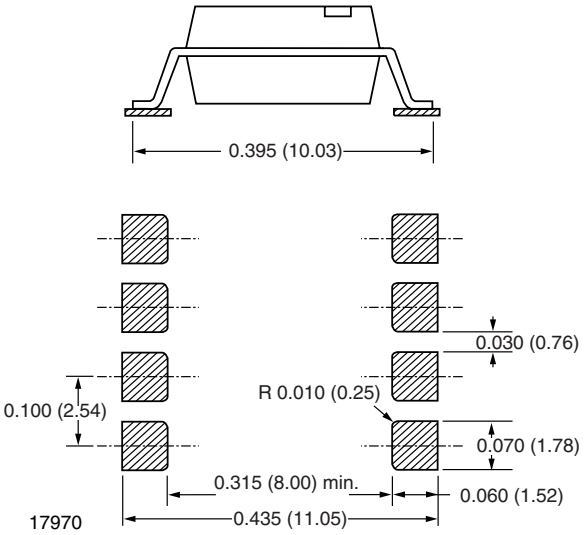


Fig. 18 - 8 Pin SMD Option 9

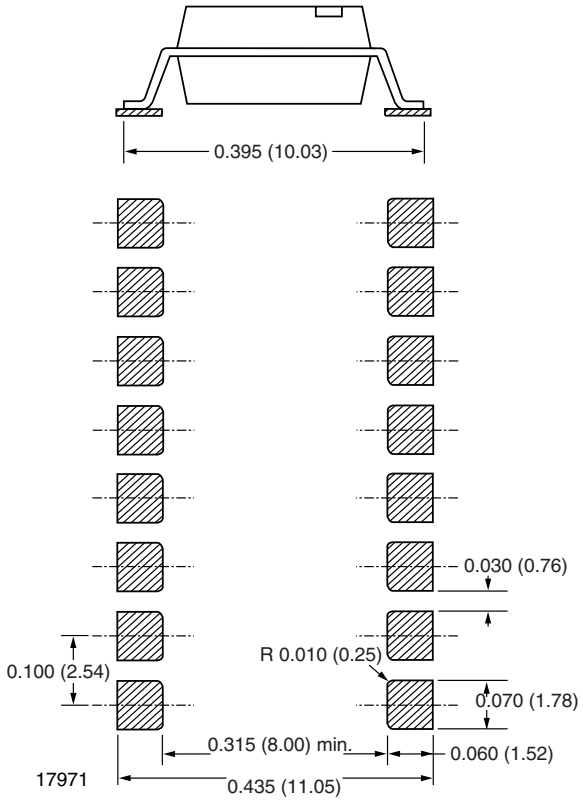


Fig. 19 - 16 Pin SMD Option 9

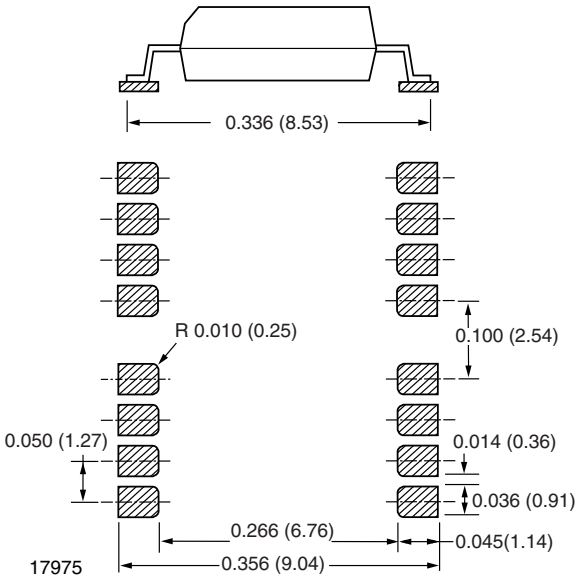


Fig. 20 - 16 Pin PCMCIA

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