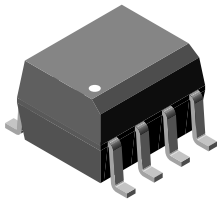
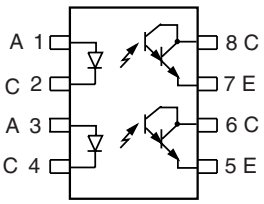
Optocoupler, Photodarlington Output, Dual Channel, SOIC-8 Package





i179042

FEATURES

- Two channel optocoupler
- High current transfer ratio at I_F = 1.0 mA, 500 % minimum
- Isolation test voltage, 4000 V_{RMS}
- Electrical specifications similar to standard 6-pin coupler
- Compatible with dual wave, vapor phase and IR reflow soldering
- SOIC-8 surface mountable package
- Standard lead spacing, 0.05"
- Available only on tape and reel (conforms to EIA standard 481-2)
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

AGENCY APPROVALS

- UL1577, file no. E52744 system code Y
- CUL - file no. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-2 (VDE 0884) available with option 1

DESCRIPTION

The ILD233T is a high current transfer ratio (CTR) optocoupler. It has a gallium arsenide infrared LED emitter and silicon NPN photodarlington transistor detector.

This device has CTRs tested at an LED current of 1.0 mA. This low drive current permits easy interfacing from CMOS to LSTTL or TTL.

The ILD223T is constructed in a standard SOIC-8 foot print which makes it ideally suited for high density applications. In addition to eliminating through hole requirements, this package conforms to standards for surface mounted devices.

ORDER INFORMATION	
PART	**REMARKS**
ILD223T	CTR > 500 %, SOIC-8

ABSOLUTE MAXIMUM RATINGS (1)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Peak reverse voltage		V_R	6.0	V
Peak pulsed current	1.0 µs, 300 pps		3.0	A
Continuous forward current per channel			30	mA
Power dissipation		P_{diss}	45	mW
Derate linearly from 25 °C			0.4	mW/°C
OUTPUT				
Collector emitter breakdown voltage		BV_{CEO}	30	V
Emitter collector breakdown voltage		BV_{ECO}	5.0	V
Power dissipation per channel		P_{diss}	75	mW
Derate linearly from 25 °C			3.1	mW/°C

ABSOLUTE MAXIMUM RATINGS (1)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Isolation test voltage	t = 1.0 s	V_{ISO}	4000	V_{RMS}
Total package dissipation (2 LEDs and 2 detectors, 2 channels)		P_{tot}	250	mW
Derate linearly from 25 °C			2.0	mW/°C
Storage temperature		T_{stg}	- 55 to + 150	°C
Operating temperature		T_{amb}	- 55 to + 100	°C
Soldering temperature (2)		T_{sld}	260	°C

Notes

(1) T_{amb} = 25 °C, unless otherwise specified
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 (SOP/SOIC).

ELECTRICAL CHARACTERISTICS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Forward voltage	I_F = 10 mA		V_F			1.3	V
Reverse current	V_R = 6.0 V		I_R		0.1	100	µA
Capacitance	V_F = 0 V, f = 1.0 MHz		C_O		25		pF
OUTPUT							
Collector emitter breakdown voltage	I_C = 10 µA		BV_{CEO}	30			V
Emitter collector breakdown voltage	I_C = 10 µA		BV_{CEO}	5.0			V
Collector emitter leakage current	V_{CE} = 50 V, I_F = 0 A		I_{CEO}			50	nA
Collector emitter capacitance	V_{CE} = 5.0 V		C_{CE}		3.4		pF
COUPLER							
Capacitance (input to output)		ILD223T	C_{IO}	0.5			pF
Saturation voltage, collector emitter	I_F = 1.0 mA, I_{CE} = 0.5 mA	ILD223T	V_{CEsat}			1.0	V
Resistance, input to output		ILD223T	C_{IO}	100			GΩ

Note

T_{amb} = 25 °C, unless otherwise specified
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.

CURRENT TRANSFER RATIO

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
DC current transfer ratio	I_F = 1.0 mA, V_{CE} = 5.0 V	CTR_{DC}	500			%

SWITCHING CHARACTERISTICS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	V_{CC} = 10 V, R_L = 100 Ω, I_F = 5.0 mA	ILD223T	t_{on}	15			µs
Turn-off time	V_{CC} = 10 V, R_L = 100 Ω, I_F = 5.0 mA	ILD223T	t_{off}	30			µs

SAFETY AND INSULATION RATINGS						
PARAMETER	**TEST CONDITION**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Climatic classification (according to IEC 68 part 1)				55/100/21		
Comparative tracking index		CTI	175		399	
V_{IOTM}			6000			V
V_{IORM}			560			V
P_{SO}					350	mW
I_{SI}					150	mA
T_{SI}					165	°C
Creepage distance			4			mm
Clearance distance			4			mm
Insulation thickness, reinforced rated	per IEC 60950 2.10.5.1		0.2			mm

Note

As per IEC 60747-5-2, §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.

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

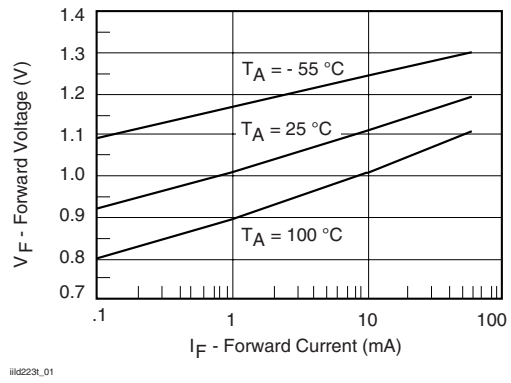


Fig. 3 - Forward Voltage vs. Forward Current

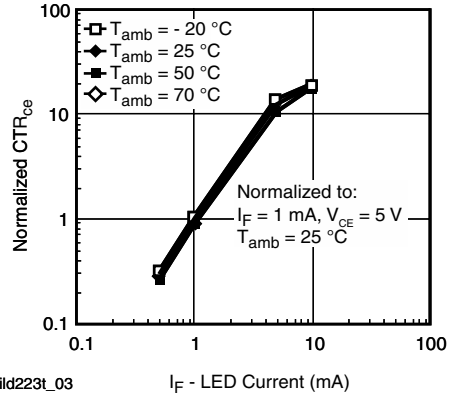


Fig. 5 - Normalized CTR_{CE} vs. LED Current

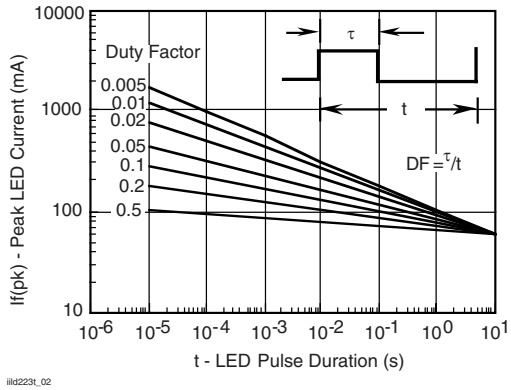


Fig. 4 - Peak LED Current vs. Duty Factor, τ

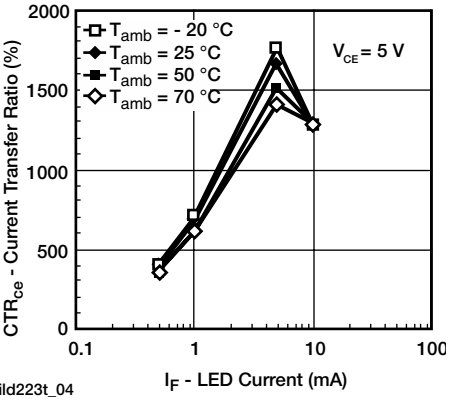


Fig. 6 - CTR vs. LED Current

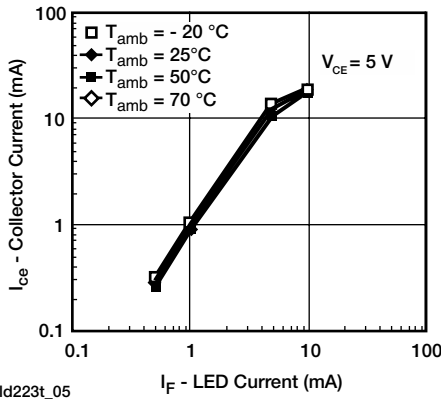


Fig. 7 - Collector Current vs. LED Current

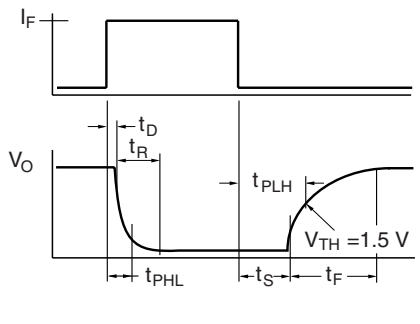


Fig. 9 - Switching Timing

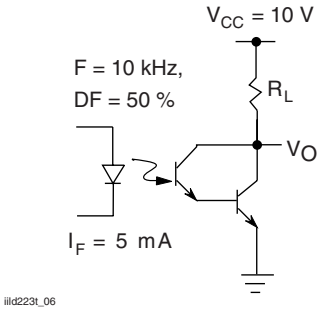
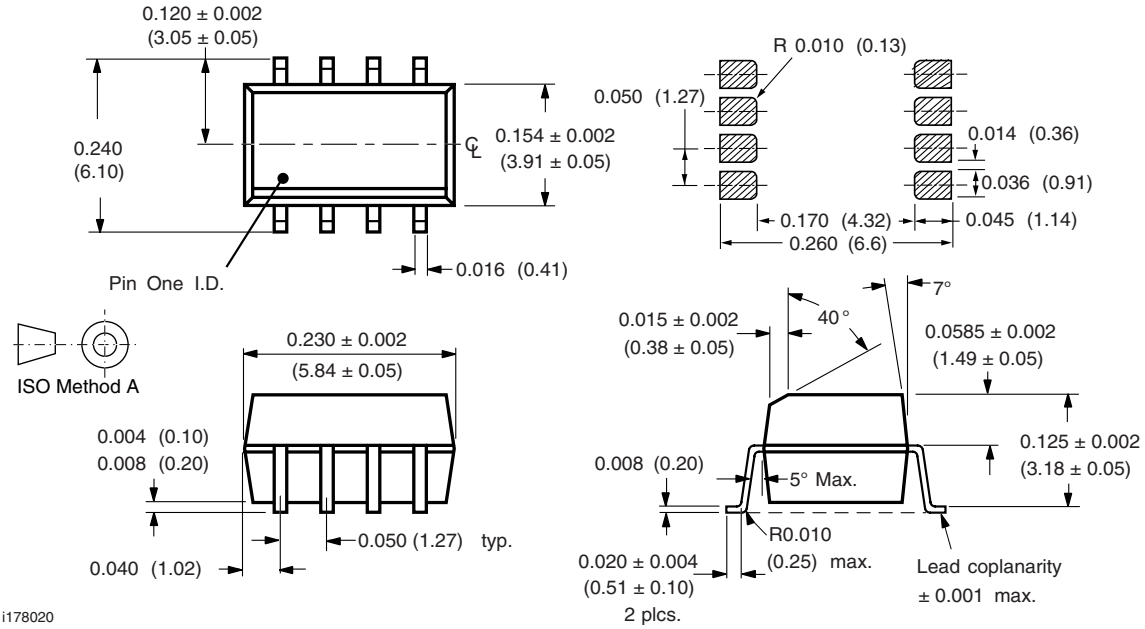


Fig. 8 - Switching Schematic

PACKAGE DIMENSIONS in inches (millimeters)



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 operating systems 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.

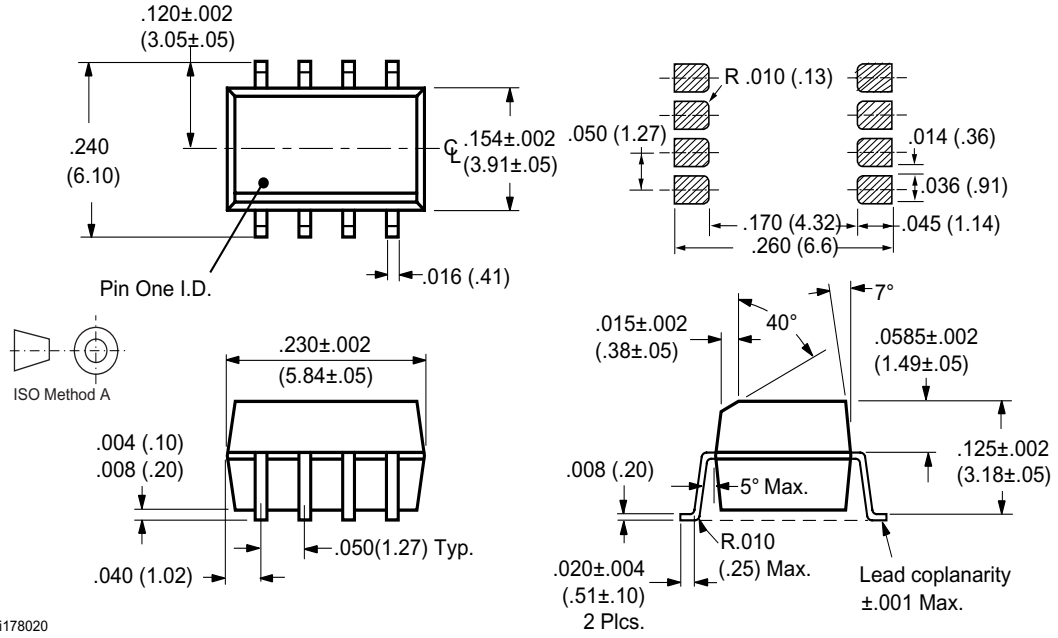
1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively.
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC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

SOIC-8D

Package Dimensions in Inches (mm)



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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

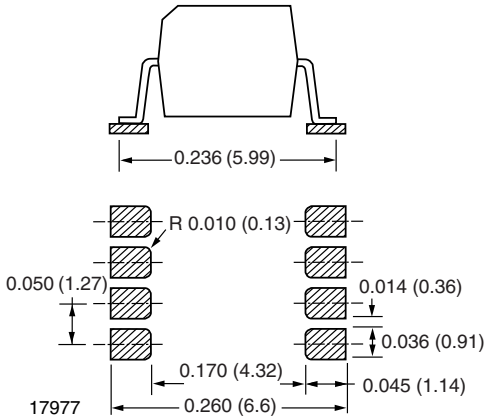

Fig. 1 - SO8A and DSO8A SMD

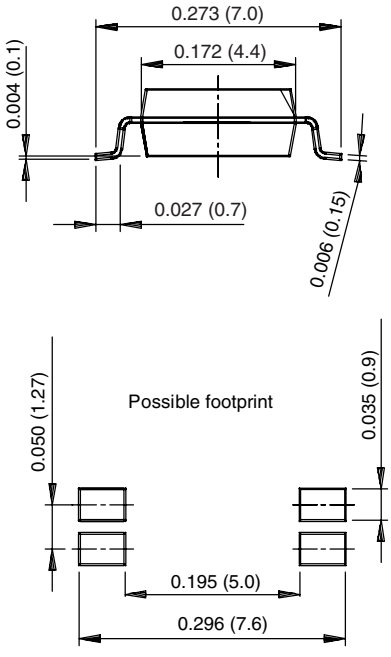

Fig. 2 - SOP-4, Miniflat

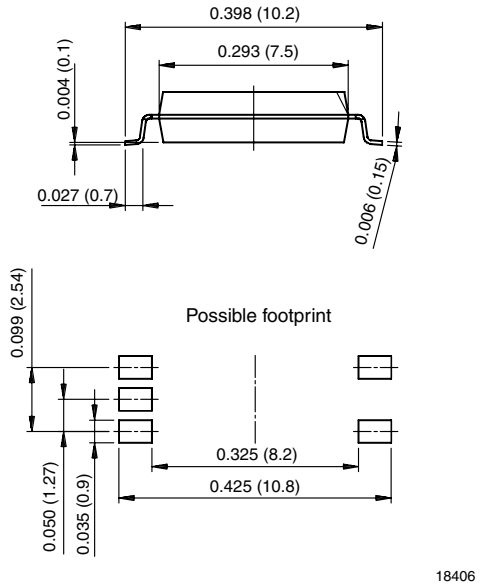

Fig. 3 - SOP-6, 5 Pin Wide Body

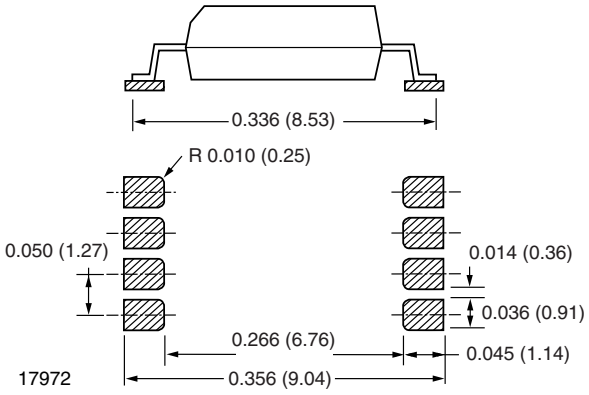

Fig. 4 - 8 Pin PCMCIA

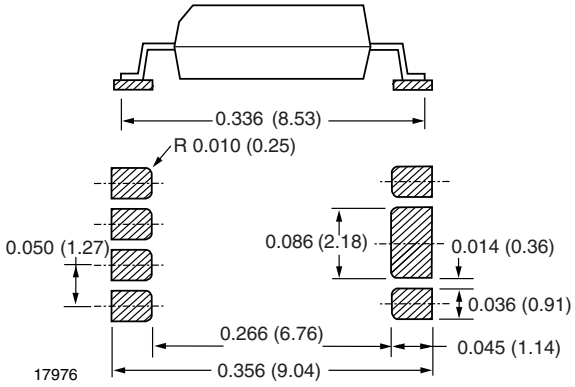

Fig. 5 - 8 Pin PCMCIA, Heat Sink

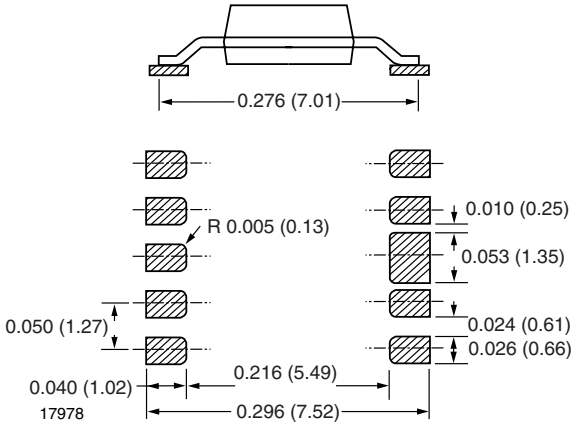

Fig. 6 - Mini Coupler

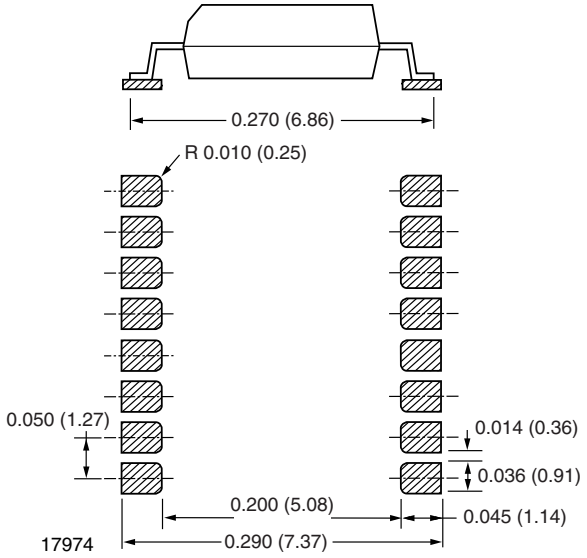

Fig. 7 - SOP-16

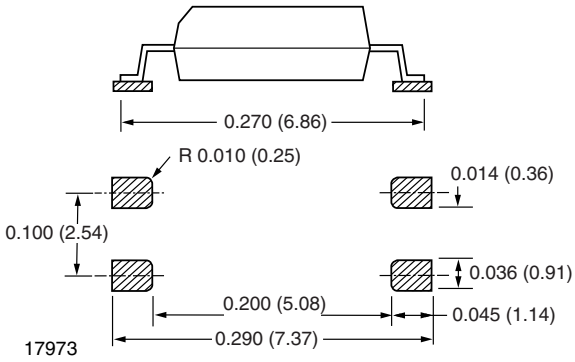

Fig. 8 - 4 Pin Mini-Flat

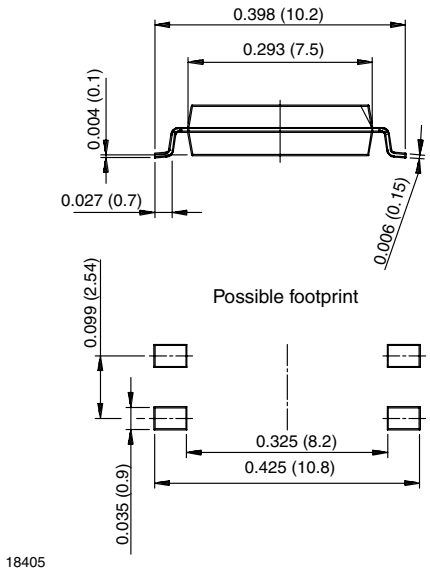

Fig. 9 - SOP-6, 4 Pin Wide Body

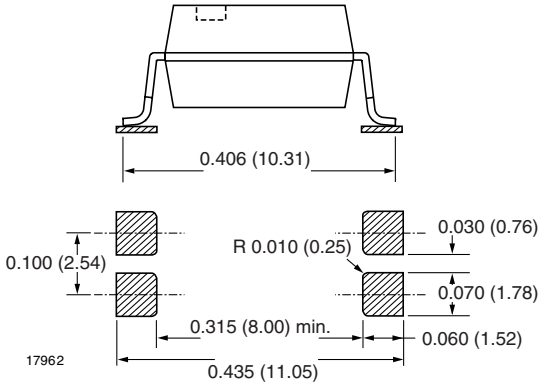

Fig. 10 - 4 Pin SMD Option 7

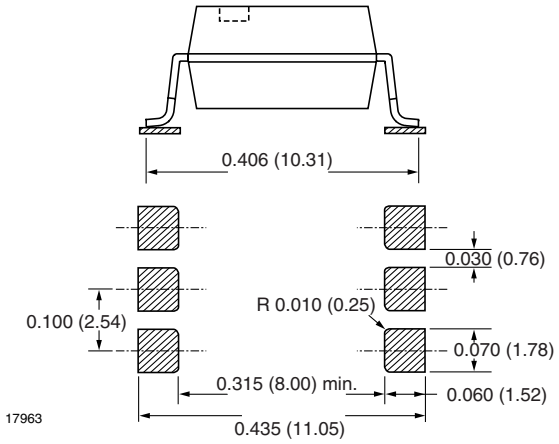

Fig. 11 - 6 Pin SMD Option 7

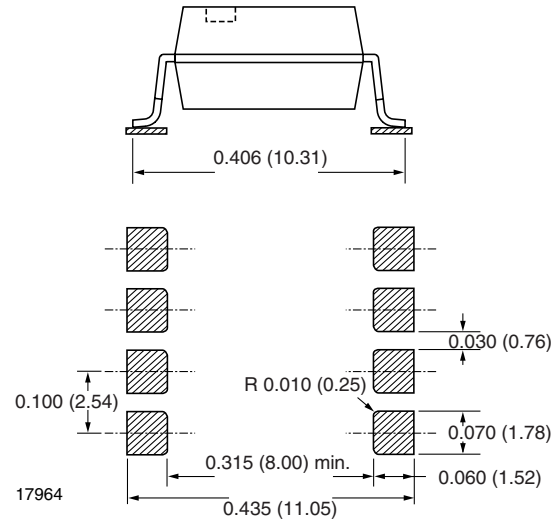

Fig. 12 - 8 Pin SMD Option 7

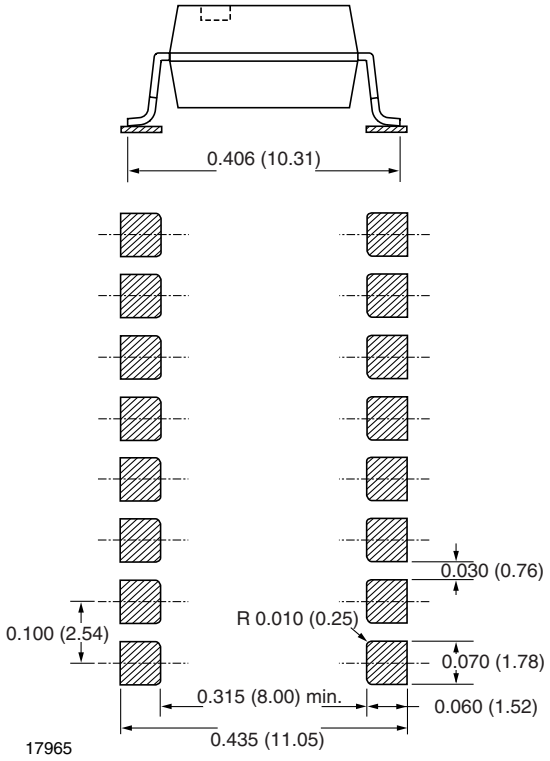

Fig. 13 - 16 Pin SMD Option 7

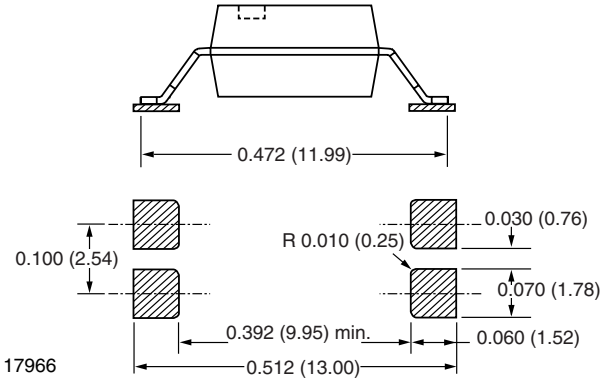

Fig. 14 - 4 Pin SMD Option 8

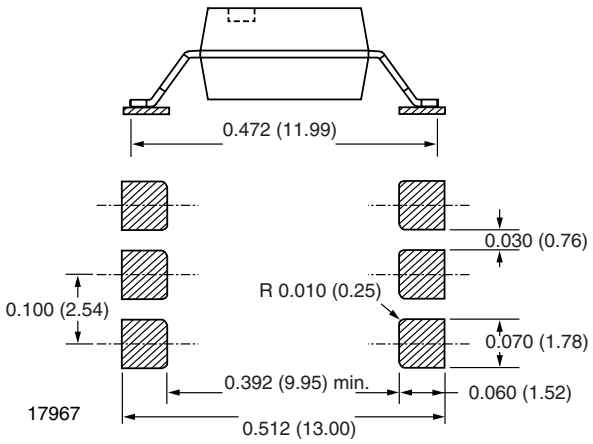

Fig. 15 - 6 Pin SMD Option 8

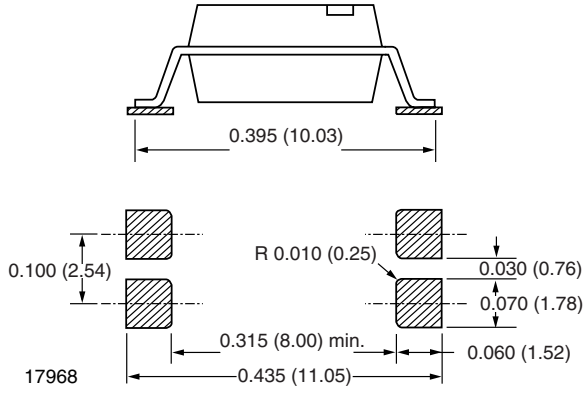

Fig. 16 - 4 Pin SMD Option 9

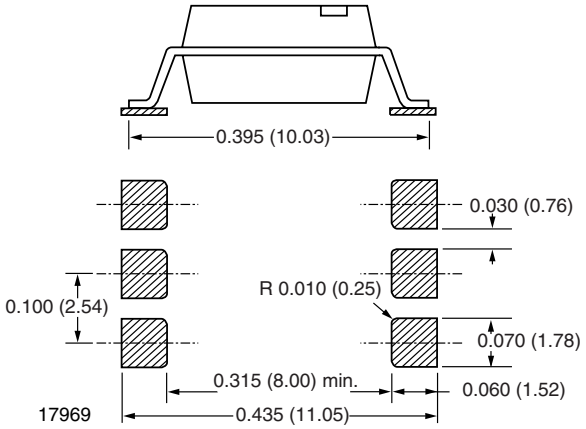

Fig. 17 - 6 Pin SMD Option 9

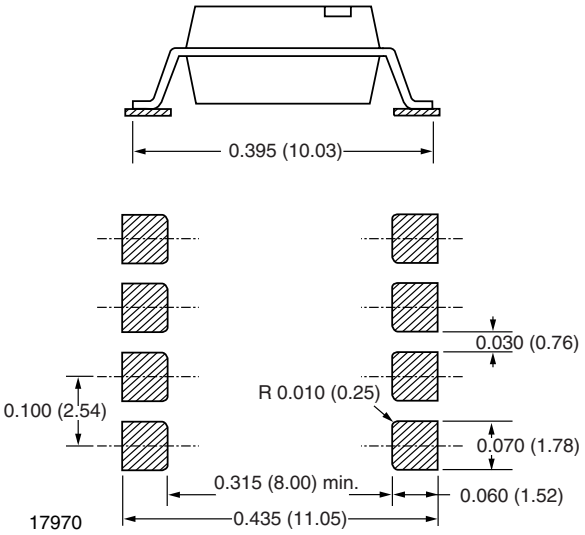

Fig. 18 - 8 Pin SMD Option 9

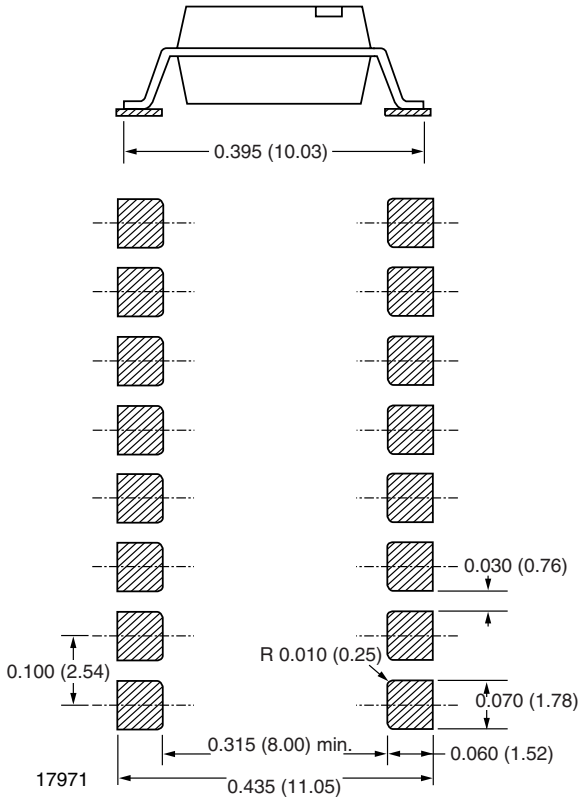

Fig. 19 - 16 Pin SMD Option 9

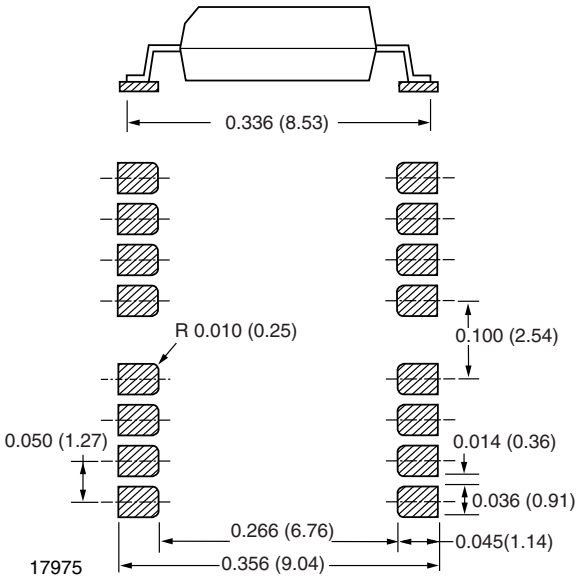

Fig. 20 - 16 Pin PCMCIA

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