PART NUMBER IS49

COMPONENT SPECIFICATION ISSUE 7

Component Specification For Ceramic Hermetically Sealed, Radiation-Hard Transistor Optocouplers

Features	Applications
▪ Radiation Tolerance Tested to 150 Krad(Si) ▪ Displacement Damage Tested to 1 MeV x 10^{13} ▪ Withstand Test Voltage of 1,000 VDC ▪ High Current Transfer Ratio ▪ Low Input Requirements ▪ LCC-6 Package ▪ Small Outline Package for Surface Mount ▪ Hermetically Sealed	▪ Space Equipment and Systems ▪ Military Equipment and Systems ▪ Medical Instruments ▪ MOS / CMOS Applications ▪ Logic Interfacing ▪ Data Transmission ▪ Power Supply ▪ Modems

DESCRIPTION

The IS49 is a hermetically sealed, single-channel optically coupled isolator. It is comprised of an infrared emitting diode and a silicon phototransistor.

The IS49 is being used in environments encountered in space applications. Package styles for this device include an 6-Pin LCC package with solder dip options available.

Absolute maximum ratings, recommended operating conditions, electrical specifications and performance characteristics are identical for all units. Any exceptions, due to packaging variations and limitations, are as noted.

ISOCOM Limited is AS9100 certified for the design and manufacture of electronic and optoelectronic components.

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STANDARDS

The following specifications have been complied with in the manufacturing of this product -

Aerospace Compliance Standards

AS9100D & ISO 9001:2015 – Design & Manufacture of Electronic and Optoelectronic Components *(Ref GB15/92780)*

Military Compliance Specifications

MIL-PRF-38534 – General Specification for Hybrid Microcircuits
MIL-PRF-19500 – General Specification for Discrete Semiconductor Devices

Military Compliance Standards

MIL-STD-202 – Test Method Standard Electronic and Electrical Component Parts
MIL-STD-883 – Test Method Standard Microcircuits
MIL-STD-750 – Test Method Standard for Semiconductor Devices

SCREENING INFORMATION

Our products can be screened to MIL-PRF-38534, applying test methods from MIL-STD-883; MIL-PRF-19500, applying test methods of MIL-STD-750; or a combination thereof. Please contact us for more information relating to the applicable screening processes.

AMENDMENT RECORD

Issue No.	Date	Description
1	September 2013	First Issue.
2	September 2015	Added DD Information.
3	February 2016	Updated Formatting.
4	December 2017	Removed DD Information.
5	April 2018	Updated Quality Standards.
6	May 2019	Updated Standards Section. Removed Screening and Group Testing Information.
7	September 2020	Updated Quality Management Logos.

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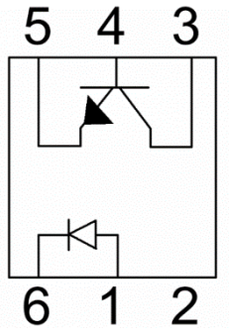
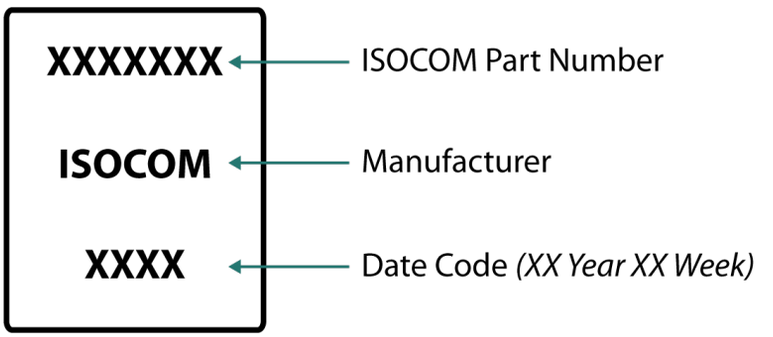
PACKAGE STYLES AND CONFIGURATION OPTIONS

Package	LCC-6
Lead Style	-
Channels	1
Common Channel Wiring	-
Isocom Part Number and Options	
Commercial	IS49
Defense Screen Level	IS49/L2
Space Screen Level	IS49/L2S
Standard Finish	Gold Plate
Solder Dipped	Option #20

FUNCTIONAL DIAGRAMS

IS49
LCC-6
1 Channel


DEVICE MARKING



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ABSOLUTE MAXIMUM RATINGS

T_A = 25°C U.O.S.

Storage Temperature	-65°C to +150°C	
Operating Temperature	-55°C to +125°C	
Lead Soldering Temperature	260°C 1.6mm from case for 10 seconds	
Input-to-Output Isolation Voltage	⇧1,000 V_{DC}	
Input Diode		
Forward DC Current	50 mA	
Reverse DC Voltage	7 V	
Peak forward Current	1.5 A	≤ 10µs
Power Dissipation	150 mW	
Output Transistor		
Collector-Emitter Voltage	70 V	
Emitter-Collector Voltage	7 V	
Collector-Base Voltage	70 V	≤ 10µs
Collector Current	100 mA	t=1ms
Power Dissipation	150 mW	Derate linearly above 100ºC at 1.4 W/ºC
Coupled Device		
Input to Output Isolation Voltage	1,000 V	
Power Dissipation	360 mW	
Soldering Temperature, Soldering Iron	260.5°C	This part shall not be re-soldered until 3 minutes have elapsed.
Soldering Temperature, Vapour Phase	220.40°C	This part shall not be re-soldered until 3 minutes have elapsed.
ESD Classification	Class 2	Class 2 with minimum critical path voltage of 4,000 to 15,999V. MIL-STD-883

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ELECTRICAL CHARACTERISTICS

T_A = -55°C - 125°C U.O.S.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Diode Electrical Characteristics						
Forward Voltage	V_F	I_F = 10 mA	0.7	1.2	1.8	V
		I_F = 10 mA -55°C	0.7	1.3	1.8	V
		I_F = 10 mA +125°C	0.7	1.1	1.8	V
Reverse Current	I_R	V_R = 3.0 V	-	-	100	µA
Output Detector Electrical Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 1 mA	70	100	-	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_B = 100 µA	70	200	-	V
Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E = 0.1 mA	7	9	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_B = 1 mA	5	-	-	V
Collector–Emitter Leakage Current	I_{CEO}	VCE = 20 V, IF = 0	-	7	100	µA
		VCE = 20 V, IF = 0, -55°C	-	-	100	µA
		VCE = 20 V, IF = 0, +125°C	-	10	100	µA
Coupled Electrical Characteristics						
DC Current Transfer Ratio	IC/IF	I_F = 1.0 mA, V_{CE} = 1 V	200	-	-	%
		I_F = 3.0 mA, V_{CE} = 1 V	200	-	-	%
		I_F = 15.0 mA, V_{CE} = 1 V	100	-	-	%
		I_F = 10.0 mA, V_{CE} = 5 V	350	-	-	%
		I_F = 15.0 mA, V_{CE} = 5 V	100	-	-	%
		I_F = 1.0 mA, V_{CE} = 15 V	300			%
Collector-Emitter Saturation Voltage	V_{CE} (Sat)	I_C =10.0 mA I_F = 20 mA	-	-	0.22	V
Isolation Voltage [1]	V in-out	T = 5s	1,000	-	-	Vdc
Input to Output Resistance [1]	R in-out	V_{IO} = 500 V	-	10^{11}		Ω
Rise Time	tr	R_L = 100 Ω, Vcc = 10 V, I_F = 10 mA	-	6	12	µs
Fall Time	tf	R_L = 100 Ω, Vcc = 10 V, I_F = 10 mA	-	6	12	µs
Propagation Delay – H-L	tPHL	R_L = 100 Ω, Vcc = 10 V, I_F = 10 mA	-	-	5.0	µs
Propagation Delay – L-H	tPLH	R_L = 100 Ω, Vcc = 10 V, I_F = 10 mA	-	-	5.0	µs
DC Current Transfer Ratio	IC (CTR)	I_F = 1.0 mA, V_{CE} = 1 V, T_A = 125°C	200	-	-	%
		I_F = 1.0 mA, V_{CE} = 1 V, T_A = -55°C	200	-	-	%
		I_F = 3.0 mA, V_{CE} = 1 V, T_A = 125°C	100	-	-	%
		I_F = 3.0 mA, V_{CE} = 1 V, T_A = -55°C	100	-	-	%
		I_F = 15.0 mA, V_{CE} = 1 V, T_A = 125°C	66	-	-	%
		I_F = 15.0 mA, V_{CE} = 1 V, T_A = -55°C	66	-	-	%
		I_F = 10.0 mA, V_{CE} = 5 V; T_A =125°C	160	-	-	%
		I_F = 10.0 mA, V_{CE} = 5 V, T_A = -55°C	160	-	-	%
		I_F = 15.0 mA, V_{CE} = 5 V, T_A = 125°C	40	-	-	%
		I_F = 15.0 mA, V_{CE} = 5 V, T_A = -55°C	40	-	-	%
		I_F = 1.0 mA, V_{CE} = 15 V, T_A = 125°C	250	-	-	%
		I_F = 1.0 mA, V_{CE} = 15 V, T_A = -55°C	250	-	-	%

Notes:

1. Measurements with inputs shorted together and outputs shorted together.

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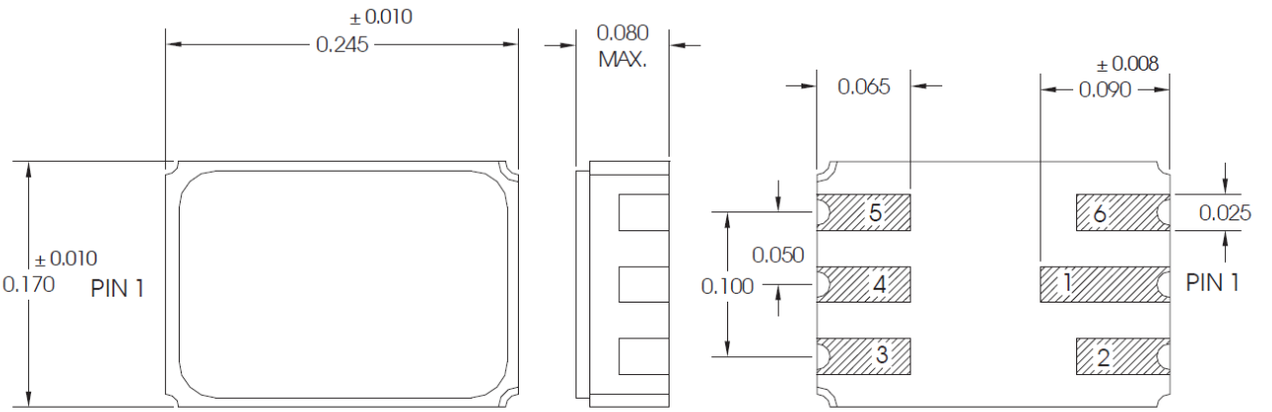
OUTLINE DRAWINGS

LCC-6



SWITCHING TIME

Input waveform is supplied by a generator with the following characteristics:
Zo = 50 Ω
tr.tf < 10ns

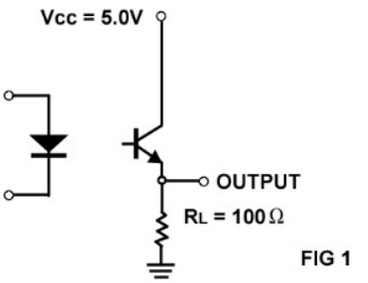
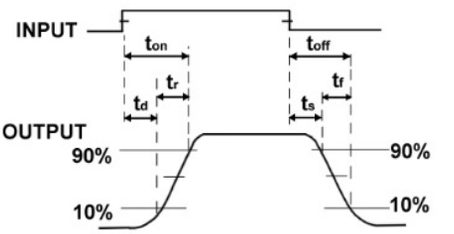


FIG 1



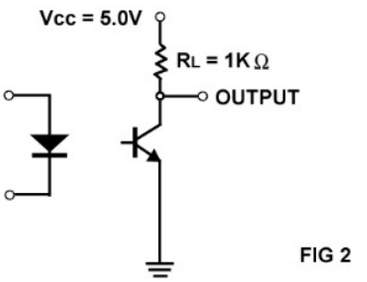
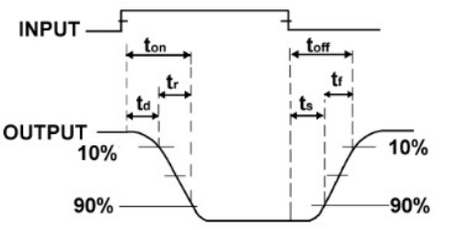


FIG 2



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