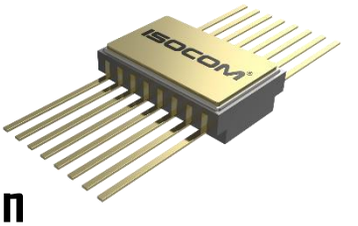
PART NUMBER **CSM160,CSM161,CSM162**

COMPONENT SPECIFICATION **ISSUE 7**



Component Specification For Hermetically Sealed, Radiation-Hard High Gain Optocouplers

Features	Applications
▪ Total Ionising Dose Tested to 30 Krad(Si) ▪ Displacement Damage Tested to 3 MeV x 10^{12} ▪ High Current Transfer Ratio (Typically 1000%) ▪ Low Input Requirements 0.5mA ▪ Hermetically Sealed ▪ 16-Pin Flatpack ▪	▪ Space Radiation Equipment ▪ Military and High-Reliability Systems ▪ Medical Instruments ▪ MOS / CMOS Applications ▪ Logic Interfacing ▪ Data Transmission ▪ Power Supply

DESCRIPTION

These devices are hermetically sealed, dual-channel and quad-channel optically coupled isolators. Each channel is composed of a Gallium Arsenide infrared emitting diode and a high gain photon detector. The high gain output stage features an open collector output providing bother low output saturation and a higher speed of operation than what is possible with conventional photodarlington couplers.

The CSM160 series are being used in environments encountered in space applications. Package styles for this device include a 16-Pin flatpack package with solder dip options available. These packages have a shield effect to cut off ambient light, as they are designed for high density mounting applications.

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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Email: sales@isocom.uk.com • Tel: +44 (0)191 416 6546

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	May 2019	Edited Title Format. Removed Screening and Group Testing Information.
3	May 2020	Removed Pin Numbers from Schematic Drawing.
4	September 2020	Updated Quality Management Logos and Schematic Drawing. Removed IECQ Logos.
5	February 2021	Updated Crosstalk (I_{OHX}) Test Conditions.
6	November 2022	Updated Format
7	January 2023	Updated Electrical Characteristics

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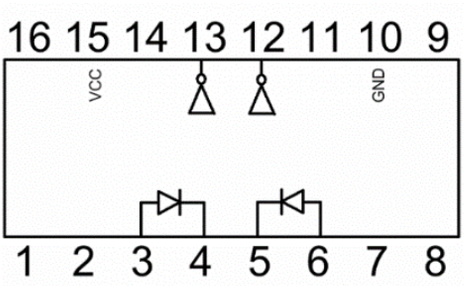
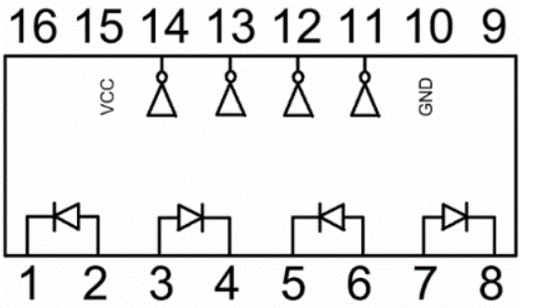
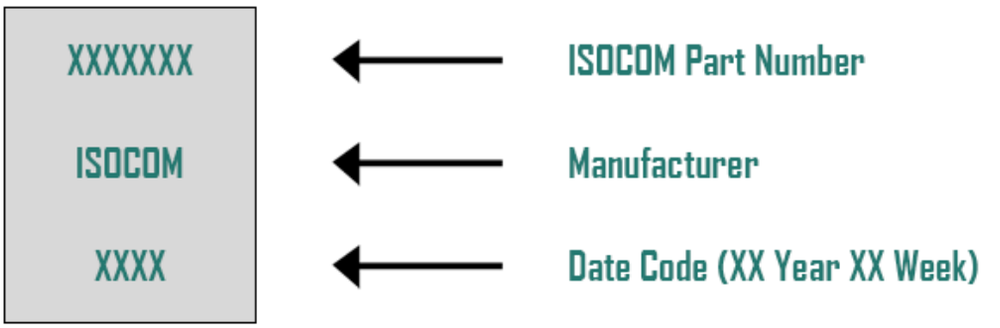
PACKAGE STYLES AND CONFIGURATION OPTIONS

Package	16-FLP		
Lead Style	-	-	-
Channels	2-4	2-4	2-4
Common Channel Wiring	-	-	-
Isocom Part Number and Options			
Commercial	CSM160	CSM161	CSM162
Defense Screen Level	CSM160/L2	CSM161/L2	CSM162/L2
Space Screen Level	CSM160/L2S	CSM161/L2S	CSM162/L2S
Standard Gold Plate Finish	Gold Plate		
Solder Dipped	Option #20		

FUNCTIONAL DIAGRAMS

CSM160-2, CSM161-2, CSM162-2	CSM160-4, CSM161-4, CSM162-4
16-FLP	16-FLP
2 Channels	4 Channels
	

DEVICE MARKING



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ABSOLUTE MAXIMUM RATINGS

T_A = 25°C C.U.O.S

Storage Temperature	-65ºC to +150ºC
Operating Temperature	-55ºC to +125ºC
Lead Soldering Temperature	260ºC 1.6mm from case for 10s
Input-to-Output Isolation Voltage	⇧1500VDC
Input Diode	
Peak Forward Current	20mA < 1ms duration, 500pps
Average Forward Current (3)	5mA
Reverse Voltage	5V
Power Dissipation	35mW
Output Detector	
Supply Voltage (1) (2)	0.5V to 20V
Average Current	10mA

ELECTRICAL CHARACTERISTICS

T_A = 25°C C.U.O.S

Parameter	Symbol	Test Conditions	Min	Type	Max	Units
Current Transfer Ratio (4) (5)	CTR	V_{CC} = 4.5V, V_O = 0.4V, I_F = 0.5mA	300	700	-	%
		V_{CC} = 4.5V, V_O = 0.4V, I_F = 1.6mA	200	1000	-	%
		V_{CC} = 5V, V_{OS} = 0.4V, I_F = 5mA	200	600	-	%
Logic Low Output Voltage (4)	V_{OL}	V_{CC} = 4.5V, I_F = 0.5mA, I_{OL} = 1.5mA	-	0.1	0.4	V
		V_{CC} = 4.5V, I_F = 5mA, I_{OL} = 10mA	-	0.15	0.4	V
Logic High Output Current (3) (5) (6)	I_{OH}	V_O = V_{CC} = 5.5V, I_F = 2 µA, I_F = 5mA	-	0.001	250	µA
Logic High Supply Current	I_{CCH}	I_{F1} = I_{F2} = I_{F3} = I_{F4} = 0	-	-	60	µA
Logic Low Supply Current (4)	I_{CCL}	V_{CC} = 5.5V, I_{F1} = I_{F2} = I_{F3} = I_{F4} = 2mA	-	-	8.0	mA
Input Forward Voltage (4)	V_F	I_F = 4mA	-	1.45	1.9	V
Input-Output Insulation Leakage Current (7) (13)	I_{I-O}	R_H = 45%, t=5S, T_A = 25°C, V_{I-O}= 1500vdc	-	-	1.0	µA
Input Reverse Breakdown (4)	B_{VR}	I_R = 10 µA, T_A = 25ºC	5	-	-	V
Propagation Delay H-L (4)	T_{PHL}	R_L = 4.7 KΩ, V_{CC} = 5V, I_F = 0.5mA	-	-	100	µS
Propagation Delay L-H (4)	T_{PLH}	R_L = 4.7 KΩ, V_{CC} = 5V, I_F = 0.5mA	-	-	100	µS
Common Mode Transient Immunity at Logic High Output (4) (10) (12)	C_{MH}	V_{CC} = 5V, I_F = 0mA, V_{CM} = 50V p-p, R_L = 1.5 KΩ	500	1000	-	V/µS
Common Mode Transient Immunity at Logic Low Output (4) (10) (12)	C_{ML}	V_{CC} = 5V, I_F = 1.6mA, V_{CM} = 50V p-p, R_L = 1.5 KΩ	500	1000	-	V/µS

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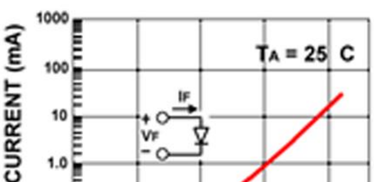

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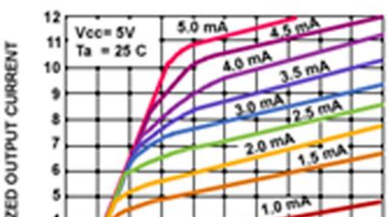

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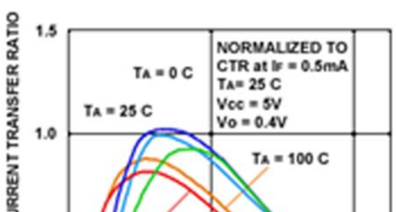
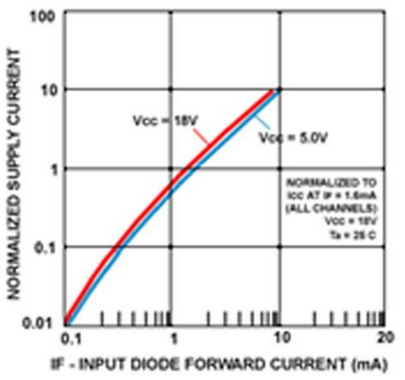
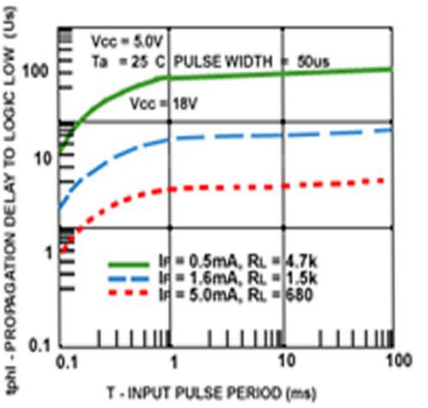


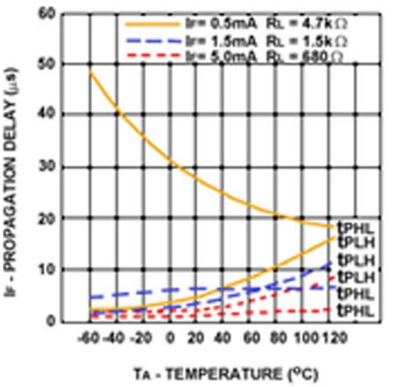
Input Diode Forward Current vs Forward Voltage



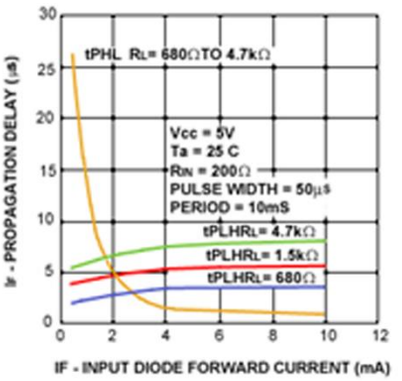
Normalised Supply Current vs Input Diode Forward Current



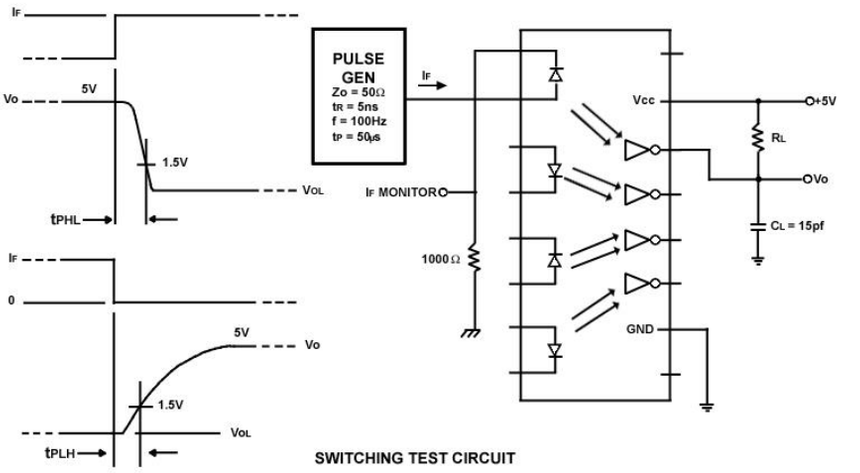
Propagation Delay to Logic Low vs Input Pulse Period



Propagation Delay vs Temperature



Propagation Delay vs Input Diode Forward Current



SCHEMATIC DRAWING

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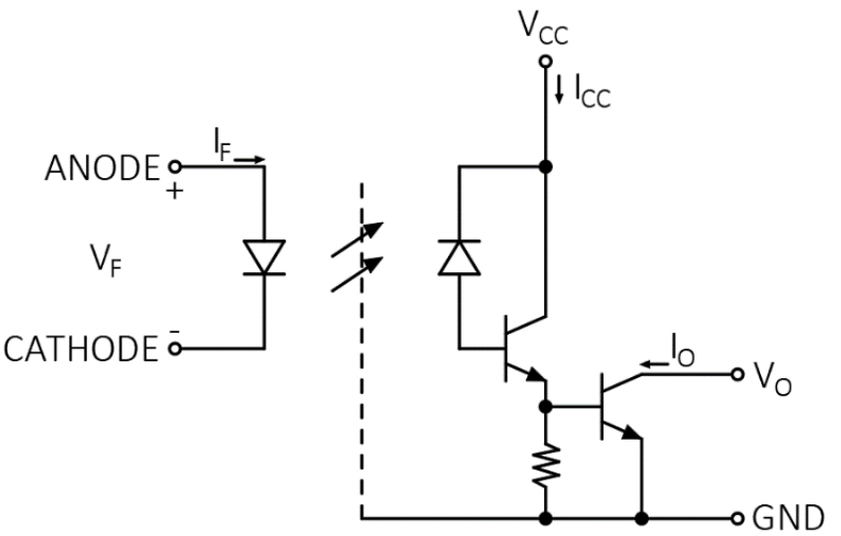
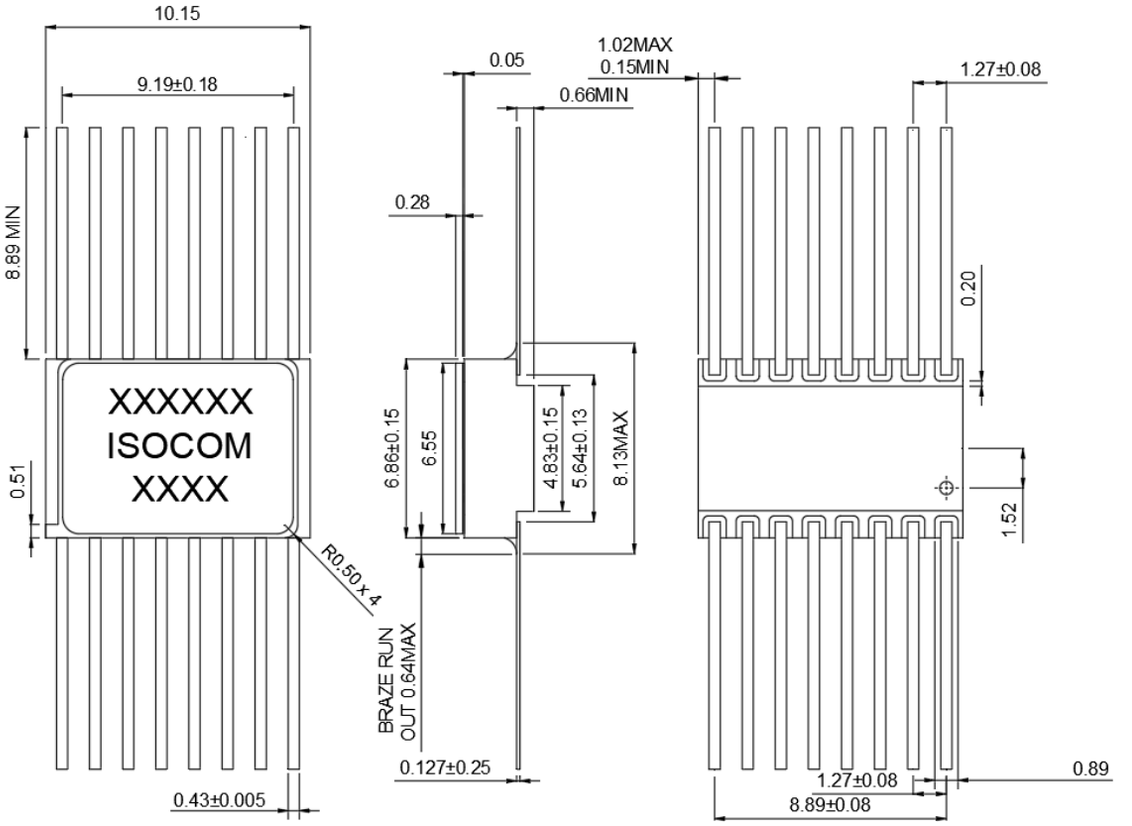


OUTLINE DRAWINGS

16-Pin Flatpack



PIN OUT INFORMATION

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Pin Number	Pin Function	
	CSM160-2 CSM161-2 CSM161-4	CSM160-4 CSM161-4 CSM162-4
1	N/C	LED Cathode
2	N/C	LED Anode
3	LED Anode	LED Anode
4	LED Cathode	LED Cathode
5	LED Cathode	LED Cathode
6	LED Anode	LED Anode
7	N/C	LED Anode
8	N/C	LED Cathode
9	N/C	N/C
10	GND	GND
11	N/C	$V_{OUT\ (1)}$
12	$V_{OUT\ (1)}$	$V_{OUT(2)}$
13	$V_{OUT(2)}$	$V_{OUT\ (3)}$
14	N/C	$V_{OUT(4)}$
15	V_{CC}	V_{CC}
16	N/C	N/C

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ISOCOM Limited
2 Fern Court
Bracken Hill Business Park
Peterlee
County Durham
SR8 2RR
United Kingdom

W – www.isocom.uk.com
E – sales@isocom.uk.com
T - +44 (0) 191 416 6546

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