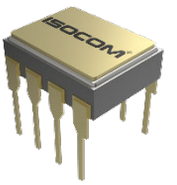
ISOCOM LIMITED

PART NUMBER **CSMR40, CSMR41**



COMPONENT SPECIFICATION **ISSUE 11**

Component Specification
For Ceramic Hermetically Sealed, Radiation-Hard Optically Coupled Solid State Relays

Features	Applications
▪ Released to European Standard and Complies with MIL-STD ▪ Total Ionizing Dose Tested to 150 Krad(Si) ▪ Withstand Test Voltage 1,000 V_{DC} ▪ 8-Pin DIP ▪ Hermetically Sealed ▪ Low Input Requirements ▪ High Current Ratio	▪ Space Equipment and Systems ▪ Military and High-Reliability Equipment and Systems ▪ Medical Instruments ▪ MOS / CMOS Applications ▪ Logic Interfacing ▪ Power Supplies

DESCRIPTION

This CSMR40/41 is a single channel optically coupled solid state relay. It consists of an LED optically coupled to a photovoltaic diode which drives two discrete power MOSFETs. The CSMR40/41 is being used in environments encountered by space applications. It is manufactured to JANS standards in conjunction with MIL-PRF-19500 procedures. Package styles for this device include 8-Pin DIP 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	June 2014	First issue
2	December 2014	Added AS9100C to military compliance standards.
3	February 2016	Changed datasheet layout.
4	February 2016	Added note for TID reference on pg. 1 and disclaimer added.
5	April 2016	Amended peak forward current to 40mA
6	December 2016	Amended description and added LCC-8 package option details.
7	May 2018	Updated standards section.
8	May 2021	Removed IECQ logos and updated quality management logos.
9	June 2021	Removed Screening and Group Test Information.
10	August 2022	Removed LCC-8 Package and Updated Format
11	April 2024	Updated Format

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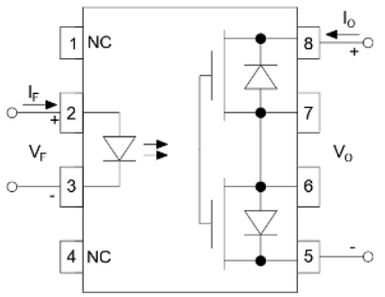
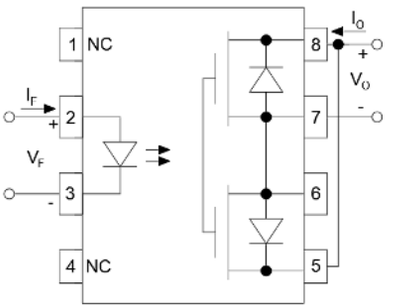
PACKAGE STYLES AND CONFIGURATION OPTIONS

Package	8-Pin DIP
Lead Style	-
Channels	1
Common Channel Wiring	-
Isocom Part Number and Options	
Commercial	CSMR40 CSMR41
Defense Screen Level	CSMR40/L2 CSMR41/L2
Space Screen Level	CSMR40/L2S CSMR41/L2S
Standard Gold Plate Finish	Gold Plate
Butt Joint	Option #10
Solder Dipped	Option #20
Gull Wing	Option #30
Crew Cut	Option #60

FUNCTIONAL DIAGRAMS

CSMR40 / CSMR41

8-Pin DIP

AC-DC Connection	DC Connection
	

Truth Table	
Input	**Output**
H	Closed
L	Open

PIN OUT

Pin number	Function
1	NC
2	In+
3	In-
4	NC
5	
6	
7	Out 1-
8	Out 1+

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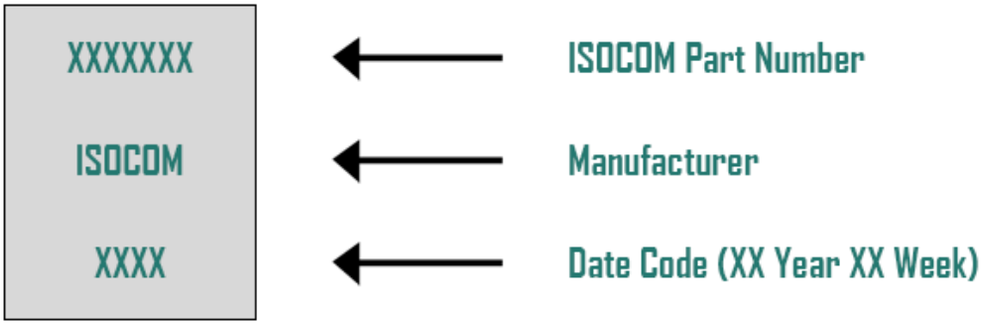
DEVICE MARKING



ABSOLUTE MAXIMUM RATINGS

T_A = 25°C 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 10s
Operating Case Temperature (Note 1)	+145°C
Input-to-Output Isolation Voltage	⇧1500VDC
Input Diode	
Average Input Current	20mA
Reverse Input Voltage	5V
Peak forward Current	40mA (≤ 10µs)
Power Dissipation	100mW
Output Detector	
Input to Output Isolation Voltage	1000V
Average Output Current	
Connection A	0.8A
Connection B	1.6A
Single Shot Output Current	
Connection A	3.0A
Connection B	6.0A
Output Voltage	

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Connection A	100V
Connection B	100V
Power Dissipation (Note 2)	800mW

TYPICAL CHARACTERISTICS

T_A = 25°C C.U.O.S

Parameter	Symbol	Test Conditions	Typ	Units
Output Off-Capacitance	$C_{O(OFF)}$	V_O=28V, f=1MHz	145	pF
Output Offset Voltage	Vos	I_F=10mA, I_O=0mA *(n.7)*	2	µV
Input Diode Temperature Coefficient	$\Delta V_F/\Delta T_A$	I_F=10mA	-1.4	mV/°C
Input Capacitance	C_{IN}	V_F=0V, f=1MHz *(n.8)*	20	pF
Input-Output Capacitance	C_{I-O}	V_{I-O}=0V, f=1MHz *(n.4)*	1.5	pF
Input-Output Resistance	R_{I-O}	V_{I-O}=500V, t=60s *(n.4)*	10^{13}	Ω
Turn On Time With Peaking	t_{ON}	I_{FPK}=100mA, I_{FSS}=10ma V_{DD}=28V, I_O=800mA *(n.6)*	0.22	ms

ELECTRICAL CHARACTERISTICS

T_A = 25°C C.U.O.S

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Forward Voltage	V_F	I_F = 10mA	1.0	1.24	1.7	V
Reverse Voltage	V_R	I_R = 100µA	5.0	–	–	V
Output Withstand Voltage	$V_{o(off)}$	V_F = 0.6V, I_O = 10µA	90	110	–	V
Output On-Resistance Connection A	$R_{(ON)}$	I_F = 10mA, I_O =500mA, (pulse duration ≤ 30ms) *(n.3)*	-	0.8	2.5	Ω
Output On-Resistance Connection B	$R_{(ON)}$	I_F = 10mA, I_O =1.0A, (pulse duration ≤ 30ms) *(n.3)*	-	0.2	0.7	Ω
Output Leakage Current	$I_{O(OFF)}$	V_F = 0.6V, V_O = 90V	-	-	10	µA
Input to Output Insulation	I_{I-O}	RH≤65%, t=5s, V_{I-O}= 1500V_{DC}, T_A = 25°C *(n.4, 5)*	-	–	1.0	µA
Isolation Voltage	V_{in-out}	T = 5s *(n.4)*	1500	–	–	Vdc
Turn On Time	t_{ON}	I_F = 10mA, V_{DD} =28V, I_O =800mA	-	1.25	6.0	ms
		I_F = 5mA, V_{DD} =28V, I_O =800mA *(n.10)*	-	–	6.0	ms
Turn Off Time	t_{OFF}	I_F = 10mA, V_{DD} =28V, I_O =800mA	-	0.02	0.25	ms

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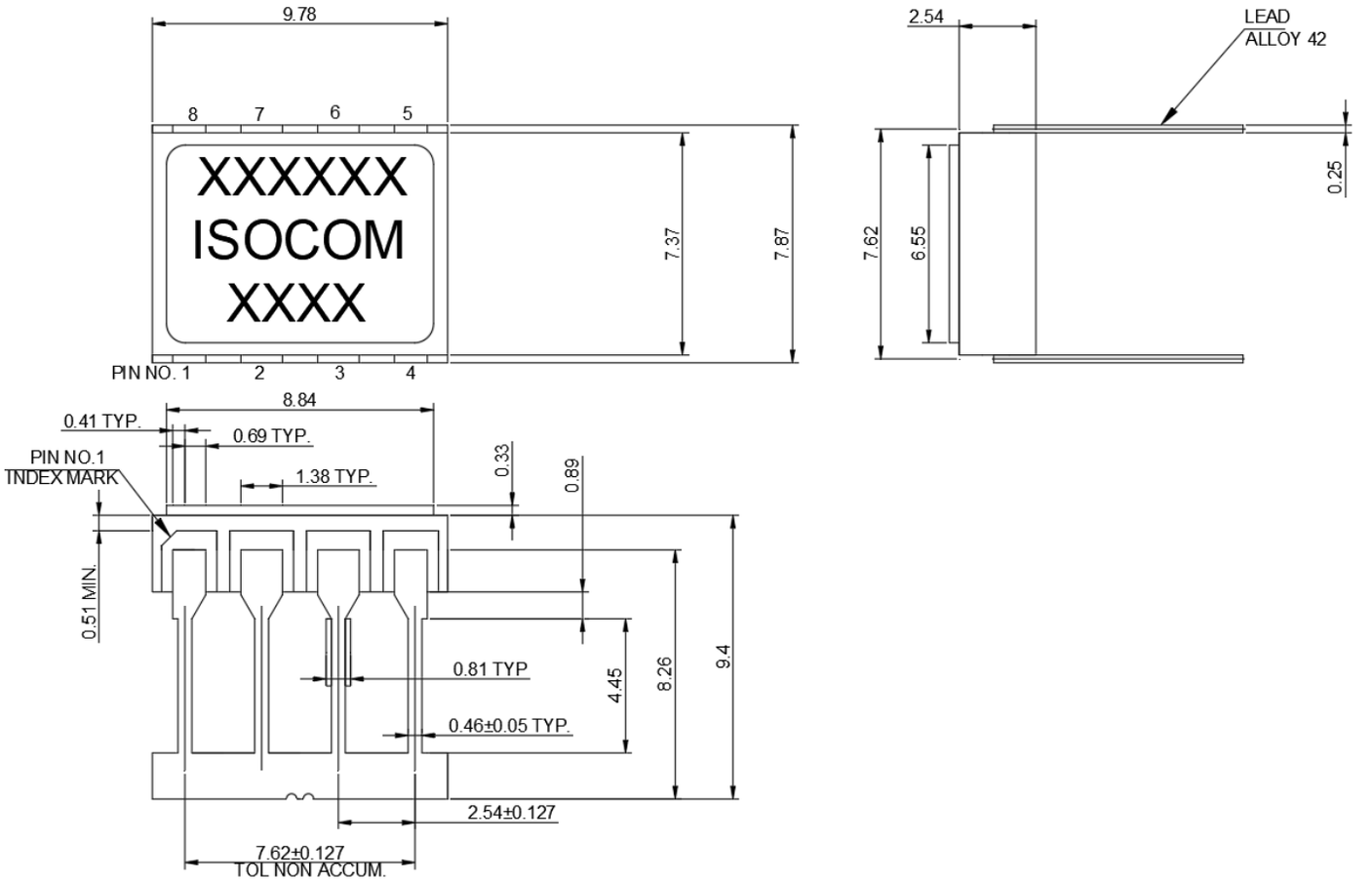
		I_F = 5mA, V_{DD} =28V, I_O =800mA	-	–	0.25	ms
Output Transient Rejection	$\frac{dV_O}{dt}$	V_{PEAK}=50V, C_m=1000 pF, C_L=15 Pf, R_M ≥1MΩ	1000	–	–	V/μS
Input-Output Transient Rejection	$\frac{dV_{I-O}}{dt}$	V_{DD} =5V, Vi-o ($_{PEAK}$) =50V, R_L=20KΩ, C_L=15 pF	500	–	–	V/μS[i]

Notes

1. Maximum junction to case thermal resistance for the device is 15°C/W, where case temperature, Tc is measured at the centre of the package bottom.
2. The output power P_O rating curve is obtained when the part is handling the maximum average output current.
3. During the pulsed R_{ON} measurement (I_O duration <30ms), ambient, (T_A) and case temperature (T_C) are equal.
4. Device considered a two terminal device: pins 1 through 4 shorted together and pins 5 through 8 shorted together.
5. This is momentary withstand test, not an operating condition.
6. For a faster turn-on time, the optional peaking circuit shown in Figure 1may be implemented.
7. V_{OS} is a function of I_F, and is defined between pins 5 and 8, with pin 5 as the reference. VOS must be measured in stable ambient (free of temperature gradients).
8. Zero-bias capacitance measured between LED anode and cathode.
9. Standard parts receive 100% testing.

OUTLINE DRAWINGS

8-Pin DIP



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