ISOCOM®

LIMITED

High Reliability Optical Isolation since 1982

OPTOCOUPLERS

Product Catalogue

SYSTEM CERTIFICATION AS9100 SGS

SYSTEM CERTIFICATION ISO 9001 SGS

IEC

IECQ

SPACE HERITAGE

PANCAM EXOMARS
CS249
225,000 km

MOMA EXOMARS
CSM100
225,000 km

ELECTRO-L
CSM165-4
36,000 km

LUCH-M
IS49, CSM168-5, CSM1801
36,000 km

ANGOSAT 1
CD501
35,786 km

GALILEO
CD501
23,000 km

GLONASS
CD501, CSM1200, CSM165-4
19,000 km

SPACESYSTEM IONOZOND
CSM165
800 km

OBZOR-O
CD501, CSM165
700 km

EnMAP
CS600, 6N134
643 km

E-STAR
CD501
643 km

INTERNATIONAL SPACE STATION
CD501, CS200, CSM165-4
416 km

ISOCOM LIMITED FACILITIES AND CAPABILITIES

ISOCOM Limited is an AS9100D and ISO9001:2015 company based in the North East of England. We specialise in Custom Packaging, Hybrid Assembly Design, and offer clean room manufacturing including: wire bonding, die attaching and lid sealing. Our screening facilities and test capabilities include:

- ATE and bench test equipment for all component parameters
- High temperature handlers
- High/Low temperature forcing
- Die wafer probing
- High magnification inspection stations
- Acceleration tests to 5,000G
- Vibration test to MIL and DESC levels
- Solderability tests
- Fluorocarbon pressurisation and gross and fine leak tests
- Endurance tests and environmental tests, including temperature cycling and various burn-in processes
- Particle Impact Noise Detector (PIND) testing
- Hermetic Sealing of components
- Full production equipment for Hybrid and PCB assemblies
- Conceptual design to final production: components and systems
- Ceramic and metal product design

We would welcome the opportunity to discuss how we can help you achieve your custom design requirements. You can contact us by:

Address 48 Hutton Close • Crowther • Washington • Tyne & Wear • NE38 0AH • United Kingdom
Tel +44 (0)191 416 6546
Fax +44 (0)191 415 5055
Email sales@isocom.uk.com
Web www.isocom.uk.com

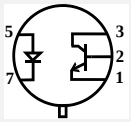
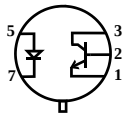
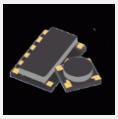
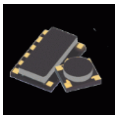
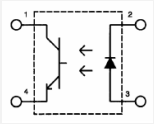
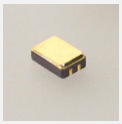
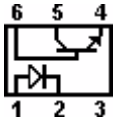
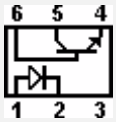
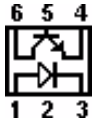
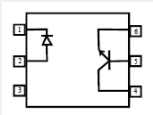
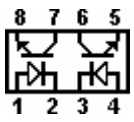
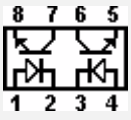
RADIATION HARD CERAMIC OPTOCOUPLERS

ISOCOM LIMITED RADIATION SUMMARY ON OPTOCOUPLERS

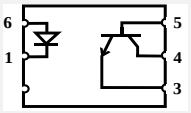
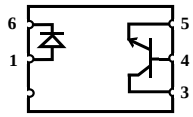
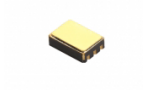
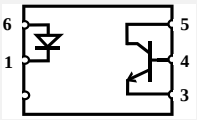
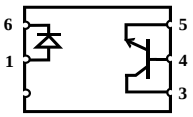
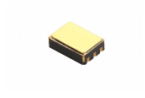
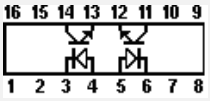
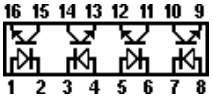
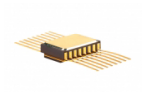
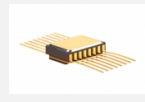
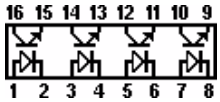
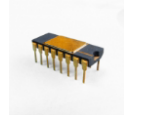
TOTAL IONIZATION DOSE TESTED: **Up to 1 Mrad(Si)**
DISPLACEMENT DAMAGE TESTED: **1 MeV X 10^{12}**
NEUTRON TESTED: **Transistors – 1.00E + 11**
High Speed – 3.00E + 12
High Gain – 3.00E + 12
High Gain Photon – 1.00E + 13

ISOCOM LIMITED

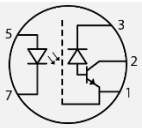
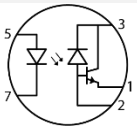
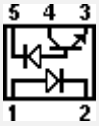
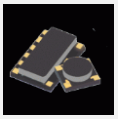
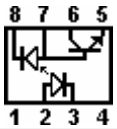
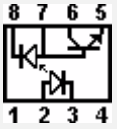
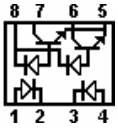
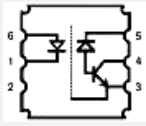
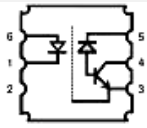
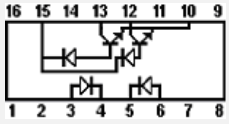
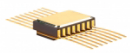
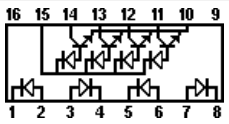
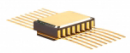
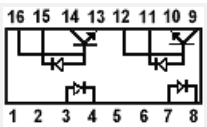
Ceramic Hermetically Sealed Transistor Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	CTR (I_F = 10mA) MIN(%)	Continuous Forward Current MAX(mA)	Forward Voltage @ 10mA MAX(V_F)	BV_{CEO} @ 1mA MIN(V)	I_{CEO}(Dark) V_{CE} = 20V MAX(µA)	V_{CE} Sat I_F = 10mA I_C = 2mA MAX(V)	Package Figure No.
4N24			100	50	1.8	70	100	0.3	Page 14 Fig.3
4N49			200	50	1.8	70	100	0.3	Page 14 Fig.3
CH300			100	15	1.8	70	100	0.25 I_F = 2mA I_C = 0.2mA	Page 14 Fig.1
CH301A			100	15	1.8	70	100	0.25 I_F = 2mA I_C = 0.2mA	Page 14 Fig.1
CSM100			350	50	1.6	70	100	0.3	Page 14 Fig.4
CS200			100	50	1.8	70	100	0.3	Page 15 Fig.6
CS201			200	50	1.8	70	100	0.3	Page 15 Fig.6
CS224			200	50	1.8	70	100	0.3	Page 15 Fig.7
CS249			200	50	1.8	70	100	0.3	Page 15 Fig.7
CD500			100	50	1.8	70	100	0.3	Page 15 Fig.7
CD501			100	50	1.8	70	100	0.3	Page 15 Fig.7

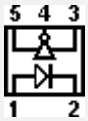
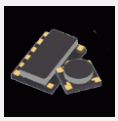
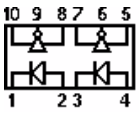
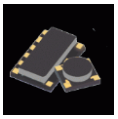
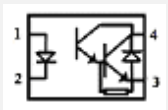
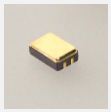
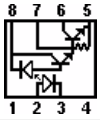
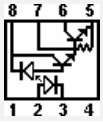
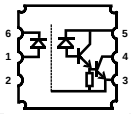
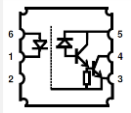
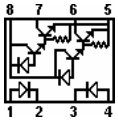
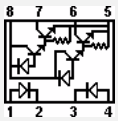
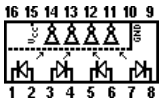
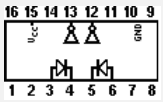
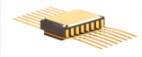
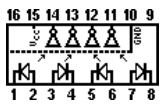
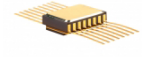
Ceramic Hermetically Sealed Transistor Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	CTR (I_F = 10mA) MIN(%)	Continuous Forward Current MAX(mA)	Forward Voltage @ 10mA MAX(V_F)	BV_{CEO} @ 1mA MIN(V)	I_{CEO}(Dark) V_{CE} = 20V MAX(μA)	V_{CE} Sat I_F = 10mA I_C = 2mA MAX(V)	Package Figure No.
CSM1200			200	50	1.8	70	100	0.3	Page 15 Fig.5
CSM1224			200	50	1.8	70	100	0.3	Page 15 Fig.5
CSM2224			200	50	1.8	70	100	0.3	Page 15 Fig.5
IS49			200	50	1.8	70	100	0.3	Page 15 Fig.5
CSM165-2			100	50	1.8	70	100	0.9	Page 16 Fig.9
CSM165-4			100	50	1.8	70	100	0.9	Page 16 Fig.9
CSM166-4			100	50	1.8	70	100	0.9	Page 16 Fig.9
CQ166			100	50	1.8	70	100	0.9	Page 15 Fig.8

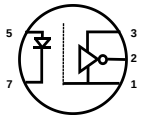
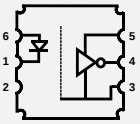
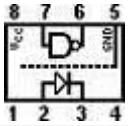
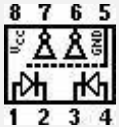
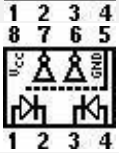
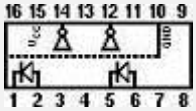
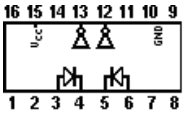
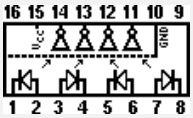
Ceramic Hermetically Sealed High Speed Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	CTR (I_F = 16mA) MIN %	Continuous Forward Current MAX(mA)	Forward Voltage @ I_F 20mA MAX(V_F)	Typical Data Rate Kb/s	Propagation Delay Times Vcc = 5V, I_F = 16mA tPHL MAX (µs)	tPLH MAX (µs)	Package Figure No.
MC800/801			9	40	1.8	700	R_L= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 14 Fig.3
MC810/811			9	40	1.8	700	R_L= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 14 Fig.3
CH380			9	40	1.8	700	R_L= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 14 Fig.2
CS800			9	40	1.8	700	R_L= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 15 Fig.7
CS801			15	40	1.8	700	R_L= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 15 Fig.7
CD850			9	40	1.8	700	R_L= 1.9KΩ 2.0	R_L= 1.9KΩ 6.0	Page 15 Fig.7
CSM1800			9	40	1.8	700	R_L= 1.9KΩ 2.0	R_L= 1.9KΩ 6.0	Page 15 Fig.5
CSM1801			15	40	1.8	700	RL= 1.9KΩ 2.0	R_L= 1.9KΩ 6.0	Page 15 Fig.5
CSM168-2			9	40	1.8	700	RL= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 16 Fig.9
CSM168-4			9	40	1.8	700	RL= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 16 Fig.9
4N55			9	40	1.8	700	RL= 8.2KΩ 2.0	R_L= 8.2KΩ 6.0	Page 15 Fig.8

Ceramic Hermetically Sealed High Gain Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	CTR (I_F = 1.6mA) MIN %	Continuous Forward Current MAX(mA)	Forward Voltage @ I_F 1.6mA MAX (V_F)	Typical Data Rate Kb/s	Propagation Delay Times R_L= 680KΩ Vcc = 5V, I_F =5mA tPHL MAX (µs)	tPLH MAX (µs)	Package Figure No.
CH370			200	20	1.8	100	12	60	Page 14 Fig.2
CH390			200	20	1.8	100	12	60	Page 14 Fig.2
CSM452			200	20	1.8	100	12	60	Page 14 Fig.4
CS700			200	20	1.8	100	12	60	Page 15 Fig.7
CS5700			200	20	1.8	100	10	30	Page 15 Fig.7
CSM141A			200	20	1.8	700	12	60	Page 15 Fig.5
CSM1700			200	20	1.8	700	12	60	Page 15 Fig.5
CD750			200	20	1.8	100	12	60	Page 15 Fig.7
CD5731			200	20	1.8	100	12	60	Page 15 Fig.7
6N140A			300	20	1.8	100	12	20	Page 15 Fig.8
CSM160-2/ 161-2/162-2			300	20	IF = 4mA 1.8	100	12	60	Page 16 Fig.9
CSM160-4/ 161-4/162-4			300	20	IF = 4mA 1.8	100	12	60	Page 16 Fig.9

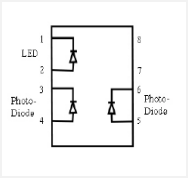
Ceramic Hermetically Sealed High Gain Photon Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	CTR (I_F = 10mA) MIN(%)	Continuous Forward Current MAX(mA)	Forward Voltage @ I_F 20mA MAX (V_F)	Typical Data Rate Mb/s	Propagation Delay Times R_L= 510KΩ, C_L= 15pF Vcc = 5V, I_F = 13mA tPHL MAX (ηs)	Propagation Delay Times R_L= 510KΩ, C_L= 15pF Vcc = 5V, I_F = 13mA tPLH MAX (ηs)	Package Figure No.
CH350			100	40	1.8	10	200	200	Page 14 Fig.2
MC600			100	40	1.8	10	100	100	Page 14 Fig.3
CSM1600			100	40	1.8	10	100	100	Page 15 Fig.7
CS600			I_F = 5mA 100	40	1.8	10	100	100	Page 15 Fig.7
CD650			I_F = 5mA 100	40	1.8	10	100	100	Page 15 Fig.7
CD651			I_F = 5mA 100	40	1.8	10	100	100	Page 15 Fig.7
6N134			100	40	1.8	10	100	100	Page 15 Fig.8
CSM169-2			100	40	1.8	10	100	100	Page 16 Fig.9
CSM169-4			100	40	1.8	10	100	100	Page 16 Fig.9

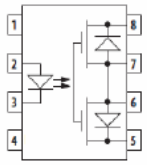
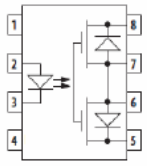
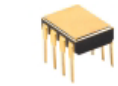
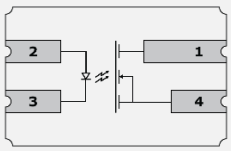
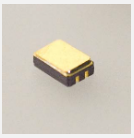
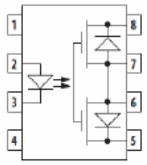
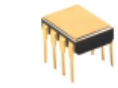
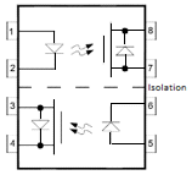
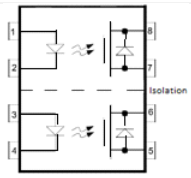
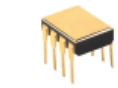
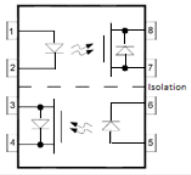
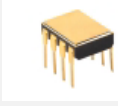
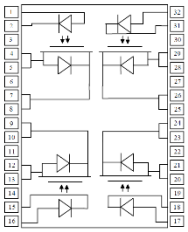
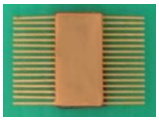
Ceramic Hermetically Sealed Zero Crossing Triac Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	Peak Blocking Voltage (V_{DRM})	Continuous Forward Current MAX(mA)	Forward Voltage @ I_F 30mA MAX(V_F)	Input Current to Trigger (I_{FT}) Main Terminal Voltage @ 3V	Critical Rate of Rise of Communicating Off-state Voltage (dv/dt (C)) Typ	Package Figure No.
CS3031/ 3032/3033			250	60	1.8	15 / 10 / 5	2000	Page 15 Fig.6
CS3041/ 3042/3043			400	60	1.8	15 / 10 / 5	2000	Page 15 Fig.6
CS3061/ 3062/3063			600	60	1.8	15 / 10 / 5	1500	Page 15 Fig.6
CS3081/ 3082/3083			800	60	1.8	15 / 10 / 5	1500	Page 15 Fig.6

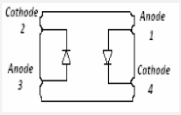
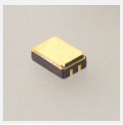
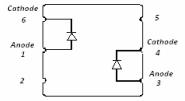
Ceramic Hermetically Sealed Linear Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	Reverse Breakdown Voltage BV_R @ I_R 100µA	Forward Voltage @ I_F 30mA MAX(V_F)	Transfer Gain I_F 10mA V_R = 15V TYP	Rise Time R_L = 50Ω I_F 10mA µs	Fall Time R_L = 50Ω I_F 10mA µs	Package Figure No.
CSL400D CSL400L			200	1.8	1.0	2	2	Page 15 Fig.7

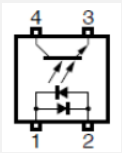
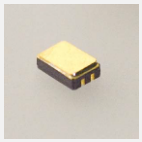
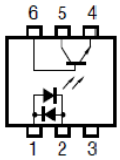
Ceramic Hermetically Sealed Solid State Relay MOSFET Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	No. of Channels	Voltage (min)	Current Rate In (min)	Package Figure No.
CSMR40/41			Single	90	3.0A	Page 15 Fig.7
CSMR42			Single	200	3.0A	Page 15 Fig.7
CSMR140			Single	400	1.0A	Page 14 Fig.4
CSMR540			Single	400	3.0A	Page 15 Fig.7
CDMR310A			Dual	90	3.0A	Page 15 Fig.7
CDMR310B			Dual	90	3.0A	Page 15 Fig.7
IS53252			Dual	90	3.0A	Page 15 Fig.7
CQMR310			Quad	100	3.0A	Page 16 Fig. 10

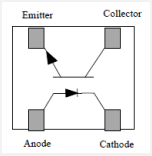
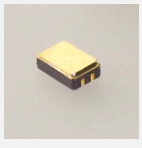
Ceramic Hermetically Sealed Photodiode Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	Dark Current V_R= 5v, R_L = 1MΩ (μA)	Reverse Breakdown Voltage BV_R (MIN)	Rise Time R_L = 3.3KΩ I_F 10mA ηs	Fall Time R_L = 3.3KΩ I_F 10mA ηs	CTR (I_F = 10mA, V_{OUT}= 5) MIN(%)	Package Figure No.
CSM150			100	200	200	200	1.56	Page 14 Fig.4
CSM151			100	200	200	200	1.56	Page 15 Fig.5

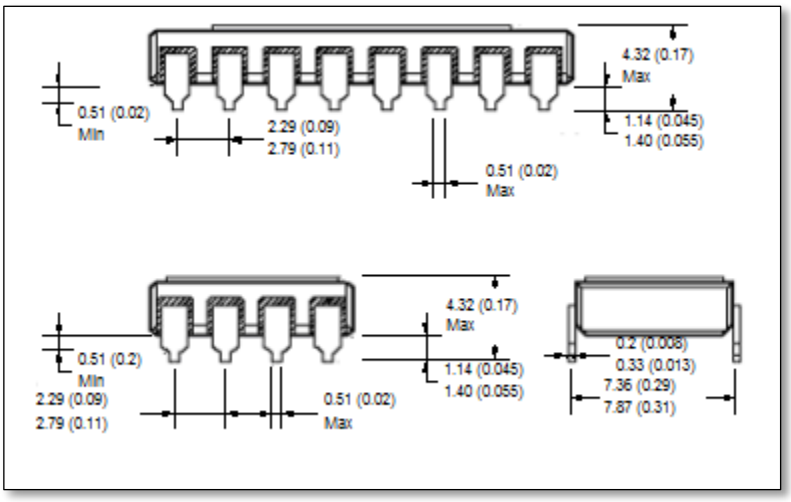
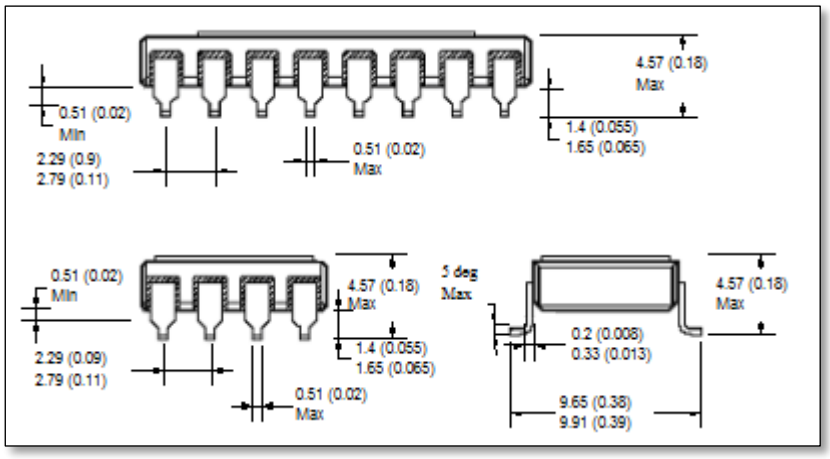
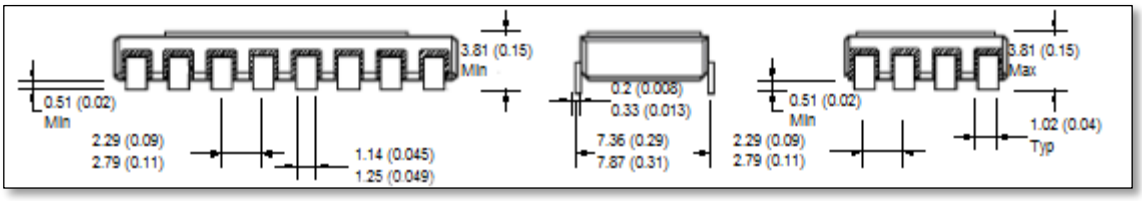
Ceramic Hermetically Sealed AC Transistor Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with an operating temperature range from -55°C to +125°C

Part No.	Circuit	Package Details	Collector-Emitter Breakdown Voltage BV_{CEO} (MIN)	Forward Voltage @ 10mA MAX(V_F)	Rise Time R_L = 3.3KΩ I_F 10mA μs	Fall Time R_L = 50Ω I_F 10mA μs	CTR I_F =10mA, V_{CE} = 5V MIN(%)	Package Figure No.
CSM120			40	1.8	20	20	200	Page 14 Fig.4
CSM121			40	1.8	20	20	200	Page 15 Fig.5

Ceramic Hermetically Sealed Transistor Optocouplers, manufactured to ISO 9001:2008 & IECQ standards, with Very Low operating temperature range from -150°C to +125°C

Part No.	Circuit	Package Details	CTR (I_F = 10mA) MIN(%)	Continuous Forward Current MAX(mA)	Forward Voltage @ 10mA MAX(V_F)	BV_{CEO} @ 1mA MIN(V)	I_{CEO}(Dark) V_{CE} = 20V MAX(μA)	V_{CE} Sat I_F = 10mA I_C = 2mA MAX(V)	Package Figure No.
CH100			100	15	1.8	70	100	0.25 I_F = 2mA I_C = 0.2mA	Page 14 Fig.4

Hermetic Optocoupler Surface Mount Options

Option	Description
10	Surface mountable hermetic optocoupler with leads trimmed for butt joint assembly. This option is available on commercial hi-rel product in 8 and 16 pin DIP. 
20	Solder Dip Option
30	Surface mountable hermetic optocoupler with leads cut and bent for gull wing assembly. This option is available on commercial and hi-rel product in 8 and 16 pin DIP. 
60	Surface mountable hermetic optocoupler with leads trimmed for butt joint assembly. This option is available on commercial hi-rel product in 8 and 16 pin DIP. 

Package Dimensions

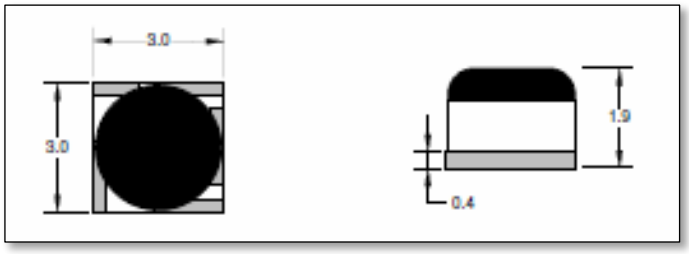


Fig 1. 4-pin Hybrid

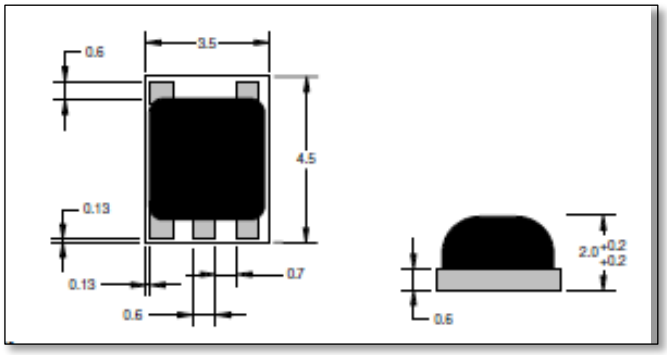


Fig 2. 5-pin Hybrid

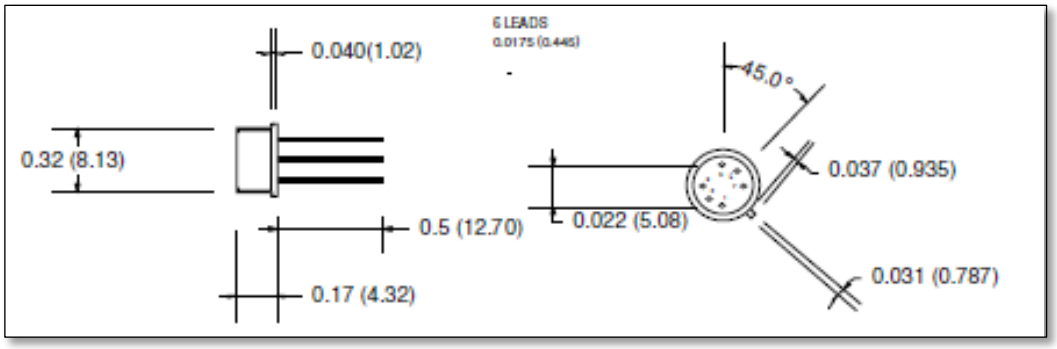


Fig 3. TO-5 6-pin Metal Can

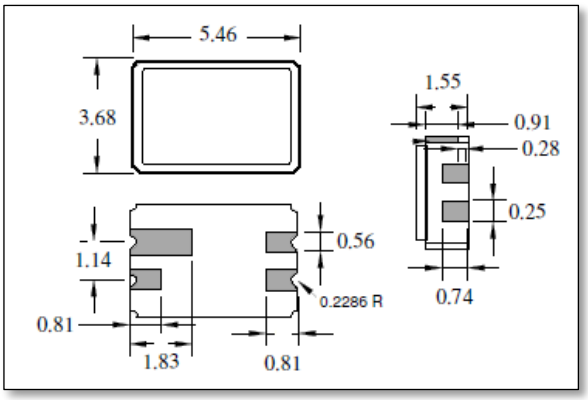


Fig 4. LCC-4

Package Dimensions (continued)

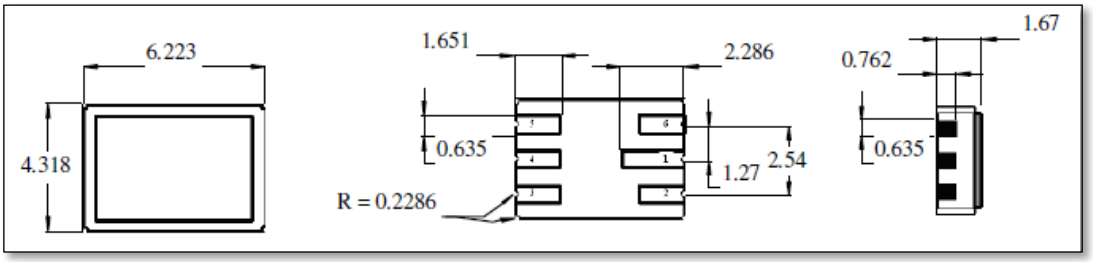


Fig 5. LCC-6

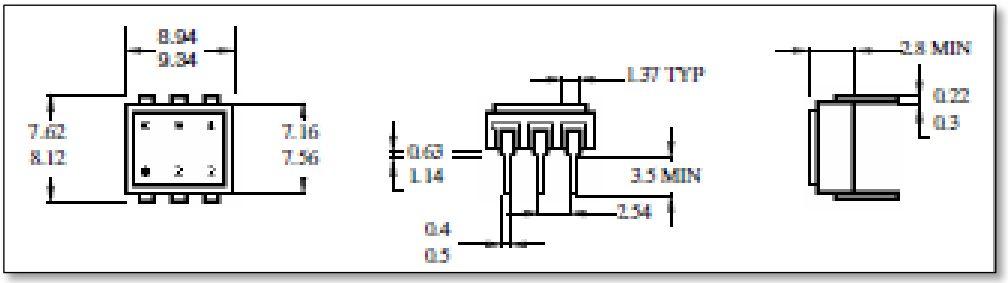


Fig 6. 6-pin DIP

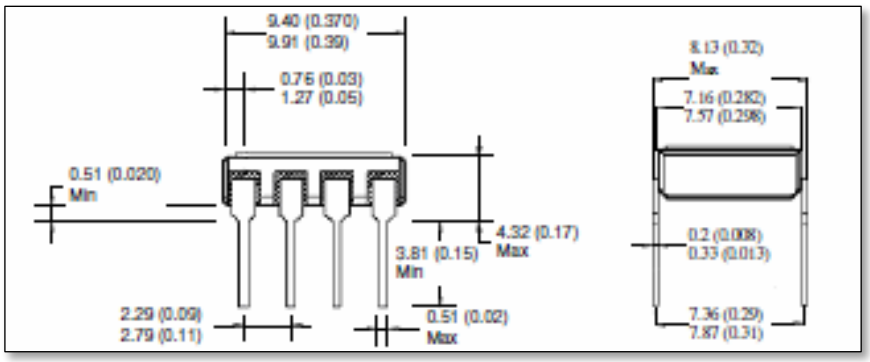


Fig 7. 8-pin DIP

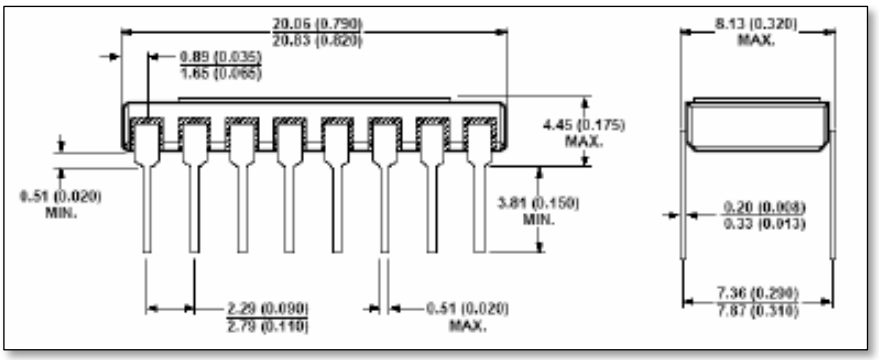


Fig 8. 16-pin DIP

Package Dimensions (continued)

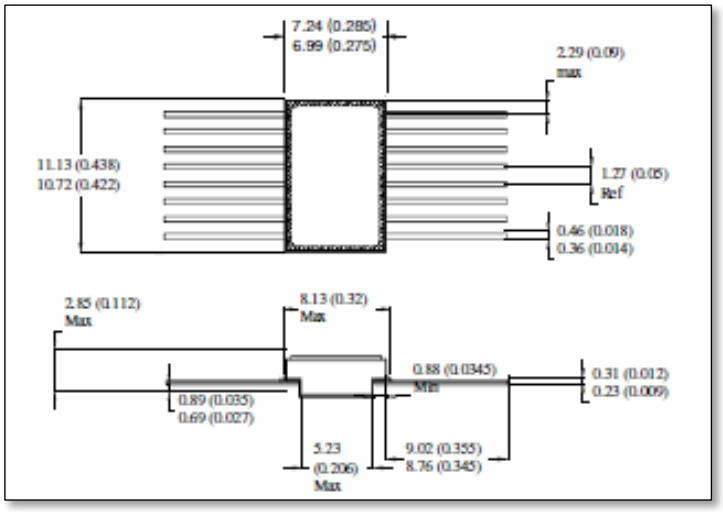


Fig 9. 16-pin Flatpack

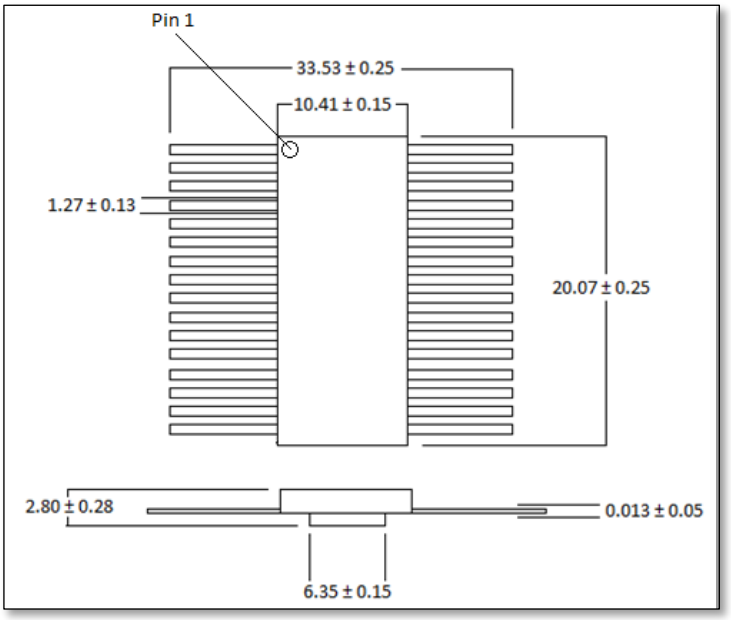


Fig 10. 32-pin Flatpack

100% SCREENING to MIL-STD-750

TEST	MIL-STD-750	READ AND RECORD
Internal Visual	2072	
Sealing		
(Fine Leak)	1071, Condition H1	
(Gross Leak)	1071, Condition C	
Temp Cycling	1051, Condition B-55/+125°C, 20 Cycles.	
Const. Acceleration	2006, 5000G, Y1 only.	
PIND	2052, Condition A	
Radiography	2076	
Initial Electrical	125°C, -55°C, 25°C	R & R
HTRB	1039	
Interim Electrical	25°C only	R & R
Burn-In	1039	
Final Electrical	125°C, -55°C, 25°C	R & R
PDA	Max. 5%, pre/post B1 electrical and delta at RT only	Calculate & R
(Fine Leak)	1071, Condition H1	
(Gross Leak)	1071, Condition C	
Solder Dip		
Fine Leak	1071, Condition H1	
Gross Leak	1071, Condition C	

GROUP TESTING to MIL-STD-750

GROUP	TEST	MIL-STD-750	READ & RECORD
GROUP A			
SG1	Visual inspection & mechanical dimensions	Method 2071	
SG2	DC static test at 25°C		yes
SG3	DC static test at 125°C and -55°C		yes
SG4	Dynamic test at 25°C		yes
GROUP B			
SG 1	Physical dimensions	Method 2066	
SG 2	Solderability	Method 2026	
	Resistance to solvents	Method 1022	
SG 3	Thermal Shock	Method 1056 Cond. B, 25 cycles	
	Temperature cycling	Method 1051, -55/+125°C	
	Hermetic seal fine and gross leak	Method 1071, Cond. H (fine), Cond. C (gross)	
	Electrical measurement	Pre and Post	yes
	Decap internal visual inspection	2075	
	Bond strength	Method 2037, Cond. D	yes
	Die shear	Method 2017	yes
SG 4	Intermittent operation life	Method 1037, 1042, Cond D, Tab.5-5	
	Hermetic seal fine and gross leak	Method 1071, Cond. H (fine), Cond. C (gross)	
	Electrical measurement	Pre and Post	yes
	Bond strength	Method 2037, Cond. D	yes
SG 5	Acc. steady-state operation life	Method 1027	
	Electrical measurement	Pre and Post	yes
	Bond strength	Method 2037, Cond. D	yes
GROUP C			
SG 2	Thermal Shock	Method 1056, Cond. B, 25 shocks	
	Temperature cycling	Method 1051, Cond. C, -55/+125°C , 25 cycles (total 45 cycles including screening)	
	Hermetic seal fine and gross leak	Method 1071, Cond. H (fine), Cond. C (gross)	
	Moisture resistance	Method 1021	
	Electrical measurement	Pre and Post	yes
SG 3	Mechanical shock	Method 2016, non-operating, 1500 G, 0.5 ms, 5 blows in each orientation (X1,Y1,Z1)	
	Vibration	Method 2056	
	Constant acceleration	Method 2006, at a peak level of 5000 G	
	Electrical measurement	Pre and Post	yes
SG 6	Steady state operating life Not required as B5 is available on same lot		

Space Qualification

PROCESS FLOW CHART FOR PACKAGED DEVICES

- QA INSPECTION
- 100% DC PROBE
- WAFER SCRIBE & BREAK
- BOND PULL TEST
- DIE SHEAR TEST
- HIGH TEMPERATURE BAKE
- WAFER SELECTION
- VISUAL INSPECTION
- ANALYSIS
- MIL QA VISUAL INSPECTION & SPACE ONLY
- SERIALISATION
- ASSEMBLE
- 100% RTH MEASUREMENT
- 100% PRE-CAP VISUAL INSPECTION
- PACKAGE SEAL
- MARKING
- 100% TEMP CYCLE - 20 CYCLES
- 100% CONSTANT ACCELERATION 5000G
- HERMETIC SEAL TEST 100% FINE & GROSS
- 100% GROUP A ELECTRICAL TEST R&R
- 100% HTRB
- 100% GROUP A ELECTRICAL TEST R&R
- 100% DC POWER BURN-IN: 240hr @ Tch=125˚C
- 100% ELECTRICAL DELTA EVALUATION
- PDA ONLY SAMPLES
- 100% QA FINAL INSPECTION
- SHIP

Space Qualification

PROCESS FLOW CHART FOR PACKAGED DEVICES

Group B Testing	*MIL-STD-883	*MIL-STD-750
Physical Dimensions	Method 2016	Method 2066
Solderability	Method 2003	Method 2023
Resistance to Solvents	Method 2015	Method 1022
Temperature Cycling	Method 1010	Method 1051
• *Military Grade*	25 cycles	25 cycles
• *Space Grade*	50 cycles	50 cycles
Steady State Life (Tch 175°C / 340hr minimum)	Method 1005	Method 1027
DPA	*MIL-STD-1580A	*MIL-STD-1580A
	*Unless otherwise indicated	*Unless otherwise indicated

Environmental & Mechanical Testing Specifications		
	***MIL-STD-883**	***MIL-STD-750**
Hermetic Seal Test	Method 1014	Method 1071
• *Fine Leak*	Condition A1	Condition G or H
• *Gross Leak*	Condition C	Method 1051
Temperature Cycle *(Standard Military Level)*	Method 1010, Condition C	Method 1051, Condition C
Temperature Cycle *(Standard Space Level)*	Method 1010, Condition C	Method 1051, Condition C
Constant Acceleration	Method 2001	Method 2006
PIND Test	Method 2020	Method 2052, Condition A
RTH Measurement	Method 1012	
HTRB *(High Temperature Reverse Bias)*	Method 1015, Condition A	Method 1042, Condition B
DPA	*MIL-STD-1580A	*MIL-STD-1580A
	*Unless otherwise indicated	*Unless otherwise indicated

Inspection Table		
COMMERCIAL	**MILITARY**	**HI-REL / SPACE**
AQL Sampling Plan	MIL-STD-883, Method 2010, Class Level B	MIL-STD-883, Method 2010, Class Level S
Isocom Internal Specifications	MIL-STD-750, Method 2070, 2071,2072	MIL-STD-750, Method 2070, 2071,2072

* Isocom Limited can offer their facilities to customers for any of the above testing and screening of parts.

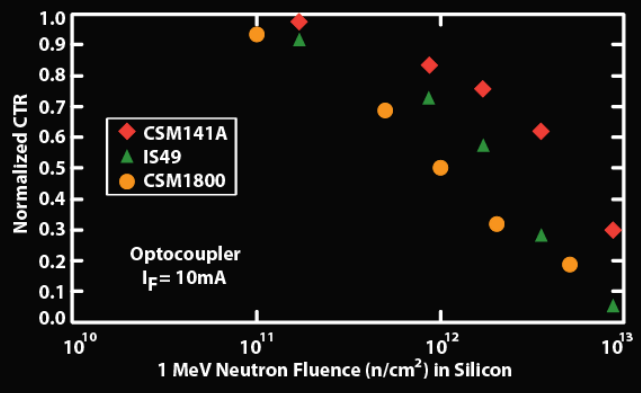
RADIATION HARD OPTOCOUPLERS

PROTON DISPLACEMENT DAMAGE MEASUREMENTS IN OPTOCOUPLER FAMILIES

Research was carried out by the Jet Propulsion Laboratory at California Institute of Technology under contract with the National Aeronautic Space Administration (NASA) on Isocom optocoupler families. JPL used the concept of non-ionizing energy loss (NIEL) to dene an equivalent 1-MeV neutron fluence to interpret displacement damage. In other words, radiation environments of protons, neutrons and electrons are regarded as equivalent if they produce the same non-ionizing dose when proper NIEL factors for protons, neutrons and electrons are used to calculate the dose. DD measurements were performed with proton beam at the $1x10^{11}$, $5x10^{11}$, $1x10^{12}$, $2x10^{12}$ and $5x10^{12}$ equivalent 1-MeV neutron fluences in Silicon.

The IS49 and CSM141A devices were tested at the University of Indiana, Bloomington Cyclotron (IUCF) using 200-MeV protons. The CSM1800 device was tested at University of California Davis (UCD) and Canada's National Laboratory for Particle and Nuclear Physics (TRIUMF) using 65-MeV and 105-MeV protons respectively. Five devices of each of the optocouplers were provided for radiation testing. The devices were exposed at room temperature to a series of radiation steps with electrical and optical measurements made before irradiation and between each step. All parts were in an unbiased condition during irradiation (all pins grounded) because DD effects are, to first order, insensitive to bias conditions during irradiation.

The graph below summarizes the result of radiation tests performed on Isocom optocouplers. After each irradiation level, the optocoupler CTRs were measured for a set of values of the forward current (I_F) through the LED, using the HP 4156 Semiconductor Parameter Analyzer. The test results demonstrate the parts have a lower degradation using an I_F10mA but have a lower operating margin when used with a low forward current, which does help the reliability of the LED.



LED degradation has a super linear dependence on displacement damage.

Where CTRo is the pre-irradiation optocoupler gain, CTR is the gain after irradiation. The alternate plotting format on the left side of figures 2, 4 and 6 is the function of fluence. A subset of the data shown in figures 1, 3 and 5, using test values of I_F 2 and 10mA are plotted in this format producing figures 2, 4 and 6, using a value of n that produces a best fit to a straight line with unit slope in log-log plot.

The best fitting n for this data set is 1/3, which is appropriate for heterostructure LED used in the device.

TRANSISTOR FAMILY

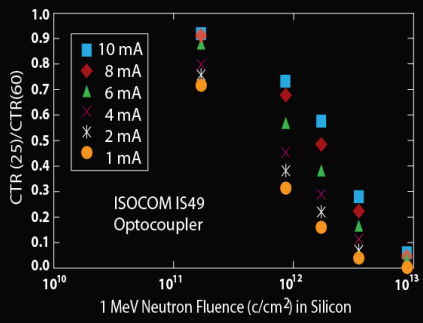


Fig. 1. Normalized CTR versus the radiation level for IS49

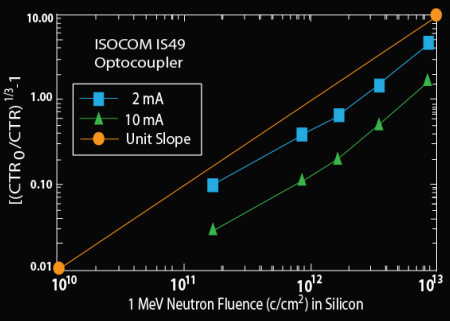


Fig. 2. Values of [(CTRo/CTR) – 1] for I_F = 2 and 10mA for IS49

HIGH SPEED FAMILY

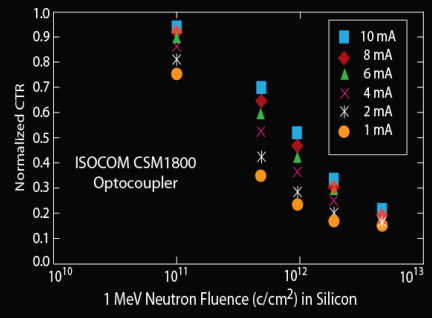


Fig. 3. Values of [(CTRo/CTR)1/3 – 1] for I_F = 2 and 8mA for CSM1800

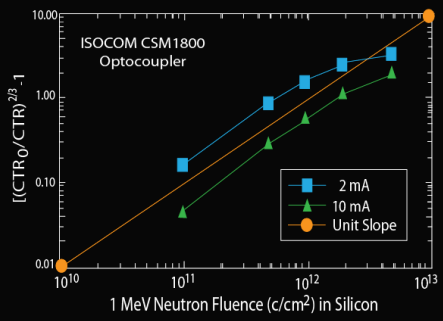


Fig. 4. Values of [(CTRo/CTR)1/3 – 1] for I_F = 2 and 10mA for CSM1800

HIGH GAIN FAMILY

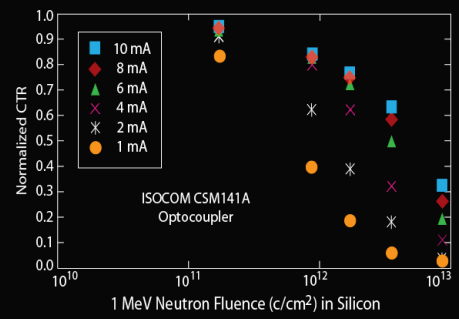


Fig. 5. Normalized CTR versus the radiation level for CSM141A

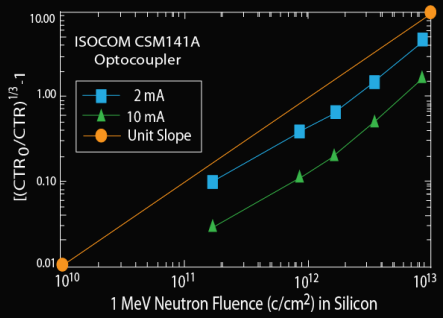


Fig. 6. Values of [(CTRo/CTR)1/3 – 1] for I_F = 2 and 10mA for CSM141A

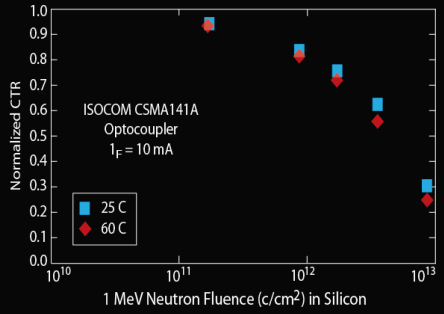


Fig. 7. Normalized CTR versus the radiation level for room temperature and 60oC for CSM141A

ISOCOM Distribution Network

We have a growing network of experienced and skilled distributors around the world

USA & CANADA
Data Device Corporation (DCC)
105 Wilbur Place, Bohemia NY 11716, USA
Tel: +1 (858) 900-6189
www.ddc-web.com

GERMANY
KAMAKA Electronic Bauelemente Vertriebs GmbH
Ulmer Straße 130, 73431 Aalen, GERMANY
Tel: +49 (0)73 6196 620
www.kamaka.de

RUSSIA
EFO Ltd
15A Novolitovskaya str., office 441, Saint Petersburg, 194100, RUSSIA
Telephone: +7 (812) 327-86-54
www.efo.ru

INDIA
Syratron Technologies Pvt Ltd
203, Copper Arch, 83, Infantry Road, Bangalore, 560001, INDIA
Telephone: +91 80 2559 1031
www.syratron.com

SOUTH KOREA
National Chips Co., Ltd
#1608, 1609-Tower, Heungdeok IT Valley, 13 Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, KOREA
Tel: +82-31-261-3173
www.nationalchips.co.kr

JAPAN
Shoshin
Honcho 1-Chome Bldg. 6F 1-9-13 Nihonbashi-Honcho, Chuo-ku, Tokyo 103-0023, JAPAN
Tel: +81-3-3270-5921
www.shoshin.co.jp

EUROPEAN MANUFACTURER OF HIGH RELIABILITY OPTOELECTRONICS

POWER MOSFETS	MEMORY DEVICES	VOLTAGE REGULATORS
OPTOCOUPLERS	**HYBRID ASSEMBLIES**	**DC/DC CONVERTERS**
SOLID STATE RELAYS	POWER CONTROLLERS	JFET TRANSISTORS
SCHOTTKY DIODES	**X-RAY SENSORS**	**CUSTOM DESIGNS**

ISOCOM® LIMITED

High Reliability Optical Isolation since 1982

T: +44 (0)191 416 6546 **F:** +44 (0)191 415 5055 **E:** sales@isocom.uk.com www.isocom.uk.com