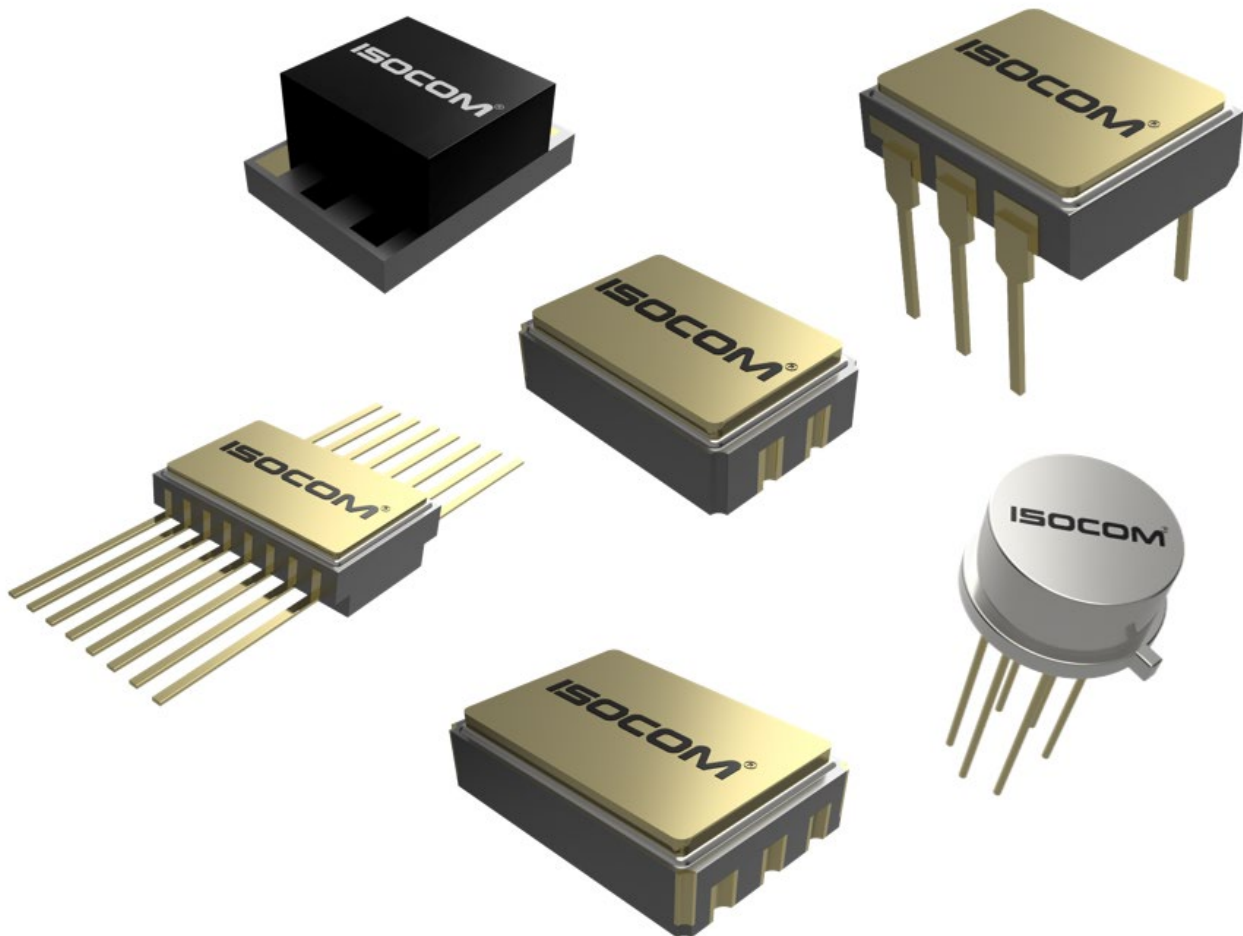




OPTOCOUPLER SELECTION GUIDE



Microcross provides distribution and value added services for all ISOCOM products sold in the USA and India. For sales and support, visit: microcross.com/ISOCOM

ISOCOM LIMITED FACILITIES AND CAPABILITIES

ISOCOM Limited, based in the North East of England, specialises in custom packaging and hybrid assembly design with 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 station
- Acceleration tests to 30,000G
- 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. Our contact details are set out below.

CONTENTS

Index of Radiation Hard Ceramic Optocouplers	4
Ceramic Hermetically Sealed Transistor Optocouplers	6
Ceramic Hermetically Sealed AC Transistor Optocouplers	9
Ceramic Hermetically Sealed High-Speed Transistor Optocouplers	10
Ceramic Hermetically Sealed High Gain Optocouplers	12
Ceramic Hermetically Sealed High Gain Photon Optocouplers	14
Ceramic Hermetically Sealed Zero Crossing Triac Optocouplers	16
Ceramic Hermetically Sealed Linear Optocouplers	16
Ceramic Hermetically Sealed Photodiode Optocoupler	17
Hermetic Optocoupler Surface Mount Options	18
Package Dimensions	19
Screening Flow MIL-PRF-19500	21
Screening Flow MIL-PRF-38534	22
Radiation Summary	23

RADIATION HARD CERAMIC OPTOCOUPPLERS

DEVICE		DEVICE	
4N24	6	CS3082	16
4N49	6	CS3083	16
4N55	10	CS5700	13
6N134	14	CSL400	16
6N140A	12	CSM100	7
CD500	6	CSM120	9
CD501	6	CSM121	9
CD650	14	CSM141A	13
CD651	14	CSM150	17
CD750	12	CSM151	17
CD850	10	CSM160-2	13
CD5731	12	CSM160-4	13
CH100	6	CSM161-2	13
CH300	6	CSM161-4	13
CH301A	7	CSM162-2	13
CH350	14	CSM162-4	13
CH370	12	CSM165-2	8
CH380	10	CSM165-4	8
CH390	12	CSM166-4	8
CS200	7	CSM168-2	10
CS201	7	CSM168-4	11
CS224	7	CSM169-2	15
CS249	7	CSM169-4	15
CS600	14	CSM200	8
CS700	12	CSM452	13
CS800	10	CSM1200	7
CS801	10	CSM1224	8
CS3031	16	CSM1600	14
CS3032	16	CSM1601A	14
CS3033	16	CSM1700	13
CS3041	16	CSM1800	11
CS3042	16	CSM1801	11
CS3043	16	CSM2224	8
CS3061	16	CSMR40	17
CS3062	16	IS49	8
CS3063	16	MC600	15
CS3081	16	MC800	11

SPACE HERITAGE

APPLICATION	PARTS USED
GLONASS TELECOM SATELLITE	CD501/L2S, CSM165-4/L2S
GLONASS "K" SATELLITE	CD501/L2S
GLONASS "M" SATELLITE	CSM1200/L2S
ALPHA MAGNETIC SPECTROMETER (ISS)	CD501/L2S, CS200/L2S, CSM165-4/L2S
GALILEO TELECOM SATELLITE	CD501/L2S
SWIR SPECTROMETER	CS600/L2S
AEROSPACE DIGITAL COMPUTER (ARGON)	CD501/L2S
E-STAR (EGYPT-SAT) SATELLITE PROGRAM	CD501/L2S
MOON RESOURCE SPACE PROGRAM	CD501/L2S
"SPEECH"	CD501/L2S#30
UNIVERSAL SPACE PLATFORM SPACECRAFT	CD501/L2S, CD501/L2S#30
OBZOR-O	CD501/L2S, CSM165-4/L2S
SPACE SYSTEM IONZOND	CSM165-4/L2S
ELECTRO-L	CSM165-4/L2S
PANCAM EXOMARS	CS249/L2S
SOLAR PROBE PLUS PROGRAM	CD650/L2S, CD850/L2S
ICON (IONOSPHERIC CONNECTION)	CS5700/L2S
MOMA EXOMARS	CSM100/L2S
MICROSATELLITE PROPULSION SYSTEM	CSM100/L2S
YENISEY A1 (LUCH 4)	IS49/L2S
ENMAP	CS600/L2S, 6N134/L2S
ANGOSAT 1	CD501/L2S

Ceramic Hermetically Sealed Transistor Optocouplers, manufactured to ISO 9001:2008, with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	CTR ($I_F = 10\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 10\text{mA}$) max(V)	BV_{CEO} ($I_C = 1\text{mA}$) min(V)	$I_{CEO}(\text{Dark})$ ($V_{CE} = 20\text{V}$) max(μA)	$V_{CE \text{ Sat}}$ ($I_F = 10\text{mA}$, $I_C = 2\text{mA}$) max(V)	Package Figure No.
4N22/4N234N24			350	50	1.8	100	100	0.3	Page 19 Fig.3
4N497/4N484N49			350	50	1.8	100	100	0.3	Page 19 Fig.3
CD500/CD501			50	50	1.5	100	100	0.22 ^③	Page 20 Fig.8
CH300			350	15	1.5	30	100 ^⑥	0.25 ^①	Page 19 Fig.1
CH100/CH101			150	40	1.8	70	100	0.3 ^②	Please contact Isocom

Ceramic Hermetically Sealed Transistor Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	CTR ($I_F = 10\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 10\text{mA}$) max(V)	BV_{CEO} ($I_C = 1\text{mA}$) min(V)	$I_{CEO}(\text{Dark})$ ($V_{CE} = 20\text{V}$) max(μA)	$V_{CE}(\text{Sat})$ ($I_F = 10\text{mA}$, $I_C = 2\text{mA}$) max(V)	Package Figure No.
CH301A			350	15	1.5	30	100**	0.25 ①	Page 19 Fig.1
CS200/CS201			100	50	1.8	70	100	0.3 ③	Page 20 Fig.10
CS224			350	50	1.8	100	0.1	0.3 ③	Page 20 Fig.10
CS249			200	50	1.8	70	100	0.22 ②	Page 20 Fig.10
CSM100/CSM101			350	40	1.6	70	100	0.22 ②	Page 19 Fig.4
CSM1200			350	50	1.8	100	100	0.3 ②	Page 20 Fig.6

- ① $I_F = 2\text{mA}$, $I_C = 0.2\text{mA}$
 ② $I_F = 20\text{mA}$, $I_C = 10\text{mA}$
 ③ $I_F = 10\text{mA}$, $I_C = 2.5\text{mA}$
 ④ $I_F = 2\text{mA}$, $I_C = 1\text{mA}$
 ⑤ $I_F = 1\text{mA}$
 ⑥ $V_{CE} = 10\text{V}$

Ceramic Hermetically Sealed Transistor Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

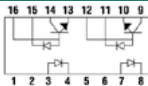
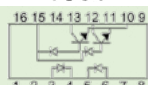
Part No.	Functional Diagram	Package Details	CTR ($I_F = 10\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 10\text{mA}$) max(V)	BV_{CEO} ($I_C = 1\text{mA}$) min(V)	$I_{CEO}(\text{Dark})$ ($V_{CE} = 20\text{V}$) max(μA)	$V_{CE}(\text{Sat})$ ($I_F = 10\text{mA}$, $I_C = 2\text{mA}$) max (V)	Package Figure No.
CSM1224			350	50	1.8	100	0.1	0.3 ②	Page 20 Fig.6
CSM165-2			350	50	1.6	100	0.1	0.22 ②	Page 20 Fig.7
CSM165-4			350	50	1.6	100	0.1	0.22 ②	Page 20 Fig.7
CSM166-2/CSM166-4			100*	10	1.8	50	0.1	0.3 ④	Page 20 Fig.8
CSM200			350	50	1.4	100	0.1	0.22 ②	Page 20 Fig.6
CSM2224			350	50	1.8	100	0.1	0.3 ②	Page 20 Fig.6
IS49			350	50	1.8	70	100	0.22 ②	Page 20 Fig.6

- ① $I_F = 2\text{mA}$, $I_C = 0.2\text{mA}$
 ② $I_F = 20\text{mA}$, $I_C = 10\text{mA}$
 ③ $I_F = 10\text{mA}$, $I_C = 2.5\text{mA}$
 ④ $I_F = 2\text{mA}$, $I_C = 1\text{mA}$
 ⑤ $I_F = 1\text{mA}$
 ⑥ $V_{CE} = 10\text{V}$

Ceramic Hermetically Sealed AC Transistor Optocoupler, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

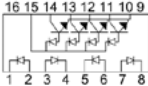
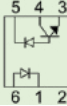
Part No.	Functional Diagram	Package Details	CTR ($I_F = 10\text{mA}$) min(%)	BV_{CEO} ($I_C = 1\text{mA}$) min(V)	V_F ($I_F = 10\text{mA}$) min(V)	Transition Times ($R_L = 100\Omega$)		Package Figure No.
						t_r max(μS)	t_f max(μS)	
CSM120			200	40	1.8	20	20	Page 19 Fig.4
CSM121			200	40	1.8	20	20	Page 20 Fig.6

Ceramic Hermetically Sealed High Speed Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	CTR ($I_F = 16\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 16\text{mA}$) max(V)	BW ($R_L = 100\Omega$) typ(MHz)	Propagation Delay Times ($R_L = 1.9\text{k}\Omega$, $V_{CC} = 5\text{V}$, $I_F = 16\text{mA}$)		Package Figure No.
							t_{PHL} max (μS)	t_{PLH} max (μS)	
4N55			9	20	1.7	3	2.0	6.0	Page 20 Fig.8
CD850			typ 17	20	1.7	3	0.8	0.8	Page 20 Fig.9
CH380			typ 17	20	1.7	3	0.8	0.8	Page 19 Fig.2
CS800			9	20	typ 1.45 [Ⓢ]	2	typ 0.5 [Ⓣ]	typ 0.5 [Ⓣ]	Page 20 Fig.9
CS801			15	20	typ 1.45 [Ⓢ]	2	typ 0.5 [Ⓣ]	typ 0.5 [Ⓣ]	Page 20 Fig.9
CSM168-2			9	20	1.7	3	typ 0.1	typ 0.3	Page 20 Fig.7

[Ⓣ] $R_L = 8.2\text{k}\Omega$
[Ⓢ] $I_F = 20\text{mA}$

Ceramic Hermetically Sealed High Speed Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	CTR ($I_F = 16\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 16\text{mA}$) max(V)	BW ($R_L = 100\Omega$) typ(MHz)	Propagation Delay Times ($R_L = 1.9\text{K}\Omega$, $V_{CC} = 5\text{V}$, $I_F = 16\text{mA}$)		Package Figure No.
							t_{PHL} max (μS)	t_{PLH} max (μS)	
CSM168-4			9	20	1.7	3	typ 0.1	typ 0.3	Page 20 Fig.7
CSM1800/CSM1801			typ 17	20	1.7	2	0.8	0.8	Page 20 Fig.6
CSM1801			typ 17	20	1.7	2	0.8	0.8	Page 20 Fig.6
MC800			9	20	1.7	2	0.8	0.8	Page 20 Fig.7

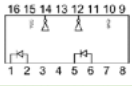
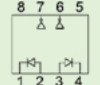
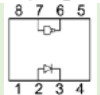
Ceramic Hermetically Sealed High Gain Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	CTR ($I_F = 1.6\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 1.6\text{mA}$) max(V)	Data Rate typ(Kb/s)	Propagation Delay Times, ($R_L = 680\Omega$, $V_{CC} = 5V$, $I_F = 5\text{mA}$)		Package Figure No.
							t_{PHL} max(μS)	t_{PLH} max(μS)	
6N140A			200	10	1.7	100	12	60	Page 20 Fig.8
CD5731			200	10	1.7	100	12	60	Page 20 Fig.9
CD750			200	10	1.7	100	12	60	Page 20 Fig.9
CH370			200	8	1.9	100	12	60	Page 19 Fig.2
CH390			200	10	1.9	100	12	60	Please contact ISOCOM
CS700			200	10	1.7	100	10	60	Page 20 Fig.9

Ceramic Hermetically Sealed High Gain Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	CTR ($I_F = 1.6\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 1.6\text{mA}$) max(V)	Data Rate typ(Kb/s)	Propagation Delay Times, ($R_L = 680\Omega$, $V_{CC} = 5\text{V}$, $I_F = 5\text{mA}$)		Package Figure No.
							t_{PHL} max(μS)	t_{PLH} max(μS)	
CS5700			300	10	1.7	100	10	60	Page 20 Fig.9
CSM141A			300	10	1.7	700	5	20	Page 20 Fig.6
CSM160-2/ CSM161- 2/CSM162-2			200	10	1.7	100	5	60	Page 20 Fig.7
CSM160-4/ CSM161- 4/CSM162-4			200	10	1.7	100	5	60	Page 20 Fig.7
CSM1700			200	10	1.7	700	12	60	Page 20 Fig.6
CSM452			1000	10 [Ⓢ]	1.4	100	12	60	Page 19 Fig.4

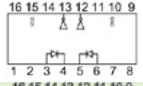
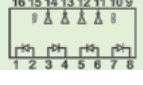
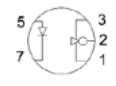
[Ⓢ] $I_F = 10\text{mA}$

Ceramic Hermetically Sealed High Gain Photon Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)									
Part No.	Functional Diagram	Package Details	CTR ($I_F = 10\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 20\text{mA}$) max(V)	Data Rate typ(Kb/s)	Propagation Delay Times ($R_L = 510\Omega$, $C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $I_F = 13\text{mA}$)		Package Figure No.
							t_{PHL} max(ns)	t_{PLH} max(nS)	
6N134			100	20	1.9	10	90	90	Page 20 Fig.8
CD650/CD651			100 ⑩	20	1.9	10	100	90	Page 20 Fig.9
CH350			100	15	1.9	10	200	200	Page 19 Fig.2
CS600			100 ⑩	20	1.9	10	75 ■	75 ■	Page 20 Fig.9
CSM1600			100	20	1.9	10	300 ⑩	1400 ⑩	Page 20 Fig.6
CSM1601A			100	20	1.9	10	300 ⑩	1400 ⑩	Page 20 Fig.6

⑩ $R_L = 350\Omega$, $V_{CC} = 5\text{V}$, $I_F = 7.5\text{mA}$, $C_L = 15\text{pF}$

■ $R_L = 350\Omega$, $V_{CC} = 5\text{V}$, $I_F = 13\text{mA}$, $C_L = 15\text{pF}$

⑩ $I_F = 5\text{mA}$ ⑩

Ceramic Hermetically Sealed High Gain Photon Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)									
Part No.	Functional Diagram	Package Details	CTR ($I_F = 10\text{mA}$) min(%)	Continuous I_F max(mA)	V_F ($I_F = 20\text{mA}$) max(V)	Data Rate typ(Kb/s)	Propagation Delay Times ($R_L = 510\Omega$, $C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $I_F = 13\text{mA}$)		Package Figure No.
							t_{PHL} max(ns)	t_{PLH} max(ns)	
CSM169-2			100	20	1.9	10	200	200	Page 20 Fig.7
CSM169-4			100	20	1.9	10	200	200	Page 20 Fig.7
MC600			100	20	1.9	10	300	300	Page 19 Fig.3

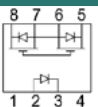
Ceramic Hermetically Sealed Zero Crossing Triac Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C

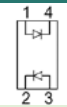
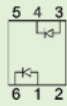
Part No.	Functional Diagram	Package Details	V_{DRM} ($I_{DRM} = 100nA$) min(V)	Continuous I_F max(mA)	V_F ($I_F = 30mA$) max(V)	I_{FT} (Main Terminal Voltage = 3V) max(mA)	dv/dt (C) typ(V/ μs)	Package Figure No.
CS3031/ 32/33			250	60	1.8	15 / 10 / 5	2000	Page 20 Fig.10
CS3041/ 42/43			400	60	1.7	15 / 10 / 5	2000	
CS3061/ 62/63			600	60	1.5	15 / 10 / 5	1500	
CS3081/ 82/83			800	60	1.5	15 / 10 / 5	1500	

Ceramic Hermetically Sealed Linear Optocouplers, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)

Part No.	Functional Diagram	Package Details	BV_R ($I_R = 100\mu A$) typ(V)	V_F ($I_F = 10mA$) max(V)	Transfer Gain ($I_F = 10mA$, $V_R = 15V$) Typ()	Transition times ($R_L = 50\Omega$, $I_F = 10mA$) max(μs)		Package Figure No.
						t_r	t_f	
CSL400D			200	1.8	1.0	2	2	Page 20 Fig.9
CSL400L			200	1.8	1.0	2	2	Page 19 Fig.5

Dual channel versions also available. Please contact us for more information.

Ceramic Hermetically Sealed MOSFET Optocoupler, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C										
Part No.	Functional Diagram	Package Details	I _F max(mA)	R(ON) (I _F = 10mA, I _O = 500mA, t _p ≤ 30ms)		V _F (I _F = 10mA) max(V)	I _O (OFF) (V _F = 0.6V, V _O = 90V) max(μA)	Turn On/Off times (I _F = 10mA, V _{DD} = 28V, I _O = 800mA)		Package Figure No.
				A typ(Ω)	B typ(Ω)			t _{ON} max(ms)	t _{OFF} max(ms)	
CSMR40			20	0.8	0.2	1.7	10	6.0	0.25	Page 20 Fig.9

Ceramic Hermetically Sealed Photodiode Optocoupler, manufactured to ISO 9001:2008 with an operating temperature range from -55°C to +125°C (RADIATION TESTED)								
Part No.	Functional Diagram	Package Details	I _D (V _R = 5V, R _L = 1MΩ) typ(μA)	BV _R (I _R = 1mA) min(V)	Transition Times (R _L = 3.3KΩ, I _F 10mA)		CTR (I _F = 10mA, V _{OUT} = 5) typ(%)	Package Figure No.
					t _r typ(nS)	t _f typ(nS)		
CSM150			100	200	200	200	1.56	Page 19 Fig.4
CSM151			100	200	200	200	1.56	Page 19 Fig.5

DIP PACKAGE 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 <i>Fig. 1 8 and 16 pin DIP trimmed for butt joint assembly</i>
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. <i>Fig. 2 8 and 16 pin DIP with leads cut and bent for gull wing assembly</i>
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 <i>Fig. 3 8 and 16 pin DIP with leads trimmed for butt joint assembly</i>

PACKAGE DIMENSIONS

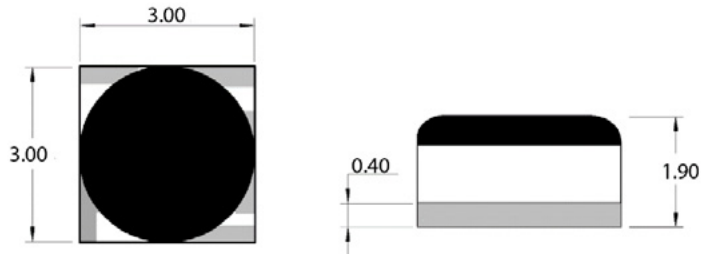


Figure 1: 4/5 Pin Hybrid

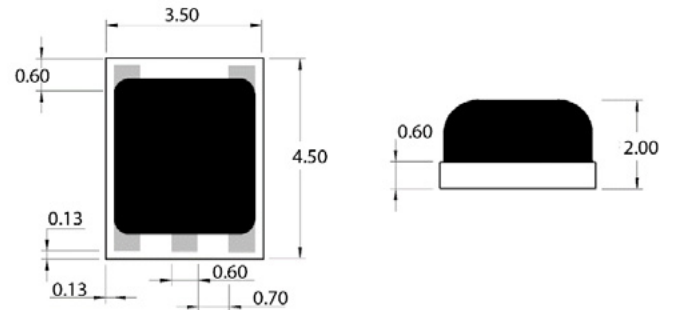


Figure 2: 5 Pin Hybrid

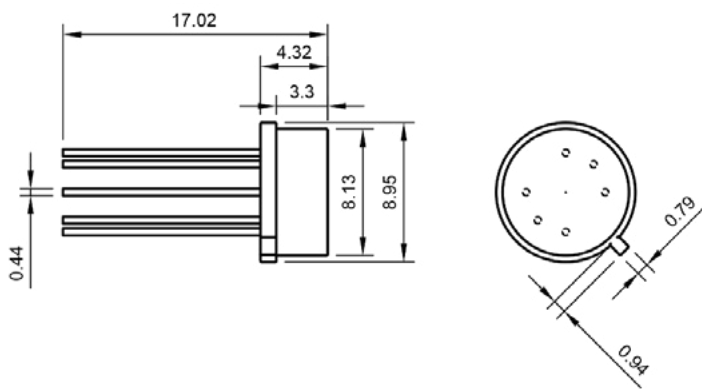


Figure 3: 6 Metal Can

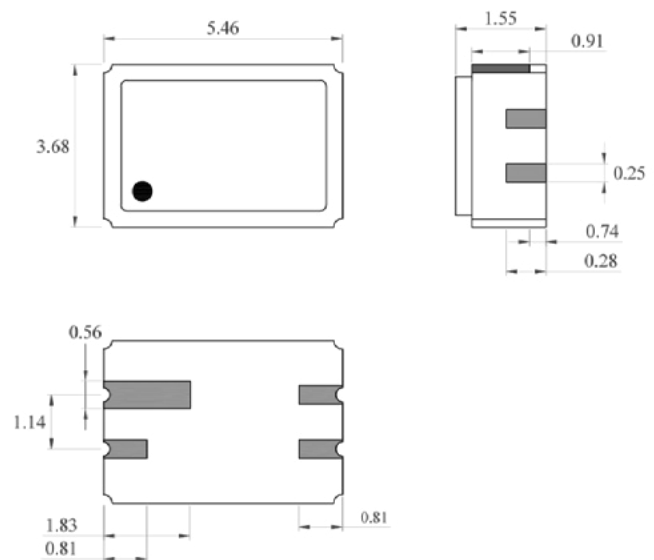
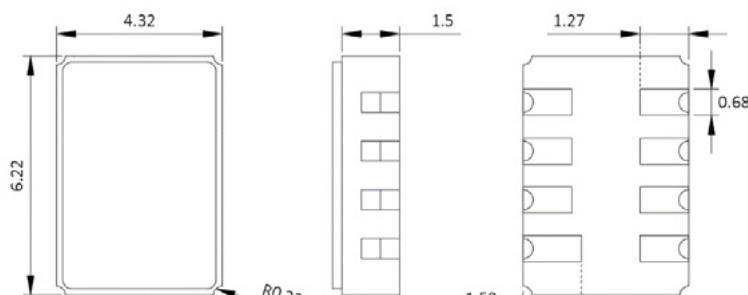


Figure 4: 4 Pin LCC



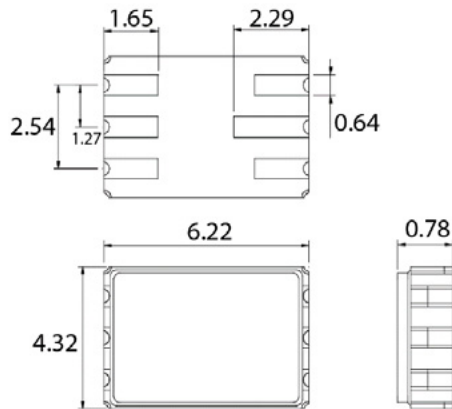


Figure 6: 6 Pin LCC

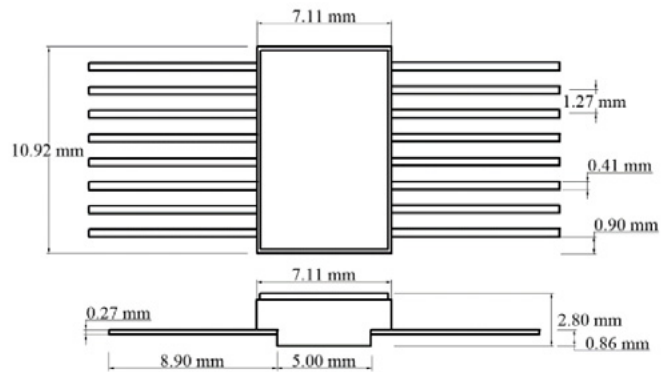


Figure 7: 16 Pin Flat Pack

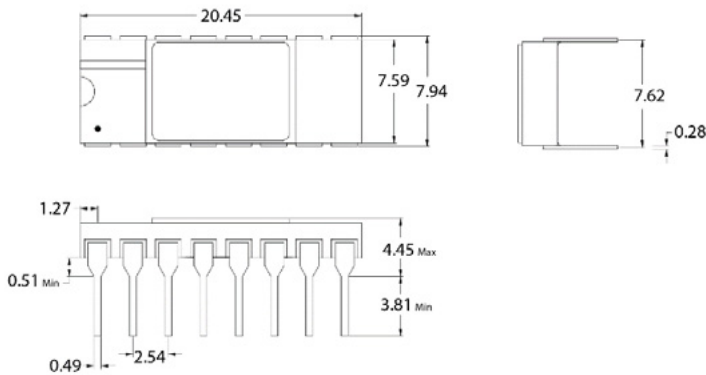


Figure 8: 16 Pin DIP

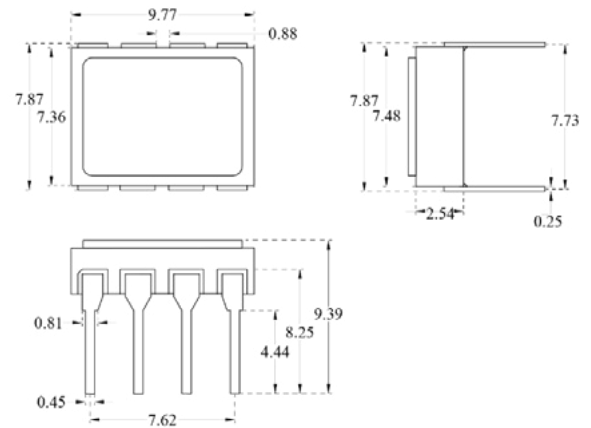


Figure 9: 8 Pin DIP

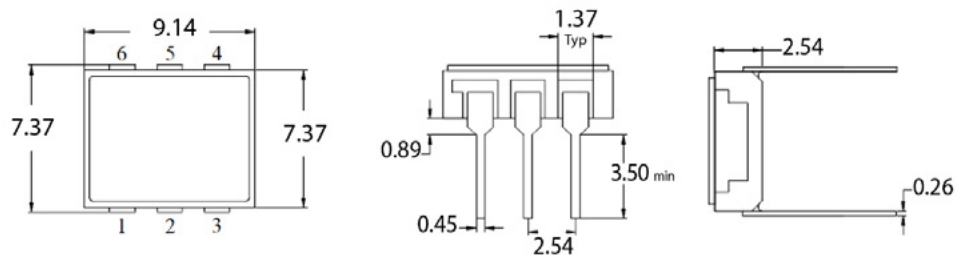
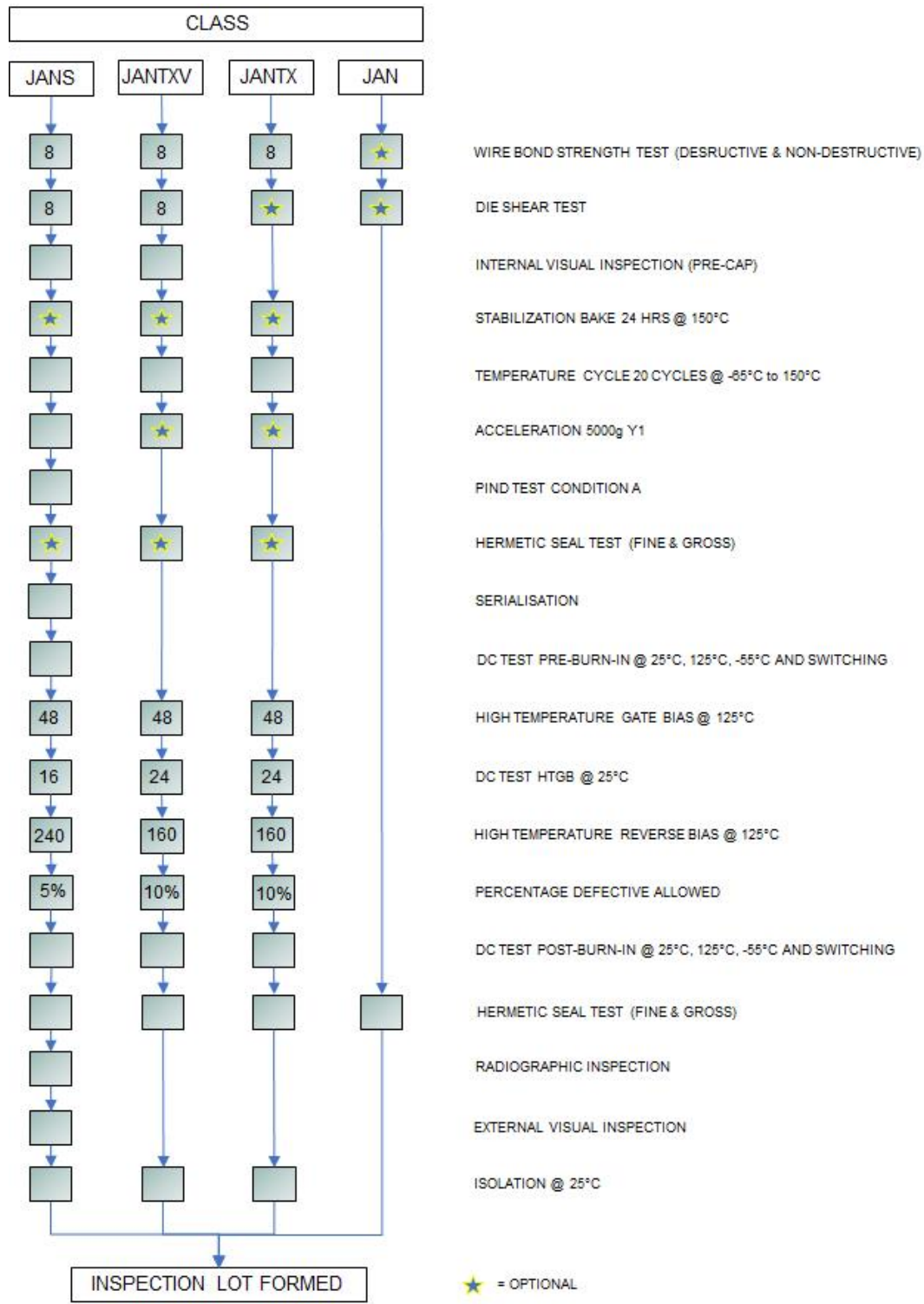
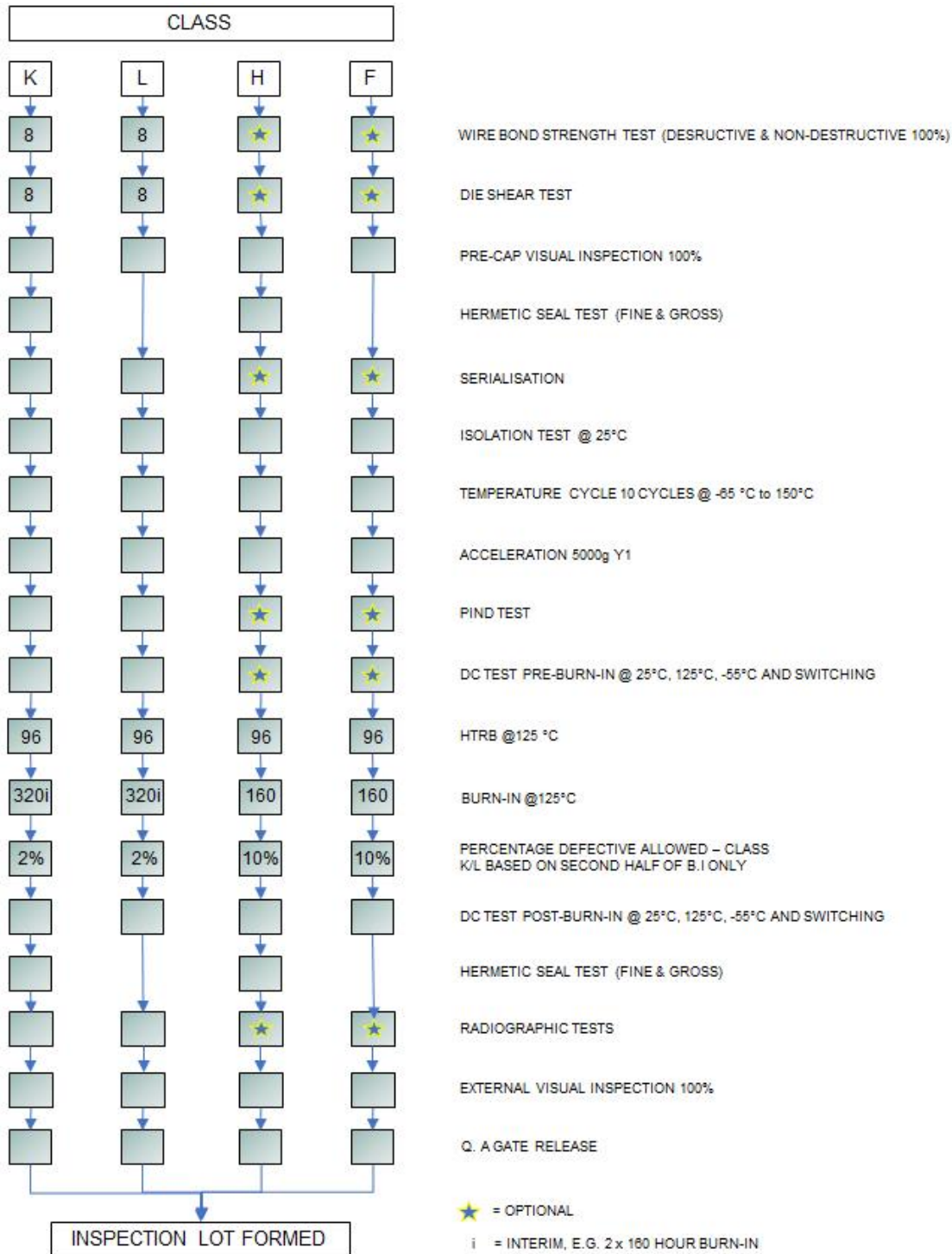


Figure 10: 6 Pin DIP

SCREENING FLOW MIL-PRF-19500



SCREENING FLOW MIL-PRF-38534



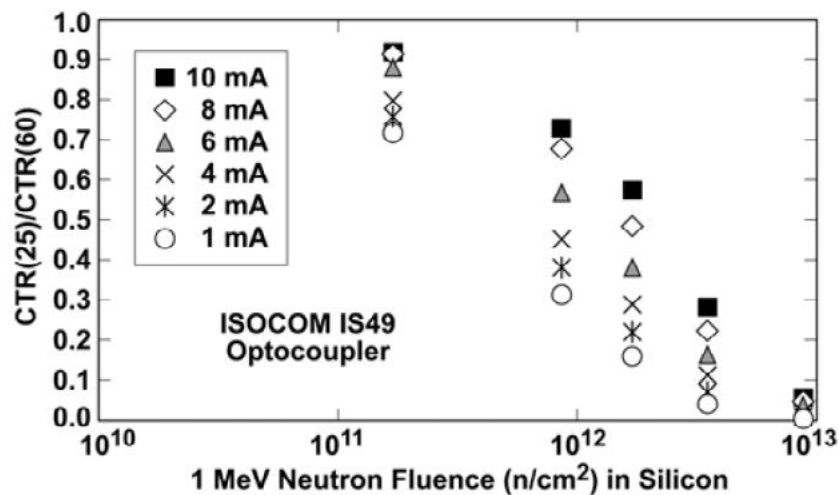
ISOCOM LIMITED RADIATION SUMMARY ON OPTOCOUPLEDERS

TOTAL IONIZATION DOSE TESTED Up to 1 Mrad(si)

DISPLACEMENT DAMAGE TESTED 1 MeV X 10¹²

NEUTRON TESTED
Transistors – 1.00E + 11
High Speed – 3.00E + 12
High Gain – 3.00E + 12
High Gain Photon – 1.00E + 13

Normalized CTR versus the radiation level for the IS49 Transistor optocoupler





Microcross provides distribution and value added services for all ISOCOM products sold in the USA and India. For sales and support, visit: **microcross.com/ISOCOM**