



**SKYWORKS®**

**Aerospace and Defense**

1119 Rev 3

# Mission Critical Communications and Power

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## The Sky is Not the Limit

Mission critical communications and power require precision systems that must operate faultlessly under the most extreme conditions, where failure is not an option. For more than 35 years, Skyworks has enabled a diverse set of aerospace and defense applications – all designed with the quality and high reliability to ensure they work day-in and day-out without fail.

In addition to standard consumer off-the-shelf (COTS) solutions, we offer high-reliability ceramic hermetic packaged devices via our Skyworks Defense and Space (SDS) business unit, formerly known as Isolink, a wholly-owned subsidiary of Skyworks Solutions.

Through our SDS business unit, we provide screened and hermetically sealed high-reliability Optocouplers, RF diodes and RFICs including multi-chip modules (MCM). Product screening for parts include the equivalent of Class B and Class S of MIL-PRF-38535, Class H and Class K of MIL-PRF-38534, JANS, JANTX and JANTXV level of MIL-PRF-19500 and New Space Flow.



Aerospace



Avionics



Surveillance Systems



Homeland Security



Microwave Subsystems



Global Positioning Systems



Portable Radio Communications



Radar



Satellite

## The Right Design Choice Starts Here

Skyworks is continually releasing new products. We invite you to review this brochure as well as our website for a complete list of our solutions.

[Skyworks Aerospace and Defense Website.](#)



# Defense and Space Capability and Provisions

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- **Mil-Std Specification Compliance**

- MIL-PRF-19500 or MIL-PRF-19500/548 Equivalent
  - JANTX, JANTXV (Military)
  - JANS (Space)
- MIL-PRF-38534 (MCMs and Hi-Rel Die) Equivalent
  - Class H (Military)
  - Class K (Space)
- MIL-PRF-38535 Equivalent
  - Class B (Military)
  - Class S (Space)

- **On-shore Manufacturing**

- **Fully Customized Solutions**

- **Lot Traceability, Data Pack, Serialization, Read/Record Data**

- **Radiation, Package, Performance and Temperature Characterization**

- **Comprehensive Customer Support**

- Obsolescence, Custom Drawings, Inspections, Audits, Applications

## The Right Products for Customer's RF, Power and New Space Applications

### *Applications*

- Avionics systems
- Electronic Countermeasures (ECM) equipment
- Electronic Warfare (EW)
- Global Positioning System (GPS)
- Improvised Explosive Device (IED)
- LEO Satellite Constellation
- Joint Tactical Radio System (JTRS)
- Land Mobile Radio (LMR)
- Microwave subsystems
- Software Defined Radio (SDR)
- Surveillance receivers or jammers
- Satellite Platforms and Payloads

### *Products*

- Optocouplers
  - Photo transistor
  - High Speed
  - Linear
  - Low Input current Photodarlington
  - Schmitt Trigger
  - Photovoltaic
- RF Diodes
  - Limiters, Schottky, PINs & Varactors
- Amplifiers – LNA & General Purpose Gain Blocks
- Digital Step and Fixed Pad Attenuators
- Switches – RF & High Power
- Demodulators
- Multi-Chip Modules – Front End & Custom

# Certifications

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As an industry leader, Skyworks and its wholly-owned subsidiaries have demonstrated their quality leadership and enhanced commitment to customer satisfaction through formal, third-party registration to ISO 9001, ISO 14001, and AS9100D.

Company	ISO 9001	ISO 14001	AS9100D
Skyworks Solutions, Inc.	•	•	
Isolink (SDS)	•		•

## ISO 9001

ISO 9001 is an internationally recognized Quality Management System standard that promotes customer satisfaction through continual improvement of the system's effectiveness. ISO 9001 provides a model for a Quality Management System which focuses on the effectiveness of the processes in a business to achieve desired results. The standard endorses the adoption of a process approach emphasizing the requirements, added value, process performance and effectiveness, and continual improvement through objective measurements.

## ISO 14001:2004

Skyworks is committed to the protection and preservation of the environment in all its business operations. We understand that our actions today can have environmental impacts tomorrow. Improvements at our facility will affect our customers and ultimately consumers. To this end, we have an established ISO 14001 certified Environment Management System by which we operate. We build products in consideration of regulatory and industry requirements, such as Restriction of Hazardous Substances Derivative (RoHS), and offer lead (Pb)-free, RoHS-compliant, and Green™ solutions to meet the needs of our customers in today's environmentally conscious market.

## AS9100D

This international standard includes ISO 9001:2015 quality management system requirements and specifies additional aviation, space, and defense industry requirements, definitions, and notes. This standard specifies requirements for a quality management system demonstrating organization's ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements. Organization with this certification aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements.

# RF Applications

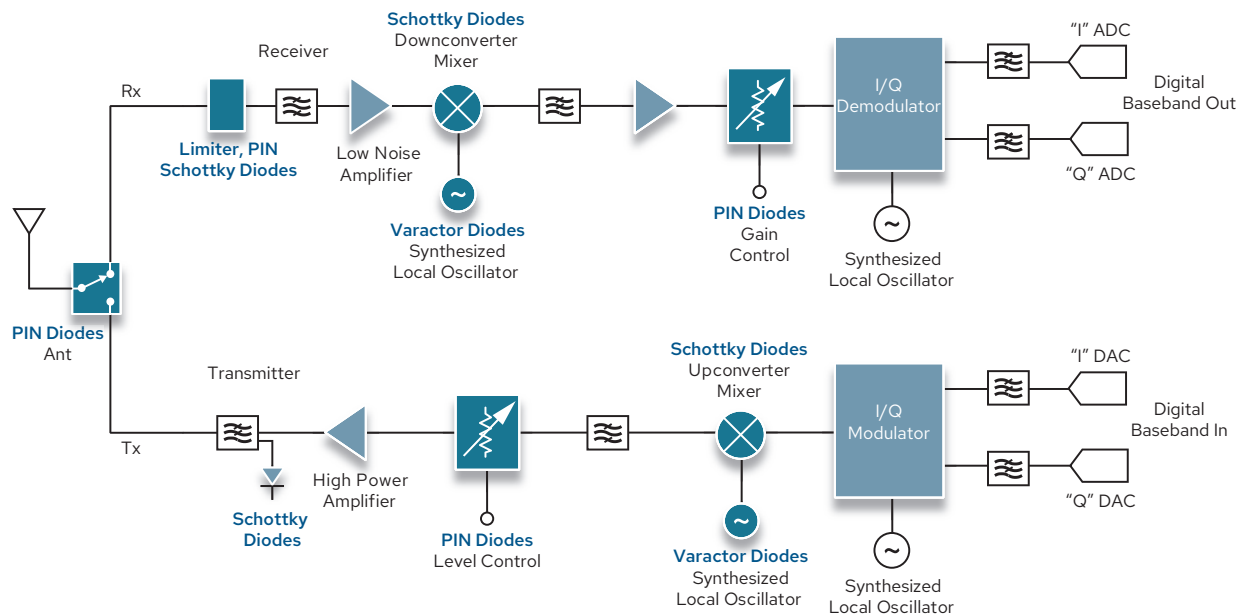


Figure 1. Transceiver (Simplified) Block Diagram

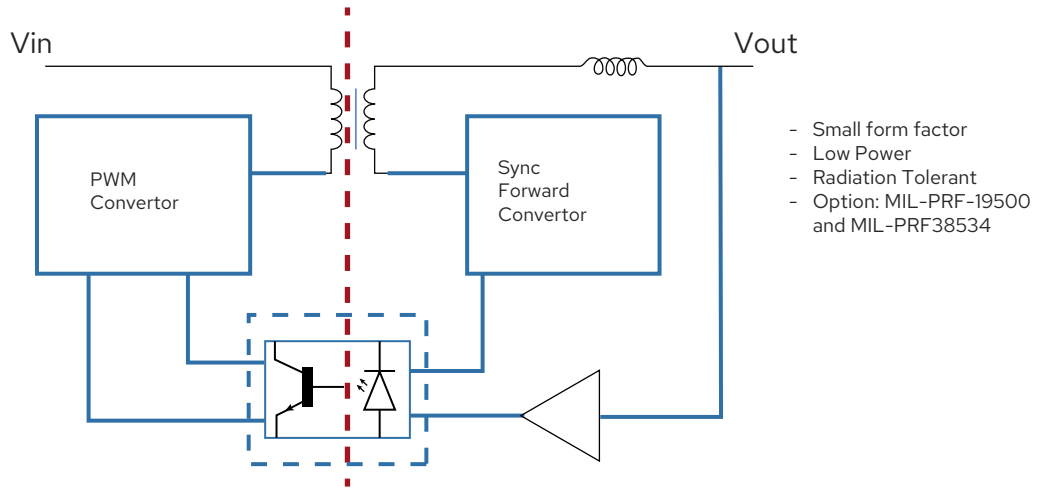
**Many of the functions in the diagram above can be integrated into a customized MCM solution.**

## Skyworks MCM/Integration capability

- Integration Leader for Vast Array of Technologies
  - Dies - CMOS, SOI, GaAs and SiGe
  - Functions - LNAs, RF Diodes, Switches, BAW and TC-SAW Filters, Gain Blocks, Attenuators, Phase Shifters
  - Bare, Stacked, Flip Chip and WLCSP
  - Wirebonds and BGA
  - SMT Components
    - 01005, 0201, 0402, Filters
  - Interconnects and Planes, Transmission Lines
  - Printed Inductors, Couplers, Attenuators
  - Micro Vias and Thermal Vias
  - Solder Mask
  - Substrate Technology
    - 4-7 layers core/coreless
    - Thermally Enhanced Vias (TEV)
    - Solid Stacked Vias (SSV)
    - Low dielectric constant and loss tangent materials

# Optocoupler Applications

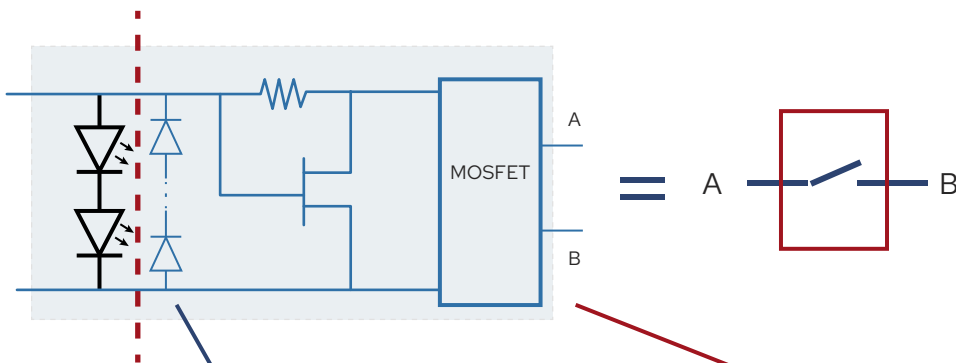
## On Board Power Management, DC to DC Converter



### Target products:

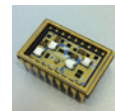
- OLI100
- OLI249
- OLS100
- OLS249
- OLH104X
- 4N4X

## Solid State Relay



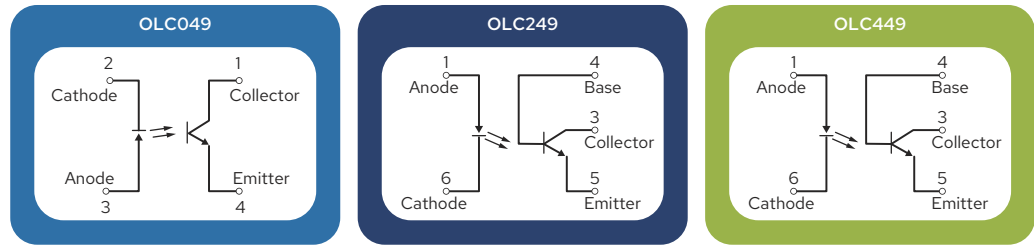
### Target products:

- OLI910
- OLS910
- OLH910
- OLX920



# New Space Applications

## LEO Constellation Solution



Part Number	OLC049	OLC249	OLC449
Category	Radiation Tolerant Optocoupler	Radiation Tolerant Optocoupler	Radiation Tolerant Optocoupler
Functionality	Non-Hermetic Phototransistor based Optocoupler	Non-Hermetic Optocoupler with Pinout access to the base of Phototransistor	Non-Hermetic, Higher CTR Optocoupler with Base Access
Electrical Isolation Voltage	1000VDC	1000VDC	1000VDC
Current Transfer Ratio CTR	200 – 1200%	200 – 1200%	700 – 4000%
Package	4-pin Glob top LCC 5.6 x 3.8 x 3.2 mm	6-pin Glob top LCC 6.3 x 4.3 x 3.8 mm	6-pin Glob top LCC 6.3 x 4.3 x 3.8 mm

*Same Fit and Function As The Hermetic Counterparts, 30+ Years Of Space Heritage*

- Low Cost Version of Popular Hermetic Devices
  - Reduces the Cost of Ownership
- Fit and Function Exact Same as Hermetic Device
  - 30+ Years of Hi-Rel Heritage
  - Known Electrical and Radiation Performance
  - Full Mil Temperature Range Performance (-55°C to +125°C)
  - Manufactured on the Same Line as Space products
  - Straight Swap Between Hermetic and Non-Hermetic Device
  - No Need for Design or Layout Changes
- Lot Traceability
- Obsolescence Managed by SDS
- Shorter Lead Times
- Custom Requirements Available
- Lot Approval and Test Report
- Lot Radiation Testing

**SDS is a Perfect Partner with 36 Years of Experience in Space Offering Turnkey Solutions For New Space Applications.**

# Featured Products

## Optocouplers

### Photo Transistor Optocouplers

Part Number	VF (V) @ IF = 10 mA		@ IF (mA)	CTR		BVceo (V)	Isolation 25°C VDC @ 1SIsol	Package Size (inch)
	Min.	Max.		Min. (%)	Max. (%)			
OLS249	1.2	1.8	1	200	1200	40	1500	"6-Iid Hermetic LCC 0.245 x 0.170 x 0.08"
OLS449	1.2	1.7	1	1500	4000	65	1000	"6-Iid Hermetic LCC 0.245 x 0.170 x 0.08"
OLS049	1.2	1.8	1	200	1200	60	1000	"4-Iid Hermetic LCC 0.22 x 0.16 x 0.08"

### High Speed Optocouplers

Part Number	Condition	CTR Min	CTR Max	BVCEO (V)	Vcc Max (V)	Propagation Delay	Isolation @ VDC 1 Sec	"Package Size (inches)"
OLF300	CTR @ IF = 16mA	9	-	-	18	6µS max	1000	"8-Iid Hermetic FP 0.18 x 0.18 x 0.1"

### Linear Optocouplers

Part Number	Condition	"Transfer Gain Min"	"Transfer Gain Max"	"Isolation @ VDC 1 Sec"	"Package Size (inches)"
OLS700	Transfer Gain, K2/K1	0.75	1.25	1000	"6-Iid Hermetic LCC 0.245 x 0.170 x 0.08"
OLH7000	Transfer Gain, K2/K1	0.75	1.25	1000	"8-Iid Hermetic DIP 0.39 x 0.32 x 0.15"



# Featured Products

## Optocouplers

### Low Input Current Photodarlington Optocouplers

Part Number	Condition	CTR Min	CTR Max	BVCEO (V)	Vcc Max (V)	Propagation Delay	Isolation @ VDC 1 Sec	"Package Size (inches)"
OLS400	CTR @ IF = 0.5/5mA	300/200	-	-	20	100µS max	1500	"6-Icd Hermetic LCC 0.245 x 0.170 x 0.08"
OLH400	CTR @ IF = 0.5/5mA	300/200	-	-	20	100µS max	1000	"6-Icd Hermetic TO-5 0.2 x 0.302 x 0.745"
OLH5700	CTR @ IF = 0.5/5mA	300/200	-	-	18	100µS max	3000	"8-Icd Hermetic DIP 0.39 x 0.32 x 0.15"

### Schmitt Trigger Optocouplers

Part Number	Condition	IF Min	IF Max	BVCEO (V)	Vcc Max (V)	Propagation Delay	Isolation @ VDC 1 Sec	"Package Size (inches)"
OLI600	Threshold Current IF @ VC	-	10	-	18	300nS max	1500	"6-Icd Ceramic Carrier Chip 0.1 x 0.11 x 0.65"

### Photovoltaic Optocouplers

Part Number	Condition	ISC Min	Isolation @ VDC 1 Sec	"Package Size (inches)"
OLS910	ISC @ IF = 10mA	-7µA	1500	"6-Icd Ceramic Carrier Chip 0.1 x 0.11 x 0.65"

# Featured Products

## RF Amplifiers & Demodulators

### LNA - Low Noise RF Amplifiers

Part Number	"Frequency Min"	"Frequency Max"	"Noise Figure (dB)"	"Gain (dB)"	"OIP3 (dBm)"	"VDD (V)"	"OP1dB (dBm)"	"Package Size (mm)"
SKY67189-396LF	0.4GHz	6 GHz	0.7	18	29	5	19	"8-lid DFN 2 x 2 x 0.75"
SKY67183-396LF	0.4GHz	6 GHz	0.5	21	32	5	22	"8-lid DFN 2 x 2 x 0.75"
SKY67159-396LF	0.2GHz	3.8 GHz	1	17	29	3.3	16	"8-lid DFN 2 x 2 x 0.75"

### RF Gain Blocks - General Purpose

Part Number	"Frequency Min"	"Frequency Max"	"Noise Figure (dB)"	"Gain (dB)"	"OIP3 (dBm)"	Quiescent Current (mA)	"OP1dB (dBm)"	"Package Size (mm)"
SKY65017-70LF	0.1 GHz	6 GHz	4.5	20	35	100	20	"4-lid SOT89 2.4 x 4.5 x 1.5"
SKY65015-70LF	0.1 GHz	6 GHz	4.8	18	35	70	17	"4-lid SOT89 2.4 x 4.5 x 1.5"

### Demodulator - Direct Quadrature

Part Number	"RF Frequency MHz"	"IF Frequency MHz"	IP3	Noise Figure	Input P1dB	Gain	IP2	"Package Size (mm)"
SKY73009-12	400 to 3000	0 to 250	25 dBm	14 dB	12 dBm	2 dB	60 dBm	"32-lid LGA 5.04 x 5.04 x 1"

# Featured Products

## Attenuators

### Digital Attenuators

Part Number	Number of Bits	"Freq Range (GHz)"	"LSB (dB)"	Control Interface	Max Attenuation (dB)	"Insertion Loss (dB)"	"IIP3 (dBm)"	"Package Size (mm)"
SKY12408-321LF	2	0.05 - 0.6	6	Parallel	6	0.3	49	"12-lid CQFN 3 x 3 x 0.75"
SKY12338-337LF	2	0.35 - 4	6	Parallel	18	0.6	45	"12-lid CQFN 3 x 3 x 0.75"

### Fixed Attenuators Pad

Part Number	"Nominal Attenuation (dB)"	"Attenuation Tolerance (dB)"	"Attenuation Flatness (dB)"	"Minimum Return Loss (dB)"
ATN3590-XX Series	1 to 30	±0.2 to ±1	±0.15 to ±2.5	16 to 28
ATN3580-XX Series	1 to 40	±0.15 to ±1.6	±0.1 to ±2	15 to 22

## Switches

### RF Switches

Part Number	"Description (Absorptive/ Reflective)"	"Frequency Min"	"Frequency Max"	"Insertion Loss (dB)"	"Isolation (dB)"	"IIP3 (dBm)"	"Package Size (mm)"
SKY13372-467LF	SP2T (A)	0.1 GHz	6 GHz	0.8 - 1.7	40 - 56	45	"16-lid QFN 4 x 4 x 0.9"
SKY13575-639LF	SP4T (A)	0.1 GHz	6 GHz	0.6	40	55	"12-lid QFN 1.6 x 1.6 x 0.45"

### High Power RF Switches

Part Number	"Description (Absorptive/ Reflective)"	"Frequency Min"	"Frequency Max"	"Insertion Loss (dB)"	"Isolation (dB)"	"Tx Power (Average)"	"Package Size (mm)"
SKY12255-708LF	SP2T (R)	0.3 GHz	3.8 GHz	-	-	160	"20-lid QFN 5 x 5 x 1.5"
SKY12248-492LF	SP2T (R)	2.3 GHz	4.2 GHz	-	-	120	"20-lid QFN 5 x 5 x 1.5"

# Featured Products - RF Diodes

## Power Detection

*Schottky Diodes - Chip and Beam Lead, Low Frequency to 100 GHz*

Base Part Number	Minimum Detectable Signal (dBm)	Barrier Height	Input Signal Frequency Range	Maximum Capacitance (pF)	Configuration
<a href="#">CDC7630-000</a>	-52	ZBD	-	0.25	Single junction
<a href="#">DME2333-000</a>	-45	Medium	Ku band	0.05-0.15	Single junction

## Receiver Protection

*Silicon Limiter Diode – Low Frequency to 36 GHz*

Part Number	V <sub>B</sub> @ 10 μA (V)	Typ. C <sub>J</sub> @ 0 V (pF)	Max. C <sub>J</sub> @ 6 V (pF)	Max. R <sub>S</sub> @ 10 mA (Ω)	Max. T <sub>L</sub> @ 10 mA (ns)	Thermal Impedance	
						Max. Average (C/W)	Typ. 1 μs Pulse (C/W)
<a href="#">CLA4601-000</a>	15-30	0.12	0.10	2.5	5	120	15
<a href="#">CLA4607-000</a>	120-180	0.20	0.15 @ 50 V	2.0	50	40	1.2

Screened bare die, epoxy and ceramic hermetic packaged versions of these devices are available. For more information, please visit [www.skyworksinc.com](http://www.skyworksinc.com).

# Featured Products -RF Diodes

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## Switching

### *PIN Diodes—Low Frequency to 36 GHz*

Part Number	$V_B @ 10 \mu A$ (V)	Nominal I-Region ( $\mu m$ )	Typ. $C_J @ 0 V$ (pF)	Max. $C_J @ 50 V$ (pF)	Max. $R_S @ 10 mA$ ( $\Omega$ )	Max. $T_L @ 10 mA$ (ns)	Max. Thermal Resistance (C/W)
<u>APD0505-000</u>	50	5	0.10	0.05	2.0	20	100

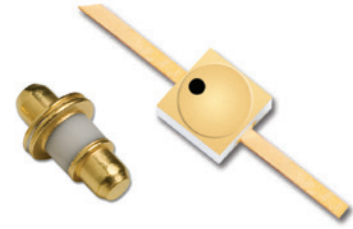
Screened bare die, epoxy and ceramic hermetic packaged versions of these devices are available. For more information, please visit [www.skyworksinc.com](http://www.skyworksinc.com).

### *Beam-Lead PIN Diodes—Low Frequency to 40 GHz*

Part Number	$V_B @ 10 \mu A$ (V)	Max. $C_J @ 10 V$ (pF)	Max. $C_J @ 50 V$ (pF)	Max. $R_S @ 10 mA$ ( $\Omega$ )	Typ. $T_L @ 10 mA$ (ns)
<u>DSM8100-000</u>	60	0.025	-	3.5	25

# High-Reliability Screening Capabilities

Skyworks can perform up to JANS level High-Reliability testing on ceramic packaged diode devices in accordance with MIL-PRF-19500, and Element Evaluation on unpackaged dice and beam-lead diode devices in accordance with MIL-PRF-38534. We also offer lot approval services for sensitive circuits. The table below shows screening requirements for ceramic packaged diode devices.



## Screening Requirements for Ceramic Packaged Diode Devices

### Screening Requirement in Accordance with Table E-IV-MIL-PRF-19500

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
1	Pre-Cap Inspection	MIL-STD-750 – Method 2070		•	•	
2	High-Temperature Bake	MIL-STD-750 – Method 1032	zzv = 24 Hours	•	•	•
3	Temperature Cycling	MIL-STD-750 – Method 1051	20 Cycles. Condition C	•	•	•
4	Constant Acceleration	MIL-STD-750 – Method 2006	Condition A Y1 Axis Only	•	•	•
5	PIND	MIL-STD-750 – Method 2052	Condition A	•		
6	Initial Electrical Test		Serialize, Read and Record	•	•	•
7	High-Temperature Reverse Bias	MIL-STD-750 – Method 1038	Condition A, t = 48 Hours	•	•	•
8	Interim Electricals		Read and Record	•	•	•
9	Burn-in	MIL-STD-750 – Method 1038	Condition B, (JANS t = 240 Hours, JANTX z JANTXV t = 160 Hours)	•	•	•
10	Final Electrical Test		Group A, Subgroup 2 and 3. Read and Record	•	•	•
11	Delta Calculation		Compare Interim Test to Final Test	•	•	•
12	PDA		Percent Defective Allowable (JANS = 5% Max.; JANTX and JANTXV = 10% Max.)	•	•	•
13	Fine Leak	MIL-STD-750 – Method 1071	Condition H	•	•	•
14	Gross Leak	MIL-STD-750 – Method 1071	Condition C	•	•	•
15	X-ray	MIL-STD-750 – Method 2076		•		
16	External Visual Inspection	MIL-STD-750 – Method 2071		•	•	•
17	Case Isolation	Not Applicable				

# High-Reliability Screening Capabilities

## Screening Requirements for Ceramic Packaged Diode Devices

### Group A Inspection in Accordance with Table E-IV-MIL-PRF-19500

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 1						
1	Visual and Mechanical Inspection	MIL-STD-750 – Method 2071	Sample Size: JANS = 15(0), JANTX and JANTXV = 45(0)	•	•	•
Subgroup 2						
1	Electrical Testing		DC (Static) @ T <sub>A</sub> = 25 °C, Sample Size = 116(0)	•	•	•
Subgroup 3						
1	Electrical Testing		DC (Static) @ Min. and Max. Operating Temp., Sample Size = 116(0)	•	•	•
Subgroup 4						
1	Electrical Testing		Dynamic @ T <sub>A</sub> = 25 °C, Sample Size = 116(0)	•	•	•
Subgroup 5 – Not Applicable						
Subgroup 6 – Not Applicable						
Subgroup 7 – Not Applicable						

### Group B Inspection for JANS Devices in Accordance with Table E-VIA-MIL-PRF-19500

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 1						
1	Physical Dimensions	MIL-STD-750 – Method 2066	Sample Size	•		
Subgroup 2						
1	Solderability	MIL-STD-750 – Method 2026	Sample Size – Large Lot = 15(0) Leads, Small Lot = 6(0) Leads	•		
2	Resistance to Solvents	MIL-STD-750 – Method 1022	Sample Size – Large Lot = 15(0) Devices, Small Lot = 6(0) Devices	•		
Subgroup 3						
			Large Lot = 22(0), Small Lot = 6(0)			
1	Temperature Cycling	MIL-STD-750 – Method 1051	100 Cycles. Condition C, Sample Size	•		
2	Fine Leak	MIL-STD-750 – Method 1071	Condition H, Sample Size	•		
3	Gross Leak	MIL-STD-750 – Method 1071	Condition C, Sample Size	•		
4	Electrical Testing		DC @ T <sub>A</sub> = 25 °C, Sample Size	•		
5	Decap Internal Visual	MIL-STD-750 – Method 2075	Sample Size = 6(0)	•		
6	Bond Strength	MIL-STD-750 – Method 2037	The same number of devices used for bond strength will also be used for die shear.	•		
7	Die Shear	MIL-STD-750 – Method 2017	The same number of devices used for bond strength will also be used for die shear.	•		
Subgroup 4						
			Large Lot = 22(0), Small Lot = 12(0)			
1	Intermittent Operation Life	MIL-STD-750 – Method 1037	2,000 Cycles. Condition D, Sample Size	•		
2	Electrical Testing		DC @ T <sub>A</sub> = 25 °C, Sample Size	•		

# High-Reliability Screening Capabilities

## Screening Requirements for Ceramic Packaged Diode Devices

### Group B Inspection for JANS Devices in Accordance with Table E-VIA-MIL-PRF-19500 (Continued)

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 5			Large Lot = 22(0), Small Lot = 12(0)			
1	Accelerated Steady-State Operation Life	MIL-STD-750 – Method 1027	1,000 Hours Sample Size	•		
2	Electrical Testing		Subgroups 2 and 3	•		
Subgroup 6 – Available Upon Request						
1	Thermal Resistance	MIL-STD-750 – Method 4081	Sample Size – Large Lot = 22(0), Small Lot = 8(0)	•		
Subgroup 7			Large Lot = 32(0), Small Lot = 12(0)			
1	High Temperature Life	MIL-STD-750 – Method 1032	t = 340 Hours @ Max. Rated Storage Temp.,	•		
2	Electrical Testing		DC @ T <sub>A</sub> = 25 °C, Sample Size	•		

### Group B Inspection for JANTX and JANTXV in Accordance with Table E-VIB-MIL-PRF-19500

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 1						
1	Solderability	MIL-STD-750 – Method 2026	Sample Size = 15(0) Leads, Small Lot = 4 (0) Leads		•	•
2	Resistance to Solvents	MIL-STD-750 – Method 1022	Sample Size = 15(0), Small Lot = 3(0) Devices		•	•
Subgroup 2			Sample Size = 22(0), Small Lot 6(0)			
1	Temperature Cycling	MIL-STD-750 – Method 1051	25 Cycles. Condition C		•	•
2	Fine Leak	MIL-STD-750 – Method 1071	Condition H		•	•
3	Gross Leak	MIL-STD-750 – Method 1071	Condition C		•	•
4	Electrical Testing		DC @ T <sub>A</sub> = 25 °C		•	•
Subgroup 3			Sample Size = 45(0), Small Lot = 12(0)			
1	Steady-State Operation Life	MIL-STD-750 – Method 1027	t = 340 Hours		•	•
2	Electrical Testing		DC @ T <sub>A</sub> = 25 °C		•	•
3	Bond Strength	MIL-STD-750 – Method 2037	Sample Size = 11 Wires(0)		•	•
Subgroup 4						
1	Decap Internal Visual	MIL-STD-750 – Method 2075	Sample Size = 1(0)		•	•
Subgroup 5 – Available Upon Request						
1	Thermal Resistance	MIL-STD-750 – Method 4081	Sample Size = 15(0), Small Lot = 6(0)		•	•
Subgroup 6			Sample Size = 32(0), Small Lot = 12(0)			
1	High Temperature Life	MIL-STD-750 – Method 1032	t = 340 Hours @ Max. Rated Storage Temp.,		•	•
2	Electrical Testing		DC @ T <sub>A</sub> = 25 °C		•	•



# High-Reliability Screening Capabilities

## Screening Requirements for Ceramic Packaged Diode Devices

### Screening Requirement in Accordance with Table C-IX of MIL-PRF-38534

Step	Screen	Test Methods and Conditions	Class K	Class H
1	Preseal Burn-in	MIL-STD-883, Method 1030	Optional	Optional
2	"100% Nondestructive Bond Pull"	MIL-STD-883, Method 2023, 2% PDA	100%	Optional
3	Internal Visual	MIL-STD-883, Method 2017	100%	100%
4	Temperature Cycling	"MIL-STD-883, Method 1010, Condition C"	100%	100%
5	Constant Acceleration	"MIL-STD-883, Method 2001, Condition 3,000 g, Y1 Direction Only"	100%	100%
6	"Particle Impact Noise Detection (PIND) See Note 1"	"MIL-STD-883, Method 2020, Condition A (Class K) or B"	100%	Optional
7	Preburn-in Electrical Test	"Table 6-3, Subgroup 1; Read and Record"	100%	Optional
8	Burn-in	"MIL-STD-883, Method 1015, at 125 °C Minimum"	160 Hours	160 Hours
9	Interim Electrical	Group A ( Read and Record)	100%	
10	Burn-in	"MIL-STD-883, Method 1015, at 125 °C Minimum"	160 Hours	
11	Final Electrical Test	"Table 6-3, Subgroup 1 -3, 9-11; Read and Record Delta per Table 6-4."	100%	100%
12	PDA	"Calculate Delta and Percent Defective"	100%	100%
13	Fine Leak	"MIL-STD-883, Method 1014, Conditions A or B"	100%	100%
14	Gross Leak	MIL-STD-883, Method 1014, Condition C	100%	100%
15	X-ray	MIL-STD-883, Method 2012	100%	Optional
16	External Visual	MIL-STD-883, Method 2009	100%	100%

# High-Reliability Screening Capabilities

## Screening Requirements for Ceramic Packaged Diode Devices

### Group E Inspection in Accordance with Table E-IX-MIL-PRF-19500

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 1			Sample Size = 45(0)			
1	Temperature Cycling	MIL-STD-750 – Method 1051	500 Cycles. Condition C	•	•	•
2	Fine Leak	MIL-STD-750 – Method 1071	Condition H	•	•	•
3	Gross Leak	MIL-STD-750 – Method 1071	Condition C	•	•	•
4	Electrical Testing		DC @ T <sub>A</sub> = 25 °C	•	•	•
Subgroup 2			Sample Size = 45(0)			
1	Steady-State Operation Life	MIL-STD-750 – Method 1026	t = 1,000 Hours	•	•	•
2	Electrical Testing		DC @ T <sub>A</sub> = 25 °C	•	•	•
Subgroup 3 – Not Applicable						
Subgroup 5 – Available Upon Request						
1	Thermal Impedance			•	•	•
Subgroup 5 – Not Applicable						
Subgroup 6						
1	ESD	MIL-STD-750 – Method 1020	Sample Size = 11(0)	•	•	•
Subgroup 7			Sample Size = 3(0)			
1	Resistance to Soldering Heat	MIL-STD-750 – Method 2031		•	•	•
2	External Visual Inspection	MIL-STD-750 – Method 2071		•	•	•
3	Fine Leak	MIL-STD-750 – Method 1071	Condition H	•	•	•
4	Gross Leak	MIL-STD-750 – Method 1071	Condition C	•	•	•
5	Electrical Testing		DC @ T <sub>A</sub> = 25 °C	•	•	•
Subgroup 8 – Not Applicable						
Subgroup 9 – Not Applicable						

# High-Reliability Screening Capabilities

## Screening Requirements for Ceramic Packaged Diode Devices

### Group C Inspection in Accordance with Table E-VII-MIL-PRF-19500

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 1						
1	Physical Dimensions	MIL-STD-750 – Method 2066	Sample Size = 15(0), Small Lot = 6(0)		•	•
			Sample Size = 22(0), Small Lot = 6(0)			
Subgroup 2						
1	Thermal Shock	MIL-STD-750 – Method 1056	Condition B	•	•	•
2	Temperature Cycling	MIL-STD-750 – Method 1051	25 Cycles. Condition C	•	•	•
3	Terminal Strength	MIL-STD-750 – Method 2036		•	•	•
4	Fine Leak	MIL-STD-750 – Method 1071	Condition H	•	•	•
5	Gross Leak	MIL-STD-750 – Method 1071	Condition C	•	•	•
6	Moisture Resistance	MIL-STD-750 – Method 1021		•	•	•
7	Electrical Testing		DC @ T <sub>A</sub> = 25 °C	•	•	•
			Sample Size = 22(0), Small Lot = 6(0)			
Subgroup 3						
1	Shock	MIL-STD-750 – Method 2016	1,500 Gs, X1, Y1 and Z1.	•	•	•
2	Vibration, Variable Frequency	MIL-STD-750 – Method 2056		•	•	•
3	Constant Acceleration	MIL-STD-750 – Method 2006	10,000 Gs, X1, Y1 and Z1.	•	•	•
4	Electrical Testing		DC @ T <sub>A</sub> = 25 °C	•	•	•
Subgroup 4						
1	Salt Atmosphere	MIL-STD-750 – Method 1041	Sample Size = 15(0), Small Lot = 6(0)	•	•	•
Subgroup 5 – Available Upon Request						
1	Thermal Resistance	MIL-STD-750 – Method 4081	Sample Size = 15(0), Small Lot = 6(0)	•	•	•
			Sample Size = 22(0), Small Lot = 12(0)			
Subgroup 6						
1	Steady-State Operation Life	MIL-STD-750 – Method 1026	1,000 Hours	•	•	•
2	Electrical Testing		DC @ T <sub>A</sub> = 25 °C	•	•	•
Subgroup 7 – Not Applicable						

# High-Reliability Screening Capabilities

## Screening Requirements for Microcircuits

### Screening Requirement in Accordance with Table IA of MIL-PRF-38535

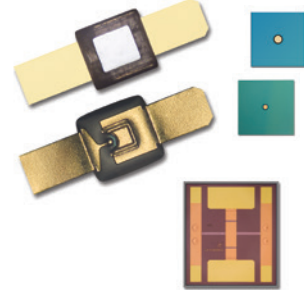
Step	Screening Tests	Class B	Class S
1	Wafer Lot Acceptance Test	"QM plan (See H.3.2.1.4) 1/"	"QM plan (see H.3.2.1.4) or TM 5007 of MIL-STD-883 (All Lots)"
2	"Nondestructive bond pull (NDBP) test"		TM 2023
3	Internal Visual Inspection	TM 2010, Condition B	TM 2010, Condition A
4	Temperature Cycling	"TM 1010, Condition C, 10 Cycles Minimum"	"TM 1010, Condition C, 10 Cycles Minimum"
5	Constant Acceleration	TM 2001, Condition E (Minimum), Y1 Orientation Only	TM 2001, Condition E (Minimum), Y1 Orientation Only
6	Visual Inspection	100%	100%
7	"Particle Impact Noise Detection (PIND) test"		"TM 2020, Test Condition A on Each Device"
8	Serialization	In Accordance with Device Specification (100%)	In Accordance with Device Specification (100%)
9	Pre burn-in (Interim) Electrical Parameters Test	In Accordance with Device Specification	In Accordance with Device Specification
10	"Burn-in test"	"TM 1015 160 Hours at +125 °C Minimum"	"TM 1015 240 Hours at 125 °C, Condition D"
11	Post Burn-in (Interim) Electrical Parameters Test		In Accordance with Device Specification
12	"Reverse Bias Burn-in Test (Static Burn-in)"		"TM 1015, Condition A or C; 144 Hours at +125 °C or 72 Hours at +150 °C Minimum"
13	"Post Burn-in (Interim-reverse Bias) Electrical Parameters Test"		In Accordance with Device Specification
		Class Q (Class Level B)	Class V (Class Level S)
14	"Percent Defective Allowable (PDA) Calculation"	5 Percent PDA (All Lots)	"5 Percent PDA, 3 Percent PDA for Functional Parameters at 25 °C (All Lots)"
15	"Final Electrical Tests a. Static Test: (1) at 25 °C (2) Maximum and Minimum Operating Temperature b. Dynamic or Functional Test: (2) Maximum and Minimum Operating Temperature c. Switching Test: (1) at 25 °C (2) Maximum and Minimum Operated Temperature"	"In Accordance with Applicable Device Specification (See Group A Test)"	"In Accordance with Applicable Device Specification (See Group A Test)"
16	"Seal Test a. Fine Leak b. Gross Leak"	TM 1014	TM 1014
17	"Radiographic (X-ray) and/or C-SAM test"		X-ray: TM 2012, Two Views; C-SAM TM 2030
18	"External Visual Inspection"	TM 2009	TM 2009
19	Qualification or Quality Conformance Inspection/TCI Test Sample Selection		
20	Radiation Dose Rate Induced Latch-up Test	TM 1020	TM 1020

# High-Reliability Screening Capabilities

## High-Reliability Product Flow for Element Evaluation for Unpackaged Devices

Skyworks offers discrete “bare die” and beam-lead products with Class H and Class K element evaluation in accordance with MIL-PRF-38534 for microcircuit and semiconductor die and for passive devices.

IE: CLA4601-000 = Commercial Product Flow  
 CLA4601H000 = Class H  
 CLA4601K000 = Class K



Product	MIL-PRF-38534	Application
Bare Die	Class H	Military
	Class K	Space

## Chip Element Evaluation for Microcircuits and Semiconductors

Test Inspection	Mil-Std-883		Requirement	
	Method	Condition	Class H	Class K
Element Electrical	Per Product Specification	On-wafer	100%	100%
Element Visual	2010	A = Class K B = Class H	100%	100%
Internal Visual	2010		10/0	10/0
Stabilization Bake	1008	C	N/A	10/0
Temperature Cycling	1010	C	N/A	10/0
Mechanical Shock or Constant Acceleration	2002	B, Y1 Direction	N/A	10/0
	2001	A, Y1 Direction		10/0
Interim Electrical	Per Product Specification	25 °C, Min. and Max. Operating Temps.	N/A	
Burn-in	1015	240 Hours Min. @ 125 °C	N/A	10/0
Post Burn-in Electrical	Per Product Specification	25 °C, Min. and Max. Operating Temps.	N/A	10/0
Steady-State Life	1005	1,000 Hours Min. @ 125 °C	N/A	10/0
Final Electrical	Per Product Specification	25 °C, Min. and Max. Operating Temps.	10/0	10/0
Wire Bond Evaluation	2011	C	10/0	10/0
SEM	2018		N/A	4/0

# High-Reliability Screening Capabilities



## Chip Element Evaluation for Passive Devices

Subgroup	Class		Test	MIL-STD-883		Quantity (Accept Number) Condition	Reference Paragraph
	K	H		Method			
1	•	•	Element Electrical			100%	C.3.4.1
2	•	•	Visual Inspection	2032		100% 22 (0)	C.3.4.2
	•		Temperature Cycling	1010	C	10 (0)	C.3.4.3
	•		Mechanical Shock or	2002	B, V1 Direction	10 (0)	
	•		Constant Acceleration	2001	3,000Gs Y1 Direction	10 (0)	
	•		Voltage Conditioning or			10 (0)	C.3.4.7
	•		Aging (Capacitors)	2032		10 (0)	
	•		Visual Inspection			10 (0)	C.3.4.5
	•	•	Electrical			10 (0)	C.3.4.4
4	•	•	Wire Bond Evaluation	2011		10 (0) Wires or 20 (1) Wires	C.3.4.3 C.3.4.6

# Packaging

The products of Skyworks are typically available in the packages shown in the table below. Please refer to individual data sheets for more details.

## Package Selection Guide

Part Number Suffix	Package Type	Actual Size	Package Dimensions (mm) (lead Inclusive)*
-203	Hermetic Pill		1.27 x 1.40
-219	Hermetic SMT		1.91 x 1.91 x 1.14
-207	Hermetic Ceramic Pill		5.08 x 2.18
-210	Hermetic Pill		5.7 x 3.15
-230	Epoxy Stripline		5.98 x 1.4 x 0.76
-232	Epoxy Stripline		5.98 x 3.69 x 0.76
-234, -235	Epoxy Stripline		5.98 x 5.98 x 0.76
-250, -251	Epoxy Stripline		8.12 x 2.54 x 1.27
-252, -253	Epoxy Stripline		8.12 x 5.33 x 1.27
-254	Epoxy Stripline		8.12 x 8.12 x 1.27
-255, -257	Epoxy Stripline		8.12 x 8.12 x 1.27
-220, -221	Hermetic Stripline		11.3 x 1.91 x 1.14
-224	Hermetic Stripline		11.3 x 11.3 x 1.14
-225	Hermetic Stripline		11.3 x 11.3 x 1.14
-222	Hermetic Stripline		11.3 x 6.6 x 1.14
-223	Hermetic Stripline		11.3 x 6.6 x 1.14
-240	Hermetic Stripline		11.52 x 2.64 x 1.18

Package Type	Actual Size	Package Dimensions (in) (Excluding leads)*
6-Lead Ceramic Carrier Chip for Hybrid Assembly		0.1 x 0.11 x 0.65
4-Lead Ceramic Carrier Chip for Hybrid Assembly		0.170 x 0.095 x 0.085
8-Lead Hermetic Ceramic Flat		0.18 x 0.18 x 0.10
4-Lead Hermetic TO-72		0.22 x 0.185 x 0.69
6-Lead Hermetic TO-5		0.200 x 0.302 x 0.745
6-Lead Hermetic Ceramic LCC		0.245 x 0.170 x 0.08
8-Lead Hermetic Ceramic LCC		0.245 x 0.170 x 0.08
8-Lead Hermetic Dip		0.39 x 0.32 x 0.15
6-Lead Non-Hermetic LCC		0.25 x 0.17 x 0.125
4-Lead Non-Hermetic LCC		0.22 x 0.15 x 0.125

\*Dimensions indicated: lead tip to lead tip x body width x total thickness.

Screened bare die, epoxy and ceramic hermetic packaged versions of these devices are available. For more information, please visit [skyworksinc.com](http://skyworksinc.com).

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- ◆ Design Center
- ★ Manufacturing
- ◆ Support

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