

High-Performance/High-Reliability Semiconductor Discrete Devices

Proven Performance and Leadership

As a world-class supplier of RF microwave components for today's wireless communication systems, Skyworks continues to deliver the highest performance Silicon and GaAs discrete products. Building on a proven legacy (which includes products developed at Alpha Industries prior to its merger with Skyworks), these innovative solutions are manufactured using the most advanced processes, driven by decades of experience and industry leadership.

With market demands constantly changing, Skyworks is committed to expanding its microwave portfolio to meet a wider range of applications including radar, point-to-point, point-to-multipoint, cellular, military, space-based communications, and other wireless microwave functions. As always, all of our solutions are backed by world-class customer service, advanced manufacturing capabilities and leadership technology.

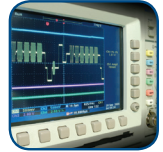
The Right Design Choice Starts Here

We invite you to review our complete catalog of packaged and unpackaged semiconductor diodes, passive elements, and switches for specific RF and microwave applications. Products include silicon varactors, PIN diodes, Schottky diodes, GaAs Schottky diodes, passive elements, and PHEMT-based switches. Design engineers will find this catalog especially useful in finding the key specifications for Skyworks' semiconductor products to easily select appropriate part numbers.

For more information—including how we can help you design the perfect solution for your application—contact our dedicated team of engineers at sales@skyworksinc.com. They have the experience and technical expertise to answer any of your questions.

Visit www.skyworksinc.com for regularly updated technical data, application notes, and new product information.

- **Silicon Diodes:** Limiter, PIN, Schottky, Varactor
- **Silicon Passive Devices:** Fixed Attenuator Pads, MIS Chip Capacitors
- **GaAs Schottky Diodes**
- **GaAs IC Switch Devices**



Certifications

As an industry leader, Skyworks has demonstrated its quality leadership and strengthened its commitment to customer satisfaction through formal, third-party registration to DNV (Det Norske Veritas) ISO 9001, ISO/TS 16949, ANSI/ESD S.20.20, and ISO 14001.



MANAGING RISK

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 promotes the adoption of a process approach emphasizing the requirements, added value, process performance and effectiveness, and continual improvement through objective measurements.

ANSI/ESD S.20.20


ANSI/ESD S20.20 is a standard for the Development of an Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment. The standard covers the requirements necessary to design, establish, implement, and maintain an Electrostatic Discharge (ESD) Control Program.

ISO/TS 16949

One of the major challenges facing today's manufacturers is that, even though there is a low failure probability for each individual component, the total failure probability for all parts combined may reach unacceptable levels. The ISO/TS 16949 standard answers this challenge by defining requirements focused on continual improvement, and the understanding of process interaction. It also creates an implementation framework for customer specific requirements, and includes clear requirements for development processes and techniques to prevent problems in the earliest possible stage of product development.

Jointly developed by International Automotive Task Force (IATF), ISO/TS 16949 is the automotive industry's international quality management system standard intended to answer the need for global consistency, continual improvement, and increased customer satisfaction. It is approved and released by the International Organization for Standardization (ISO).

ISO 14001

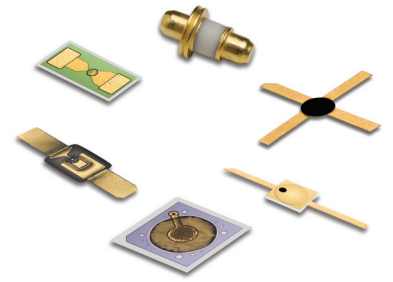
 Through our Green Initiative™, we are committed to manufacturing products that comply with global government directives and industry requirements.



Wide Variety of Devices for High-Performance Applications

Skyworks offers a variety of hermetic and epoxy packaged devices, as well as unpackaged dice and beam-leads, in various configurations for all your high-performance applications from low frequency to 100 GHz. For more information, please refer to Skyworks' complete catalog of packaged and unpackaged semiconductors, *Semiconductor Discretes for RF-Microwave Applications*, CAT501-09A.

- Silicon Diodes: Limiter, PIN, Schottky, Varactor
- GaAs Schottky Devices
- Silicon Passive Devices: Fixed Attenuator Pads, MIS Chip Capacitors
- GaAs IC Switch Devices



When requested, Skyworks will perform JANS level high-reliability testing on packaged devices in accordance with MIL-PRF-19500 and Element Evaluation on unpackaged dice and beam-lead devices in accordance with MIL-PRF-38534. Skyworks also offers lot approval services for sensitive circuits.

Designer Kits Are Available

Skyworks Designer Kits feature samples of a variety of leading-edge components, with data sheets and comprehensive application notes supplied on CD. From amplifiers to front-end modules to varactor diodes, Skyworks designer kits allow you to quickly convert your creativity into working designs.

- KIT606-10A Silicon Limiter Diode Chips
- KIT601-10A MIS Chip Capacitors for Hybrid Circuit Applications
- KIT605-10A GaAs Schottky Diode Flip Chips for Mixer and Detector Applications
- KIT619-10A Fixed Attenuator Pads (ATN3590)
- KIT604-10A Silicon PIN Beam-Lead Diodes for High Frequency Switch Applications
- KIT603-10A Silicon PIN Diode Chips for Switch and Attenuator Applications
- KIT607-10A Silicon Schottky Diode Chips for Mixer and Detector Applications
- KIT609-10A Varactor Diodes for VCO, Phase Shifter and Filtering Applications
- KIT616-10A Varactor Diodes: Hyperabrupt and Abrupt Chips for VCO and Phase Shifter Applications
- KIT615-09A RF Passive Devices
- KIT614-10A Diodes (SMT Limiter, PIN, Schottky, Varactor)
- KIT617-10A Smart Energy Solutions



Innovation to Go™ Designer Kits

Select products and sample/
designer kits available online.
www.skyworksinc.com



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

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
1	Visual Inspection	MIL-STD-750 – Method 2073		•	•	•
2	Pre-Cap Inspection	MIL-STD-750 – Method 2070		•	•	
3	High-Temperature Bake	MIL-STD-750 – Method 1032	t = 340 Hrs.	•	•	•
4	Temperature Cycling	MIL-STD-750 – Method 1051	20 Cycles. Condition C	•	•	•
5	Thermal Impedance	MIL-STD-750 – Method 3101		•	•	•
6	Constant Acceleration	MIL-STD-750 – Method 2006	20,000Gs Min., Y1 Axis Only	•	•	•
7	PIND	MIL-STD-750 – Method 2052	Condition A	•		
8	Initial Electrical Test		Serialize, Read & Record	•	•	•
9	High-Temperature Reverse Bias	MIL-STD-750 – Method 1038	Condition A, t = 48 Hrs.	•	•	•
10	Interim Electricals		Read and Record	•	•	•
11	Burn-in	MIL-STD-750 – Method 1038	Condition B, (JANS t = 240 Hrs., JANTX & JANTXV t = 96 Hrs.)	•	•	•
12	Final Electrical Test		Group A, Subgroup 2 & 3. Read and Record	•	•	•
13	Delta Calculation		Compare Interim Test to Final Test	•	•	•
14	PDA		Percent Defective Allowable (JANS = 5% Max.; JANTX & JANTXV = 10% Max.)	•	•	•
15	Fine Leak	MIL-STD-750 – Method 1071	Condition H	•	•	•
16	Gross Leak	MIL-STD-750 – Method 1071	Condition C	•	•	•
17	X-Ray	MIL-STD-750 – Method 2076		•		
18	External Visual Inspection	MIL-STD-750 – Method 2071		•	•	•

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

Subgroup 1						
1	Visual and Mechanical Inspection	MIL-STD-750 – Method 2071	Sample Size: JANS = 15(0), JANTX & JANTXV = 45(0)	•	•	•
Subgroup 2						
1	Electrical Testing		DC (static) @ $T_A = 25\text{ }^\circ\text{C}$, Sample Size = 116(0)	•	•	•
Subgroup 3						
1	Electrical Testing		DC (static) @ Min. & Max. Operating Temp., Sample Size = 116(0)	•	•	•
Subgroup 4						
1	Electrical Testing		Dynamic @ $T_A = 25\text{ }^\circ\text{C}$, 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 – Large Lot = 22(0), Small Lot = 8(0)	•		
Subgroup 2						
1	Solderability	MIL-STD-750 – Method 2026	Sample Size – Large Lot = 15(0), Small Lot = 6(0)	•		
2	Resistance to Solvents	MIL-STD-750 – Method 1022	Sample Size – Large Lot = 15(0), Small Lot = 6(0)	•		
Subgroup 3						
1	Temperature Cycling	MIL-STD-750 – Method 1051	100 Cycles. Condition C, Sample Size – Large Lot= 22(0), Small Lot = 6(0)	•		
2	Fine Leak	MIL-STD-750 – Method 1071	Condition H, Sample Size – Large Lot= 22(0), Small Lot = 6(0)	•		
3	Gross Leak	MIL-STD-750 – Method 1071	Condition C, Sample Size – Large Lot= 22(0), Small Lot = 6(0)	•		
4	Electrical Testing		DC @ T _A = 25 °C, Sample Size – Large Lot = 22(0), Small Lot = 6(0)	•		
5	Decap Internal Visual	MIL-STD-750 – Method 2075	Sample size = 6(0)	•		
6	Bond Strength	MIL-STD-750 – Method 2037	Condition D, Sample Size – Large Lot = 22 Wires (0), Small Lot = 12 wires (0)	•		
7	Die Shear	MIL-STD-750 – Method 2017	Condition D, Sample Size = 6 Wires (0)	•		
Subgroup 4						
1	Intermittent Operation Life	MIL-STD-750 – Method 1037	2,000 Cycles. Condition D, Sample Size – Large Lot = 22(0), Small Lot = 12(0)	•		
2	Electrical Testing		DC @ T _A = 25 °C, Sample Size – Large Lot = 22(0), Small Lot = 12(0)	•		
Subgroup 5						
1	Accelerated Steady-State Operation Life	MIL-STD-750 – Method 1027	1,000 Hrs. Sample Size – Large Lot = 22(0), Small Lot = 12(0)	•		
2	Electrical Testing		DC @ T _A = 25 °C, Sample Size – Large Lot = 22(0), Small Lot = 12(0)	•		
Subgroup 6						
1	Thermal Resistance	MIL-STD-750 – Method 4081	Sample Size – Large Lot = 22(0), Small Lot = 8(0)	•		
Subgroup 7						
1	High Temperature Life	MIL-STD-750 – Method 1032	t = 340 Hrs. @ Max. Rated Storage Temp., Large Lot = 32(0), Small Lot = 12(0)	•		
2	Electrical Testing		DC @ T _A = 25 °C, Sample Size – Large Lot = 22(0), Small Lot = 12(0)	•		

Group B Inspection for JANTX & 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)		•	•
Subgroup 2						
1	Temperature Cycling	MIL-STD-750 – Method 1051	25 Cycles. Condition C, Sample Size = 22(0), Small Lot 6(0)		•	•
2	Fine Leak	MIL-STD-750 – Method 1071	Condition H, Sample Size = 22(0), Small Lot 6(0)		•	•
3	Gross Leak	MIL-STD-750 – Method 1071	Condition C, Sample Size = 22(0), Small Lot = 6(0)		•	•
4	Electrical Testing		DC @ T _A = 25 °C, Sample Size = 22(0), Small Lot = 6(0)		•	•
Subgroup 3						
1	Steady-State Operation Life	MIL-STD-750 – Method 1027	t = 340 Hrs. Sample Size = 45(0), Small Lot = 12(0)		•	•
2	Electrical Testing		DC @ T _A = 25 °C, Sample Size = 45(0), Small Lot = 12(0)		•	•
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						
1	Thermal Resistance	MIL-STD-750 – Method 4081	Sample Size = 15(0), Small Lot = 6(0)		•	•
Subgroup 6						
1	High Temperature Life	MIL-STD-750 – Method 1032	t = 340 Hrs. @ Max. Rated Storage Temp., Sample Size = 32(0), Small Lot = 12(0)		•	•
2	Electrical Testing		DC @ T _A = 25 °C, Sample Size = 32(0), Small Lot = 12(0)		•	•

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)		•	•
Subgroup 2						
1	Thermal Shock	MIL-STD-750 – Method 1056	Sample Size = 22(0), Small Lot = 6(0)	•	•	•
2	Temperature Cycling	MIL-STD-750 – Method 1051	25 Cycles. Condition C, Sample Size = 22(0), Small Lot = 6(0)	•	•	•
3	Terminal Strength	MIL-STD-750 – Method 2036	Sample Size = 22(0), Small Lot = 6(0)	•	•	•
4	Fine Leak	MIL-STD-750 – Method 1071	Condition H, Sample Size = 22(0), Small Lot = 6(0)	•	•	•
5	Gross Leak	MIL-STD-750 – Method 1071	Condition C, Sample Size = 22(0), Small Lot = 6(0)	•	•	•
6	Moisture Resistance	MIL-STD-750 – Method 1021	Sample Size = 22(0), Small Lot = 6(0)	•	•	•
7	Electrical Testing		DC @ T _A = 25 °C, Sample Size = 22(0), Small Lot = 6(0)	•	•	•
Subgroup 3						
1	Shock	MIL-STD-750 – Method 2016	1,500Gs, X1, Y1 & Z1. Sample Size = 22(0), Small Lot = 6(0)	•	•	•
2	Vibration, Variable Frequency	MIL-STD-750 – Method 2056	Sample Size = 22(0), Small Lot = 6(0)	•	•	•
3	Constant Acceleration	MIL-STD-750 – Method 2006	20,000Gs, X1, Y1 & Z1. Sample Size = 22(0)	•	•	•
4	Electrical Testing		DC @ T _A = 25 °C, Sample Size = 22(0), Small Lot = 6(0)	•	•	•
Subgroup 4						
1	Salt Atmosphere	MIL-STD-750 – Method 1041	Sample Size = 15(0), Small Lot = 6(0)	•	•	•
Subgroup 5						
1	Thermal Resistance	MIL-STD-750 – Method 4081	Sample Size = 15(0), Small Lot = 6(0)	•	•	•
Subgroup 6						
1	Steady-State Operation Life	MIL-STD-750 – Method 1026	1,000 Hrs. Sample Size = 22(0), Small Lot = 12(0)	•	•	•
2	Electrical Testing		DC @ T _A = 25 °C, Sample Size = 22(0), Small Lot = 12(0)	•	•	•
Subgroup 7						
1	Internal Water Vapor	MIL-STD-750 – Method 1018	Sample Size = 3(0) (Hermetic Packages Only)	•	•	•

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

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

High-Reliability Product Flow for Element Evaluation

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

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

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

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 2001	B, Y1 Direction A, Y1 Direction	N/A	10/0 10/0
Interim Electrical	Per Product Specification	25 °C, Min. and Max. Operating Temps.	N/A	
Burn-in	1015	240 Hrs. 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 Hrs. 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

Chip Element Evaluation for Passive Devices

Subgroup	Class		Test	MIL-STD-883		Quantity (accept number)	Reference Paragraph
	K	H		Method	Condition		
1	•	•	Element Electrical			100%	C.3.4.1
2	•	•	Visual Inspection	2032		100% 22 (0)	C.3.4.2
3	• • • • • •		Temperature Cycling	1010	C	10 (0)	C.3.4.3
			Mechanical Shock or Constant Acceleration	2002 2001	B, V1 Direction 3,000Gs Y1 Direction	10 (0) 10 (0)	
			Voltage Conditioning or Aging (Capacitors)			10 (0)	
			Visual Inspection	2032		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



www.skyworksinc.com

USA

Headquarters

Skyworks Solutions, Inc.
20 Sylvan Road
Woburn, MA 01801
Telephone: (781) 376 3000
Fax: (781) 376 3100
sales@skyworksinc.com

Skyworks Solutions, Inc.
5221 California Avenue
Irvine, CA 92617
Telephone: (949) 231 3000
Fax: (949) 231 3206
kirat.hatzfeld@skyworksinc.com

Skyworks Solutions, Inc.
5520 Adamstown Road
Adamstown, MD 21710
Telephone: (301) 695 9400
Fax: (301) 695 7065
transtech@skyworksinc.com

EUROPE

Skyworks Solutions, Inc.
Parallelvej 10
Lyngby 2800, Denmark
Telephone: +45 45267945
Fax: +45 45267710
jan.thoning@skyworksinc.com

Skyworks Solutions, Inc.
34 Avenue Franklin Roosevelt
Suresnes 92150, France
Telephone: +00 33 1 41443660
Fax: +00 33 1 41443661
irene.pfeiffer@skyworksinc.com

Skyworks Solutions, Ltd.
Abbey Manor Business Centre
The Abbey
Preston Road,
Yeovil, Somerset BA20 2EN
UK
Telephone: +44 1935 848546
Fax: +44 1935 431269
mike.carroll@skyworksinc.com

Skyworks Solutions, Inc.
Keilasatama 3
02150 Espoo
Finland
Telephone: +358 925107131
tommi.hiilos@skyworksinc.com

ASIA • PACIFIC

China

Skyworks Solutions Commercial
(Shenzhen) Co., Ltd. Shanghai Branch
Room 2901-02, Chong Hing
Finance Center,
No.288 Nanjing Road (W),
Shanghai, 200003 China
Telephone: +86 21 23066230
Fax: +86 21 33663398
elaine.zhao@skyworksinc.com

Skyworks Solutions, Inc.
Room 05, 11/F, Tower 2,
Kerry Plaza
No. 1 Zhongxinsi Road
Futian District
Shenzhen 518048 PRC
Telephone: +86 755 8291 3788
ext. 60017
Fax: +86 755 8293 1633
sabrina.chen@skyworksinc.com

Skyworks Solutions, Inc.
Suite 1212, COFCO, No. 8
Jianguomennei Avenue
Dongcheng District
Beijing, 100005 PRC
Telephone: +8610 652 60859
ext. 61608
Fax: +8610 852 98350
david.qi@skyworksinc.com

Japan

Skyworks Solutions, Inc.
3-20-2 Nishi-Shinjuku
Shinjuku-ku
Opera City Tower
Tokyo, 163-1436
Japan
Telephone: +81-3-5308-5180
Fax: +81-3-5308-5190
ahihiro.karikomi@skyworksinc.com

Korea

Skyworks Solutions, Inc.
Sam Hee Bldg.
559-10, 13F
Bumeo-1 Dong, Soosung-Gu
Daegu 706-011 Korea
Telephone: +825 3746 7141
Fax: +825 3745 1440
hannah.kim@skyworksinc.com

Skyworks Solutions, Inc.
648-19, Yeoksam-Dong
Seoul, Korea 135-911
Telephone: +822 3490 3816
christine.cho@skyworksinc.com

Singapore

Skyworks Solutions, Inc.
Centennial Tower
3 Temasek Avenue
Office #21-25
Singapore 039190
Telephone: +65 65497113
peter.gan@skyworksinc.com

Taiwan

Skyworks Solutions, Inc.
4 F, #198, Section 2
Tun Hwa. S. Road
Taipei 106, Taiwan ROC
Telephone: +8862 5559 8990
Fax: +8662 2735 6508
diana.wang@skyworksinc.com



Skyworks Solutions, Inc.

20 Sylvan Road, Woburn, MA 01801

USA: (781) 376-3000 • Asia: 886 2 2735 0399

Europe: 33 (0)1 41443660 • Fax: (781) 376-3100

Email: sales@skyworksinc.com • www.skyworksinc.com

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