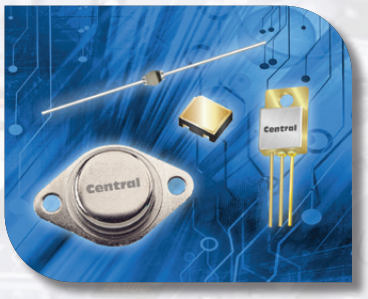
high reliability discrete semiconductors

Central™ Semiconductor Corp.

www.centralsemi.com

A heritage of outstanding quality

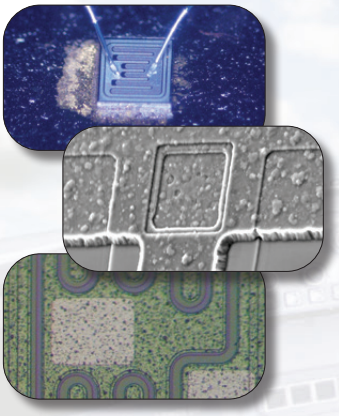
Since 1974, Central Semiconductor has manufactured innovative discrete semiconductors for OEM products worldwide. Devices are available in surface mount, through-hole and bare die. Epoxy molded, glass passivated, and hermetically sealed packages are available for a broad range of device types. Central maintains ISO 9001:2015 certification.



Central Semiconductor has the capability to screen COTS devices to a variety of standards.

Devices include:

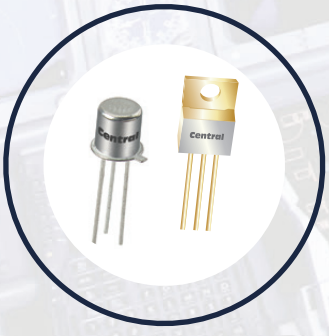
- Small signal transistors
- Bipolar power transistors
- MOSFETs/JFETs
- EOS protection devices (TVS)
- Diodes/Rectifiers
- Thyristors
- Multi Discrete Modules (MDM™)
- Wide bandgap devices



Quality by design

Central's designs provide superior performance and reliability with only superior materials used in the construction of its devices. Central's devices meet or exceed commercial performance standards and outperform industry expectations.

In a world where imperfection is all too often accepted, Central constantly monitors its manufacturing processes and business practices to achieve perfect quality products and outstanding service. Continuous improvement opportunities are regularly identified and implemented from within the organization.



High reliability up-screening

Central offers in-house up-screening solutions to ensure the highest quality devices for the most demanding high reliability applications. To best suit the constantly changing requirements of designers, up-screening and complete design solutions are available for both bare die and packaged devices.

Bare die solutions (un-encapsulated)

Central has the capability to perform MIL-PRF-38534 and MIL-PRF-19500 equivalent up-screening, and maintains an extensive wafer inventory in its Long Island, NY facility.

MIL-PRF-38534

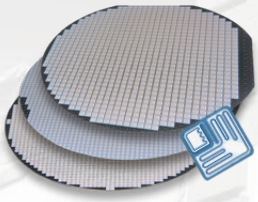
- Class H and K equivalents

MIL-PRF-19500

- Class HC and KC equivalents

Customer-specific up-screening

- Customer SCDs are reviewed and all requirements confirmed



Packaged device solutions (encapsulated)

Central Semiconductor has standard up-screening solutions which meet the majority of customer requests.

Super Industrial™

Ruggedized devices with upgraded options, including custom interconnect, packaging, and customer-specific testing

J-lite (JL)

Lite version of JAN equivalent with a streamlined test flow

JX-lite (JXL)

Lite version of JANTX equivalent with a streamlined test flow

EX (EX)

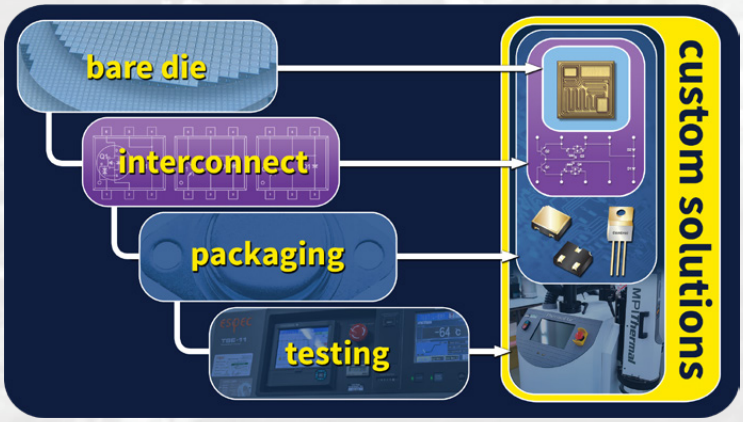
JANTX MIL-PRF-19500 equivalent

spacellite™ (CSL)

Specialized testing based on PEMS-INST-001 test flow, ideal for low Earth orbit (LEO) applications

Semi-custom capabilities

Your vision is our mission. When standard is not enough, Central excels at listening to customers' challenges and designing custom solutions that other manufacturers have no interest in pursuing. **Just ask.**



Bare die:

- Special wafer diffusion
- Backside metallization

Interconnect:

- Custom interconnect
- Gold wire bonding

Packaging:

- Custom package designs
- Plastic & hermetic options

Testing:

- MIL-PRF equivalents
- Customer-specific testing

Testing capabilities

All tests performed to MIL-STD-750 or MIL-STD-883 (bare die) test methods. Central provides dependable management of work flow with accurate device identification throughout the process.

Mechanical shock testing

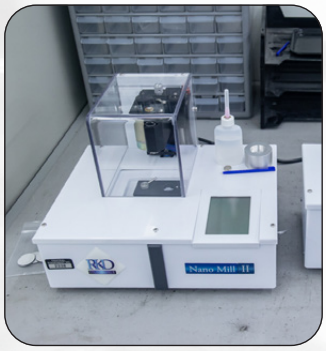
Temperature cycle testing

Particle Impact Noise Detection (PIND)

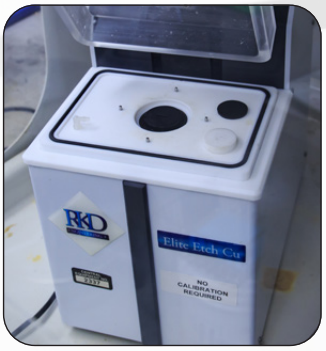
Burn-in testing

High temperature & humidity testing

Fine leak testing



Gasket fabrication for package decapsulation



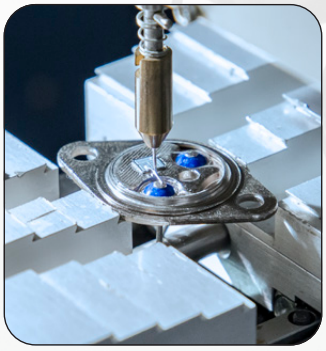
Package decapsulation

Digital microscope analysis

Scanning Electron Microscopy (SEM)

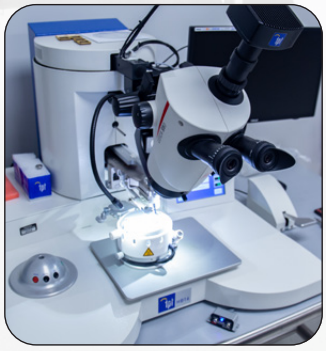
Highly-accelerated stress testing (HAST)

Confocal Scanning Acoustic Microscopy (C-SAM)



Wire pull & die shear testing

Thermal stream testing



Semi-automatic die attach and wire bonding

X-Ray analysis

Part number nomenclature

The following is a guide to Central's up-screened and custom device part numbers. This is to be used as a guide; some semi-custom solutions may deviate from these charts based on customers' levels of customization.

Bare die/un-encapsulated devices

Example - CP127-H2N6300-CM: Bipolar transistor die, up-screened to MIL-PRF-38534 Class H equivalent, 2N6300 device, packaged in chip tray.

CP127 - H - 2N6300 - CM

CENTRAL PROCESS NUMBER
5 - 7 ALPHA/NUMERIC
(BARE DIE ONLY)

- **CPxxx** = Transistor/MOSFET
- **CPZxx** = Zener Diode
- **CPDxx** = Diode
- **CPQxx** = TRIAC
- **CPSxx** = SCR
- **CPCxx** = Silicon Carbide (SiC)
- **CPGxx** = Gallium Nitride (GaN)
- **CPAxx** = Gallium Arsenide (GaAs)

DEVICE TYPE NUMBER
(10 ALPHA/NUMERIC MAX) OR

- **CEN** = Customer-specific up-screening

UP-SCREENING LEVEL CODE

- **H** = MIL-PRF-38534 Class H equivalent
- **K** = MIL-PRF-38534 Class K equivalent
- **HC** = MIL-PRF-19500 JANHC equivalent
- **KC** = MIL-PRF-19500 JANKC equivalent

PACKING METHOD

- **CM** = Singulated bare die, 100% electrically tested, 100% visually inspected, reject die removed, tray (waffle) package.

  All devices are in "CM" form.

Packaged/encapsulated devices

Example - JXLCMHD4448 TR: JX-lite certified version of a Central Semiconductor CMHD4448 switching diode, packaged in 7" tape and reel.

JXL CMHD4448 TR

UP-SCREENING LEVEL CODE

- **EX** = MIL-PRF-19500 JANTX equivalent packaged device
- **JL** = J-lite test flow
- **JXL** = JX-lite test flow
- **CSLC** = Spacellite™ Commercial
- **CSLL** = Spacellite™ (Basic)
- **CSLP** = Spacellite™ Plus
- **CSLU** = Spacellite™ Ultra

DEVICE TYPE NUMBER
(10 ALPHA/NUMERIC MAX) OR

- **CEN** = Customer-specific up-screening

PACKING METHOD

- **BK** = Bulk packaging; loose packaged product
- **TR** = Tape and reel (7")
- **TR13** = Tape and reel (13")

Other examples:

- **CP318V-H2N5682-CM** = Standard MIL-PRF-38534 Class H equivalent up-screened bare die in chip tray.
- **EX2N5682** = Standard MIL-PRF-19500 JANTX equivalent up-screened assembled product.
- **CEN1234** = Custom device up-screened to MIL-PRF-19500 equivalent or customer-defined test specifications. (1234 represents a custom item)

Test Flow: Class H equivalent die

CCS983 (R2)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

MIL-PRF-38534 Class H Equivalent Up-Screening Rev L		
Screening Requirements		
Test	**Quantity (Accept Number of Failures)**	**Specification and Test Method**
Subgroup 1: Electrical Test	100%	
Subgroup 2: Visual Inspection	100%	MIL-STD-750: 2069, 2070, 2072, 2073
Subgroup 3A: Internal/Die Visual Inspection	10 (0)	MIL-STD-750: 2069, 2070, 2072, 2073
Subgroup 3B: Sample Assembly	10 (0)	
Subgroup 4: Electrical Test as per Datasheet: DC Test @ 25°C / DC Test @ 125°C / DC Test @-55°C/ (DC1-DC3)	10 (0)	
Subgroup 5 Wire Pull	10 Wires (0) or 20 Wires (1)	MIL-STD-883: 2011 Cond. D 1 Hour 300C Pre-Test Bake (Bimetallic Bonds Only)

Note: Devices supplied will be to the test flow illustrated above. Any changes to the flow must be agreed upon in writing by the customer and Central Semiconductor Corp.

Test Flow: Class K equivalent die

CCS986 (R3)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

MIL-PRF-38534 Class K Equivalent Up-screening Rev L		
Screening Requirements		
Test	**Quantity (Accept Number of Failures)**	**Specification and Test Method**
Subgroup 1: Electrical Test	100%	
Subgroup 2: Visual Inspection	100%	MIL-STD-883: 2010 MIL-STD-750: 2069, 2070, 2072, 2073
Subgroup 3A: Internal/Die Visual Inspection	10 (0)	MIL-STD-883: 2010 MIL-STD-750: 2069, 2070, 2072, 2073
Subgroup 3B: Sample Assembly	10	
Subgroup 4A: Electrical Test as per Datasheet: DC Test @25°C (DC1)	10 devices per wafer (0)	
Subgroup 4B: Temperature Cycling	10 devices per wafer (0)	MIL-STD-883:1010-C, 20 Cycles
Subgroup 4C: Surge (Diodes)	10 devices per wafer (0)	MIL-STD-750: 4066
Subgroup 4D: Mechanical Shock or Constant Acceleration	10 devices per wafer (0)	MIL-STD-750: 2002 or 2001 B, Y1 direction or 5000 g's Y1 Direction
Subgroup 4E: Electrical Test as per Datasheet: DC Test @ 25°C (DC2)	10 devices per wafer (0)	
Subgroup 4F: HTRB	10 devices per wafer (0)	MIL-STD-750 48 Hours, 80% Rated V_R, T_A 150°C
Subgroup 4G: Electrical Test as per Datasheet: DC Test @ 25°C (DC3)	10 devices per wafer (0)	
Subgroup 4H: Burn-in	10 devices per wafer (0)	MIL-STD-750 240 Hours, T_J Max
Subgroup 4I: Electrical Test as per Datasheet: DC Test @ 25°C / DC Test @ 125°C / DC Test @-55°C/ (DC4-DC6)	10 devices per wafer (0)	
Subgroup 4J: Steady State Life	10 devices per wafer (0)	MIL-STD-750 1000 Hours, T_J 125°C
Subgroup 4K: Electrical Test as per Datasheet: DC Test @ 25°C / DC Test @ 125°C / DC Test @-55°C/ (DC7-DC9)	10 devices per wafer (0)	
Subgroup 5: Wire Pull	10 Wires (0) or 20 Wires (1)	MIL-STD-883: 2011-D 1 Hour 300C Pre-Test Bake (Bimetallic Bonds)
Subgroup 6: SEM	Per Mil Standard	MIL-STD-750: 2077

Note: Devices supplied will be to the test flow illustrated above. Any changes to the flow must be agreed upon in writing by the customer and Central Semiconductor Corp.

Test Flow: Class HC equivalent die

CCS984 (R2)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

MIL-PRF-19500 JANHC Equivalent Up-Screening Rev. R		
Screening Requirements		
Test	**Quantity (Accept Number of Failures)**	**MIL-STD-750**
Subgroup 1: Electrical Test (DC1)	100%	As per Electrical Datasheet
Subgroup 2: Visual Inspection	100%	2069, 2070, 2072, 2073
Subgroup 3A: Internal/Die Visual Inspection	10 (0)	2069, 2070, 2072, 2073
Subgroup 3B: Sample Assembly	10 minimum	
Subgroup 4A: Temperature Cycling	10 (0)	1051-C, 20 Cycles
Subgroup 4B: Electrical Test as per Datasheet: DC Test @ 25°C / DC Test @ -55°C / DC Test @150°C/ AC Test @ 25°C (DC2-DC4), (AC1)	10 (0)	As per Electrical Datasheet
Subgroup 4C: HTRB	10 (0)	1038-A, 1039-A, 1042-B, 48 Hours (PNP 24 Hours), 80% Rated V_R, T_A = 150°C
Subgroup 4D: Electrical Test (DC5)	10 (0)	As per Electrical Datasheet
Subgroup 4E: Burn-In/SSOP	10 (0)	1038-B, 1039-B, 1042-A, 160 Hours (Diode 96 Hours), T_J = Max Junction Temperature
Subgroup 4F: Electrical Test as per Datasheet: DC Test @ 25°C (DC6)	10 (0)	As per Electrical Datasheet
Subgroup 5A: Wire Pull	10 Wires (0) or 20 Wires (1)	2037, 1 Hour 300°C Pre-Test Bake (Bimetallic Bonds only)
Subgroup 5B: Die Shear	5(0) or 10 (1)	2017

Note: Devices supplied will be to the test flow illustrated above. Any changes to the flow must be agreed upon in writing by the customer and Central Semiconductor Corp.

Test Flow: Class KC equivalent die

CCS985 (R2)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

MIL-PRF-19500 JANKC Equivalent Up-Screening Rev. R		
Screening Requirements		
Test	**Quantity (Accept Number of Failures)**	**MIL-STD-750**
Subgroup 1: Electrical Test	100%	As per Electrical Datasheet
Subgroup 2: Visual Inspection	100%	2069, 2070, 2072, 2073
Subgroup 3A: Internal/Die Visual Inspection	22 devices per wafer (0)	2069, 2070, 2072, 2073
Subgroup 3B: Sample Assembly	22 devices per wafer (0)	
Subgroup 4A: Temperature Cycling	22 devices per wafer (0)	1051-C, 20 Cycles
Subgroup 4B: Mechanical Shock or Constant Acceleration	22 devices per wafer (0)	2016 or 2006 Y1 Axis Direction
Subgroup 4C: Electrical Test: DC Test @ 25°C / DC Test @ TA MIN / DC Test @ TA MAX/ AC Test @ 25°C (DC2-DC4) (AC1) AC Test are performed when applicable	22 devices per wafer (0)	As per Electrical Datasheet
Subgroup 4D: HTRB	22 devices per wafer (0)	1038-A, 1039-A, 1042-B, 48 Hours (PNP 24 Hours), 80% Rated V_R, T_A = 150°C
Subgroup 4E: Electrical Test (DC5)	22 devices per wafer (0)	As per Electrical Datasheet
Subgroup 4F: Burn-In	22 devices per wafer (0)	1038-B, 1039-B, 1042-A, 160 Hours (Diode 96 Hours), T_J = Max Junction Temperature
Subgroup 4G: Electrical Test: DC Test @ 25°C (DC6)	22 devices per wafer (0)	As per Electrical Datasheet
Subgroup 4H: Steady State Life	22 devices per wafer (0)	1038-B, 1039-B, 1042-A, 160 Hours (Diode 96 Hours), T_J = Max Junction Temperature
Subgroup 4I: Electrical Test: DC Test @ 25°C / DC Test @ TA MIN / DC Test @ TA MAX / AC Test @ 25°C (DC7-DC9)	22 devices per wafer (0)	As per Electrical Datasheet
Subgroup 5A: Wire Pull	10 Wires (0) or 20 Wires (1)	2037, 1 Hour 300°C Pre-Test Bake (Bimetallic Bonds only)
Subgroup 5B: Die Shear	5(0) or 10 (1)	2017
Subgroup 6: SEM	Per Mil Standard	2077
Subgroup 7A: RHA Total Dose	As per customer requirement	1019
Subgroup 7B: Neutron Irradiation	As per customer requirement	1017

Note: Devices supplied will be to the test flow illustrated above. Any changes to the flow must be agreed upon in writing by the customer and Central Semiconductor Corp.

Test Flow: J-lite and JX-lite

CCS964 (R2)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

J-lite and JX-lite Certification				
Test	**Sample Size**	**Standard**	**J-lite (JL)**	**JX-lite (JXL)**
Serialization			Read and Record	Read and Record
Number 1: Electrical Test	100%		25°C (DC1) Per Device Datasheet	25°C, -55°C, 125°C (DC1, DC2, DC3) Per Device Datasheet
Number 2: Temperature Cycling	100%	MIL-STD-750: TM 1051 Condition B	10 Cycles (-55°C to +125°C)	20 Cycles (-55°C to +125°C)
Number 3: Electrical Test	100%		25°C (DC2) Per Device Datasheet	25°C (DC4) Per Device Datasheet
Number 4: PIND Hermetic Devices Only	100%	MIL-STD-750: 2052 Condition A	-	Applicable
Number 5: HTRB	100%	MIL-STD 750: 1038-A, 1039-A, 1040-A, 1042-B	48 Hours for Diodes. 48 Hours for NPN Transistors. 24 Hours for PNP Transistors. 48 Hours for MOSFETs.	96 Hours for Diodes. 96 Hours for NPN Transistors. 48 Hours for PNP Transistors. 96 Hours for MOSFETs.
Number 6A: Electrical Test	100%		25°C (DC3) Per Device Datasheet	25°C (DC5) Per Device Datasheet
Number 6B: Delta Shift Calculations	100%		-	Per Specified Parameters on Device Datasheet
Number 6C: PDA Evaluation	100%		-	20% Allowable per Min/Max Limits of Device Datasheet
Number 7: Gross Leak Hermetic Devices Only	100%	MIL-STD 750 1071	Performed	Performed
Number 8: Final Electrical Test	100%		25°C (DC4) Per Device Datasheet	25°C, -55°C, 125°C (DC6, DC7, DC8) Per Device Datasheet

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Test Flow: J-lite and JX-lite

CCS964 (R2)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

J-lite and JX-lite Qualification			
Process	**Test Method & Conditions**	**Failures/Sample Size**	
		J-lite (JL)	**JX-lite (JXL)**
MIL-PRF 19500 Group A		-	-
Subgroup 1: Visual and Mechanical Examination	MIL-STD 750: 2071	0/45	0/45
Subgroup 2: DC Testing @ 25°C	As Per Datasheet	0/116	0/116
Subgroup 3: DC Testing at High and Low Specified Temperatures		0/116	0/116
Subgroup 4: AC Testing @ 25°C		0/116	0/116
Subgroup 5: Safe Operation Area (Transistors Only)		0/45	0/45
Subgroup 6: Surge Current (Diodes/Rectifiers Only)		0/22	0/22
Subgroup 7: Selected Static and Dynamic Tests		0/22	0/22

Note:

1) Devices supplied will be to the test flow illustrated above. Any changes to the flow must be agreed upon in writing by the customer and Central Semiconductor Corp.
2) Above are the standard Certification and Qualification test flows for all devices starting with JL (for J-lite) and JXL (for JX-lite) devices.

Example:

JL2N2222A = J-lite certified version of a Central Semiconductor 2N2222A
JXL2N2222A = JX-lite certified version of a Central Semiconductor 2N2222A

Test Flow: EX (JANTX equivalent)

CCS988 (R1)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

EX Certification		
Certification		**100% Testing**
MIL-PRF-19500P Appendix E **Table E-IV - Screening Requirements**		
Test	Sample Size	MIL-STD-750 Method
1a) Die visual For Glass Diodes 1b) Internal visual		
2) High Temperature Life Nonoperating Life	Optional	1032
3a) Temperature Cycling	100%	1051
3b) Surge (as specified)		
3c) Thermal Impedance (as specified)	100%	
4) Constant Acceleration		
5) PIND		
6) Instability Shock Test		
7) Hermetic Seal F&G		
8) Serialization	100%	
9) Interim Electrical Parameters	100%	
10) HTRB 24 Hours	100%	1039 Condition A
11) Interim Electrical Parameters As Specified For Device Type	100%	
12) Burn-in 160 Hours	100%	1039 Condition B
13) Final Electrical Parameters As Specified For Device Type	100%	
14) Hermetic Seal F&G	100%	1071
15) Radiography		
16) External Visual Examination		
17) Case Isolation		

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Test Flow: EX (JANTX equivalent)

CCS988 (R1)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

EX Qualification

Qualification SubGroups A, B, C, E

Group A	Group B
Subgroup 1 Visual & Inspection MIL-STD-750 Method 2071	**Subgroup 1** Solderability Resistance To Solvents Salt Atmosphere
Subgroup 2 DC (Static) test @ +25C	**Subgroup 2** Thermal Shock Glass Diodes Only Temperature Cycling 25 Cyc (20 @ Screening, totaling 45) Surge Current Hermetic Seal Electrical Measurements Per Group A SubG 2
Subgroup 3 DC (Static) test @ -65C and +150C	**Subgroup 3** Steady State Operation Life Biased, 340 Hours Electrical Measurements Per Group A SubG 2 Hermetic Seal Method 1071 Bond Strength Condition D 11 Wires
Subgroup 4 Dynamic test @ +25C	**Subgroup 4** Decap - Internal Visual; Examination
Subgroup 5 Safe Operating Area Test	**Subgroup 5** Thermal Resistance Not Applicable - Case Mount Device
Subgroup 6 Surge Current	**Subgroup 6** High Temperatrue Life, Non-Operating 340 Hours Electrical Measurements Per Group A SubG 2
Subgroup 7 Select Static & Dynamic Tests	

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Test Flow: EX (JANTX equivalent)

CCS988 (R1)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

Group C	Group E
Subgroup 1 Physical Dimensions	**Subgroup 1** Temperature Cycling Hermetic Seal Electrical Measurements Per Group A SubGroup 2
Subgroup 2 Thermal Shock (Glass Diodes Only) Temperature Cycling Terminal Strength Hermetic Seal Moisture Resistance Electrical Measurements (Per Group A SubGroup 2)	**Subgroup 2** SS Operation Life Biased, 1000 Hrs
Subgroup 3 Shock Test Vibration, Variable Frequency Constant Acceleration Electrical Measurements (Per Group A SubGroup 2)	**Subgroup 3** **Subgroup 4** Thermal Impedance Curves **Subgroup 5** Barometric Pressure
Subgroup 4 Salt Atmosphere **Subgroup 5** Thermal Resistance	**Subgroup 6** ESD
Subgroup 6 SS Operation Life Electrical Measurements (Per Group A SubGroup 2) Hermetic Seal Bond Strength	**Subgroup 7** Resistance To Solder Heat Hermetic Seal Electrical Measurements (Per Group A SubGroup 2)
Subgroup 7 I G A	**Subgroup 8** Reverse Stability Method 1033 Condition B **Subgroup 9** Resistance To Glass Cracking

spacellite™ solutions

what is spacellite™

Spacellite discrete semiconductors are devices designed to meet the reliability and functionality specifications for today's modern satellite applications.

SILICON BY Central

RADIATION TESTING BY TROXEL

why spacellite™

- Reduced cost without compromising quality or reliability
- Meets Space 2.0 methodology and directives
- Ideal for low Earth orbit (LEO) applications for the latest satellite technologies
- Equivalent to MIL-PRF-19500 and MIL-PRF-38534 devices

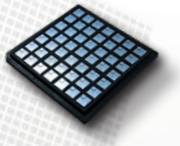
spacellite™ options

- Various plastic and hermetic packages options possible
- Bare die available
- Optional gold wire bonds

plastic through-hole package

hermetic through-hole package

plastic surface mount package



bare die

spacellite-Commercial™

Spacellite-Commercial (or Spacellite-C) level products are radiation tested commercial devices designed to meet radiation effects experienced by commercial satellites.

Spacellite-C devices meet radiation specifications ideal for LEO (low earth orbit) applications at a reduced cost while meeting exceptionally high quality and reliability standards.

The test flows for these devices are specific to the product type. Please consult Central's Engineering team for Spacellite-C flows.

When standard commercial devices do not meet your requirements, Central Semiconductor's spacellite™ devices are the perfect solution.

Test Flow: spacellite™

CCS963 (R3)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

Spacellite™ Certification [1]					
Test	**Sample Size**	**Standard**	**Spacellite**	**Spacellite Plus**	**Spacellite Ultra**
Serialization	100%		Read and Record	Read and Record	Read and Record
Number 1: Electrical Test (DC1, DC2, DC3) 25°C, -55°C, 125°C	100%		Per Device Datasheet	Per Device Datasheet	Per Device Datasheet
Number 2: X-Ray	-		Not Applicable	Not Applicable	Sample (25% of Lot)
Number 3: Temperature Cycling	100%	MIL-STD 883: TM1010 Condition B	20 Cycles (-55°C to +125°C)	20 Cycles (-55°C to +125°C)	20 Cycles (-55°C to +125°C)
Number 4: Electrical Test (DC4) 25°C	100%		Per Device Datasheet	Per Device Datasheet	Per Device Datasheet
Number 5: PIND Hermetic Devices Only	100%	MIL-STD 750: TM2052 Condition A	Not Applicable	Not Applicable	Applicable
Number 6: HTRB	100%	MIL-STD 750: TM1038-A, TM1039-A, TM1040-A, TM1042-B	Not Applicable	48 Hours for Diodes. 48 hours for NPN Transistor. 24 Hours for PNP Transistor. 48 Hours for MOSFET.	48 Hours for Diodes. 48 hours for NPN Transistor. 24 Hours for PNP Transistor. 48 Hours for MOSFET.
Number 7A: Electrical Test (DC5) 25°C	100%		Per Device Datasheet	Per Device Datasheet	Per Device Datasheet
Number 7B: Delta Shift Calculations	100%		±100% Allowable Shift	±50% Allowable Shift	±25% Allowable Shift

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Test Flow: spacellite™

CCS963 (R2)

For the latest test flows, please visit:
www.centralsemi.com/up-screening

Test	Sample Size	Standard	Spacellite	Spacellite Plus	Spacellite Ultra
Number 7C: PDA Evaluation	100%		20% Allowable per Min/Max Limits of Device Datasheet	10% Allowable per Min/Max Limits of Device Datasheet	10% Allowable per Min/Max Limits of Device Datasheet
Number 8: Burn-in	100%	MIL-STD 750: TM1038-B, TM1039-B, TM1040-A, TM1042-C	168 Hours	168 Hours	240 Hours
Number 9A: Electrical Test (DC6) 25°C	100%		Per Device Datasheet	Per Device Datasheet	Per Device Datasheet
Number 9B: Delta Shift Calculations	100%		±100% Allowable Shift	±50% Allowable Shift	±25% Allowable Shift
Number 9C: PDA Evaluation	100%		20% Allowable per Min/Max Limits of Device Datasheet	10% Allowable per Min/Max Limits of Device Datasheet	5% Allowable per Min/Max Limits of Device Datasheet
Number 10A: Fine Leak	100%	MIL-STD 883: TM1014	Yes	Yes	Yes
Hermetic Devices Only					
Number 10B: Gross Leak	100%	MIL-STD 750: TM1071	Yes	Yes	Yes
Hermetic Devices Only					
Number 11: Final Electrical Test (DC7, DC8, DC9) 25°C, -55°C, 125°C	100%		Per Device Datasheet	Per Device Datasheet	Per Device Datasheet

Continued on next page

Test Flow: spacellite™

CCS963 (R2)

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Spacellite™ Qualification [2]				
Process	**Test Methods & Conditions**	**Sample Size / Failures Allowed**		
		Spacellite	**Spacellite Plus**	**Spacellite Ultra**
Group 1*: Radiation Analysis	MIL-STD 750: TM1019	3) 10 Krad	3) 30 Krad	3) 60 Krad
Group 2: Serialization & External Visual Inspection	JESD22-B101	17/0	32/0	32/0
Group 3: Preconditioning of Non-Hermetic SMDS (Performed before Groups 4-7)	Sequence: Elec test, visual insp., temp cycle, bake, moisture soak, reflow, flux soak, clean & dry per JESD22-A113	17/0	32/0	32/0
Group 4: Electrical Test (Tri Temp)	Per product datasheet 25C, -55C & 125C	17/0	32/0	32/0
Group 5A: High Temperature Reverse Bias (HTRB)	MIL STD 883; TM1005 Condition A @ 125C	10 devices 200 hours	22 devices 500 hours	22 devices 1000 hrs.
Group 5B: Post Electrical Test (Tri Temp)	Per product datasheet 25C, -55C & 125C	10/0	22/0	22/0
Group 6A: Temperature Cycling	MIL-STD 883: TM1010 Condition B Temperature: -55°C to +125°C Dwell Time: 15mins	10 devices 100 cycles	22 devices 200 cycles	22 devices 500 cycles
Group 6B: Post Electrical Test (Tri Temp)	Per product datasheet 25C, -55C & 125C	10/0	22/0	22/0
Group 7A-1: Highly Accelerated Temperature and Biased Humidity Stress Test (HAST)	JESD22-A110 w/continuous bias 96 Hrs. @ 130C Or 264 Hrs. @ 110C Relative Humidity: 85%	NA	NA	10
Group 7A-2: Unbiased HAST	JESD22-A118 Condition A 96 Hrs. @ 130C & 85%RH Or JESD22-A102 96 Hrs. @ 121C & 100%RH, 15psig	7	10	NA
Group 7B: Post Electrical Test (Tri Temp)	Per product datasheet 25C, -55C & 125C	7/0	10/0	10/0

* Rad-Tolerant

1. Certification required on each lot (100%)
2. Qualification required on each lot (samples as noted above)
3. Radiation tolerance of parts required on each lot. Unscreened samples may be used for radiation testing – those are in addition to quantities noted above.
4. Testing based on PEM-INST-001

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