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SKYWORKS®

Product Specification OLS449PS

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REVISION HISTORY			
Rev	Description of Change	Author	Approval Submit Date
0	ECN# 2075	A-J de Bussy	12/01/2016
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1.0 Scope

This specification establishes the requirements of the radiation tolerant optocoupler OLS449PS from Skyworks Defense and Space (SDS) intended to use in the environments encountered by high reliability spacecraft applications. The OLS449PS optocoupler is intended to meet the equivalent of JANS requirement of MIL-PRF-19500 as specified, or where specified herein. The lot identification and the JANS inspection lot requirements are applicable. Except where noted herein, inspection tests will be done in accordance with MIL-PRF-19500, or unless otherwise specified by the purchase order.

2.0 References

The following documents, of the issue in effect on the date of the purchase order, form a part of this specification and are intended to meet the equivalent JANS requirements to the extent specified herein. Military specifications and standards:

MIL-PRF-19500 For MIL-STD-750	Performance Specification Semiconductor Devices, General Specification Test Methods for Semiconductor Devices
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3.0 Order of Precedence

For the purpose of interpretation and in case of conflict with regard to the documentation, the following order of precedence shall apply:

- a) Purchase order or contract
- b) This specification
- c) Referenced military specifications or standards
- d) Other documents

4.0 Requirements

4.1 General

The devices shall meet OLS449 datasheet requirements with the following additions and modifications included herein.

4.2 Physical and Mechanical Characteristics

4.2.1 Outline Dimensions

The devices shall meet OLS449 datasheet requirements for non-solder-dipped devices.

4.2.2 Lead Finish

Standard finish on leads shall be gold plated.

For hot lead/tin solder dipped parts, the part number is OLS449PS-1.

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4.3 Electrical Characteristics

The devices shall meet OLS449 datasheet requirements. Parameter Drift values are listed within Table 1.

4.3.1 Handling and Test Precautions

The optocoupler is rated at ESD Class 2 (>2000V). However it can be susceptible to damage by Electro Static Discharge (ESD) and Electrical Over Stress (EOS). Suitable precautions shall be employed for protection during all phases of manufacturing, testing, packaging, shipment, and any handling.

4.4 Single lot Elements

Each active element shall be issued from a single lot.

5.0 Quality Assurance Provisions

5.1 Responsibility for Inspection

SDS shall be responsible for the performance of all inspection requirements as specified herein. SDS may utilize its own or any other inspection facilities or services acceptable to the customer.

5.1.1 Final Acceptance Inspection

Final acceptance inspection consists of verification of screening tests and QCI of group A, B, C and E, and shall be specified on the purchase order.

All devices submitted for final acceptance inspection shall be from the same inspection lot, unless otherwise specified.

5.2 Screening Requirements

The screening is to be performed in accordance with MIL-PRF-19500 with the additions or modifications herein.

5.2.1 Temperature Cycling: Condition C, -65°C to +150°C (maximum storage temperature).

5.2.2 Constant Acceleration: Constant acceleration shall be performed at 10,000G in accordance with MIL-STD-750, TM 2006.

5.2.3 Surge: Not performed.

5.2.4 Thermal Impedance: Not performed.

5.2.5 PIND: Not applicable to optocouplers. May be performed if required by purchase order.

5.2.6 Initial Electrical and Drift

The parameters specified the OLS449 datasheet, 25°C static only, and Table 1 shall be measured and recorded for each optocoupler. All devices that fail to meet the requirements shall be removed from the lot and the quantities removed shall be noted on the traveler.

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5.2.7 High Temperature Reverse Bias (HTRB)

Each optocoupler shall be tested in accordance with MIL-STD-750, Method 1039. The following details shall apply:

$$I_F = 0 \text{ mA}$$

$$V_{CB} = 36 \text{ V}$$

$$T_A = 125^\circ\text{C} \pm 3^\circ\text{C}$$

$$t = 48 \text{ hours min}$$

5.2.8 Interim Electrical Measurement and Drift

The parameters specified the OLS449 datasheet, 25°C static only (except isolation), and Table 1 shall be measured and recorded for each optocoupler. All devices that fail to meet the requirements shall be removed from the lot and the quantities removed shall be noted on the traveler.

5.2.9 Burn-in Test

Each optocoupler shall be tested in accordance with MIL-STD-750, Method 1039. The following details shall apply:

$$I_F = 20 \text{ mA}$$

$$I_{CE} = 10 \text{ mA}$$

$$T_A = 125^\circ\text{C} \pm 3^\circ\text{C}$$

$$t = 240 \text{ hours min}$$

The test circuit is shown in Figure 1.

5.2.10 Final Electrical Measurement and Drift

The parameters specified the OLS449 datasheet, 25°C static only (except isolation), and Table 1 shall be measured and recorded for each optocoupler. All devices that fail to meet the requirements shall be removed from the lot and the quantities removed shall be noted on the traveler.

5.2.11 Electrical Measurement: High (+125°C) and Low (-55°C) Temperature

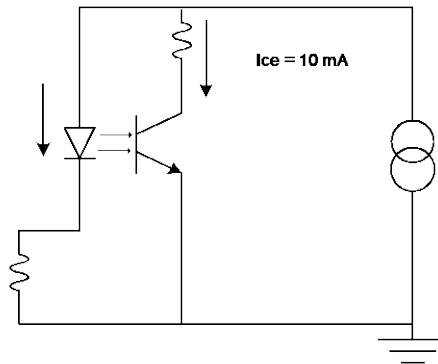
All components shall be measured at high and low temperature in accordance with the OLS449 datasheet. All data must be recorded.

Table 1: Parameter Drift Values

Characteristics	Symbol	MIL-STD-750	Change limits	Unit	Note
		Method Test conditions			
Input Reverse Current	I_R	25°C only	± 100 or 25	% μA	Note 1
Off-state Leakage Current Collector to Emitter	I_{CEO}	25°C only	± 100 or 25	% nA	Note 1
On-state Collector Current	$I_{C(ON)}$	25°C only	+ 25 - 25	%	
Saturation Voltage	$V_{CE(SAT)}$	25°C only	± 50	mV	

Note 1) Whichever is greater, referred to the initial value

Figure 1: Test circuit



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6.0 Quality Conformance Inspection

6.1 Test Requirements

Subgroups noted as “Available Upon Request” or “N/A” are not performed except as required by purchase order.

6.2 Group A Inspection

Group A inspection tests shall be conducted in accordance with MIL-PRF-19500, as required by purchase order. Subgroups 5, 6 and 7 are not applicable.

6.3 Group B Inspection

Group B inspection tests shall be conducted in accordance with MIL-PRF-19500. The customer purchase order shall specify each required subgroup. Subgroup 6 is available upon request.

6.3.1 Disposition of Group B Sample Units

Sample units which have been subjected to Group B Inspection, except for Subgroup 1 and 7, shall not be delivered as a part of the quantity on the purchase order.

6.3.2 Subgroup 4: Intermittent Operating Life

Each optocoupler shall be tested in accordance with MIL-STD-750, Method 1037. The following details shall apply:

I_F	= 20 mA
I_{CE}	= 10 mA
T_A	= 125°C ± 3°C
t	= 30 sec. on/off minimum
N	= 2000 cycles minimum

The test circuit is shown in Figure 1.

6.3.3 Subgroup 5: Accelerated Steady-State Operating Life

Each optocoupler shall be tested in accordance with MIL-STD-750, Method 1027. The following details shall apply:

I_F	= 20 mA
I_{CE}	= 10 mA
T_A	= 125°C ± 3°C
t	= 1000 hrs min

The test circuit is shown in Figure 1.

6.3.4 Subgroup 6: Available upon request, as specified by purchase order.

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6.3.5 Subgroup 7: High-Temperature Life (non-operating)

Each optocoupler shall be tested in accordance with MIL-STD-750, Method 1027. The following details shall apply:

$$t = 340 \text{ hrs min}$$

$$T_A = T_{STG(max)}$$

6.4 Group C Inspection

Group C inspection tests shall be conducted in accordance with MIL-PRF-19500. The customer purchase order shall specify each required subgroup.

6.4.1 Disposition of Group C Sample Units

Sample units which have been subjected to Group C Inspection shall not be delivered as a part of the quantity on the purchase order.

6.4.2 Subgroup 2: Moisture Resistance; omit initial conditioning

6.4.3 Subgroup 3: Constant Acceleration: X1, Y1, and Z1 at 10,000 G's.

6.4.4 Subgroup 4: Available upon request, as specified by purchase order.

6.4.5 Subgroup 5: Available upon request, as specified by purchase order.

6.4.6 Subgroup 6: Steady State Operating Life

Group C, Subgroup 6, is not required if Group B, Subgroup 5, is performed on the same inspection lot, unless otherwise specified on the purchase order.

Each optocoupler shall be tested in accordance with MIL-STD-750, Method 1026. The following details shall apply:

$$I_F = 20 \text{ mA}$$

$$I_{CE} = 10 \text{ mA}$$

$$T_A = 125^\circ\text{C} \pm 3^\circ\text{C}$$

$$t = 1000 \text{ hours min}$$

The test circuit is shown in Figure 1.

6.4.7 Subgroup 7: Not applicable.

6.4.8 Disposition of Group C Sample Units

Sample units which have been subjected to Group C Inspection shall not be delivered as a part of the quantity on the purchase order.

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6.5 Group E Inspection

Group E inspection tests shall be conducted in accordance with MIL-PRF-19500. The customer purchase order shall specify each required subgroup.

6.5.1 Subgroup 3: not applicable.

6.5.2 Subgroup 4: Available upon request, as specified by purchase order.

6.5.3 Subgroup 5: not applicable.

6.5.4 Subgroup 6: The optocoupler is rated at ESD Class 2 (>2000V). As required by purchase order.

6.5.5 Subgroup 8: Available upon request.

6.5.6 Subgroup 9: not applicable.

7.0 Documentation

7.1 Data

- The following data shall accompany the parts shipment. The data shall include, but not necessarily be limited to, the following information:
 - Customer purchase order number
 - SDS part number
 - SDS's name and part number
 - Part lot identification code
 - Quantity shipped
 - Variables data (read and record) and the delta calculations resulting from Screening.
 - Attributes data for screening test summary
 - Quality Conformance Inspection Data, including Groups A, B, C, and/or E attributes and variables data as required
 - Radiographic images
 - All data shall clearly indicate that the test results are in compliance with specification requirements, and shall be signed by cognizant test personnel. The accuracy and integrity of the data and screening test results shall be certified by the manufacturer's quality assurance organization and shall have evidence of such verification.

8.0 Delivery

8.1 Packaging

The devices shall be packaged in such a manner that they will be protected during shipments and storage. Package shall be suitable to provide maximum physical protection.