PHOTODIODE

BASED ON TYPE AE9493

ESCC Detail Specification No. 5403/001

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DOCUMENTATION CHANGE NOTICE

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DCR No.	CHANGE DESCRIPTION
955	Specification upissued to incorporate editorial changes per DCR.

TABLE OF CONTENTS

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

(a) ESCC Generic Specification No. 5000
(b) MIL-STD-750, Test Methods and Procedures for Semiconductor Devices

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. 21300 shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 540300101

- Detail Specification Reference: 5403001
- Component Type Variant Number: 01

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

Variant Number	Based on Type	Case	Lead/Terminal Material and Finish	Weight max g
01	AE9493	Metal Can	D7	1.1

The lead/terminal material and finish shall be in accordance with the requirements of ESCC Basic Specification No. 23500.

1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Units	Remarks
Reverse Voltage	V_R	-50	V	Over entire operating temperature range
Forward Current	I_F	2	mA	
Junction Temperature	T_j	+150	°C	-
Operating Temperature Range	T_{op}	-45 to +110	°C	T_{case}
Storage Temperature Range	T_{stg}	-55 to +125	°C	-
Soldering Temperature	T_{sol}	+295	°C	Note 1

NOTES:

1. Duration 5 seconds maximum at a distance of not less than 5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

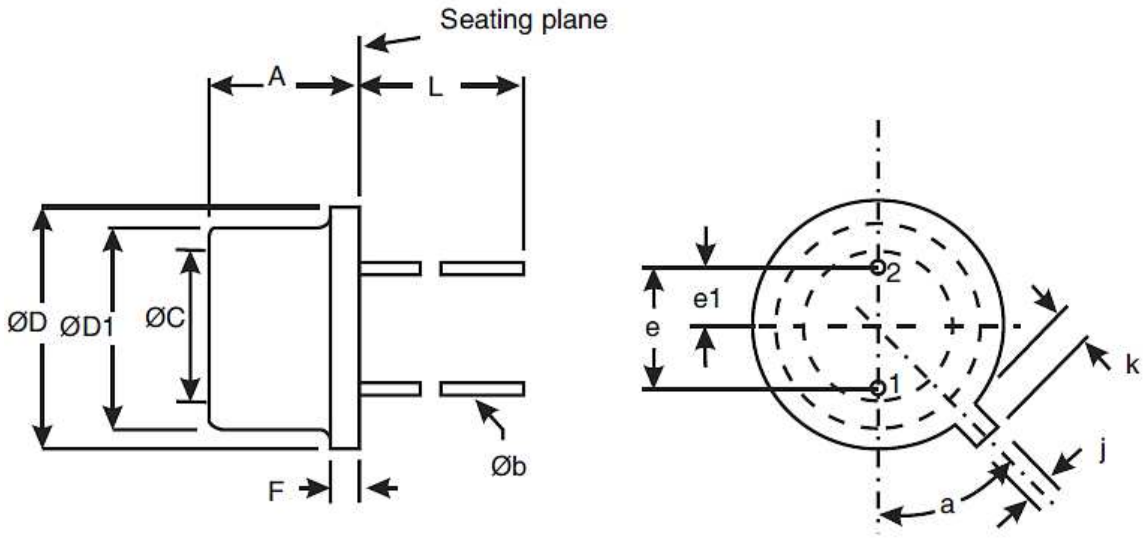
1.6 HANDLING PRECAUTIONS

These devices are susceptible to damage by electrostatic discharge. Therefore, suitable precautions shall be employed for protection during all phases of manufacture, testing, packaging, shipment and any handling.

These components are categorised as Class 3 per ESCC Basic Specification No. 23800 with a Minimum Critical Path Failure Voltage of 4000 Volts.

1.7 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.7.1 Metal Can Package - 2 lead

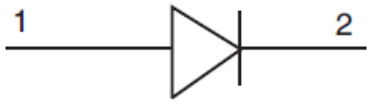


Symbols	Dimensions mm		Notes
	Min	Max	
A	5.05	5.45	
Øb	0.42	0.48	2
ØC	5.75	5.85	3
ØD	9.05	9.35	
ØD1	8.03	8.23	
e	5.08 BSC		
e1	2.54 BSC		
F	0.45	0.7	
j	0.75	0.85	
k	0.8	0.93	4
L	12.7	-	2
a	45° BSC		5

NOTES:

1. Terminal identification is specified by reference to the tab position where lead 1 = Anode, lead 2 = Cathode.
2. Applies to all leads.
3. Glass window diameter.
4. Measured from the maximum diameter of the actual device.
5. Tab centreline.

1.8 FUNCTIONAL DIAGRAM



1. Anode
2. Cathode

NOTES:
1. The cathode is internally connected to the case.

1.9 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

(a) Case
For the metal can package the case shall be hermetically sealed and have a metal body with a hard glass seal and a borosilicate glass window.

(b) Leads/Terminals
As specified in Component Type Variants.

2 REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 Deviations from the Generic Specification

2.1.1.1 Deviations from Screening Tests - Chart F3

(a) Power Burn-in and the subsequent Final Measurements for Power Burn-in shall be omitted.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. 21700 and as follows.

The information to be marked on the component shall be:

(a) The ESCC qualified components symbol (for ESCC qualified components only).
(b) The ESCC Component Number.
(c) Traceability information.

2.3 TERMINAL STRENGTH

The test conditions for terminal strength, tested as specified in the ESCC Generic Specification, shall be as follows:

Test Condition: E, lead fatigue.

2.4 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

Electrical measurements shall be performed at room, high and low temperatures.

2.4.1 Room Temperature Electrical Measurements

The measurements shall be performed at T_{amb} = +22 ±3°C.

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions (Note 1)	Limits		Units
				Min	Max	
Breakdown Voltage	V_B	4021	I_R = 10µA	50	-	V
Dark Current	I_D	-	V_R = -5V	-	300	pA
Forward Voltage	V_F	4011	I_F = 1mA	550	650	mV
Shunt Capacitance	C_{SH}	-	V = 0V	380	450	pF
Responsivity	R_{410}	-	λ = 410nm	150	-	mA/W
	R_{500}		λ = 500nm	220	-	
	R_{600}		λ = 600nm	300	-	
	R_{750}		λ = 750nm	450	-	
	R_{800}		λ = 800nm	480	-	
Field of View	FOV	-	Note 2	40.4	-	°

NOTES:

1. Unless otherwise specified V_R = 0V, load resistance = 50 ±1Ω.
2. Guaranteed but not tested.

2.4.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions (Notes 1, 2)	Limits		Units
				Min	Max	
Breakdown Voltage	V_B	4021	T_{case} = +110 (+0 -5)°C I_R = 10µA	50	-	V
			T_{case} = -45 (+5 -0)°C I_R = 10µA	50	-	
Dark Current	I_D	-	T_{case} = +110 (+0 -5)°C V_R = -5V	-	4	nA
			T_{case} = -45 (+5 -0)°C V_R = -5V	-	0.3	
Forward Voltage	V_F	4011	T_{case} = +110 (+0 -5)°C I_F = 1mA	-	550	mV
			T_{case} = -45 (+5 -0)°C I_F = 1mA	-	800	

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions (Notes 1, 2)	Limits		Units
				Min	Max	
Responsivity		-	T_{case} = +110 (+0 -5)°C			mA/W
	R_{410}		λ = 410nm	150	-	
	R_{500}		λ = 500nm	220	-	
	R_{600}		λ = 600nm	300	-	
	R_{750}		λ = 750nm	450	-	
	R_{800}		λ = 800nm	480	-	
		-	T_{case} = -45 (+5 -0)°C			mA/W
	R_{410}		λ = 410nm	150	-	
	R_{500}		λ = 500nm	220	-	
	R_{600}		λ = 600nm	300	-	
	R_{750}		λ = 750nm	450	-	
	R_{800}		λ = 800nm	430	-	

NOTES:
1. Read and record measurements shall be performed on a sample of 5 components with 0 failures allowed. Alternatively a 100% inspection may be performed.
2. Unless otherwise specified V_R = 0V, load resistance = 50 ±1Ω.

2.5 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits			Units
		Drift Value Δ	Absolute		
			Min	Max	
Shunt Capacitance	C_{SH}	±10%	380	450	pF
Responsivity	R_{410}	±6%	150	-	mA/W
	R_{500}	±6%	220	-	
	R_{600}	±6%	300	-	
	R_{750}	±6%	450	-	
	R_{800}	±6%	480	-	

2.6 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at T_{amb} = +22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits		Units
		Min	Max	
Breakdown Voltage	V_B	50	-	V
Dark Current	I_D	-	300	pA
Forward Voltage	V_F	550	650	mV
Shunt Capacitance (Note 1)	C_{SH}	380	450	pF
Responsivity (Note 1)	R_{410}	150	-	mA/W
	R_{500}	220	-	
	R_{600}	300	-	
	R_{750}	450	-	
	R_{800}	480	-	

NOTES:

1. Test may be omitted during Operating Life intermediate electrical measurements at the 1000 hour data point.

2.7 HIGH TEMPERATURE REVERSE BIAS BURN-IN CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+125(+0-5)	°C
Reverse Voltage	V_R	-10	V
Duration	-	168 minimum	hours

NOTES:

1. Load resistance = 50 ±1Ω.

2.8 OPERATING LIFE CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+125(+0-5)	°C
Reverse Voltage	V_R	-2.5	V

NOTES:

1. Load resistance = 50 ±1Ω.

APPENDIX 'A'

AGREED DEVIATIONS FOR OSI OPTOELECTRONICS AS (N)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Deviations from Production Control - Chart F2	Special In-process Control Internal Visual Inspection. The criteria specified for 75% minimum die mounting material around the visible die perimeter for die mounting defects may be omitted.