DIODE, SILICON, SWITCHING

BASED ON TYPE BAY6642

ESCC Detail Specification No. 5101/029

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DCR No.	CHANGE DESCRIPTION
849	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: 510102901

- Detail Specification Reference: 5101029
- 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	Breakdown Voltage $V_{(BR)}$ (V)	Working Peak Reverse Voltage V_{RWM} (V)	Terminal Material and Finish	Weight max g
01	BAY6642	HSL2-1808	100	75	D2	0.06

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	Unit	Remarks
Forward Surge Current	I_{FSM}	2.5	A (pk)	Notes 1, 2
Working Peak Reverse Voltage	V_{RWM}	Note 3	V	
Average Output Rectified Current	I_O	300	mA	Note 4
Operating Temperature Range (Case Temperature)	T_{op}	-65 to +175	^oC	
Junction Temperature	T_j	+175	^oC	
Storage Temperature Range	T_{stg}	-65 to +175	^oC	
Soldering Temperature	T_{sol}	+245	^oC	Note 5
Thermal Resistance, Junction to Soldering Point	$R_{th(j-s)}$	100	$^oC/W$	

NOTES:

1. Sinusoidal pulse of 10ms duration.
2. At $T_{amb} \leq 25\ ^oC$.
3. See Component Type Variants for V_{RWM} value.
4. At $T_s > +110\ ^oC$, derate linearly to 0A at $+175\ ^oC$. T_s is measured on the PCB at the soldering point to the cathode terminal.
5. Duration 10s maximum and the same package shall not be resoldered until 3 minutes have elapsed.

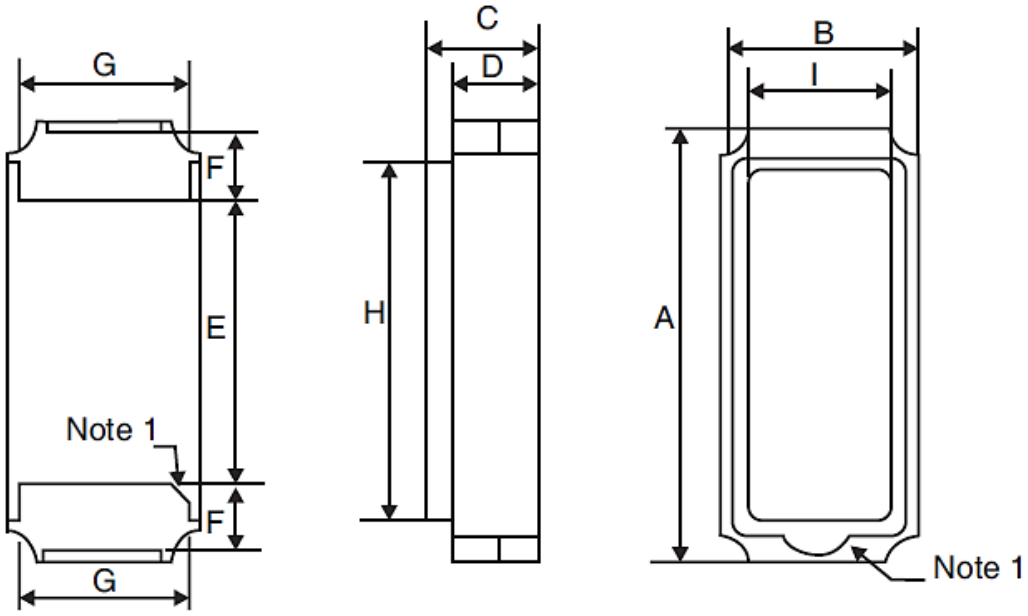
1.6 HANDLING PRECAUTIONS

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 10kV.

1.7 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.7.1 Leadless Chip Carrier Package (HSL2-1808) - 2 Terminal



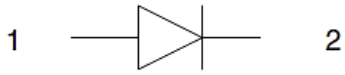
Symbols	Dimensions mm	
	Min	Max
A	4.4	4.8
B	1.8	2.2
C	1.1	1.5
D	0.85	1.15
E	2.8	3.2
F	0.5	0.9
G	1.6	2
H	3.6	3.9
I	1.4	1.7

NOTES:

1. Terminal identification: The cathode is identified by a chamfer on the bottom metallisation and an index mark on the lid seal ring.

1.8 FUNCTIONAL DIAGRAM

Terminal 1: Anode
Terminal 2: Cathode



NOTES:
1. For the HSL2-1808 package, the lid is connected to the cathode terminal.

1.9 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

(a) Case
The case shall be hermetically sealed and have a ceramic body with a Kovar lid.
(b) Terminal Finish
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) Particle Impact Noise Detection may be performed at any point after Temperature Cycling, prior to Seal.
(b) Following Temperature Cycling, Parameter Drift Values (initial measurements) shall be performed as specified herein.
Immediately following Parameter Drift Values measurements, a Surge Current test shall be performed on a sample of 32 components with 0 failures allowed. The Surge Current test shall be as follows:
MIL-STD-750, Test Method 4066, condition A
- I_{FS} = 2.5A(pk) for duration 10ms or 1A(pk) for duration 250ms
- I_O = 300mA
- 10 surges at a rate of 10 per minute maximum.

After the Surge Current test, Parameter Drift Values measurements shall be performed as specified herein referred to the measurements prior to the Surge Current test.
(c) Parameter Drift Values measurements need not be repeated prior to HTRB. The electrical measurements results from after the Surge Current test may be used as initial measurements prior to HTRB.

2.1.1.2 Deviations from Qualification and Periodic Tests (Chart F4)

(a) Mechanical Shock: Not applicable
(b) Vibration: Not applicable
(c) Constant Acceleration: Not applicable

2.2 MARKING

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

(a) The information to be marked on the component shall be:
(b) Terminal Identification.
(c) The ESCC qualified components symbol (for ESCC qualified components only).
(d) The ESCC Component Number.
(e) Traceability information.

2.3 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

Electrical measurements shall be performed at room, high and low temperatures. Consolidated notes are given after the tables.

2.3.1 Room Temperature Electrical Measurements

The measurements shall be performed at T_{amb} = +25 ±3 ^{o}C.

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions	Limits		Units
				Min	Max	
Forward Voltage	V_{F1}	4011	I_F = 1mA, Note 1	0.54	0.62	V
	V_{F2}	4011	I_F = 10mA, Note 1	0.64	0.8	V
	V_{F3}	4011	I_F = 100mA, Note 1	0.78	0.92	V
	V_{F4}	4011	I_F = 500mA, Note 1	0.87	1.2	V
Reverse Current 1	I_{R1}	4016	DC Method V_R = 20V	-	25	nA
Reverse Current 2	I_{R2}	4016	DC Method $V_R = V_{RWM}$, Note 2	-	100	nA
Breakdown Voltage	$V_{(BR)}$	4022	DC Method I_R = 10µA	Note 2	-	V
Capacitance	C	4001	V_R = 0V V_{sig} = 50mV (p-p) max f = 1MHz Note 3	-	2.5	pF
Reverse Recovery Time	t_{rr}	4031	Test Condition A $I_F = I_R$ = 10mA I_{rr} = 2mA Note 3, 4	-	4	ns

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions	Limits		Units
				Min	Max	
Forward Recovery Time	t_{fr}	4026	I_F = 200mA V_{fr} = 1.1V_F Note 3, 4	-	10	ns
Forward Recovery Voltage	V_{fr}	4026	I_F = 200mA V_{fr} = 1.1V_F Note 3, 4	-	5	V
Thermal Impedance Junction to Case	$Z_{th(j-c)}$	3101	I_H = 1A, t_H = 10ms t_{md} = 70µs max	-	35	$^oC/W$

2.3.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions Note 5	Limits		Units
				Min	Max	
Forward Voltage	V_{F2}	4011	T_{amb} = +150 (+0 -5) ^oC I_F = 10mA, Note 1	-	0.65	V
	V_{F3}	4011	T_{amb} = -55 (+5 -0) ^oC I_F = 100mA, Note 1	-	1.2	V
	V_{F4}	4011	T_{amb} = -55 (+5 -0) ^oC I_F = 500mA, Note 1	-	1.3	V
Reverse Current 1	I_{R1}	4016	T_{amb} = +150 (+0 -5) ^oC DC Method V_R = 20V	-	50	µA
Reverse Current 2	I_{R2}	4016	T_{amb} = +150 (+0 -5) ^oC DC Method V_R = V_{RWM}, Note 2	-	100	µA

2.3.3 Notes to Electrical Measurement Tables

1. Pulsed measurement, pulse width 20ms maximum.
2. See Component Type Variants for V_{RWM} and $V_{(BR)}$ values.
3. Read and record measurements shall be performed on a sample of 32 components with 0 failures allowed. Alternatively a 100% inspection may be performed.
4. The sample may be soldered to a suitable test substrate to facilitate the test but then shall not form part of the delivery lot.
5. Read and record measurements shall be performed on a sample of 5 components with 0 failures allowed. Alternatively a 100% inspection may be performed.

2.4 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at T_{amb} = +25 ±3 ^{o}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	
Forward Voltage 2	V_{F2}	±0.03	0.64	0.8	V
Reverse Current 1	I_{R1}	±10 or (1) ±100%	-	25	nA
Reverse Current 2	I_{R2}	±25 or (1) ±100%	-	100	nA
Breakdown Voltage	$V_{(BR)}$	±15 or (1) ±15%	Note 2	-	V

NOTES

1. Whichever is the greater referred to the initial value.
2. See Component Type Variants for $V_{(BR)}$ value.

2.5 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at T_{amb} = +25 ±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	
Forward Voltage 2	V_{F2}	±0.03	0.64	0.8	V
Reverse Current 1	I_{R1}	±10 or (1) ±100%	-	25	nA
Reverse Current 2	I_{R2}	±25 or (1) ±100%	-	100	nA
Breakdown Voltage	$V_{(BR)}$	-	Note 2	-	V

NOTES:
1. Whichever is the greater referred to the initial value.
2. See Component Type Variants for $V_{(BR)}$ value.

2.6 HIGH TEMPERATURE REVERSE BIAS BURN-IN CONDITIONS

Characteristics	Symbols	Limits	Units
Ambient Temperature	T_{amb}	+150 (+0 -5)	°C
Reverse Voltage	V_R	60 (+0 -3)	V
Duration	t	72 ±12	hours

NOTES
1. Voltage may be switched off during cool down.

2.7 POWER BURN-IN CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	< 150 (Note 1)	^{o}C
Junction Temperature	T_J	+175 (+0 -5)	^{o}C
Forward Current	I_F	300 (+0 -30)	mA

NOTES:
1. T_{amb} shall be adjusted to attain the specified junction temperature.

2.8 OPERATING LIFE CONDITIONS

The conditions shall be as specified for Power Burn-in.

APPENDIX 'A'

AGREED DEVIATIONS FOR INFINEON TECHNOLOGIES (D)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Deviations from Production Control (Chart F2)	The 3 component sample Dimension Check need only be performed once on each component package production lot.
Deviations from Screening Tests (Chart F3)	Temperature Cycling shall be performed in accordance with MIL-STD-883, Test Method 1010, Test Condition F, 20 cycles at maximum storage temperature rating specified in the Detail Specification.
	High and Low Temperatures Electrical Measurements may be performed at any point after Power Burn-in, prior to Seal, but shall still count towards Check for Lot Failure.
	Radiographic Inspection is not applicable.
	Seal Fine Leak. The maximum leak rate shall be 2×10^{-8} atm.cm^3/s.
	Solderability is not applicable unless otherwise stipulated in the Purchase Order.
Deviations from Qualification and Periodic Tests (Chart F4)	Seal Fine Leak. The maximum leak rate shall be 2×10^{-8} atm.cm^3/s.
	Temperature Cycling shall be performed in accordance with MIL-STD-883, Test Method 1010, Test Condition F, 100 cycles at maximum storage temperature rating specified in the Detail Specification.
	Permanence of Marking is not applicable.
Room Temperature Electrical Measurements	The read and record 32 component sample electrical measurements for characteristics t_{rr}, t_{fr} and V_{fr} need only be performed once on each wafer used to supply components to this specification. Any failure shall result in rejection of the wafer. The sample measurement may be performed at any time during production.
High and Low Temperature Electrical Measurements	The read and record 5 component sample low temperature electrical measurements for characteristics V_{F3} and V_{F4} need only be performed once on each wafer used to supply components to this specification. Any failure shall result in rejection of the wafer. The sample measurement may be performed at any time during production.