DIODES, MICROWAVE, SILICON, PIN

BASED ON TYPE BXY42

ESCC Detail Specification No. 5513/017

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DCR No.	CHANGE DESCRIPTION
1299	Specification upissued to incorporate changes per DCR.

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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. 5010

(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: 551301701R

- Detail Specification Reference: 5513017
- Component Type Variant Number: 01 (as required)
- Total Dose Radiation Level Letter: R (as required)

1.4.2 Component Type Variants

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

Variant Number	Based on Type	Case	Terminal Material and Finish	Weight max g	Total Dose Radiation Level Letter
01	BXY42	T1	E2	0.02	R [100krad(Si)]
02	BXY42	T	D2	0.02	R [100krad(Si)]

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

The total dose radiation level letter shall be as defined in ESCC Basic Specification No. 22900. If an alternative radiation test level is specified in the Purchase Order the letter shall be changed accordingly.

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
DC Reverse Voltage	V_R	-50	V	
Peak Forward Current (Pulsed)	I_{FM}	5	A	Note 1
Power Dissipation Variant 01 Variant 02	P_D	 350 600	mW	 $T_{case} \leq +52.5°C$ $T_{case} \leq +55°C$ Note 2
Operating Temperature Range	T_{op}	-55 to +175	°C	T_{case}
Storage Temperature Range	T_{stg}	-65 to +175	°C	
Soldering Temperature	T_{sol}	+250	°C	Note 3
Junction Temperature	T_j	+175	°C	
Thermal Resistance, Junction-to-Case Variant 01 Variant 02	$R_{th(j-c)}$	 350 200	°C/W	

NOTES:

1. Pulse duration = 1µs, duty cycle = 0.001%.
2. For T_{case} greater than specified, derate linearly to 0W at T_{case} = +175°C.
3. Duration 5 seconds maximum and the same termination shall not be resoldered until 5 minutes have elapsed.

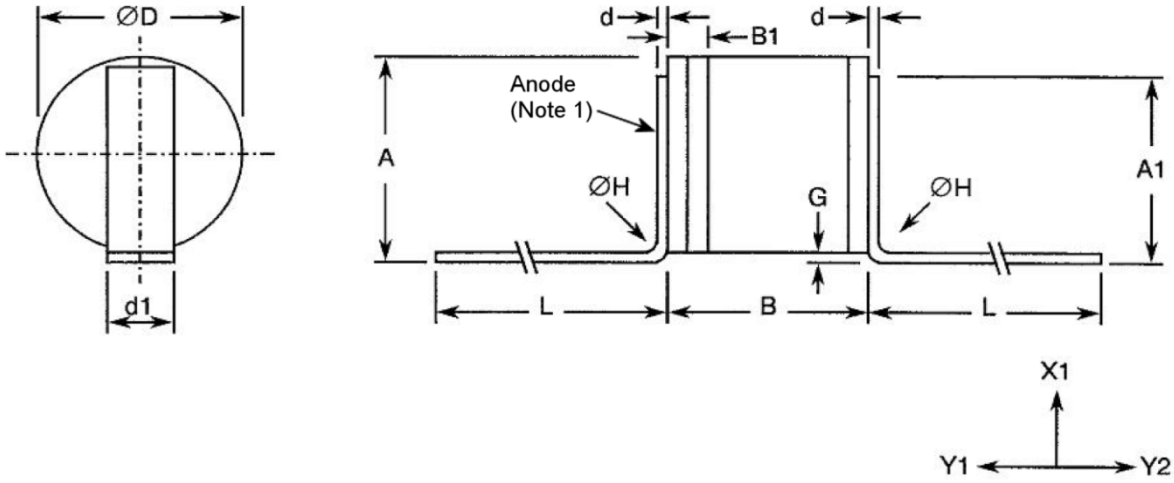
1.6 HANDLING PRECAUTIONS

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

These components are categorised as Class 1 per ESCC Basic Specification No. 23800 with a Minimum Critical Path Failure Voltage of 1000V.

1.7 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.7.1 Case Type T1

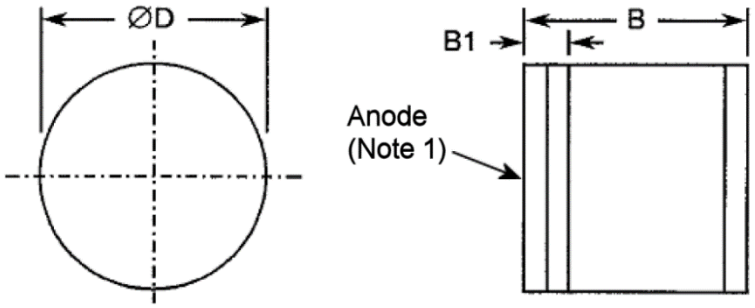


Symbols	Dimensions mm		Notes
	Min	Max	
A	1.4	1.95	
A1	1.05	1.25	
B	1.15	1.35	
B1	-	0.4	1
d	0.06	0.1	
d1	0.4	0.6	
ØD	1.3	1.45	
G	0.1	0.5	
ØH	-	0.3	
L	5.5	-	

NOTES:

1. The anode terminal is identified by the sealing ring and lid (dimension B1).

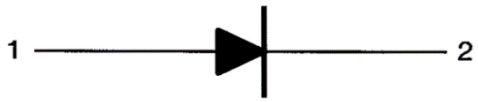
1.7.2 Case Type T



Symbols	Dimensions mm		Notes
	Min	Max	
B	1.15	1.35	
B1	-	0.4	1
ØD	1.3	1.45	

NOTES:
1. The anode terminal is identified by the sealing ring and lid (dimension B1).

1.8 FUNCTIONAL DIAGRAM



1. Anode
2. Cathode

1.9 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

(a) Case
The case shall be hermetically sealed, have a ceramic body and a metal sealing ring and lid.

(b) Terminals
As specified in Para. 1.4.2 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) Radiographic Inspection: shall be performed in the X and Z axes only.

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. The information to be marked and the order of precedence shall be as follows:

(a) The ESCC qualified components symbol (for ESCC qualified components only).
(b) The ESCC Component Number (see Para. 1.4.1).
(c) Traceability information.

2.3 DIE SHEAR

In those cases where package clearances are such that a die shear test is not practicable, the die shall be pushed away with a suitable tool. The force required to remove the die need not be recorded. The die attachment area shall be inspected and the component shall be considered acceptable if more than 50% of the semiconductor material remains.

2.4 TERMINAL STRENGTH

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

- Variant 01: Test Condition A, tension, with a force of 1.5N and a duration of 5s.

2.5 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

2.5.1 Room Temperature Electrical Measurements

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

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions	Limits		Units
				Min	Max	
Reverse Current 1	I_{R1}	4016	V_R = -50V	-	10	µA
Reverse Current 2	I_{R2}	4016	V_R = -40V	-	5	nA
Forward Voltage	V_F	4011	I_F = 100mA	-	1.1	V
Total Capacitance	C_T	4001	V_R = -20V, f = 1MHz	-	0.24	pF
Forward Resistance 1	R_{F1}	4056	f = 100MHz, I_{F1} = 1mA	-	3.5	Ω
Forward Resistance 2	R_{F2}	4056	f = 100MHz I_{F2} = 10mA	-	2.5	Ω
Minority Carrier Lifetime	τ_L	-	I_F = 10mA, I_R = -6mA Note 1	35	-	ns

NOTES:

1. Pulsed measurement, duration = 1µs, duty cycle ≤ 33%. The input pulse shall be provided by a suitable pulse generator with t_r ≤ 5ns.
   τ_L is measured across the 50% I_R points of the output waveform.

2.5.2 High and Low Temperatures Electrical Measurements

The measurements shall be performed only at T_{amb} = +125 (+0 -5)°C.

Characteristics	Symbols	MIL-STD-750 Test Method	Test Conditions (Note 1)	Limits		Units
				Min	Max	
Reverse Current 2	I_{R2}	4016	V_R = -40V	-	100	nA

NOTES:

1. Measurements shall be performed on a sample of 5 components. In the event of any failure, a 100% inspection shall be performed.

2.6 PARAMETER DRIFT VALUES

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 Para. 2.5.1 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 (1) Δ	Absolute		
			Min	Max	
Reverse Current 2	I_{R2}	±3	-	5	nA
Forward Voltage	V_F	±20 or (2) ±5%	-	1.1	mV
Forward Resistance 1	R_{F1}	±15%	-	3.5	Ω

NOTES:

1. Δ1 = Δ2.
2. Whichever is the greater.

2.7 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 Para. 2.5.1 Room Temperature Electrical Measurements.

The limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits		Units
		Min	Max	
Reverse Current 1	I_{R1}	-	10	µA
Reverse Current 2	I_{R2}	-	5	nA
Forward Voltage	V_F	-	1.1	V
Total Capacitance	C_T	-	0.24	pF
Forward Resistance 1	R_{F1}	-	3.5	Ω
Forward Resistance 2	R_{F2}	-	2.5	Ω

2.8 BURN-IN 1 CONDITIONS

Characteristics	Symbols	Test Conditions	Units
Ambient Temperature	T_{amb}	+150 (+0 -5)	°C
Reverse Voltage	V_R	-40 (Note 1)	V

NOTES:

1. After the burn-in period, the components shall be allowed to cool until T_{amb} = +25 ±3°C; the V_R bias shall be maintained until T_{amb} < +35°C.

2.9 BURN-IN 2 CONDITIONS

Characteristics	Symbols	Test Conditions (Note 1)	Units
Junction Temperature	T_j	+175 (+0 -3)	°C
Power Dissipation	P_D	≤ P_D given in Para. 1.5 Maximum Ratings	mW

NOTES:

1. T_{case} shall be adjusted to attain the specified T_j.

2.10 OPERATING LIFE CONDITIONS

The conditions shall be as specified in Para. 2.9 for Burn-in 2.

2.11 TOTAL DOSE RADIATION TESTING

2.11.1 Bias Conditions and Total Dose Level for Total Dose Radiation Testing

Continuous bias shall be applied during irradiation testing as specified below:

- Ambient Temperature: +25 ±3°C
- Reverse Voltage: -10V

The total dose level applied shall be as specified in Para. 1.4.2 or in the Purchase Order.

2.11.2 Electrical Measurements for Total Dose Radiation Testing

Prior to irradiation testing, the devices shall have successfully met Para. 2.5.1 Room Temperature Electrical Measurements.

Unless otherwise stated 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 Para. 2.5.1 Room Temperature Electrical Measurements.

The parameters to be measured during and on completion of irradiation testing are shown below.

Unless otherwise specified all inputs and outputs shall be tested for each characteristic.

Characteristics	Symbols	Limits			Units
		Drift Value Δ	Absolute		
			Min	Max	
Reverse Current 1	I_{R1}	±1	-	10	µA
Forward Resistance 1	R_{F1}	±50%	-	3.5	Ω

APPENDIX A

AGREED DEVIATIONS FOR INFINEON TECHNOLOGIES AG (D)

Items Affected	Description of Deviations
Para. 2.1.1 Deviations from Generic Specification: Special In-Process Controls - Chart F2	Bond Strength: The following pre-seal bond strength shall apply: • 0.05N minimum
	Dimension Check: May be performed during Chart F3 testing.
Para. 2.1.1 Deviations from Generic Specification: Final Customer Source Inspection	Final Customer Source Inspection shall be limited to witnessing of the DC parameters specified in Para. 2.5.1 Room Temperature Electrical Measurements.
Para. 2.1.1 Deviations from Generic Specification: Data Documentation	Additional Documentation and Wafer Lot Acceptance Data: If Wafer Lot Acceptance Data is stipulated in the Purchase Order, such data will not be delivered but will be available for review at Infineon Technologies AG.
Para. 2.1.1.1 Deviations from Screening Tests - Chart F3	Temperature Cycling: Shall be replaced by a Thermal Shock test in accordance with MIL-STD-202, Test Method 107, Test Condition B, 20 cycles.
Para. 2.1.1.2 Deviations from Qualification and Periodic Tests - Chart F4	Temperature Cycling: Shall be replaced by a Thermal Shock test in accordance with MIL-STD-202, Test Method 107, Test Condition B, 100 cycles.
	Assembly Capability Subgroup tests: In addition to the permitted use of empty packages or electrical rejects as test samples, components rejected during the following Screening Tests: • Radiographic Inspection • Seal • External Visual Inspection may be used on the condition that the cause for rejection has no possible impact on the tests, and they have been subjected to the same screening as the packages of the assembly lot with which they are associated.
	Bond Strength: The following post-seal bond strength shall apply: • 0.04N minimum