



**DIODES, SILICON, POWER SCHOTTKY  
RECTIFIER,**

**BASED ON TYPE IN5822U**

**ESCC Detail Specification No. 5106/020**

|         |           |
|---------|-----------|
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| DCR No.  | CHANGE DESCRIPTION   |
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| 854, 868 | Specification upissued to incorporate editorial and technical 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. 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: 510602001

- Detail Specification Reference: 5106020
- Component Type Variant Number: 01 (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 Finish | Weight max g |
|----------------|---------------|-------|-----------------|--------------|
| 01             | 1N5822U       | LCC2B | 2               | 0.18         |
| 02             | 1N5822U       | LCC2B | 4               | 0.18         |

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 | Unit           | Remarks             |
|--|---------------|-----------------|----------------|---------------------|
| Forward Surge Current                    | $I_{FSM}$     | 80              | A              | Notes 1, 2          |
| Working Peak Reverse Voltage             | $V_{RWM}$     | 40              | V              |                     |
| Average Output Rectified Current         | $I_O$         | 3               | A              | Note 3              |
| Critical Rate of Rise of Reverse Voltage | dV/dt         | 10000           | V/ $\mu$ s     |                     |
| Operating Temperature Range              | $T_{op}$      | -55 to +150     | $^{\circ}$ C   | $T_{case}$ , Note 4 |
| Junction Temperature                     | $T_j$         | +150            | $^{\circ}$ C   |                     |
| Storage Temperature Range                | $T_{stg}$     | -65 to +150     | $^{\circ}$ C   | Note 4              |
| Soldering Temperature                    | $T_{sol}$     | +245            | $^{\circ}$ C   | Note 5              |
| Thermal Resistance, Junction to Case     | $R_{th(j-c)}$ | 7               | $^{\circ}$ C/W |                     |

**NOTES:**

1. Sinusoidal pulse of 10ms duration.
2. At  $T_{amb} \leq +25$   $^{\circ}$ C.
3. At  $T_{case} \geq +139$   $^{\circ}$ C, derate linearly to 0A at +150  $^{\circ}$ C.
4. For Variant 02 with hot solder dip terminal finish all testing performed at  $T_{amb} > +125$   $^{\circ}$ C shall be carried out in a 100% inert atmosphere.
5. Duration 5 seconds maximum and the same package shall not be resoldered until 3 minutes have elapsed.

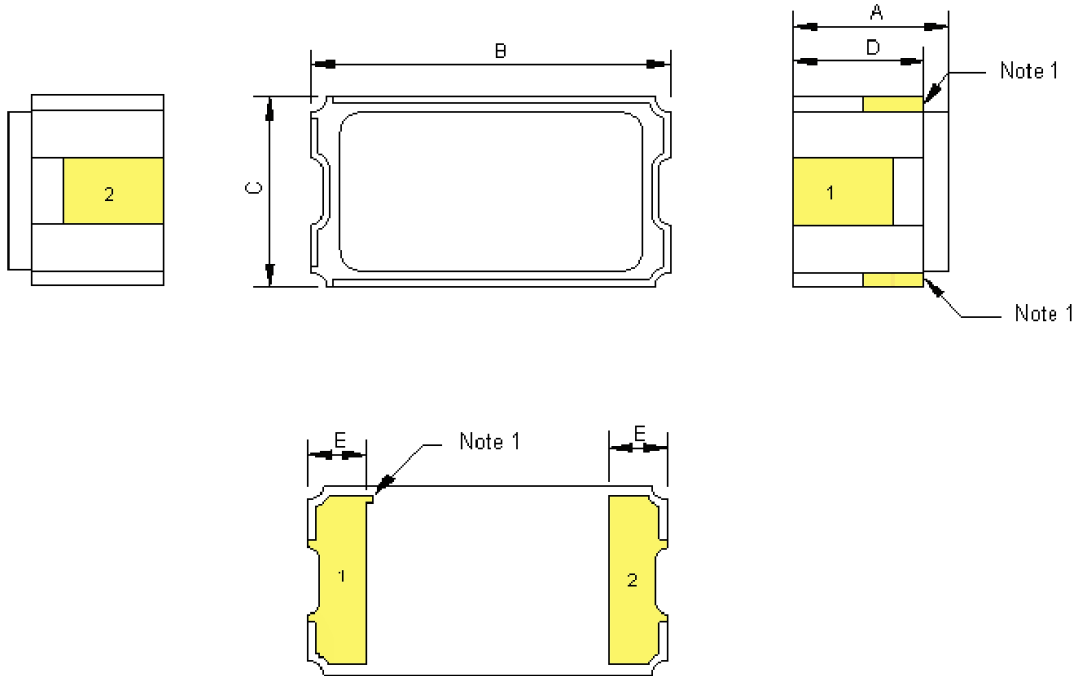
1.6 HANDLING PRECAUTIONS

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 8000 Volts.

1.7 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.7.1 Leadless Chip Carrier Package (LCC2B) - 2 Terminal



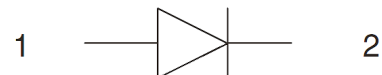
| Symbols | Dimensions mm |      | Notes |
|---------|---------------|------|-------|
|         | Min           | Max  |       |
| A       | 2.04          | 2.42 | 2     |
| B       | 5.27          | 5.6  |       |
| C       | 3.49          | 3.76 |       |
| D       | 1.71          | 2.09 |       |
| E       | 0.48          | 0.71 |       |

**NOTES:**

- Terminal identification: The anode is identified by metallisation in the two castellations and by the index mark on the bottom metallisation.
- For Variant 02 dimension limits apply prior to solder coating of terminals.

1.8 FUNCTIONAL DIAGRAM

Terminal 1: Anode  
Terminal 2: Cathode



**NOTES:**

- For LCC2B, the lid is not connected to any terminal.

## 1.9 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

- (a) Case  
The case shall be hermetically sealed and have an Aluminium Nitride 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

None.

### 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 shall be as specified in the ESCC Generic Specification.

### 2.4 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.



2.4.1 Room Temperature Electrical Measurements

The measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

| Characteristics                     | Symbols       | MIL-STD-750<br>Test Method | Test Conditions   | Limits                                |     | Units              |
|-------------------------------------|---------------|----------------------------|---|---------------------------------------|-----|--------------------|
|                                     |               |                            |   | Min                                   | Max |                    |
| Forward Voltage                     | $V_{F1}$      | 4011                       | Pulse Method<br>$I_F = 1\text{A}$ , Note 1  | -                                     | 400 | mV                 |
|                                     | $V_{F2}$      | 4011                       | Pulse Method<br>$I_F = 3\text{A}$ , Note 1  | -                                     | 485 | mV                 |
|                                     | $V_{F3}$      | 4011                       | Pulse Method<br>$I_F = 9.4\text{A}$ , Note 1  | -                                     | 700 | mV                 |
| Reverse Current                     | $I_R$         | 4016                       | Pulse Method<br>Note 1<br>$V_R = 40\text{V}$  | -                                     | 80  | $\mu\text{A}$      |
| Capacitance                         | C             | 4001                       | $V_R = 5\text{V}$<br>$V_{sig} = 50\text{mV}$ (p-p) max<br>$f = 1\text{MHz}$                           | -                                     | 240 | pF                 |
| Thermal Impedance, Junction to Case | $Z_{th(j-c)}$ | 3101                       | $I_H = 1$ to 10A<br>$t_H = 50\text{ms}$<br>$I_M = 50\text{mA}$<br>$t_{md} = 100\mu\text{s}$<br>Note 2 | (Calculate $\Delta V_F$ , see Note 3) |     | $^\circ\text{C/W}$ |

2.4.2 High and Low Temperatures Electrical Measurements

| Characteristics   | Symbols  | MIL-STD-750<br>Test Method | Test Conditions<br>Note 4   | Limits |     | Units         |
|-------------------|----------|----------------------------|---|--------|-----|---------------|
|                   |          |                            |   | Min    | Max |               |
| Forward Voltage 2 | $V_{F2}$ | 4011                       | $T_{amb} = +100 (+0 -5) \text{ }^\circ\text{C}$<br>Pulse Method<br>$I_F = 3\text{A}$ , Note 1   | -      | 455 | mV            |
|                   |          |                            | $T_{amb} = -55 (+5 -0) \text{ }^\circ\text{C}$<br>Pulse Method<br>$I_F = 3\text{A}$ , Note 1    | -      | 560 | mV            |
| Reverse Current   | $I_R$    | 4016                       | $T_{amb} = +100 (+0 -5) \text{ }^\circ\text{C}$<br>Pulse Method<br>Note 1<br>$V_R = 40\text{V}$ | -      | 12  | mA            |
|                   |          |                            | $T_{amb} = -55 (+5 -0) \text{ }^\circ\text{C}$<br>Pulse Method<br>Note 1<br>$V_R = 40\text{V}$  | -      | 40  | $\mu\text{A}$ |

2.4.3 Notes to Electrical Measurement Tables

1. Pulse Width  $\leq 680\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
2. Performed only during Screening Tests Parameter Drift Values (Initial Measurements), go-no-go.

3. The limits for  $\Delta V_F$  shall be defined by the Manufacturer on every lot in accordance with MIL-STD-750 Method 3101 and shall guarantee the  $R_{th(j-c)}$  limits specified in Maximum Ratings.
4. Read and record measurements shall be performed on a sample of 5 components with 0 failures allowed. Alternatively a 100% inspection may be performed.

2.5 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

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

The drift values ( $\Delta$ ) 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<br>$\Delta$           | Absolute |     |               |
|                   |          |                                   | Min      | Max |               |
| Forward Voltage 2 | $V_{F2}$ | $\pm 30$                          | -        | 485 | mV            |
| Reverse Current   | $I_R$    | $\pm 25$<br>or (1)<br>$\pm 100\%$ | -        | 80  | $\mu\text{A}$ |

**NOTES:**

1. Whichever is the greater referred to the initial value.

2.6 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at  $T_{amb} = +22 \pm 3 \text{ }^\circ\text{C}$ .

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

| Characteristics   | Symbols  | Limits |     | Units         |
|-------------------|----------|--------|-----|---------------|
|                   |          | Min    | Max |               |
| Forward Voltage 2 | $V_{F2}$ | -      | 485 | mV            |
| Reverse Current   | $I_R$    | -      | 80  | $\mu\text{A}$ |

**2.7 HIGH TEMPERATURE REVERSE BIAS BURN-IN CONDITIONS**

| Characteristics     | Symbols   | Limits      | Units        |
|---------------------|-----------|-------------|--------------|
| Ambient Temperature | $T_{amb}$ | +80 $\pm$ 3 | $^{\circ}$ C |
| Reverse Voltage     | $V_R$     | 40 (Note 1) | V            |
| Duration            | t         | 96          | hours        |

**NOTES:**

1.  $V_R$  = rectangular wave, f = 50Hz, duty cycle = 25%.

**2.8 POWER BURN-IN CONDITIONS**

| Characteristics                  | Symbols   | Test Conditions | Units        |
|----------------------------------|-----------|-----------------|--------------|
| Ambient Temperature              | $T_{amb}$ | +22 $\pm$ 3     | $^{\circ}$ C |
| Junction Temperature             | $T_j$     | +150 (+0 -5)    | $^{\circ}$ C |
| Average Output Rectified Current | $I_o$     | Note 1          | A            |

**NOTES:**

1. The output current may be adjusted, within the given limit range, to attain the specified junction temperature.

**2.9 OPERATING LIFE CONDITIONS**

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

**APPENDIX 'A'**  
**AGREED DEVIATIONS FOR STMICROELECTRONICS (F)**

| ITEMS AFFECTED                                | DESCRIPTION OF DEVIATIONS   |
|---|---|
| Deviations from Production Control - Chart F2 | Special In-Process Controls - Internal Visual Inspection. Wedge bonds equal to 1.1 wire diameter are acceptable for bonding with a V-Groove tool.   |
|   | Special In-process Control Internal Visual Inspection. For CCP packages the criteria specified for voids in the fillet and minimum die mounting material around the visible die perimeter for die mounting defects may be omitted providing that a radiographic inspection to verify the die-attach process is performed on a sample basis in accordance with STMicroelectronics procedure 7050651. |
| Deviations from Screening Tests - Chart F3    | Solderability is not applicable unless specifically stipulated in the Purchase Order.   |
| Room Temperature Electrical Measurements      | All AC characteristics (C) may be considered guaranteed but not tested if successful pilot lot testing has been performed in accordance with STMicroelectronics procedure 7188211 on the wafer lot, which includes AC characteristic measurements per the Detail Specification. A summary of the pilot lot testing shall be provided if required by the Purchase Order.                             |