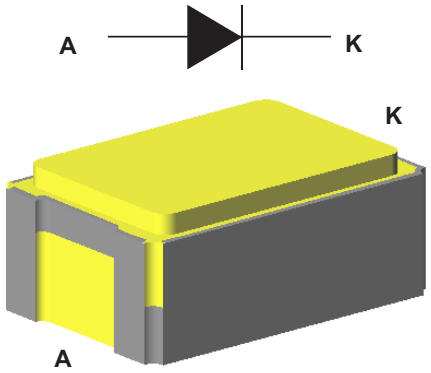
1N5819U

Aerospace 45 V power Schottky rectifier

Datasheet - production data



Leadless chip carrier 2 (LCC2B)

Description

This power Schottky rectifier is designed and packaged to comply with the ESCC5000 specification for aerospace products. It is housed in a surface mount hermetically sealed LCC2B package.

The 1N5819U is suitable for switching mode power supplies and high frequency DC to DC converters such as low voltage high frequency inverter, free wheeling or polarity protection.

Features

- Aerospace applications
- Surface mount hermetic package
- High thermal conductivity materials
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Package mass: 0.18 g
- Target radiation qualification
  - 150 krad (Si) low dose rate
  - 3 Mrad (Si) high dose rate
- ESCC qualified

Table 1. Device summary(1)

Order code	ESCC detailed specification	Quality level	Lead finish	EPPL	$I_{F(AV)}$	V_{RRM}	$T_{j(max)}$	$VF_{(max)}$
1N5819UB1		Engineering model	Gold		1	45	150	0.49
1N5819U01B	5106/021/02	ESCC	Gold	yes				
1N5819U02B	5106/021/03	ESCC	Solder dip	yes				

1. Contact ST sales office for information about the specific conditions for products in die form.

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		45	V
$I_{F(RMS)}$	Forward rms current		10	A
$I_{F(AV)}$	Average forward rectified current	$T_c \geq 142$ °C, $\delta = 0.5$	1	A
I_{FSM}	Forward surge current	t_p = 10 ms sinusoidal	25	A
T_{stg}	Storage temperature range		-65 to +150	°C
T_j	Maximum operating junction temperature (1)		150	°C
T_{sol}	Maximum soldering temperature (2)		245	°C

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid runaway for a diode on its own heatsink
2. Maximum duration 5 s. The same package must not be re-soldered until 3 minutes have elapsed.

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th\ (j\text{-}c)}$	Junction to case	16	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	V_R = 45 V	-	-	20	µA
		T_j = 100 °C		-	-	3.5	mA
		T_j = -55 °C	V_R = 45 V	-	-	20	µA
		T_j = -55 °C	V_R = 40 V	-	-	10	
		T_j = 25 °C	V_R = 40 V	-	-	15	
		T_j = 100 °C		-	-	3	mA
		T_j = 100 °C	V_R = 35 V	-	-	2.5	
		T_j = 100 °C	V_R = 24 V	-	-	1.6	
		T_j = 100 °C	V_R = 12 V	-	-	1.2	
		T_j = 100 °C	V_R = 6 V	-	-	1	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 0.1 A	-	-	350	mV
		T_j = 25 °C	I_F = 1A	-	-	490	
		T_j = 100 °C		-	-	450	
		T_j = - 55 °C		-	-	650	
		T_j = 25 °C	I_F = 3.1 A	-	-	800	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 680 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.285 \times I_{F(AV)} + 0.165 \times I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_j	Diode capacitance	V_R = 5 V, F = 1 MHz	-	-	70	pF

Figure 1. Average forward power dissipation versus average forward current

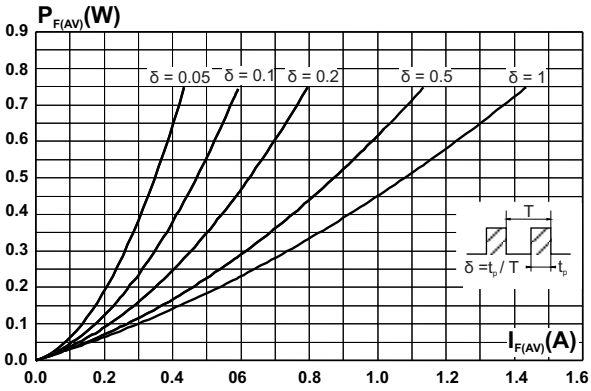


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

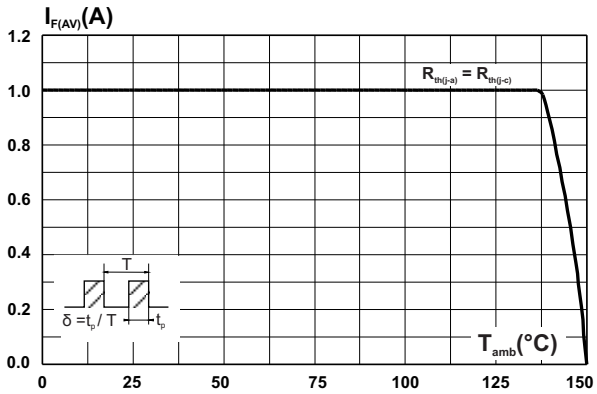


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

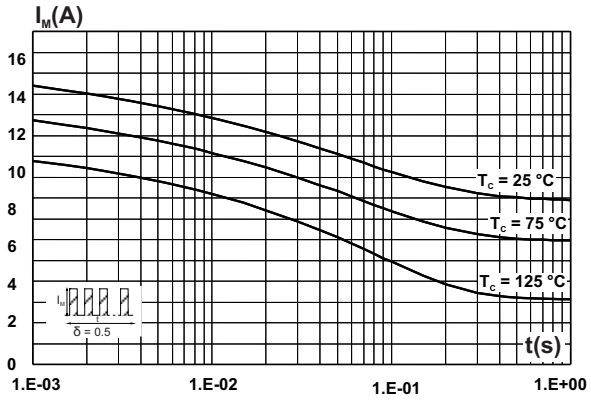


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

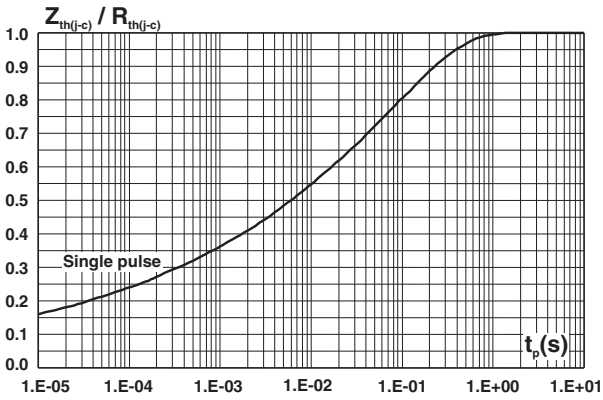


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

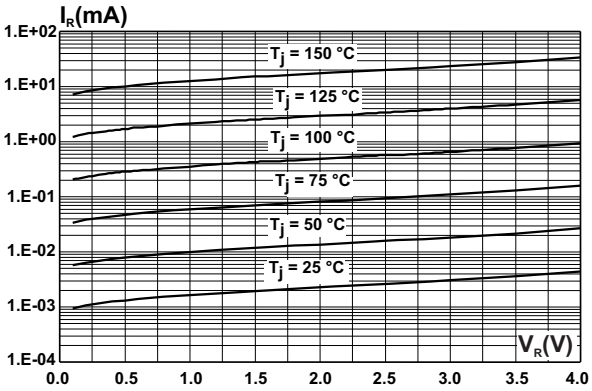


Figure 6. Forward voltage drop versus forward current (typical values)

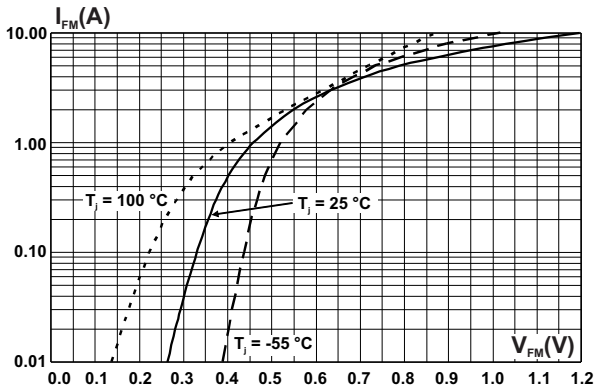
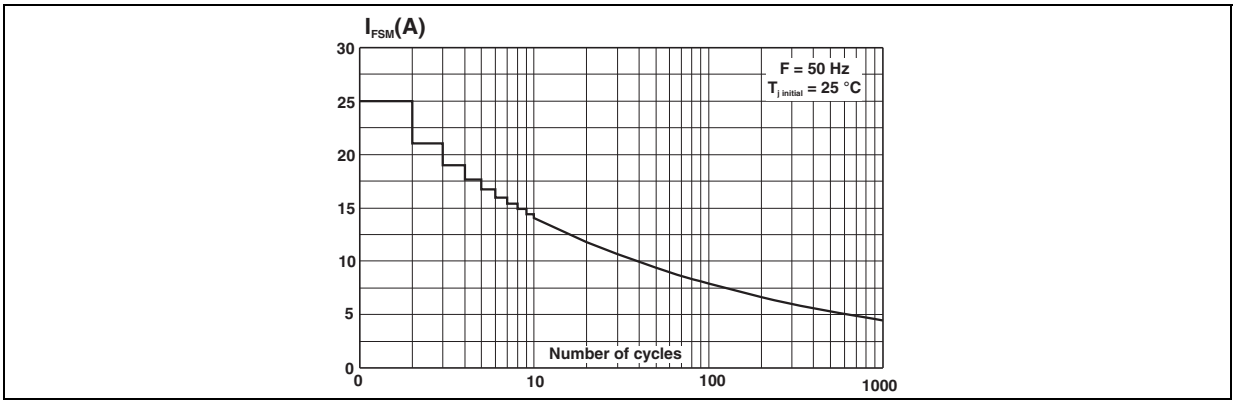


Figure 7. Non repetitive surge peak forward current versus number of cycles

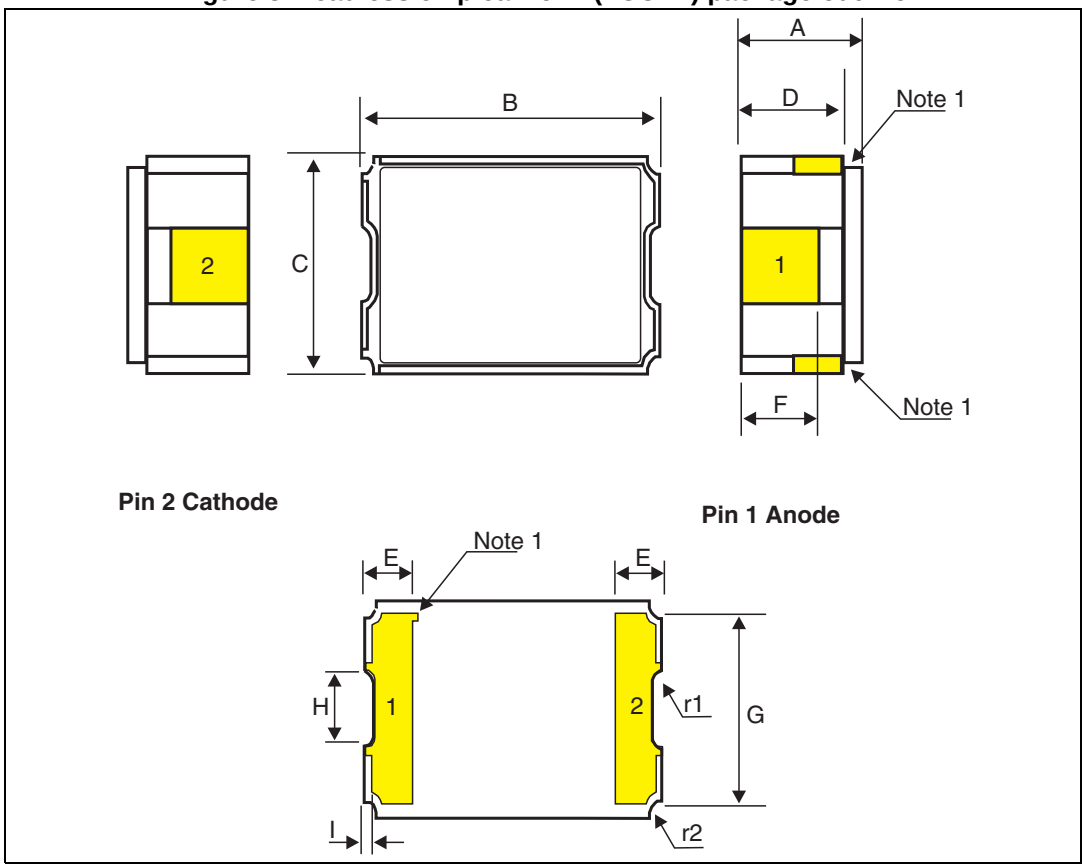


2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

2.1 Leadless chip carrier 2 (LCC2B) package information

Figure 8. Leadless chip carrier 2 (LCC2B) package outline



1. The anode is identified by metalization in two top internal angles and the index mark.

Table 6. Leadless chip carrier 2 (LCC2B) package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A(1)	2.04	2.23	2.42	0.080	0.088	0.095
B	5.27	5.4	5.6	0.207	0.213	0.220
C	3.49	3.62	3.76	0.137	0.143	0.148
D	1.71	1.90	2.09	0.067	0.075	0.082
E	0.48	-	0.71	0.019	-	0.028
F	-	1.4	-	-	0.055	-
G	-	3.32	-	-	0.131	-
H	-	1.82	-	-	0.072	-
I	-	0.15	-	-	0.006	-
r1	-	0.15	-	-	0.006	-
r2	-	0.20	-	-	0.008	-

1. Measurement prior to solder coating the mounting pads on bottom of package

3 Ordering information

Table 7. Ordering information(1)

Order code	ESCC detailed specification	Package	Lead finish	Marking(2)	EPPL	Mass	Packing
1N5819UB1		LCC2B	Gold	1N5819UB1	-	0.18 g	Waffle pack
1N5819U01B	5106/021/02		Gold	510602102	Y		
1N5819U02B	5101/021/03		Solder dip	510602103	Y		

1. Contact ST sales office for information about the specific conditions for products in die form.
2. Specific marking only. The full marking includes in addition:

For the engineering models: ST logo, date code, country of origin (FR).

For ESCC flight parts: ST logo, date code, country of origin (FR), ESA logo, serial number of the part within the assembly lot.

4 Other information

4.1 Date code

Date code is structured as describe below:

- EM xyywwz
- ESCC flight yywwz

Where:

- x (EM only): 3, assembly location Rennes (France)
- yy: last two digits year
- ww: week digits
- z: lot index in the week

4.2 Documentation

In *Table 8* is a summary of the documentation provided with each type of products.

Table 8. Documentation provided with each type of products

Quality level	Documentation
Engineering model	
ESCC flight	Certificate of conformance

5 Revision history

Table 9. Document revision history

Date	Revision	Changes
10-Aug-2009	1	First issue.
07-Jun-2010	2	Updated ESCC specification codes in Table 1 and Table 7.
23-Sep-2011	3	Updated Table 1 and Table 7 for ESCC qualification.
8-Nov-2013	4	Updated Table 1, Table 5 and Table 7 and inserted Other information.
04-Dec-2015	5	Updated *Table 7* and reformatted to current standard.