

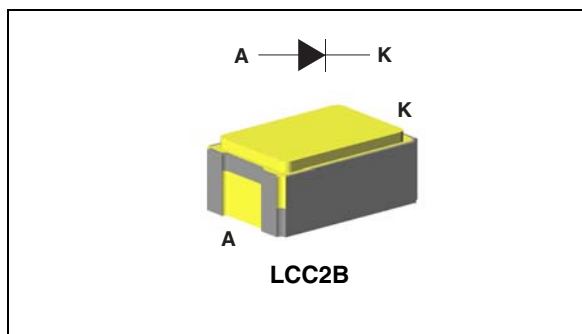


# 1N5819U

## Aerospace 45 V power Schottky rectifier

### 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 weight: 0.18 g
- Target radiation qualification
  - 150 krad (Si) low dose rate
  - 3 Mrad (Si) high dose rate
- Under ESCC qualification



### 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.

**Table 1. Device summary<sup>(1)</sup>**

Order code	ESCC detailed specification	Quality level	Lead finish	EPPL	$I_{F(AV)}$	$V_{RRM}$	$T_{j(max)}$	$V_F(max)$
1N5819UB1	-	Engineering model	Gold plated	-	1 A	45 V	150 °C	0.45 V
1N5819U01B	5103/028/04	Flight part	Gold plated	Y				
1N5819U02B	5103/028/05	Flight part	Solder dip	Y				

1. Contact ST sales office for information about the specific conditions for products in die form and QML-Q versions.

# 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 current	$T_c = 135\text{ °C } \delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
$T_{stg}$	Storage temperature range	-65 to + 150	°C
$T_j$	Maximum operating junction temperature <sup>(1)</sup>	150	°C
$T_{sol}$	Maximum soldering temperature <sup>(2)</sup>	245	°C

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

**Table 3. Thermal resistances**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	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	$T_j = 25\text{ }^\circ\text{C}$	$V_R = 45\text{ V}$	-	-	20	$\mu\text{A}$	
		$T_j = 100\text{ }^\circ\text{C}$		-	-	3.5	$\text{mA}$	
		$T_j = -55\text{ }^\circ\text{C}$	$V_R = 45\text{ V}$	-	-	20	$\mu\text{A}$	
		$T_j = -55\text{ }^\circ\text{C}$	$V_R = 40\text{ V}$	-	-	10		
		$T_j = 25\text{ }^\circ\text{C}$	$V_R = 40\text{ V}$	-	-	15	$\text{mA}$	
		$T_j = 100\text{ }^\circ\text{C}$		-	-	3		
		$T_j = 100\text{ }^\circ\text{C}$	$V_R = 35\text{ V}$	-	-	2.5		
		$T_j = 100\text{ }^\circ\text{C}$	$V_R = 24\text{ V}$	-	-	1.6		
		$T_j = 100\text{ }^\circ\text{C}$	$V_R = 12\text{ V}$	-	-	1.2		
		$T_j = 100\text{ }^\circ\text{C}$	$V_R = 6\text{ V}$	-	-	1		
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 0.1\text{ A}$	-	-	350		$\text{mV}$
		$T_j = 25\text{ }^\circ\text{C}$		-	-	490		
		$T_j = 100\text{ }^\circ\text{C}$	$I_F = 1\text{ A}$	-	-	450		
		$T_j = -55\text{ }^\circ\text{C}$		-	-	650		
		$T_j = 25\text{ }^\circ\text{C}$	$I_F = 3.1\text{ A}$	-	-	800		

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 680\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

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

**Table 5. Dynamic characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$C_j$	Diode capacitance	$V_R = 5\text{ V}$ , $F = 1\text{ MHz}$			70	$\text{pF}$

**Figure 1. Average forward power dissipation versus average forward current**      **Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**

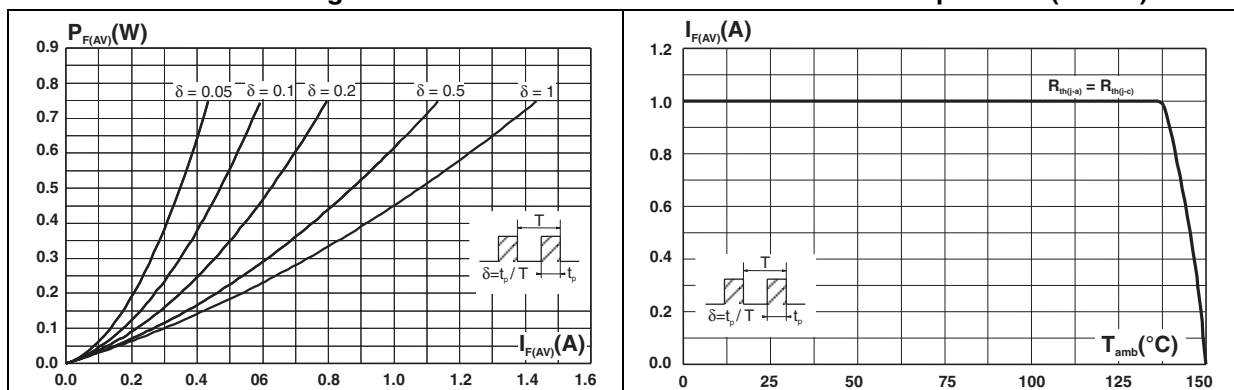


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

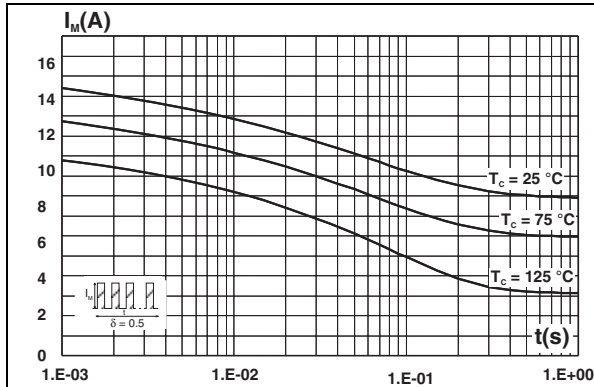


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

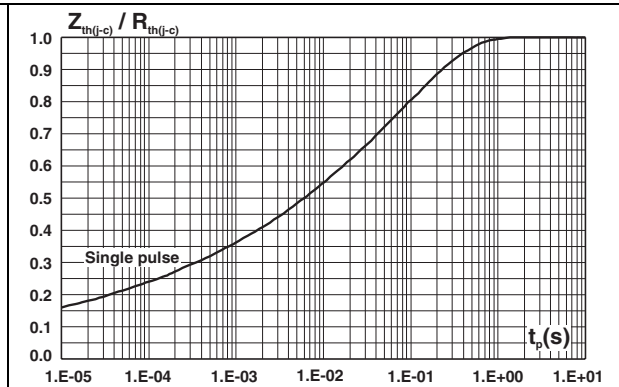


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

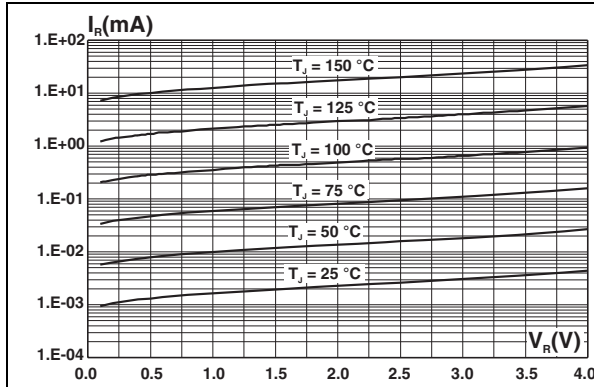


Figure 6. Forward voltage drop versus forward current (typical values)

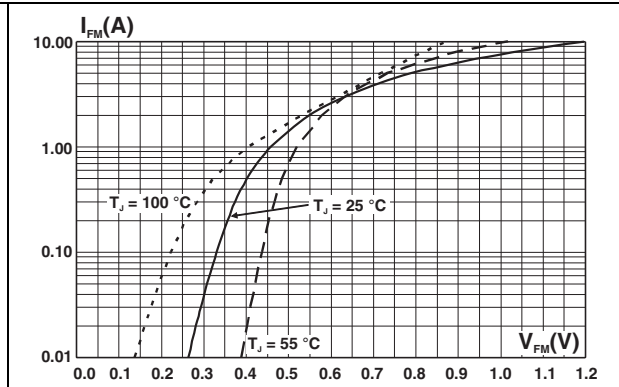
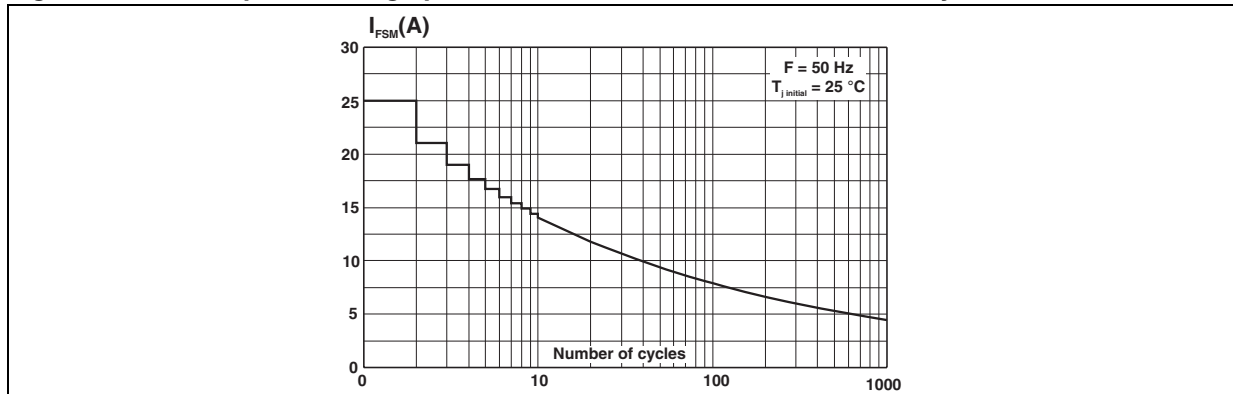


Figure 7. Non repetitive surge peak forward current versus number of cycles



## 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](http://www.st.com). ECOPACK® is an ST trademark.

**Table 6. Leadless chip carrier 2 (LCC2B) package dimensions**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A <sup>(1)</sup>	2.04	2.23	2.42	0.080	0.088	0.095
B	5.27	5.40	5.60	0.207	0.213	0.220
C	3.49	3.62	3.76	0.137	0.143	0.150
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	-

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

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

### 3 Ordering Information

**Table 7. Ordering information<sup>(1)</sup>**

Order code	ESCC detailed specification	Package	Lead finish	Marking	EPPL	Weight	Packing
1N5819UB1	-	LCC2B	Gold plated	19UB1	-	0.18 g	Waffle pack
1N5819U01B	5103/028/04		Gold plated	19U01B	Y	0.18 g	
1N5819U02B	5103/028/05		Solder dip	19U02B	Y		

1. Contact ST sales office for information about the specific conditions for products in die form and QML-Q versions.

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
10-Aug-2009	1	First issue.

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