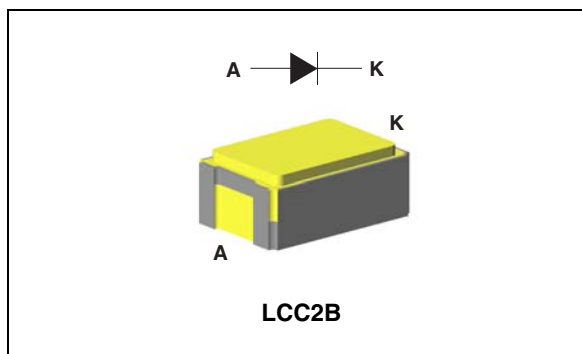


Aerospace 40 V power Schottky rectifier

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
- ESCC qualified



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 whose footprint is 100% compatible with industry standard solutions in D5B.

The 1N5822U 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⁽¹⁾

Order code	ESCC detailed specification	Quality level	Lead finish	EPPL	$I_{F(AV)}$	V_{RRM}	$T_{J(max)}$	$V_F(max)$
1N5822UB1	-	Engineering model	Gold plated	-	3 A	40 V	150 °C	0.47 V
1N5822U02B	5106/020/02	Flight part	Solder dip	Y				

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

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	40	V
$I_{F(RMS)}$	Forward rms current	10	A
$I_{F(AV)}$	Average forward rectified current $T_c = 135\text{ °C}, \delta = 0.5$	3	A
I_{FSM}	Forward surge current $t_p = 10\text{ ms sinusoidal}$	80	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 thermal runaway for a diode on its own heatsink

2. Maximum duration 5 s. The same package must not be resoldered until 3 minutes have elapsed.

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	7	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse current	$T_j = -55\text{ }^{\circ}\text{C}$	$V_R = 40\text{ V}$	-	-	40	μA
		$T_j = 25\text{ }^{\circ}\text{C}$		-	-	80	
		$T_j = 100\text{ }^{\circ}\text{C}$		-	-	12	mA
$V_F^{(2)}$	Forward voltage	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$	-	-	0.4	V
		$T_j = -55\text{ }^{\circ}\text{C}$	$I_F = 3\text{ A}$	-	-	0.56	
		$T_j = 25\text{ }^{\circ}\text{C}$		-	-	0.485	
		$T_j = 100\text{ }^{\circ}\text{C}$		-	-	0.455	
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 9.4\text{ A}$	-	-	0.70	

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:

$$P = 0.32 \times I_{F(AV)} + 0.050 I_{F(RMS)}^2$$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
C_j	Diode capacitance	$V_R = 5\text{ V}, F = 1\text{ MHz}$	-	-	240	pF

Figure 1. Average forward power dissipation versus average forward current

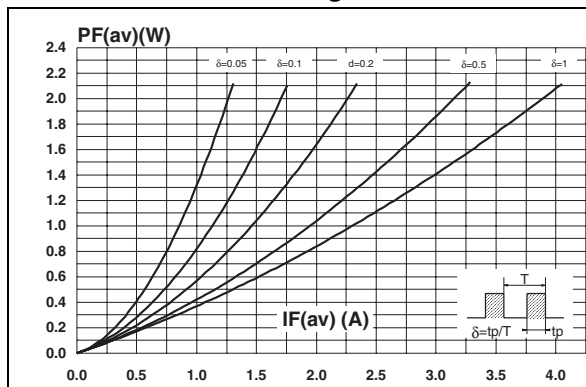
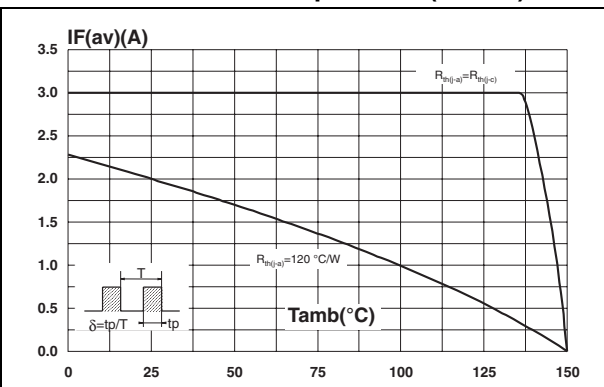
Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

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

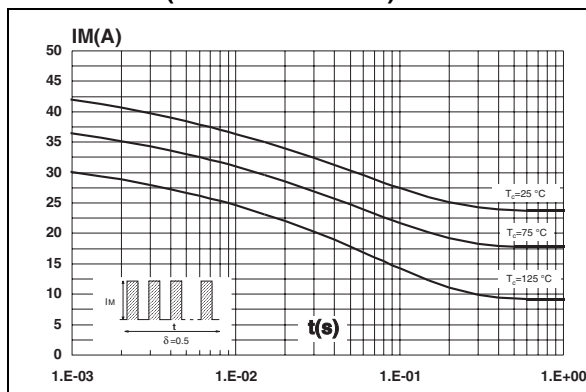


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

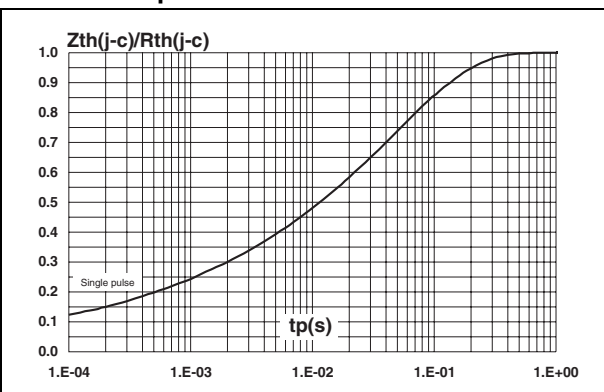


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

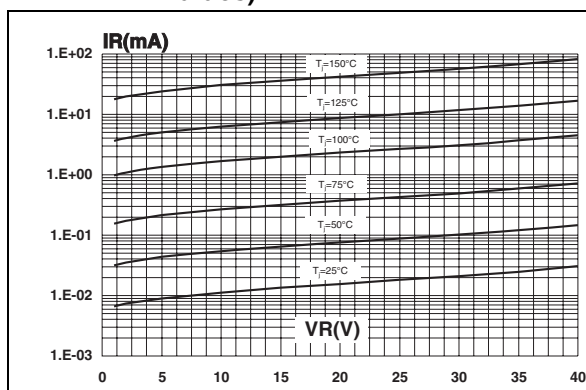


Figure 6. Forward voltage drop versus forward current (typical values)

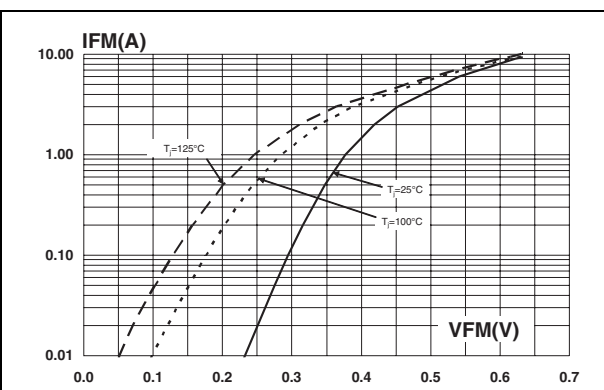
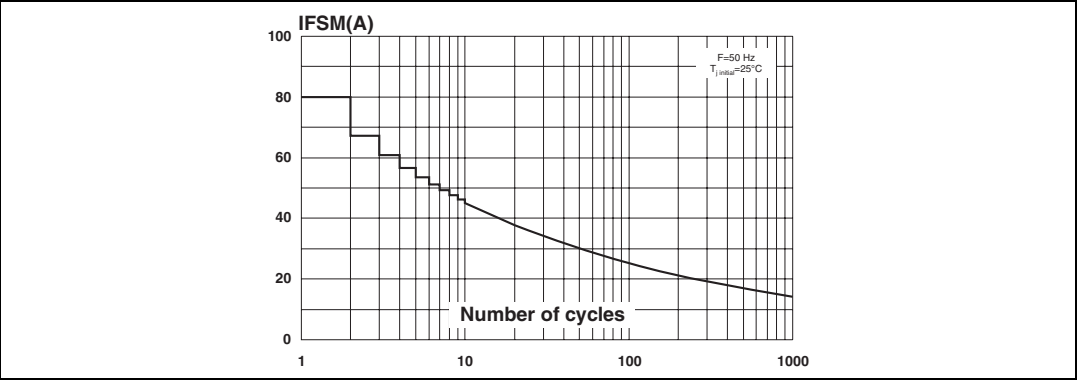


Figure 7. Non repetitive surge peak forward current versus number of cycles



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. 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 ⁽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	3.82	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⁽¹⁾

Order code	ESCC detailed specification	Package	Lead finish	Marking	EPPL	Weight	Packing
1N5822UB1	-	LCC2B	Gold plated	22UB1	-	0.18 g	Waffle pack
1N5822U02B	5106/020/02		Solder dip	22U02B	Y		

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

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
10-Aug-2009	1	First issue.
23-Sep-2011	2	Updated Table 1 and Table 7 for ESCC qualification.

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