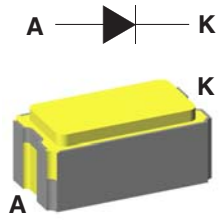
1N5806U

Aerospace 2.5 A fast recovery 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: 0.12 g
- Target radiation qualification
  - 150 krad (Si) low dose rate
  - 3 Mrad (Si) high dose rate
- Under ESCC qualification



LCC2A

Description

This power ultrafast recovery rectifier is designed and packaged to comply with the ESCC5000 specification for aerospace products. It is housed in a surface mount hermetically sealed LCC2A package whose footprint is 100% compatible with industry standard solutions in D5A.

The 1N5806U 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}	$T_{j(max)}$	$V_{F\,(max)}$
1N5806UA1	-	Engineering model	Gold plated	-	2.5 A	150 V	175 °C	1.0 V
1N5806U01A	5101/014/13	Flight part	Gold plated	Y				
1N5806U02A	5101/014/14	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		150	V
$I_{F(RMS)}$	Forward rms current		6	A
$I_{F(AV)}$	Average forward rectified current	T_c = 135 °C, δ = 0.5	2.5	A
I_{FSM}	Forward surge current	t_p = 8.3 ms sinusoidal	35	A
		t_p = 10 ms sinusoidal	33	
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		175	°C
T_{sol}	Maximum soldering temperature (1)		245	°C

1. 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
$R_{th\ (j-c)}$	Junction to case	13	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse current	T_j = 25 °C	V_R = 150 V	-	-	0.5	µA
		T_j = 125 °C		-	-	20	
		T_j = 25 °C	V_R = 160 V	-	-	10	
		T_j = -65 °C		-	-	10	
V_F (2)	Forward voltage	T_j = 25 °C	I_F = 1 A	-	-	880	mV
		T_j = 125 °C		-	-	800	
		T_j = -65 °C		-	-	1075	
		T_j = 25 °C	I_F = 2.5 A	-	-	1000	

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

To evaluate the conduction losses use the following equation:

$P = 0.70 \times I_{F(AV)} + 0.10 \times I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{RR}	Reverse recovery time	$I_F = I_R = 0.5$ A, $I_{rr} = 0.05$ A, dI/dt = -65 A/µs (min.)	-	-	25	ns
		$I_F = 1$ A, $V_R = 30$ V, dI/dt = -50 A/µs,	-	-	30	
V_{FP}	Forward recovery voltage	$I_{FM} = 250$ mA	-	-	2.2	V
t_{FR}	Forward recovery time	$I_{FM} = 250$ mA, $V_{RF} = 1.1 \times V_F$	-	-	15	ns
C_j	Diode capacitance	$V_R = 10$ V, F = 1 MHz	-	-	25	pF

Figure 1. Forward voltage drop versus forward current (typical values)

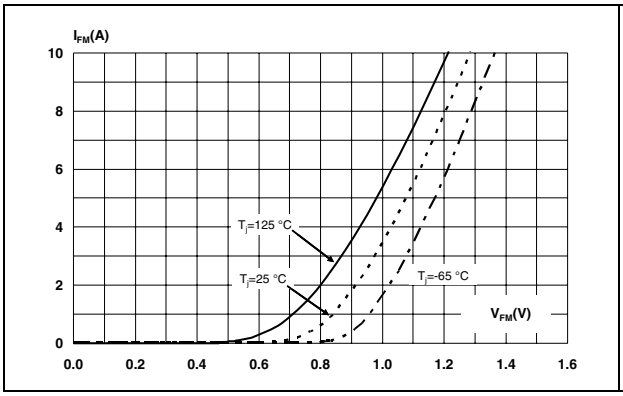


Figure 2. Forward voltage drop versus forward current (maximum values)

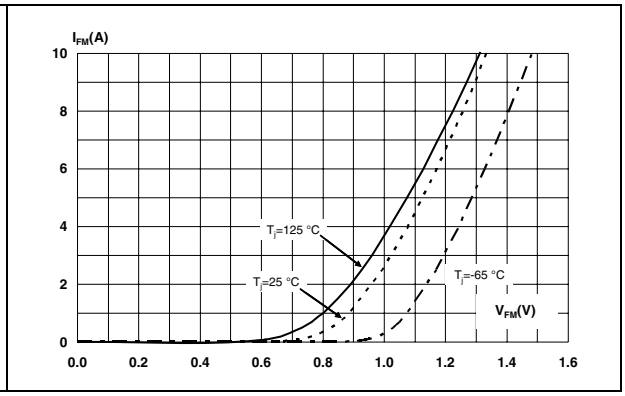


Figure 3. Reverse leakage current versus reverse voltage applied (typical values)

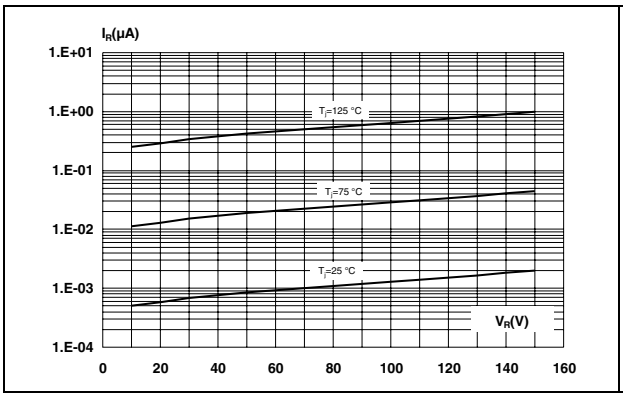


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

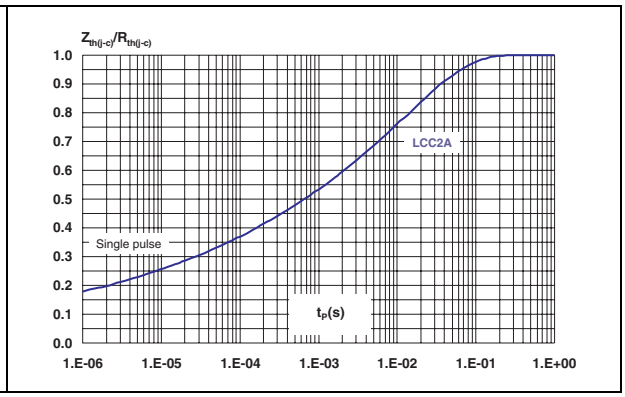


Figure 5. Reverse recovery time versus dI_F/dt

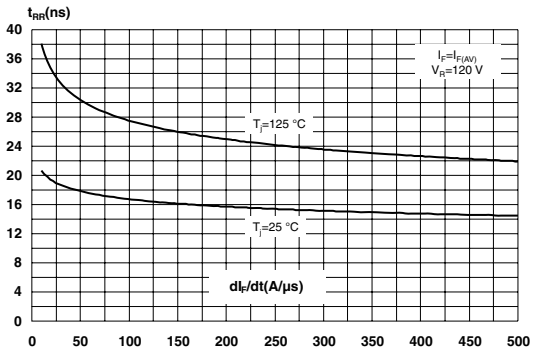
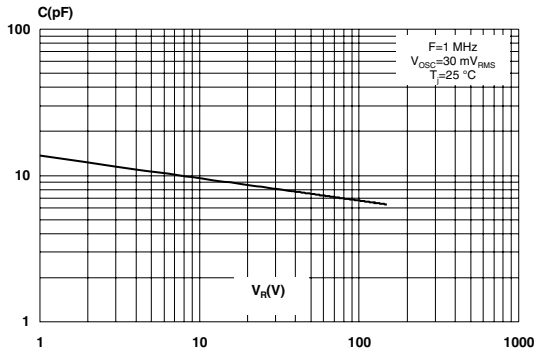


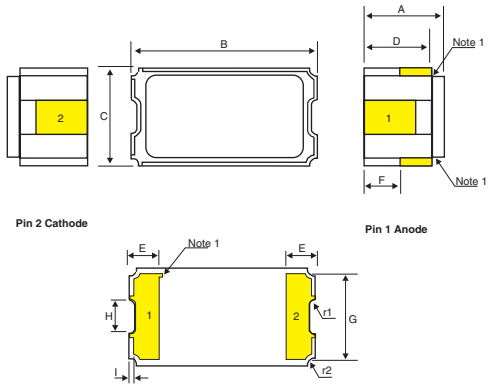
Figure 6. Junction capacitance versus reverse voltage applied (typical values)



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 (LCC2A) package dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A(1)	1.86	2.03	2.20	0.073	0.080	0.087
B	4.54	4.67	4.87	0.179	0.184	0.192
C	2.33	2.46	2.59	0.92	0.97	0.102
D	1.53	1.70	1.87	0.060	0.067	0.074
E	0.48	-	0.71	0.019	-	0.028
F	-	1.3	-	-	0.051	-
G	-	2.16	-	-	0.085	-
H	-	0.86	-	-	00.34	-
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
1N5806UA1	-	LCC2A	Gold plated	06UA1	-	0.12 g	Waffle pack
1N5806U01A	5101/014/13		Gold plated	06U01A	Y	0.12 g	
1N5806U02A	5101/014/14		Solder dip	06U02A	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
27-Jul-2009	1	First issue.

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