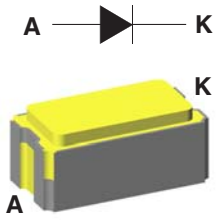
1N6642U

Aerospace 0.3 A - 100 V switching diode

Features

- Surface mount hermetic package
- High thermal conductivity materials
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Target radiation qualification:
  - 150 krad (Si) low dose rate
  - 3 Mrad high dose rate
- Package weight: 0.12 g



LCC-2D

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 LCC-2D package whose footprint is 100% compatible with industry standard solutions in D5A.

The 1N6642U 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	EPPL	$I_{F(AV)}$	V_{RRM}	$T_{j(max)}$	$V_{F\ (max)}$
1N6642UD1	-	Engineering model	-	0.3 A	100 V	175 °C	1.2 V
1N6642U02D	5101/026/xx	Flight part	Target				

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

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		100	V
$I_{F(RMS)}$	Forward rms current		0.5	A
$I_{F(AV)}$	Average forward rectified current (1)		300	mA
I_{FSM}	Forward surge current	t_p = 8.3 ms sinusoidal, $t_{amb} \leq 25$ °C	2	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range		-65 to +175	°C
T_{sol}	Maximum soldering temperature (2)		245	°C

1. For all variants at $T_c \geq +155$ °C per diode, derate linearly to 0 A at +175 °C.
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 (1)	60	°C/W
$R_{th\ (j\text{-}a)}$	Junction to ambient	280	

1. Package mounted on infinite heatsink

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
V_{BR} (1)	Breakdown voltage	T_j = 25 °C	I_R = 100 µA	100	-	-	V
I_R (1)	Reverse current	T_j = 25 °C	V_R = 20 V	-	-	25	nA
		T_j = 25 °C	V_R = 75 V	-	-	50	nA
		T_j = 150 °C	V_R = 20 V	-	-	30	µA
		T_j = 150 °C	V_R = 75 V	-	-	40	µA
V_F (2)	Forward voltage	T_j = 25 °C	I_F = 10 mA	-	-	800	mV
		T_j = 25 °C	I_F = 100 mA	-	-	1200	
		T_j = 150 °C	I_F = 10 mA	-	-	800	
		T_j = -55 °C	I_F = 100 mA	-	-	1200	

1. Pulse test: tp = 10 ms, $\delta < 2\%$
2. Pulse test: tp = 680 µs, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.74 \times I_{F(AV)} + 1.00 \times I_F{}^2{}_{(RMS)}$$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$I_F = I_R = 10$ mA(1)	-	-	9	ns
		$I_F = 1$ A, $V_r = 30$ V, dI/dt = -15 A/µs			20	
V_{FP}	Forward recovery voltage	$I_{FM} = 200$ mA	-	-	5	V
t_{FR}	Forward recovery time	$I_{FM} = 200$ mA	-	-	20	ns
C_j	Diode capacitance	$V_R = 0$ V, V = 50 mV, F = 1 MHz	-	-	5	pF
		$V_R = 1.5$ V, V = 50 mV, F = 1 MHz	-	-	2.8	pF

1. Guaranteed but not tested

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

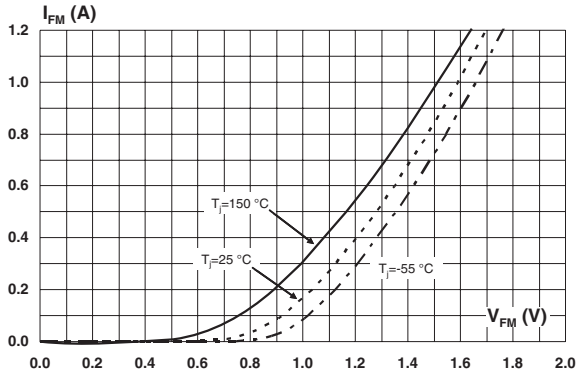


Figure 2. Forward voltage drop versus forward current (maximum values)

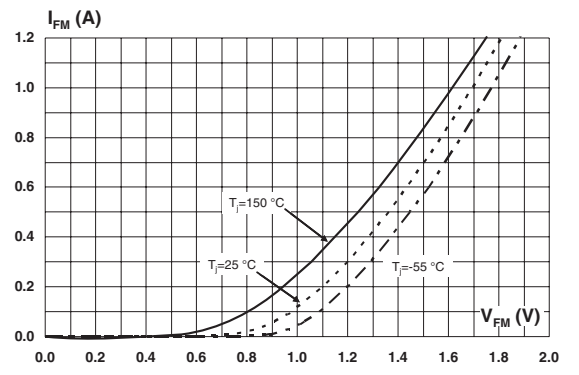


Figure 3. Reverse leakage current versus reverse voltage applied (typical values)

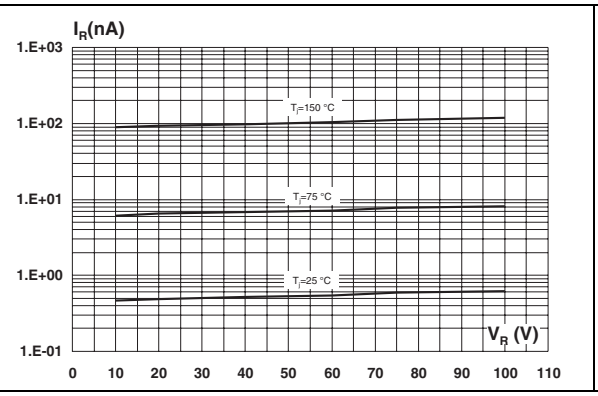


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

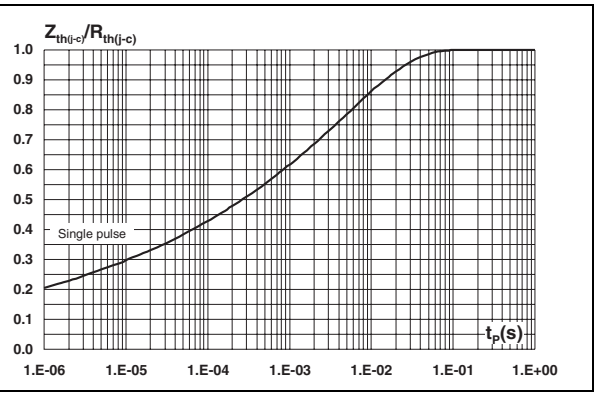
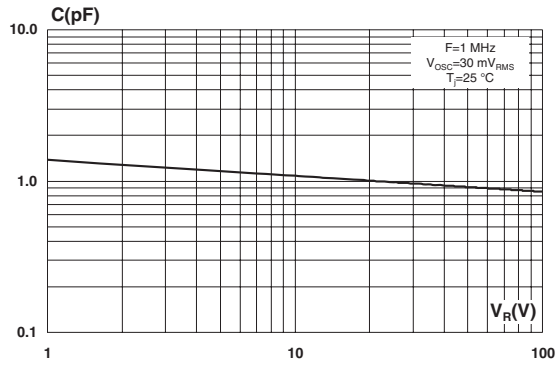


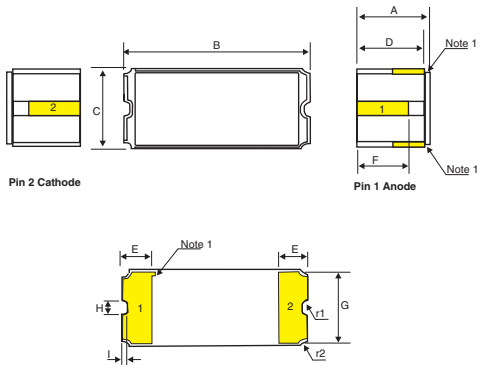
Figure 5. Junction capacitance versus reverse voltage applied (typical values)



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 (LCC-2D) 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	4.44	4.57	4.77	0.175	0.180	0.188
C	1.84	1.97	2.10	0.072	0.078	0.083
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	-	1.67	-	-	0.066	-
H	-	0.37	-	-	0.015	-
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
1N6642UD1	-	LCC-2D	Gold	42UD1	-	0.12 g	Waffle pack
1N6642U02D	5101/026/xx		Solder dip	42U02D	Target		

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

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
26-Mar-2010	1	First issue.
23-Sep-2011	2	Updated order codes in *Table 1* and *Table 7*.

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