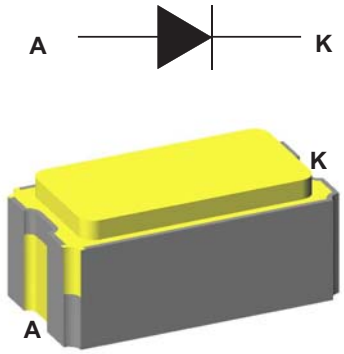
1N6640U

Aerospace 0.3 A - 75 V switching diode

Datasheet - production data



Leadless chip carrier 2 (LCC2D)

Description

Packaged in LCC2D this device intended for use in low voltage, high frequency inverters, free wheeling, polarity protection and other aerospace applications.

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 (Si) high dose rate
- Package mass: 0.12 g

Table 1. Device summary(1)

Order code	ESCC detailed specification	Quality level	Lead finish	EPPL	$I_{F(AV)}$	V_{RRM}	$T_{j(max)}$	$VF_{(max)}$
1N6640UD1		Engineering model	Gold		0.3	75	175	1,06
1N6640U01D	5101/027/07	ESCC	Gold	Yes				
1N6640U02D	5101/027/08	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		75	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 = 10 µA	75	-	-	V
I_R (1)	Reverse current	T_j = 25 °C	V_R = 50 V	-	-	40	nA
		T_j = 150 °C		-	-	30	µA
V_F (2)	Forward voltage	T_j = 25 °C	I_F = 1 mA	540	-	630	mV
		T_j = 25 °C	I_F = 50 mA	760	-	890	
		T_j = 25 °C	I_F = 100 mA	820	-	980	
		T_j = 25 °C	I_F = 200 mA	870	-	1100	
		T_j = -55 °C	I_F = 200 mA	-	-	1200	

1. Pulse test: tp = 10 ms, δ < 2%
2. Pulse test: tp = 680 µs, δ < 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	-	-	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	-	-	3	pF

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

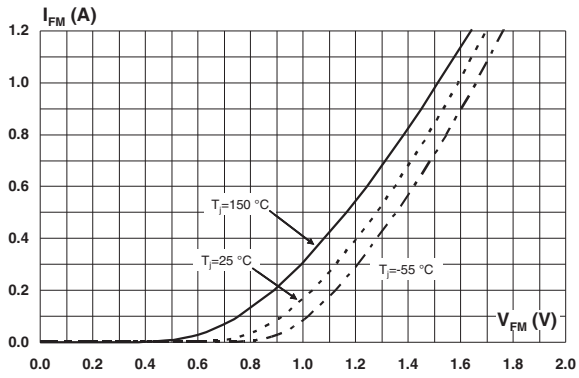


Figure 2. Forward voltage drop versus forward current (maximum values)

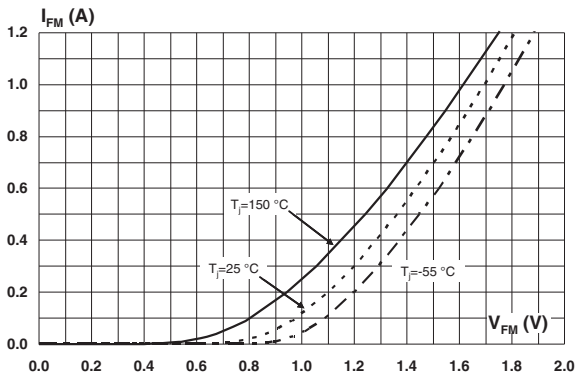


Figure 3. Reverse leakage current versus reverse voltage applied (typical values)

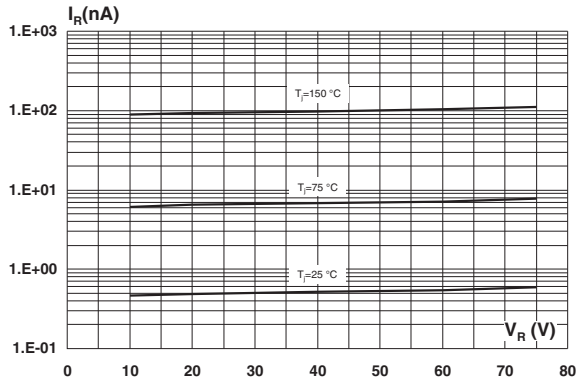


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

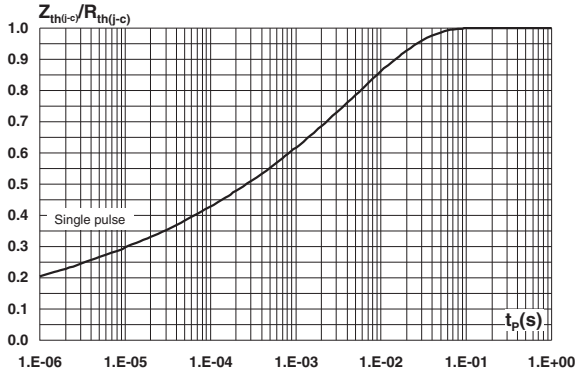
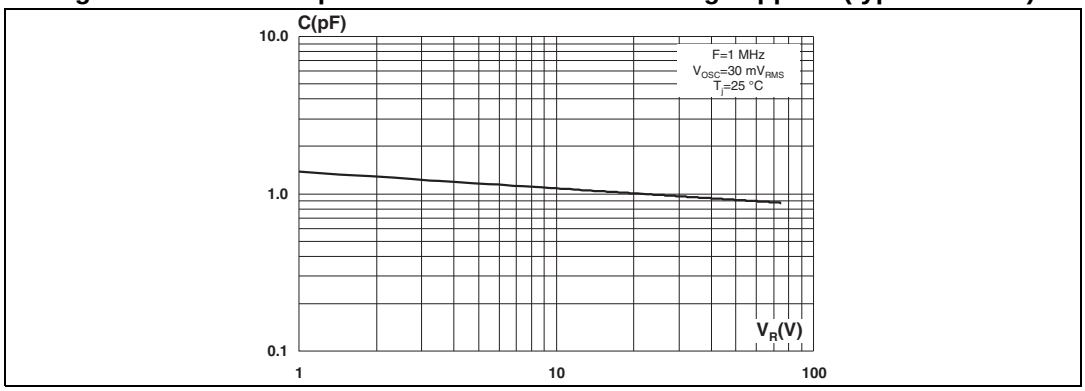


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

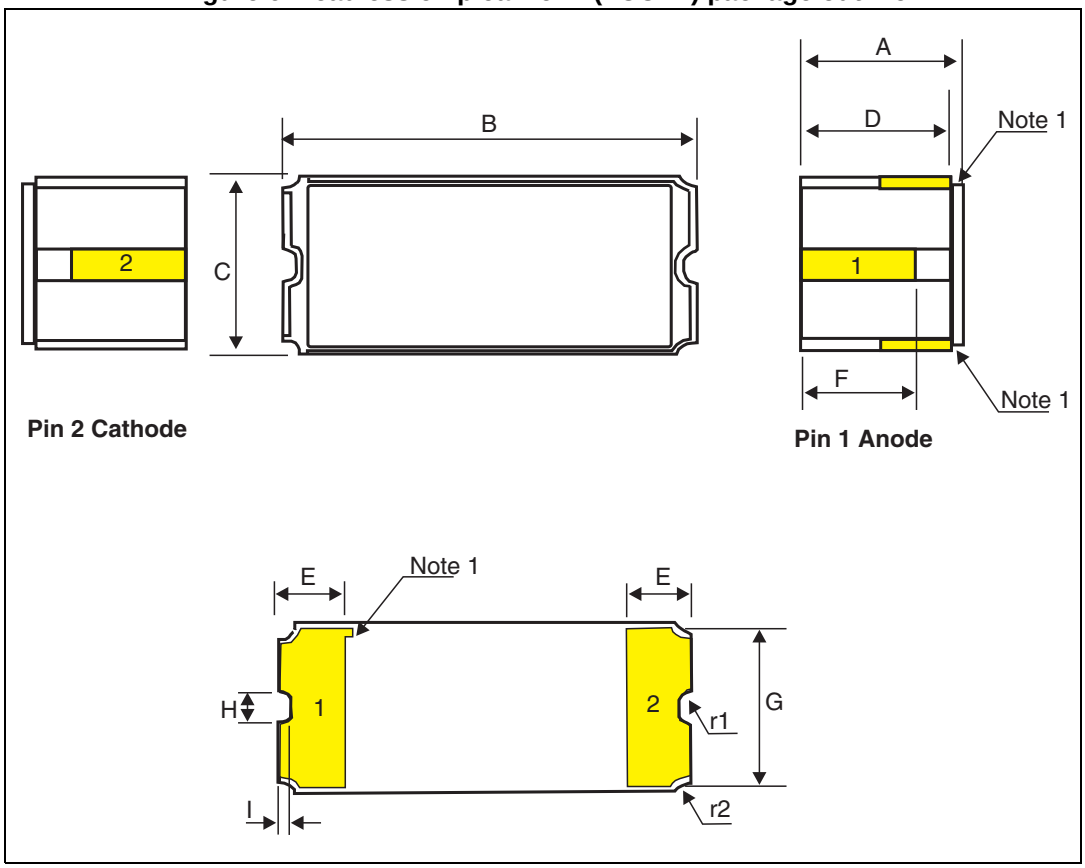


2 Package information

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.

2.1 Leadless chip carrier 2 (LCC2D) package information

Figure 6. Leadless chip carrier 2 (LCC2D) package outline



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

Table 6. Leadless chip carrier 2 (LCC2D) package mechanical data

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	-

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
1N6640UD1	-	LCC2D	Gold	1N6640UD1	-	0.12 g	Waffle pack
1N6640U01D	5101/027/07		Gold	510102707	Y		
1N6640U02D	5101/027/08		Solder dip	510102708	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
26-Mar-2010	1	First issue.
23-Sep-2011	2	Updated order codes in Table 1 Table 7.
8-Nov-2013	3	Updated Table 1, Table 5 and Table 7 and inserted Other information.
04-Dec-2015	4	Updated *Table 7* and reformatted to current standard.