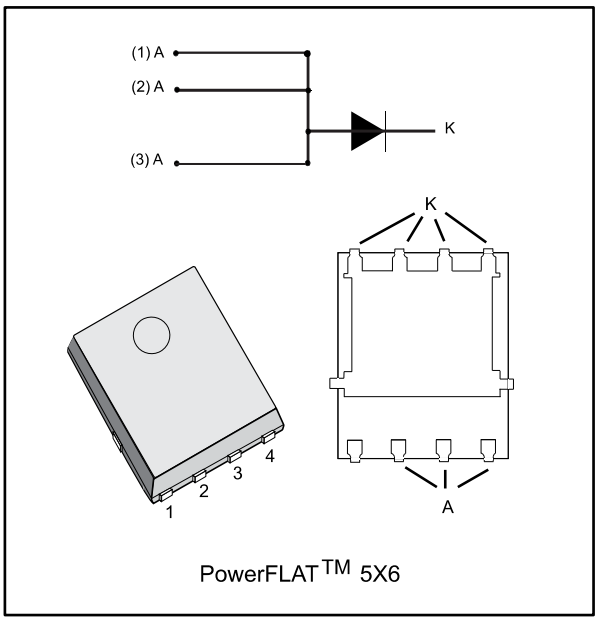
FERD20U60DJFD

Field effect rectifier

Datasheet - production data



PowerFLAT™ 5X6

Description

This single rectifier is based on a proprietary technology, enabling to achieve the best in class V_F/I_R trade-off for a given silicon surface.

Packaged in PowerFLAT™ 5x6, this device is intended to be used in rectification and freewheeling operations in switch-mode power supplies.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	20 A
V_{RRM}	60 V
T_j (max.)	+150 °C
V_F (typ.)	350 mV

Features

- ST proprietary process
- Stable leakage current over reverse voltage
- Low forward voltage drop
- High frequency operation

TM: PowerFLAT is a trademark of STMicroelectronics

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		60	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 115 °C	20	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	180	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature (1)		+150	°C

Notes:

(1)$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 3: Thermal resistance parameters

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	2.6	°C/W

Table 4: Static electrical characteristics, anode terminals short circuited

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		800	µA
		T_j = 125 °C		-	30	70	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-	0.380	0.425	V
		T_j = 125 °C		-	0.350	0.400	
		T_j = 25 °C	I_F = 20 A	-	0.465	0.510	
		T_j = 125 °C		-	0.465	0.505	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.295 \times I_{F(AV)} + 0.0105\ I_F{}^2{}_{(RMS)}$

1.1 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current

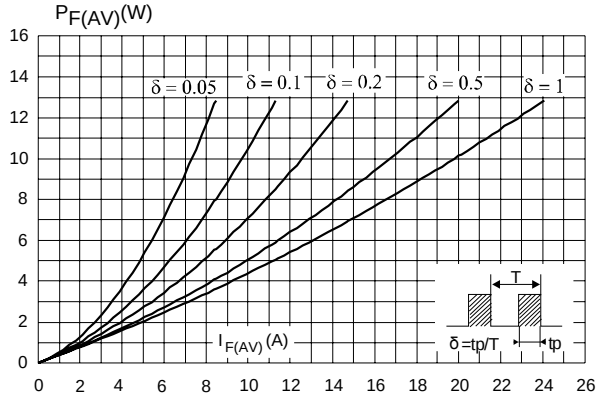


Figure 2: Average forward current versus ambient temperature (δ = 0.5)

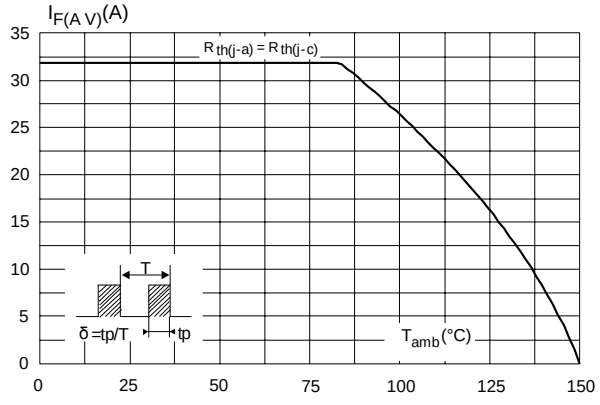


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

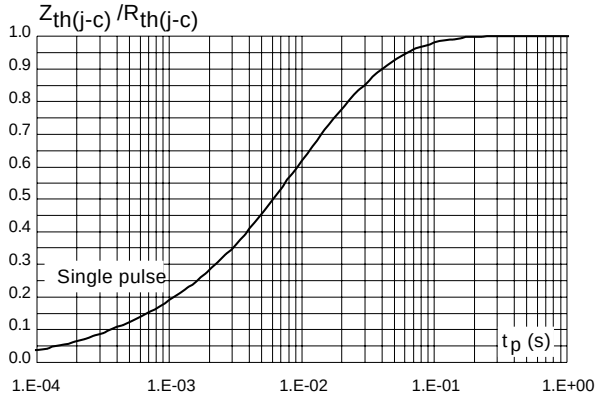


Figure 4: Reverse leakage current versus reverse voltage applied (typical values)

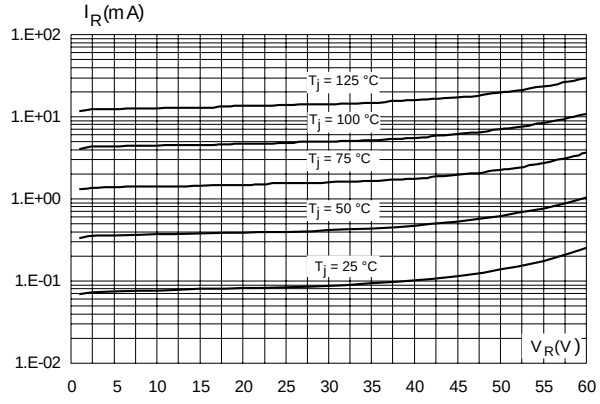


Figure 5: Junction capacitance versus reverse voltage applied (typical values)

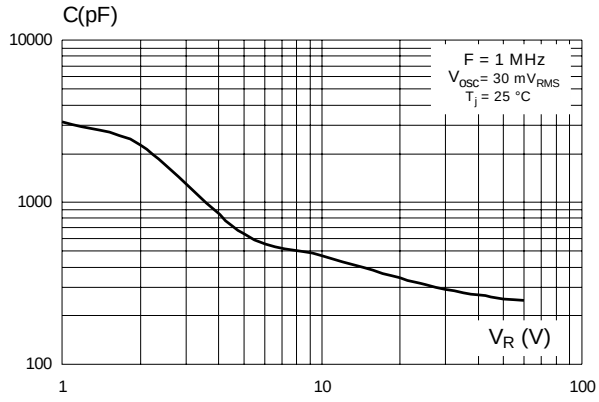


Figure 6: Forward voltage drop versus forward current (typical values)

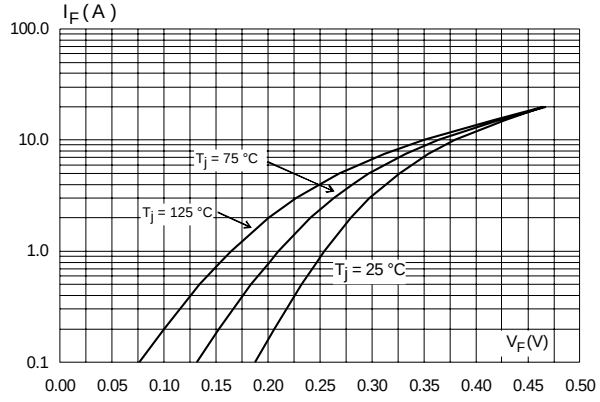
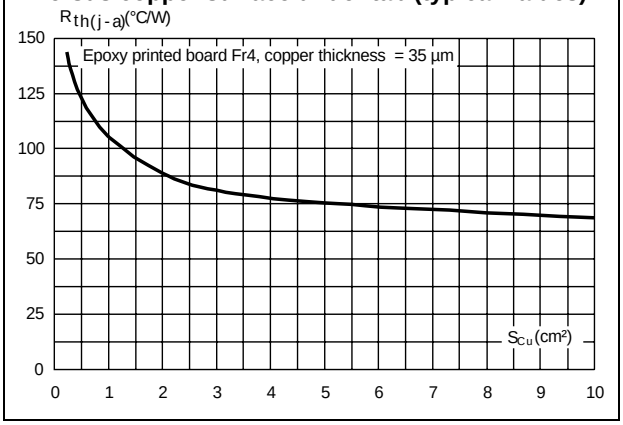


Figure 7: Thermal resistance junction to ambient versus copper surface under tab (typical values)



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.

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

2.1 PowerFLAT™ 5x6 8L package information

Figure 8: PowerFLAT™ 5x6 8L package outline

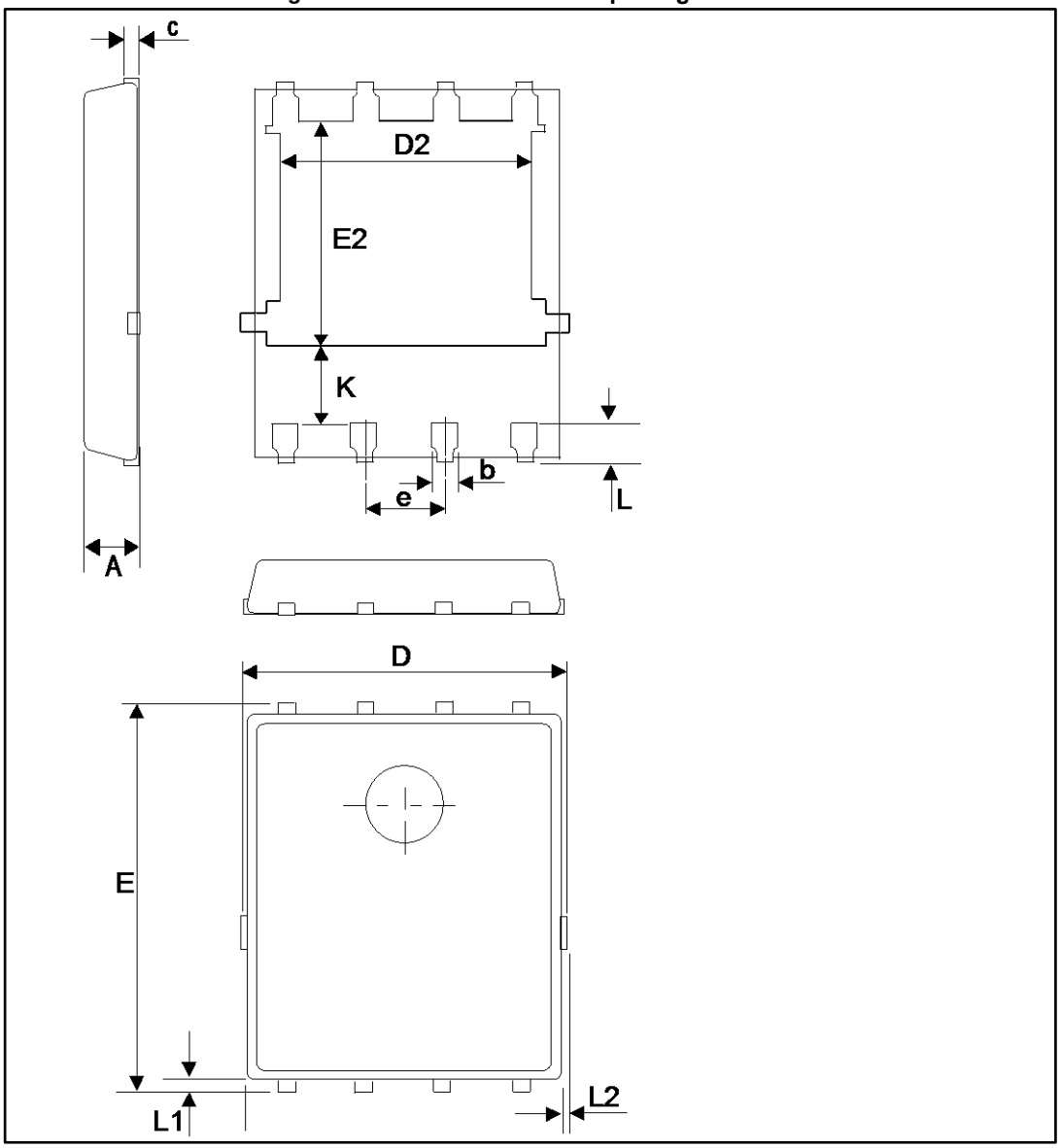
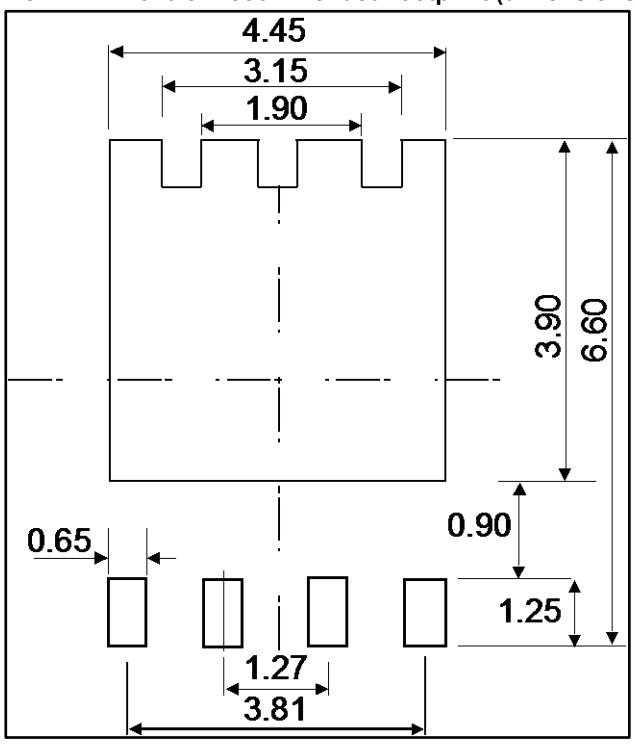


Table 5: PowerFLAT™ 5x6 8L mechanical data

Dim.						
Ref	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
b	0.30		0.50	0.011		0.019
c		0.25			0.10	
D			5.10			0.201
D2	3.91		4.11	0.153		0.162
e		1.27			0.05	
E	5.90		6.10	0.232		0.240
E2	3.34		3.54	0.131		0.139
K	1.10		1.575	0.043		0.062
L	0.50		0.80	0.019		0.031
L1	0.06		0.20	0.002		0.008
L2			0.10			0.004

Figure 9: PowerFLAT™ 5x6 8L recommended footprint (dimensions are in mm)



3 Ordering information

Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
FERD20U60DJFD-TR	FD20U60	PowerFLAT 5x6	0.9 g	3000	Tape and reel

4 Revision history

Table 7: Document revision history

Date	Revision	Changes
11-Feb-2015	1	Initial release.
27-Sep-2017	2	Updated description in cover page. Minor text changes.

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