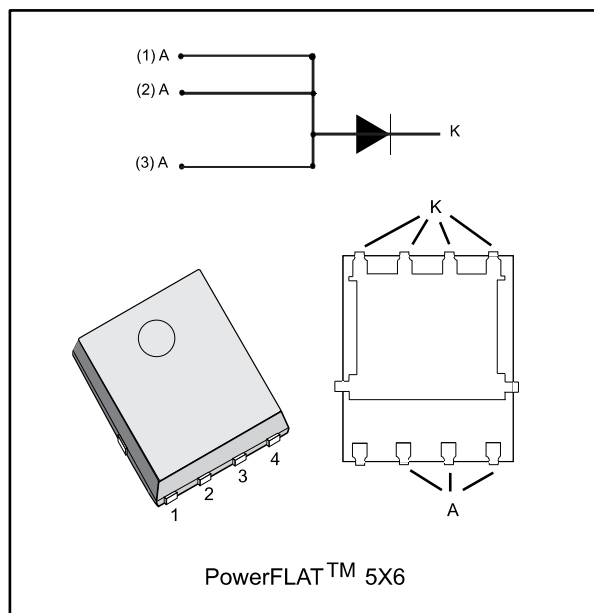


Field effect rectifier

Datasheet - production data



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 $\delta = 0.5$, square wave	$T_C = 115\text{ °C}$	20	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ 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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		800	μA
		$T_j = 125\text{ °C}$		-	30	70	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$	-	0.380	0.425	V
		$T_j = 125\text{ °C}$		-	0.350	0.400	
		$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$	-	0.465	0.510	
		$T_j = 125\text{ °C}$		-	0.465	0.505	

Notes:

⁽¹⁾Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

⁽²⁾Pulse test: $t_p = 380\text{ μs}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

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

1.1 Characteristics (curves)

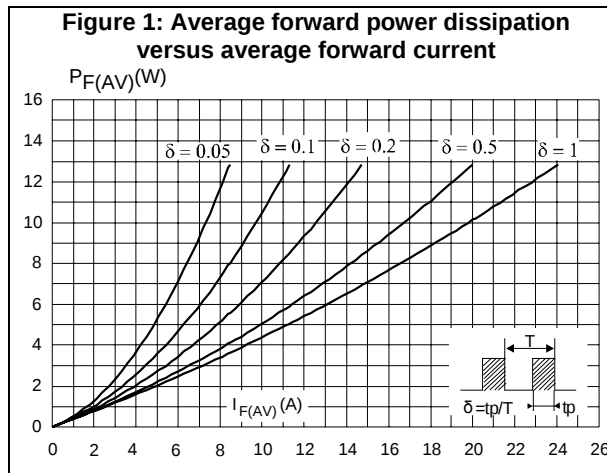


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$)

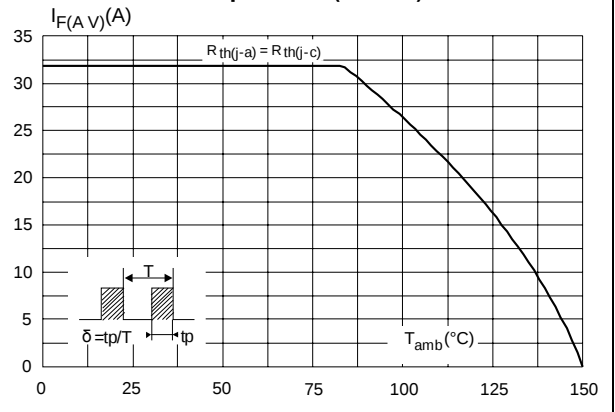


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

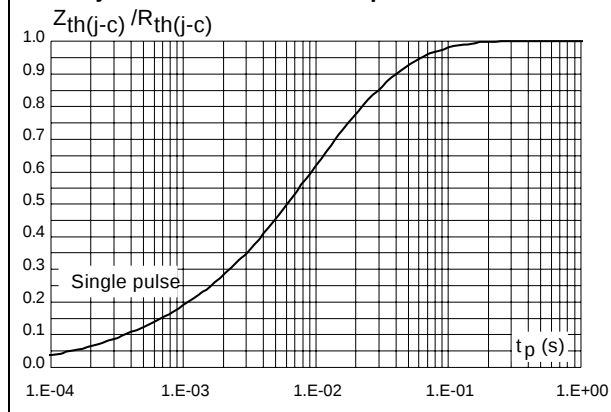


Figure 4: Reverse leakage current versus reverse voltage applied (typical values)

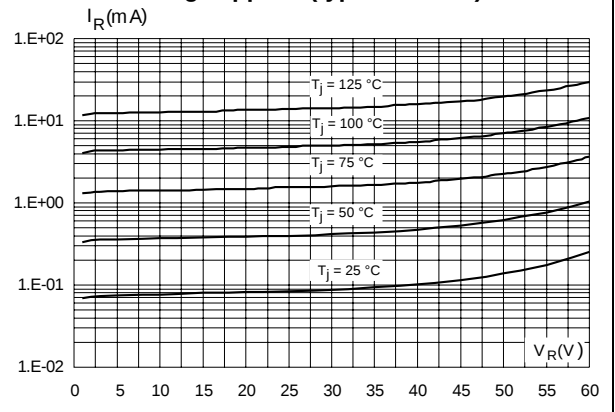


Figure 5: Junction capacitance versus reverse voltage applied (typical values)

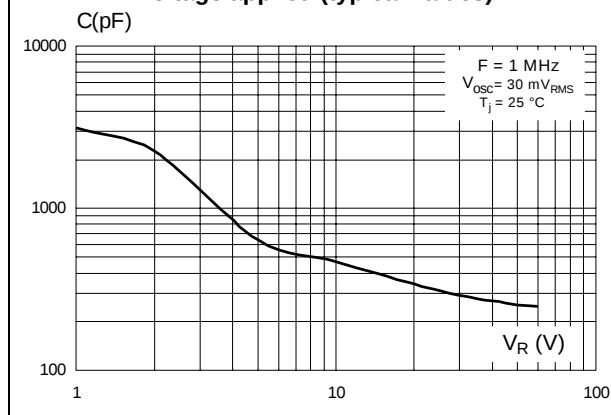
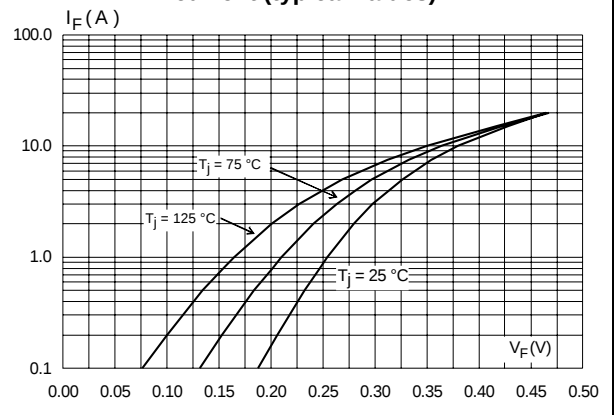
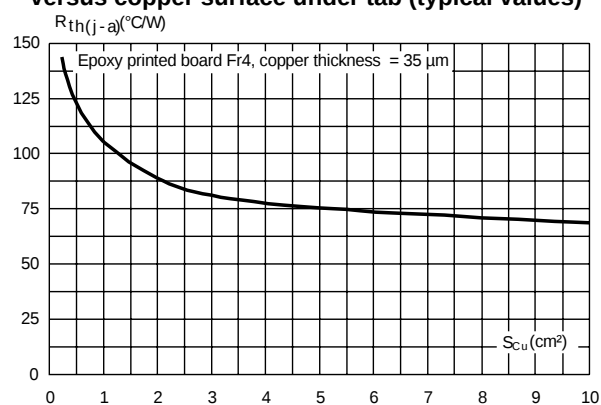


Figure 6: Forward voltage drop versus forward current (typical values)



**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

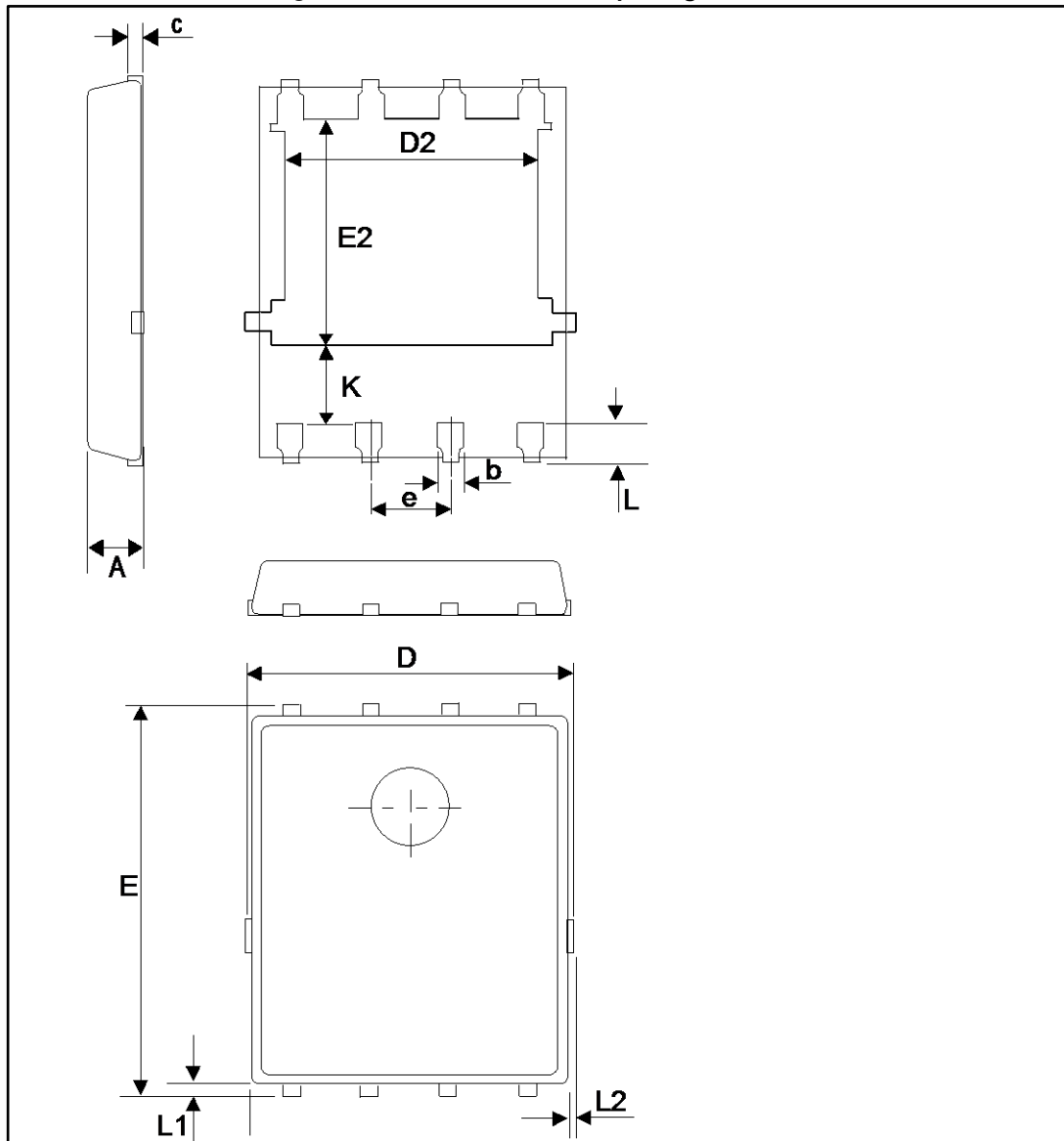
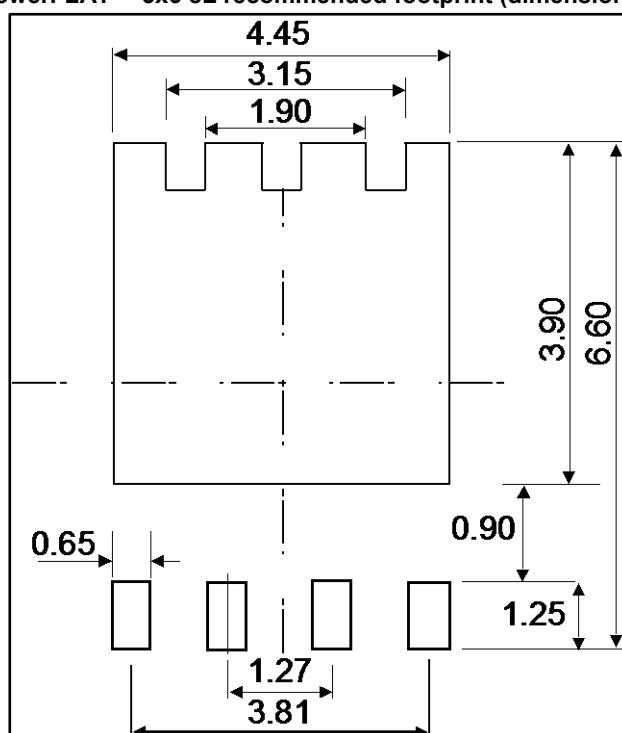


Table 5: PowerFLAT™ 5x6 8L mechanical data

Ref	Dim.					
	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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