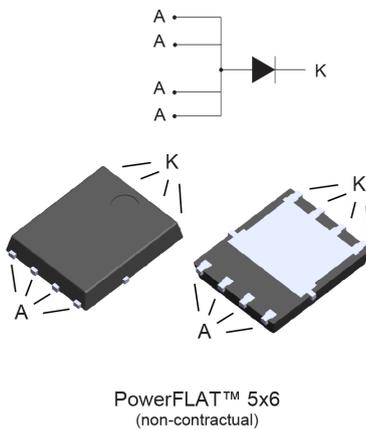


## 100 V, 30 A field effect rectifier



### Features

- ST patented rectifier process
- Stable leakage current over reverse voltage
- Low forward voltage drop
- High frequency operation
- ECOPACK®2 compliant

### Applications

- Switching diode
- Notebook adapter
- LED lighting
- DC / DC converter

### Description

The FERD30SM100DJF is based on a proprietary technology that achieves the best in class  $V_F / I_R$  trade-off for a given silicon surface.

Packaged in PowerFLAT™ 5x6, the FERD30SM100DJF is optimized for use in confined applications where both efficiency and thermal performance are key.

Product status	
FERD30SM100DJF	
Product summary	
Symbol	Value
$I_{F(AV)}$	30 A
$V_{RRM}$	100 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.665 V

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited)**

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage	100	V	
I <sub>F(RMS)</sub>	Forward rms current	45	A	
I <sub>F(AV)</sub>	Average forward current, $\delta = 0.5$ , square wave	T <sub>C</sub> = 100 °C	30	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	180	A
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>	+175	°C	

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

**Table 2. Thermal resistance parameter**

Symbol	Parameter	Max. value	Unit
R <sub>th(j-c)</sub>	Junction to case	2.6	°C/W

For more information, please refer to the following application note :

- AN5046 : Printed circuit board assembly recommendations for STMicroelectronics PowerFLAT™ packages

**Table 3. Static electrical characteristics (anode terminals short-circuited)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	-	-	150	μA
		T <sub>j</sub> = 125 °C	-	8	16	mA
		T <sub>j</sub> = 125 °C	-	-	9	
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	-	-	0.480	V
		T <sub>j</sub> = 125 °C	-	0.395	0.435	
		T <sub>j</sub> = 25 °C	-	-	0.595	
		T <sub>j</sub> = 125 °C	-	0.510	0.555	
		T <sub>j</sub> = 25 °C	-	-	0.970	
		T <sub>j</sub> = 125 °C	-	0.665	0.735	

1. Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$

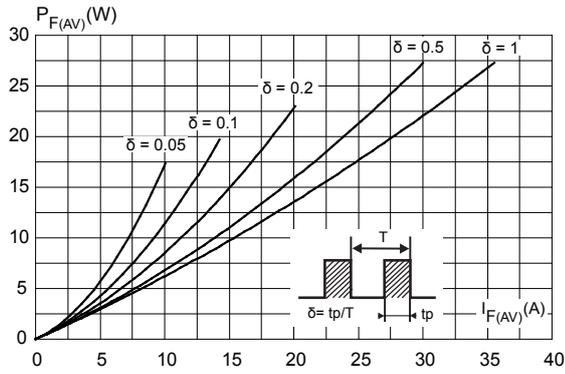
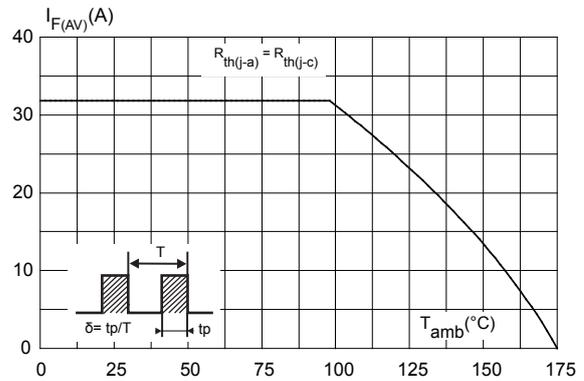
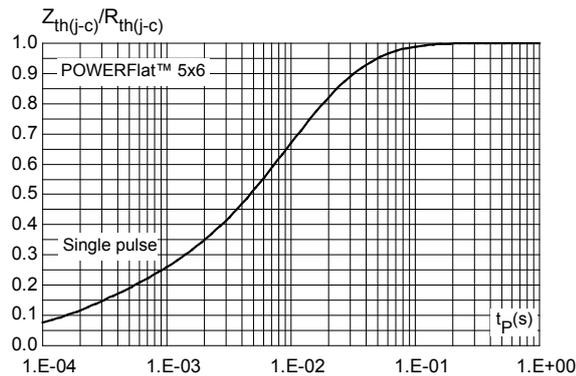
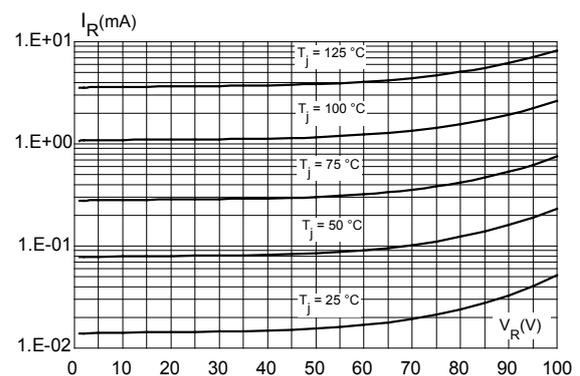
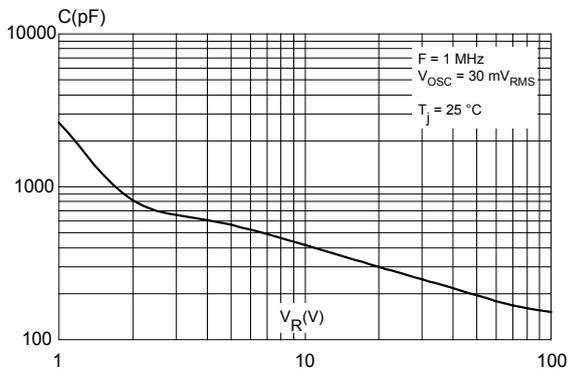
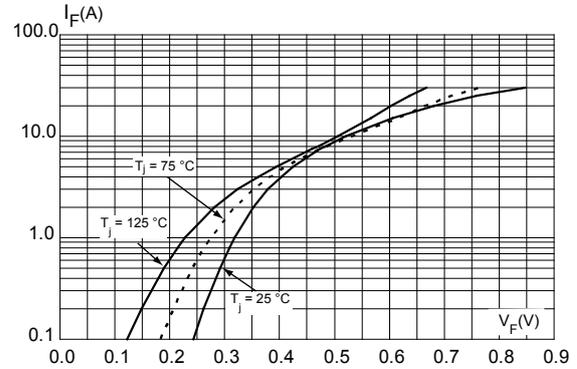
2. Pulse test: t<sub>p</sub> = 380 μs,  $\delta < 2\%$

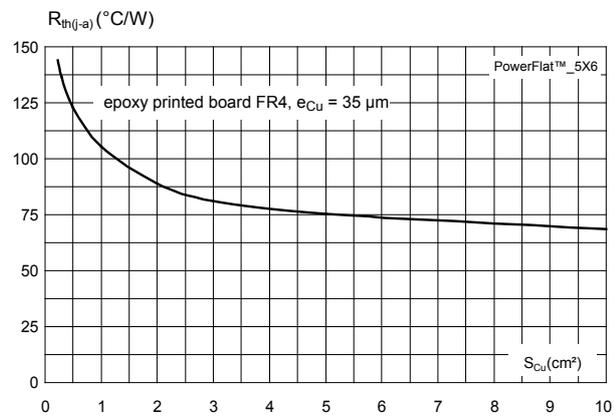
To evaluate the conduction losses, use the following equation:

$$P = 0.562 \times I_{F(AV)} + 0.0057 \times I_{F(RMS)}^2$$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

**1.1 Characteristics (curves)**
**Figure 1. Average forward power dissipation versus average forward current (anode terminals short circuited)**

**Figure 2. Average forward current versus ambient temperature (delta = 0.5, anode terminals short circuited)**

**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, anode terminals short circuited)**


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


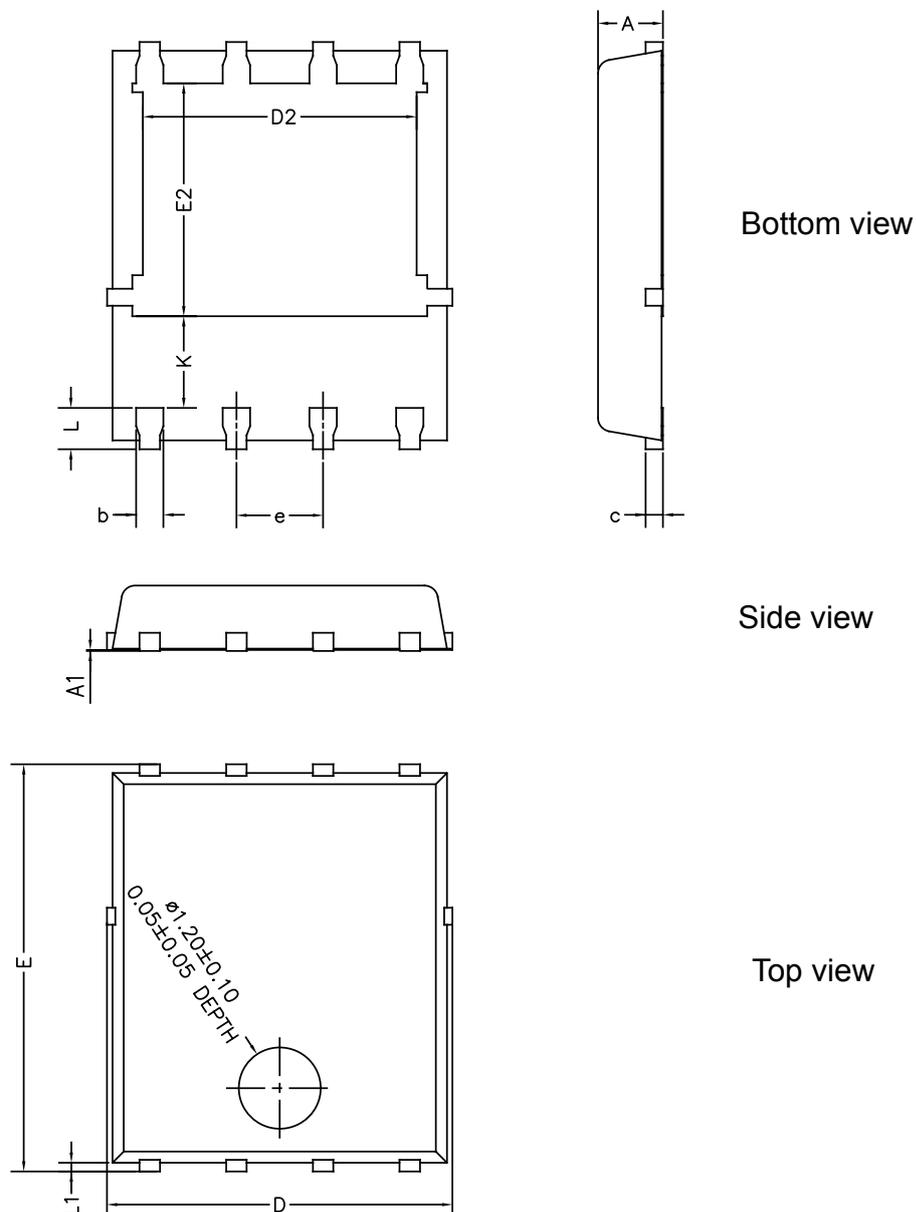
## 2 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 PowerFLAT™ 5x6 package information

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

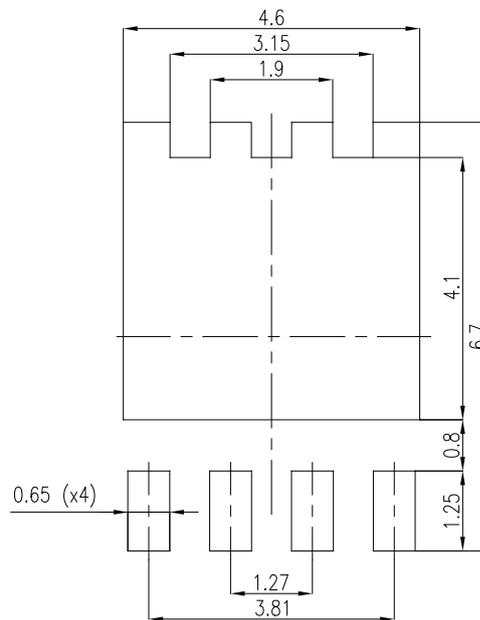
**Figure 8. PowerFLAT™ 5x6 package outline (non-contractual)**



**Table 4. PowerFLAT™ 5x6 mechanical data**

Ref	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
A1	0.00		0.05	0.000		0.002
b	0.30		0.50	0.01		0.02
c		0.25			0.010	
D	4.80		5.40	0.189		0.212
D2	3.91		4.45	0.154		0.175
e		1.27			0.050	
E	5.90		6.35	0.232		0.250
E2	3.34		3.70	0.138		0.146
L	0.50		0.80	0.020		0.031
K	1.10		1.575	0.015		0.023
L1	0.05	0.15	0.25	0.002	0.006	0.009

**Figure 9. PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)**



### 3 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
FERD30SM100DJFTR	F30SM 100	PowerFLAT™ 5x6	95 mg	3000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Version	Changes
09-Jan-2015	1	Initial release.
29-Nov-2018	2	Updated Section Cover image and Section 2.1 PowerFLAT™ 5x6 package information. Added Section Applications.
08-Feb-2019	3	Updated Figure 8. PowerFLAT™ 5x6 package outline (non-contractual) and Table 4. PowerFLAT™ 5x6 mechanical data.

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