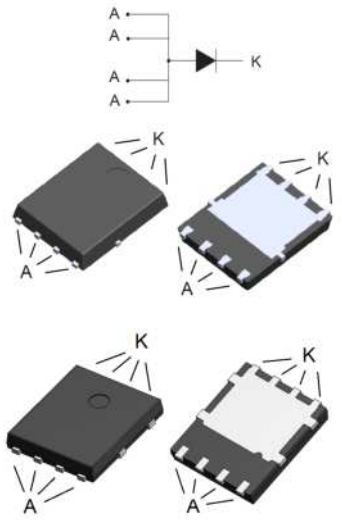
STPS30M60DJF

Datasheet

60 V, 30 A high efficiency PowerFLAT power Schottky diode



PowerFLAT 5 x 6
(non-contractual)

Features

- Low forward voltage drop
- Very low conduction losses
- Low thermal resistance
- Avalanche rated
- High integration
- Thin package: 1 mm
- ECOPACK2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

Description

This Schottky rectifier is ideally suited for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT 5x6, the STPS30M60DJF is optimized for use in low voltage high frequency inverters, free-wheeling and polarity protection applications.

Its low profile was especially designed to be used in applications with space-saving constraints.

Product status link
STPS30M60DJF

Product summary	
Symbol	**Value**
$I_{F(AV)}$	30 A
V_{RRM}	60 V
T_j (max.)	150 °C
V_F (typ.)	0.46 V

1 Characteristics

Table 1. 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 = 100 °C	30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	250	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	1370	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		+150	°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 parameters

Symbol	Parameter	Max.	Unit
$R_{th(j-c)}$	Junction to case	2	°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_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		90	µA
		T_j = 125 °C		-	20	50	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		0.59	V
		T_j = 125 °C		-	0.46	0.52	
		T_j = 25 °C	I_F = 30 A	-		0.72	
		T_j = 125 °C		-	0.57	0.67	

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:

$P = 0.55 \times I_{F(AV)} + 0.004 \times I_F{}^2{}_{(RMS)}$

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 in a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

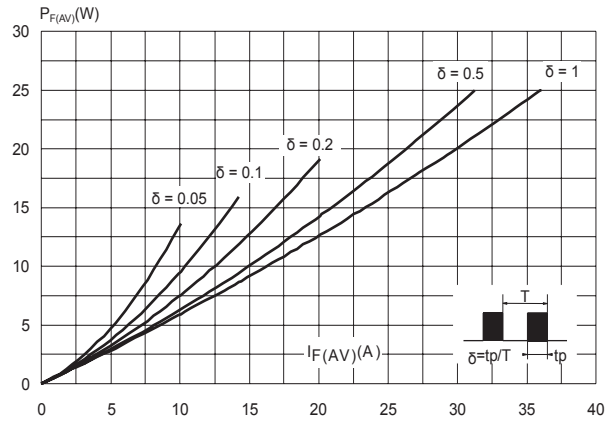


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

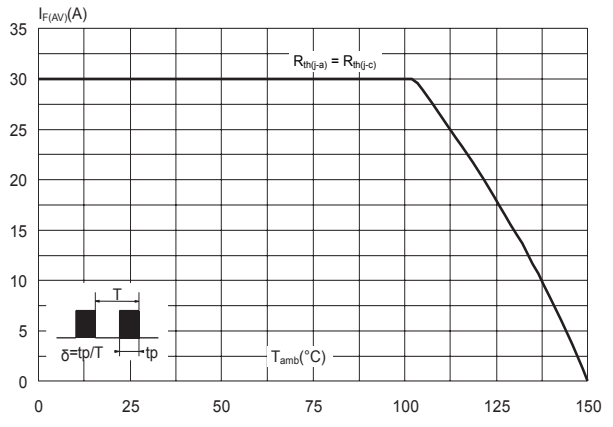


Figure 3. Normalized avalanche power derating versus pulse duration

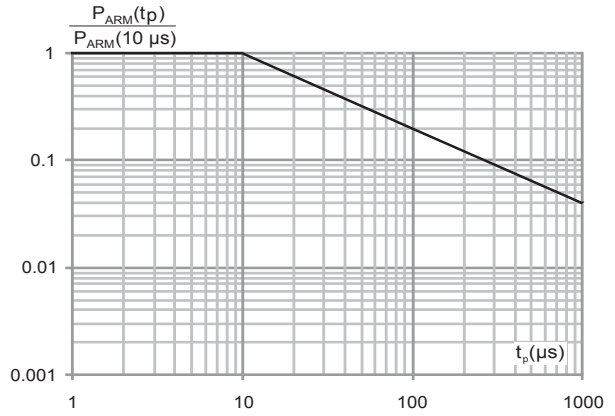


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

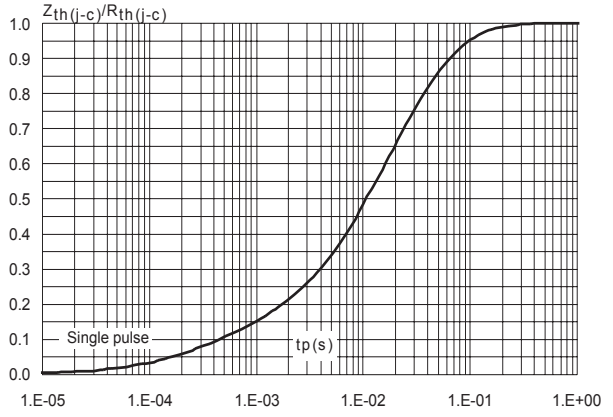


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

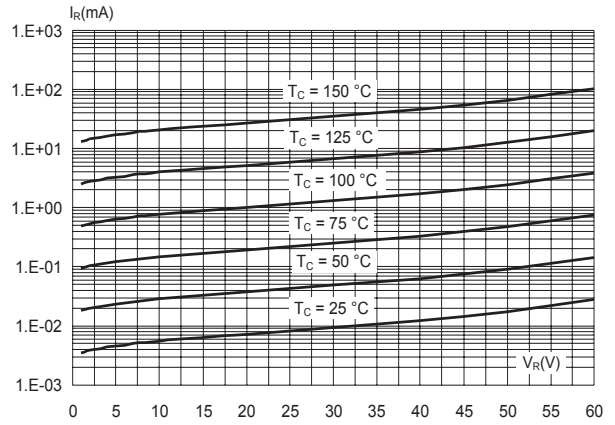


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

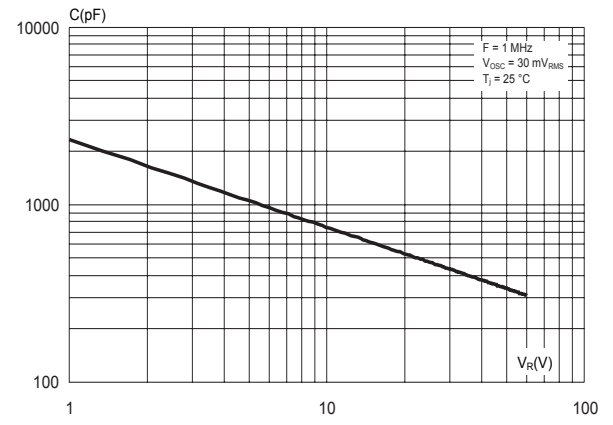


Figure 7. Forward voltage drop versus forward current

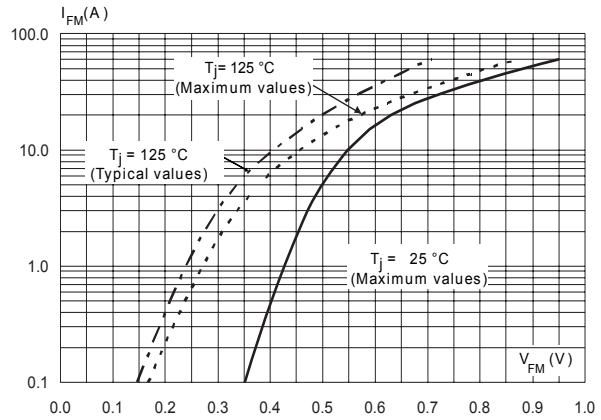
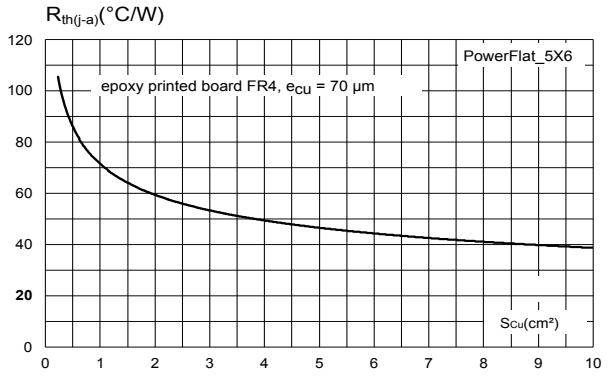


Figure 8. Thermal resistance junction to ambient versus copper surface under tab (typical values)



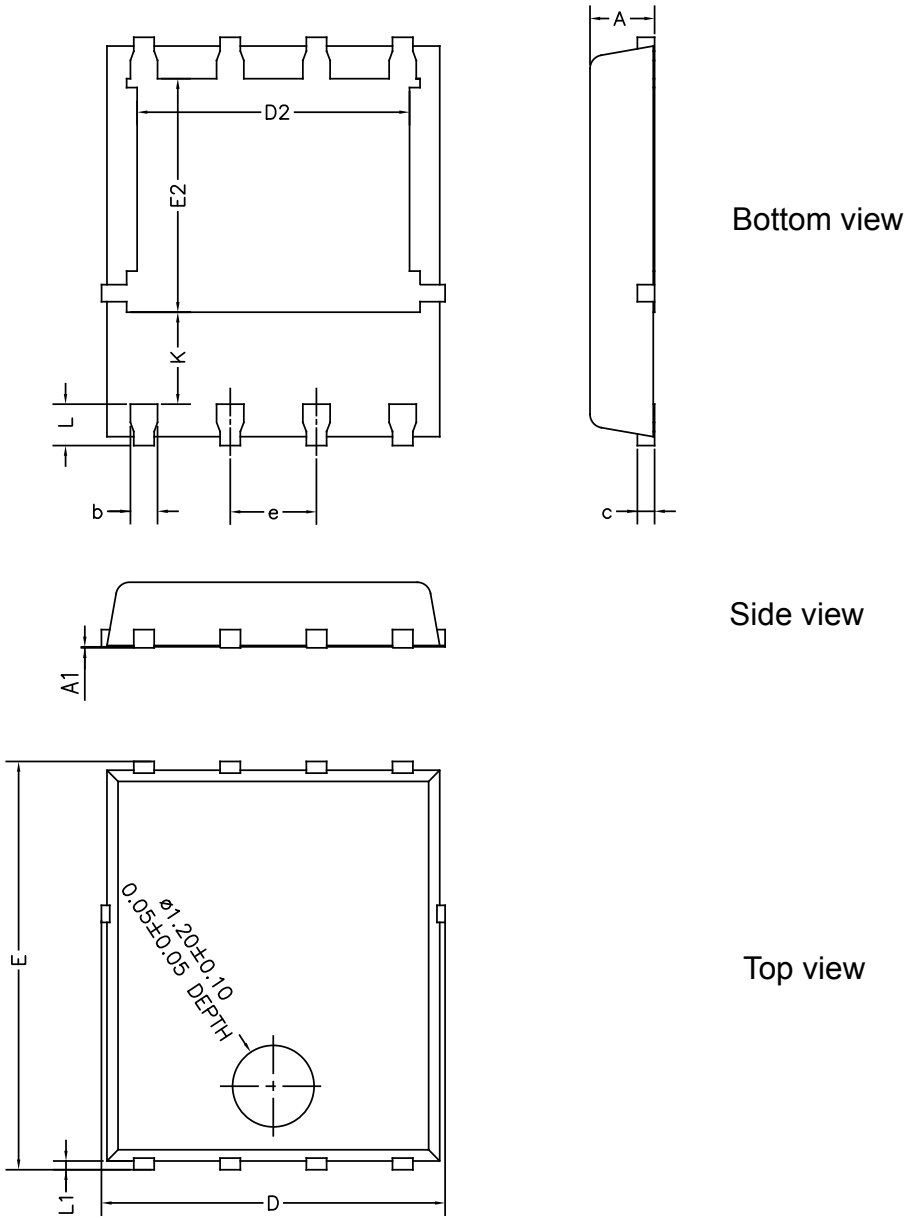
2 Package information

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.

2.1 PowerFLAT 5x6 package information

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

Figure 9. PowerFLAT 5x6 package outline (non-contractual)

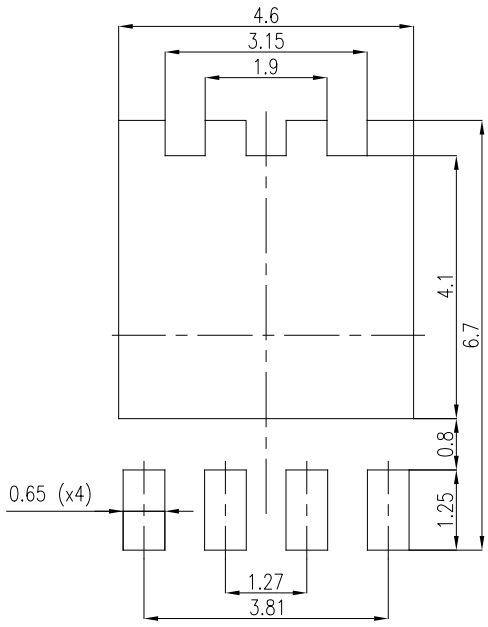


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. PowerFLAT 5x6 mechanical data

Dimensions						
Ref	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 10. PowerFLAT 5x6 recommended footprint (dimensions are in mm)



Note: For packing information, please refer to TN1173.

3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS30M60DJF-TR	PS30 M60	PowerFLAT 5x6	0.095 g	3000	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Revision	Changes
18-Apr-2012	1	First issue.
15-Mar-2023	2	Updated cover image, Figure 8. Thermal resistance junction to ambient versus copper surface under tab (typical values) and Section 2.1 PowerFLAT 5x6 package information.Added Section Applications.

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