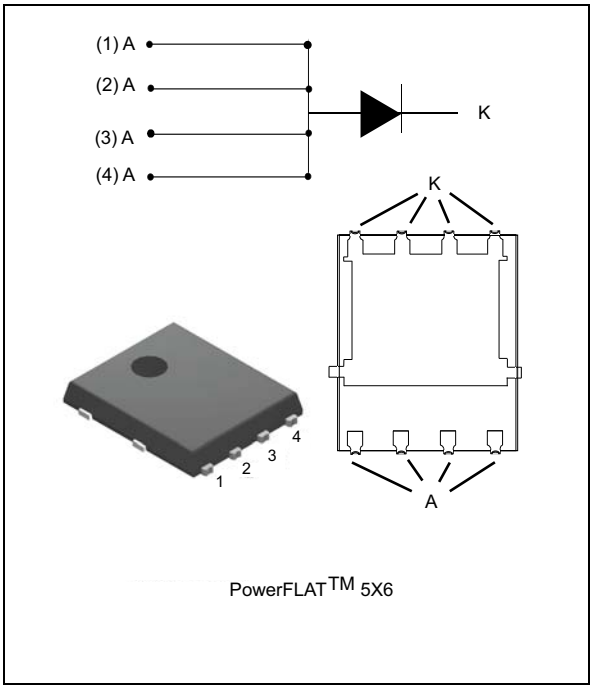
STPS3045DJF-Y

Automotive power Schottky rectifier

Datasheet - production data



PowerFLAT™ 5X6

Description

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

Packaged in PowerFLAT™ wettable flanks, this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications in automotive applications.

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

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	45 V
T_j (max.)	175 °C
V_F (typ.)	0.41 V

Features

- Low forward voltage drop
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- Thin package: 1 mm
- ECOPACK®2 compliant component
- AEC-Q101 qualified
- Wettable flanks for A.V.I. (Automatic visual inspection)
- PPAP capable

TM: PowerFLAT is a trademark of STMicroelectronics

This is information on a product in full production. www.st.com

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	T_j = -40 °C to +175 °C	45	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current	T_c = 130 °C, δ = 0.5	30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	380	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs T_j = 125 °C	900	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature(1)		-40 to +175	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink.

For pulse time duration deratings, please refer to Figure 3. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, “Admissible avalanche power of schottky diodes” and AN2025, “Converter improvement using Schottky rectifier avalanche specification”.

Table 3. Thermal resistance

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	2.0	°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	$V_R = V_{RRM}$	-	-	300	µA
		T_j = 125 °C		-	20	80	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-	-	0.56	V
		T_j = 125 °C		-	0.41	0.46	
		T_j = 25 °C	I_F = 30 A	-	-	0.68	
		T_j = 125 °C		-	0.50	0.56	

1. Pulse test t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 0.43 \times I_{F(AV)} + 0.00433 \times I_F{}^2{}_{(RMS)}$

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)

Figure 1. Average forward power dissipation versus average forward current

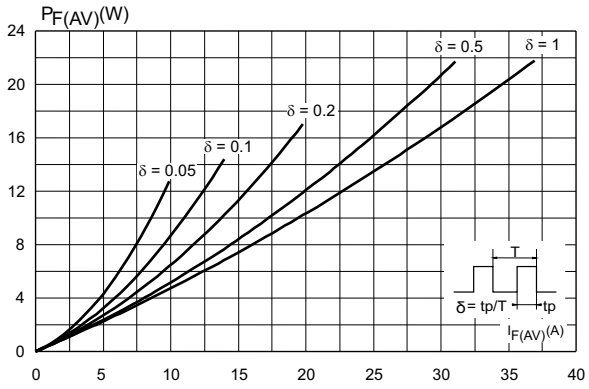


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

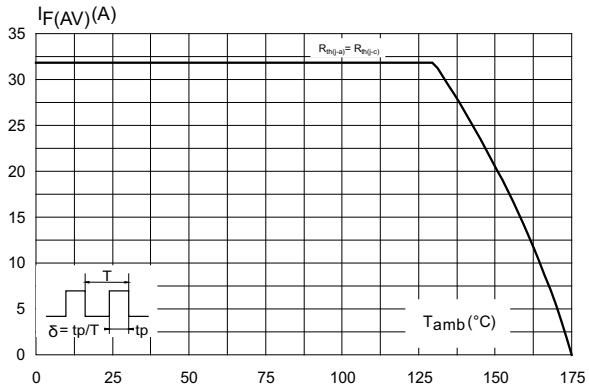


Figure 3. Normalized avalanche power derating versus pulse duration

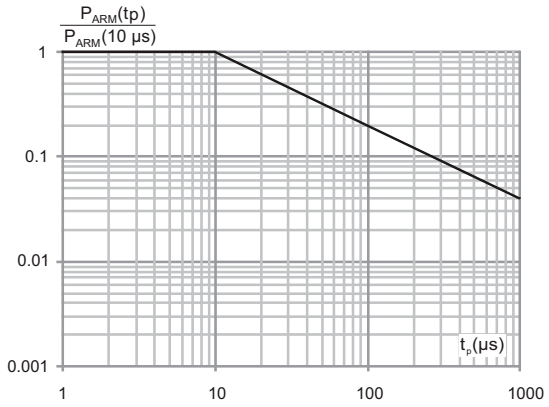


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

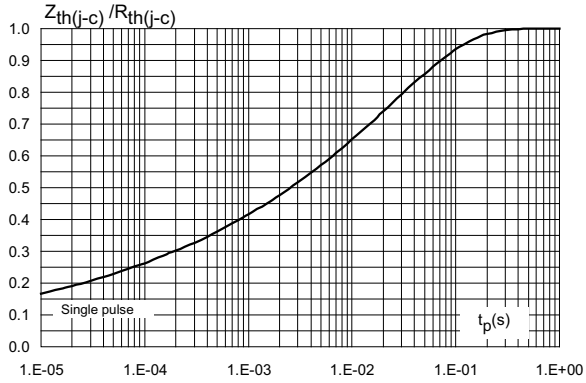


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

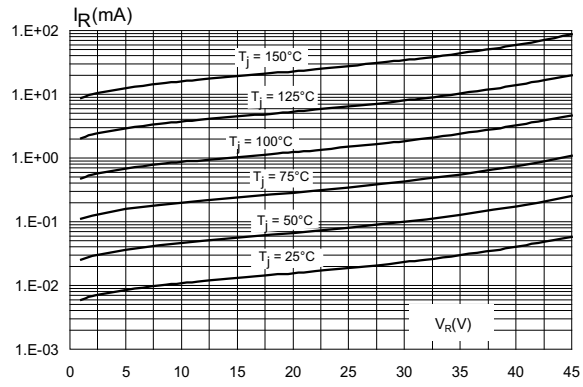


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

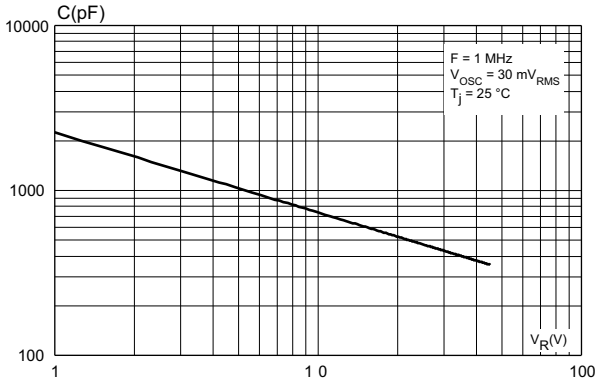


Figure 7. Forward voltage drop versus forward current

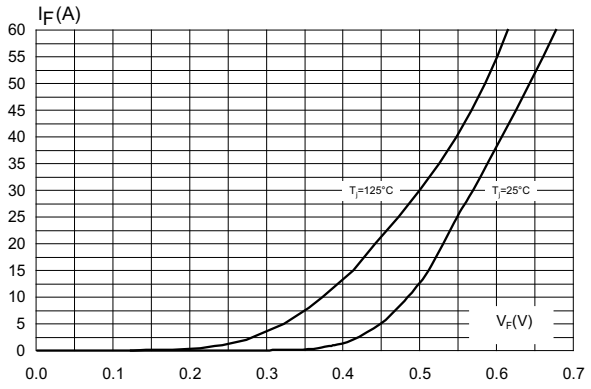
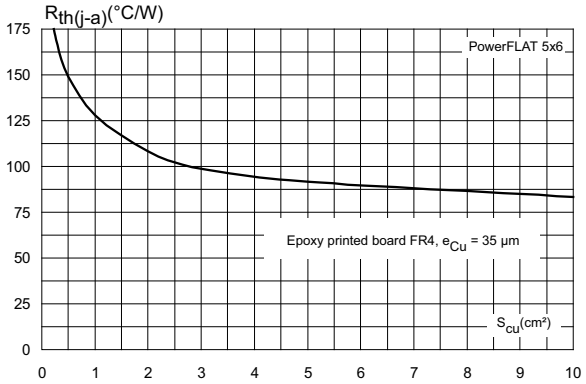


Figure 8. Thermal resistance, junction to ambient, versus copper surface under tab (typical values)



2 Package information

- Epoxy meets UL94,V0
- Lead-free package

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

Figure 9. PowerFLAT 5x6 package outline

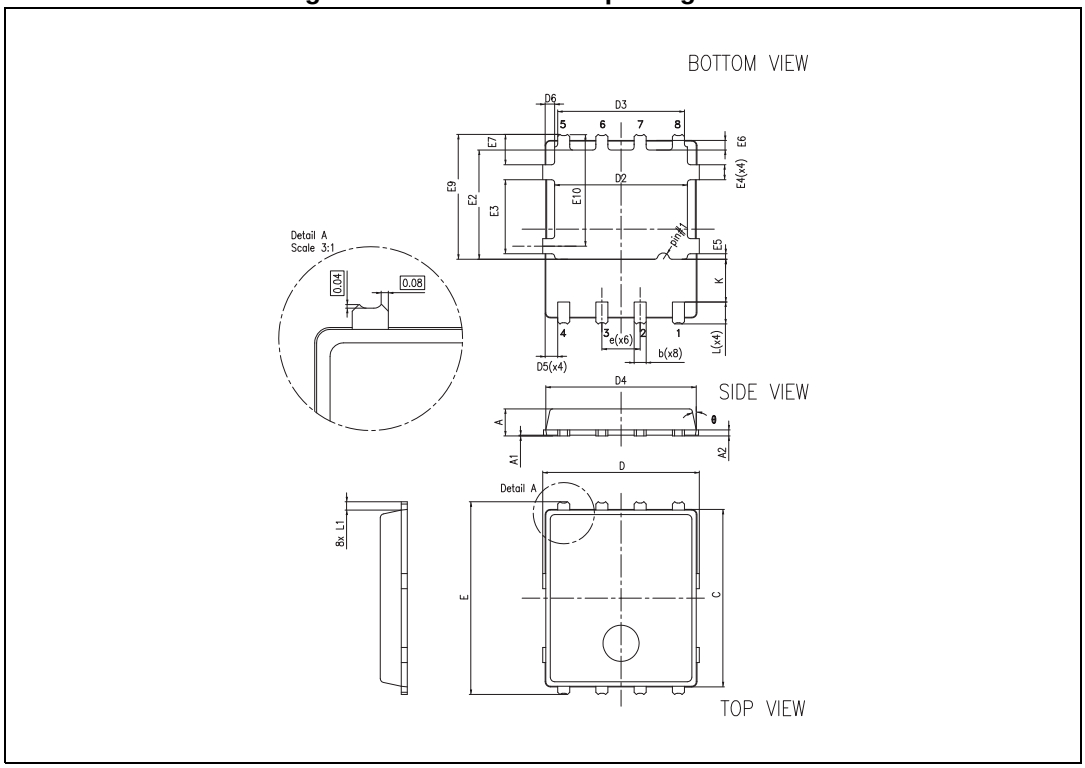


Table 5. PowerFLAT 5x6 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Typ.	Min.	Max.	Typ.	Min.	Max.
A		0.80	1.00		0.031	0.039
A1		0.02	0.05		0.0008	0.0020
A2	0.25			0.0098		
b		0.30	0.50		0.0118	0.0197
C	6.00	5.80	6.10	0.2362	0.2283	0.2402
D	5.20	5.00	5.40	0.2047	0.1969	0.2126
D2		4.15	4.45		0.1634	0.1752
D3	4.20	4.05	4.35	0.1654	0.1594	0.1713
D4	5.0	4.80	5.10	0.1969	0.1890	0.2008
D5	0.4	0.25	0.55	0.0157	0.0099	0.0217
D6	0.3	0.15	0.45	0.0118	0.0059	0.0177
e	1.27			0.05		
E	6.40	6.20	6.60	0.2520	0.2441	0.2598
E2		3.50	3.70		0.1378	0.1457
E3		2.35	2.55		0.0925	0.1004
E4		0.40	0.60		0.0157	0.0236
E5		0.08	0.28		0.0031	0.0110
E6	0.325	0.20	0.45	0.0128	0.0079	0.0177
E7	1.00	0.85	1.15	0.0394	0.0335	0.0453
E9	4.20	4.00	4.40	0.1654	0.1575	0.1732
E10	3.70	3.55	3.85	0.1457	0.1398	0.1516
K		1.275	1.575		0.0502	0.0620
L	0.825	0.725	0.925	0.0325	0.0285	0.0364
L1	0.275	0.175	0.375	0.0108	0.0069	0.0148
diam.		0	12		0	0.4724

1. Values in inches are converted from mm and rounded to 4 decimal digits.

Figure 10. Tape and reel outline

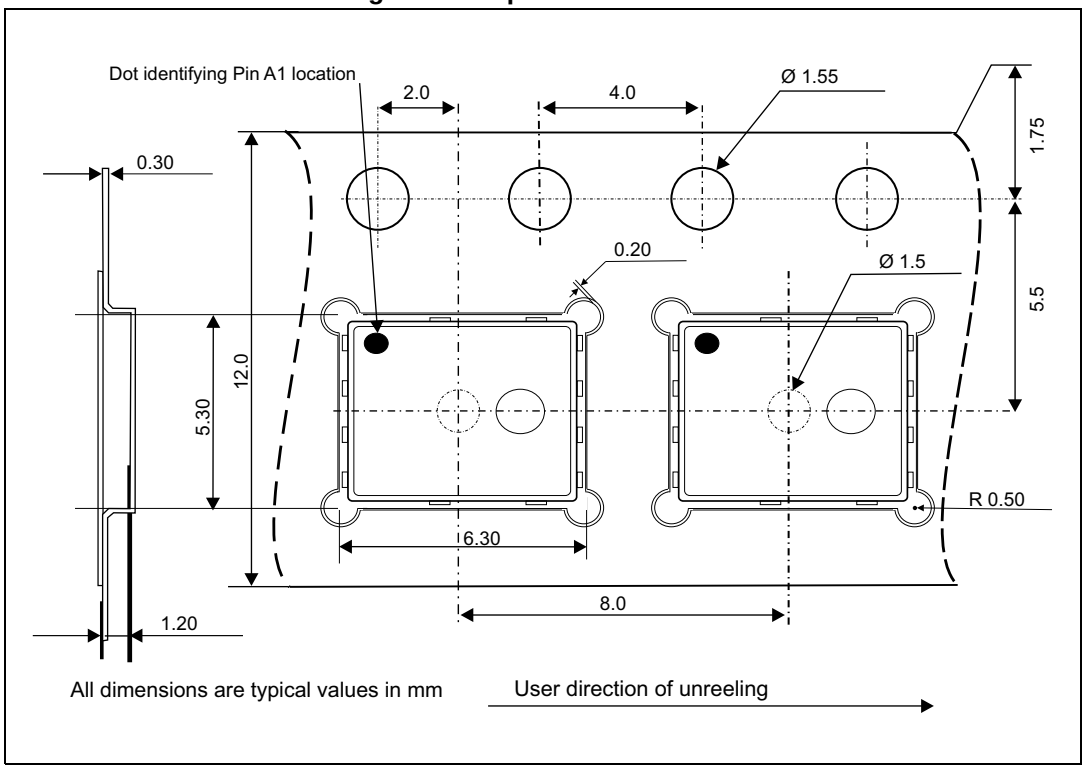
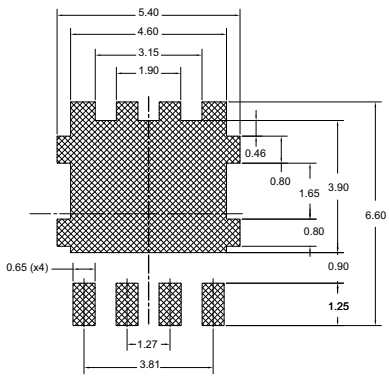


Figure 11. Footprint (dimensions in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3045DJFY-TR	S30Y45	PowerFLAT 5x6 wettable flank	95 mg	3000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
12-Jul-2016	1	Initial release.

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