

# STPS8170DEE

### Power Schottky rectifier

Datasheet - production data

#### **Features**

- Very low conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capacity specified
- High junction temperature
- ECOPACK<sup>®</sup>2 compliant component

### **Description**

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

Packaged in PowerFLAT<sup>TM</sup>, this device is intended for use in low voltage, high frequency, inverters, free-wheeling, by-pass diode and polarity protection applications. Its low profile was especially designed to be used in applications with space-saving constraints.

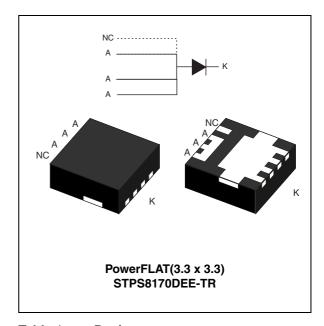


Table 1. Device summary

Symbol	Value
I <sub>F(AV)</sub>	8 A
$V_{RRM}$	170 V
T <sub>j</sub> (max)	175 °C
V <sub>F</sub> (typ)	0.66 V

TM: PowerFLAT is a trademark of STMicroelectronics

Characteristics STPS8170DEE

#### 1 Characteristics

Table 2. Absolute ratings (limiting values  $T_{amb} = 25$  °C unless otherwise specified)

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage	170	V	
I <sub>F(RMS)</sub>	Forward rms current	15	Α	
I <sub>F(AV)</sub>	Average forward current	Tc = 145 °C $\delta$ = 0.5	8	Α
I <sub>FSM</sub>	Surge non repetitive forward current	100	Α	
P <sub>ARM</sub> <sup>(1)</sup>	Repetitive peak avalanche power	400	W	
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperat	175	°C	

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	Value	Unit
R <sub>th(j-c)</sub>	Junction to case	4	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		15	μΑ
IR. / Heverse leaka	Theverse leakage current	T <sub>j</sub> = 125 °C	VR - VRRM	1	1.5	15	mA
V <sub>E</sub> <sup>(2)</sup> Forward voltage drop		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 8A			0.90	٧
A.E.,	To ward voilage drop	T <sub>j</sub> = 125 °C	1F = 0/1	-	0.66	0.72	٧

<sup>1.</sup> Pulse test:  $t_p = 5$  ms,  $\delta < 2\%$ 

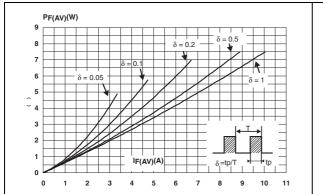
To evaluate the conduction losses use the following equation:

$$P = 0.62 \text{ x } I_{F(AV)} + 0.0125 \text{ x } I_{F}^{2}_{(RMS)}$$

<sup>2.</sup> Pulse test:  $t_p$  = 380  $\mu$ s,  $\delta$  < 2%

STPS8170DEE Characteristics

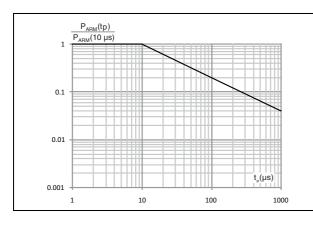
Figure 1. Average forward power dissipation Figure 2. Average forward current versus versus average forward current ambient temperature ( $\delta$  = 0.5)



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Figure 3. Normalized avalanche power derating versus pulse duration

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



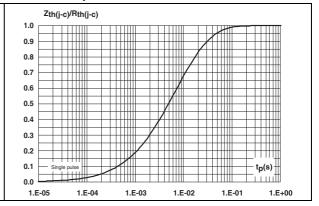
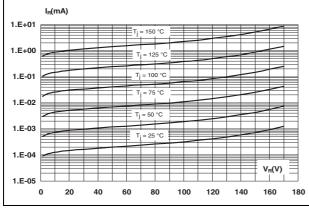
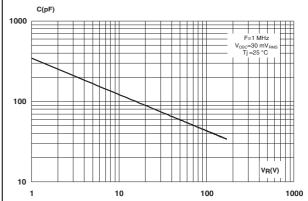


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

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

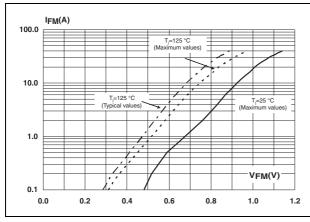




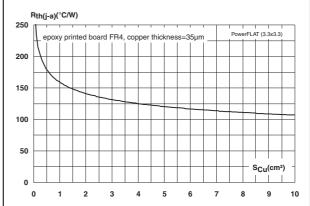
Characteristics STPS8170DEE

Figure 7. Forward voltage drop versus forward current

Figure 8. Thermal resistance junction to ambient versus copper surface under tab



4/8



# 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<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <a href="https://www.st.com">www.st.com</a>. ECOPACK<sup>®</sup> is an ST trademark.

Figure 9. PowerFLAT-3.3x3.3-8L dimensions (definitions)

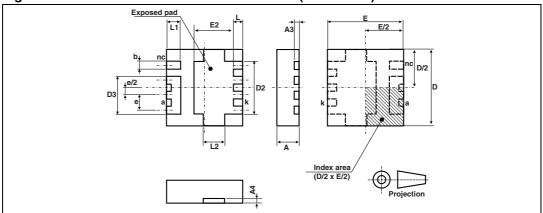
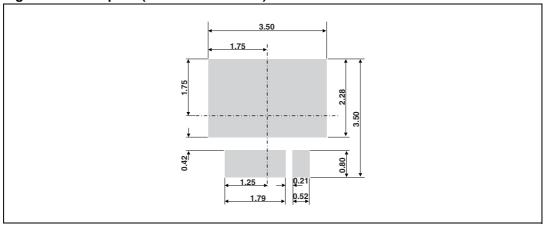


Table 5. PowerFLAT-8L dimensions (values)

	Dimensions						
Ref.	Millimeters			Inches			
	Min.	Тур.	Max.	Min.	Тур.	Max.	
Α	0.95	1.00	1.05	0.037	0.039	0.041	
A3		0.20			0.0079		
A4		0.20			0.0079		
b	0.30	0.37	0.44	0.012	0.015	0.017	
D	3.20	3.30	3.40	0.126	0.130	0.134	
D2	2.24	2.31	2.38	0.088	0.091	0.094	
D3	1.60	1.67	1.74	0.063	0.066	0.069	
е		0.65			0.026		
Е	3.20	3.30	3.40	0.126	0.130	0.134	
E2	1.68	1.75	1.82	0.066	0.069	0.072	
L	0.31	0.38	0.45	0.012	0.015	0.018	
L1	0.55	0.62	0.69	0.22	0.024	0.027	
L2	0.86	0.93	1.00	0.034	0.037	0.039	

Package information STPS8170DEE

Figure 10. Footprint (dimensions in mm)



# **3** Ordering information

 Table 6.
 Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS8170DEE-TR	PS8170	PowerFLAT (3.3 x 3.3)	34 mg	3000	Tape and reel 13" reel

# 4 Revision history

Table 7. Document revision history

Date	Revision	Changes
09-Sep-2012	1	First issue.

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4