STTH5R06DJF

Ultrafast recovery diode high efficiency

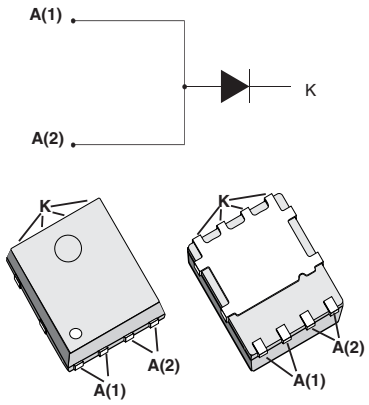
Datasheet – production data

Features

- Suited for DC/DC converts
- Low losses
- High T_J
- High surge current capability
- High energy avalanche capability
- 1 mm package thickness
- ECOPACK®2 compliant component

Description

High performance diode suited for high frequency DC to DC converters. Packaged in PowerFLAT™ 5x6, this device is intended for use in low voltage high frequency inverters.



PowerFLAT 5x6
STTH5R06DJF

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	5 A
V_{RRM}	600 V
T_j	175 °C
V_F (typ)	0.95 V
t_{rr} (typ)	30 ns

TM: PowerFLAT is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values with anode terminals short-circuited)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current	T_c = 160 °C δ = 0.5	5	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	190	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		175	°C

Table 3. Thermal parameter

Symbol	Parameter	Maximum	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 = 600V			60	µA
		T_j = 125 °C			60	600	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A		1.55	2.00	V
		T_j = 125 °C			0.95	1.20	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the maximum conduction losses use the following equation:

$P = 0.9 \times I_{F(AV)} + 0.06\ I_F{}^2{}_{(RMS)}$

Table 5. Recovery characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A V_r = 30 V dI_F/dt = - 100 A/µs		30	40	ns
			I_F = 1 A V_r = 30 V dI_F/dt = - 50 A/µs		40	55	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 5 A, dI_F/dt = - 200 A/µs, V_R = 400 V		6.0	8.0	A
S_{factor}	Reverse recovery softness factor				0.5		-
Q_{rr}	Reverse recovery charges				180		nC

Table 6. Turn-on switching characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 5 A dI_F/dt = - 100 A/µs V_{FR} = 1.6 V			150	ns
V_{FP}	Forward recovery voltage				2.3	3.5	V

Figure 1. Average forward power dissipation versus average forward current

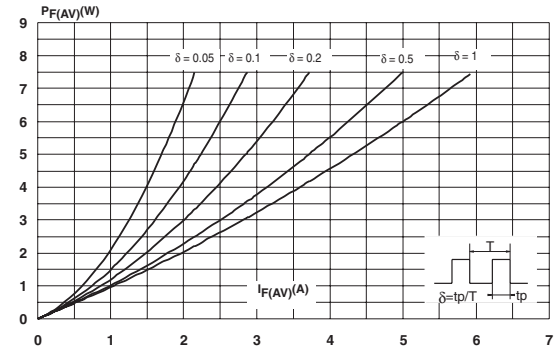


Figure 2. Forward voltage drop versus forward current

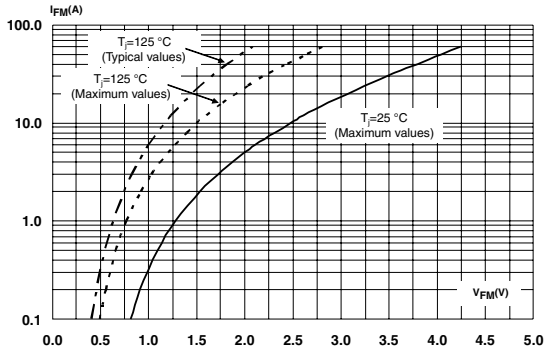


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

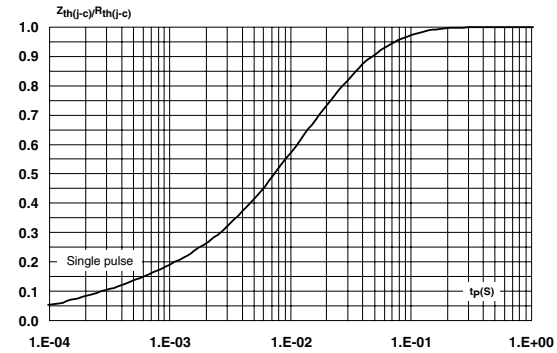


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

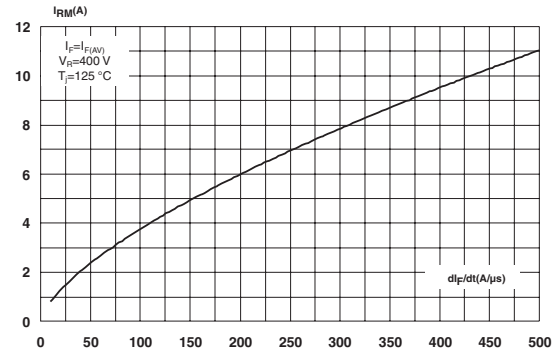


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

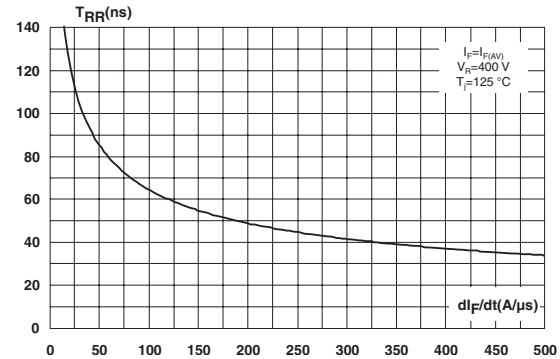


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

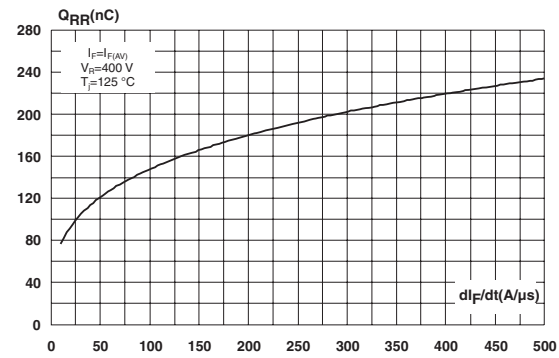


Figure 7. Softness factor versus dI_F/dt (typical values)

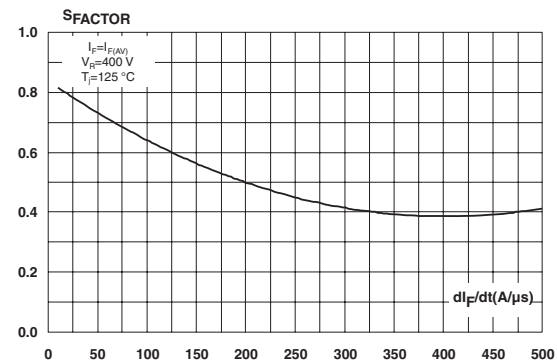


Figure 8. Relative variations of dynamic parameters versus junction temperature

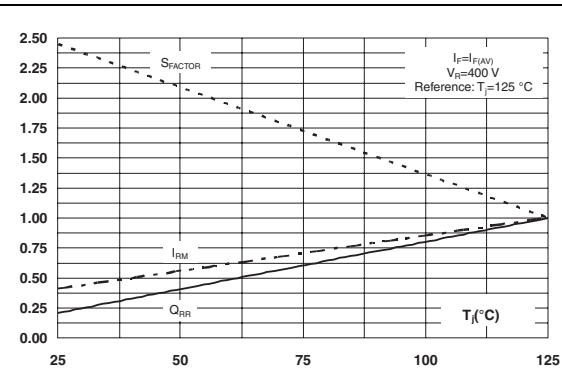


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

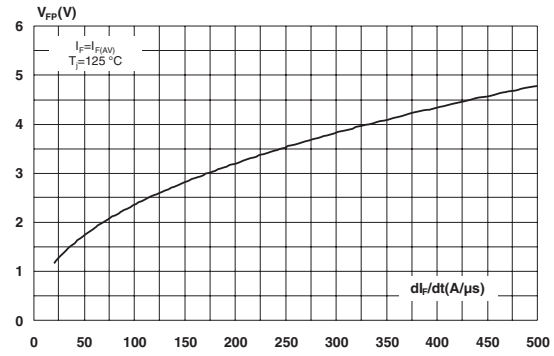


Figure 10. Forward recovery time versus dI_F/dt (typical values)

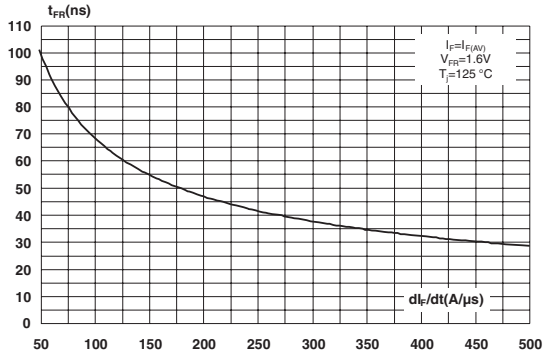


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

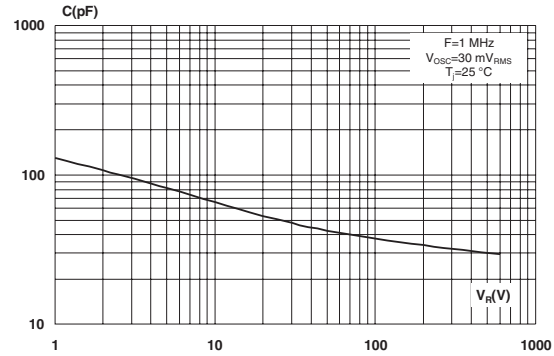
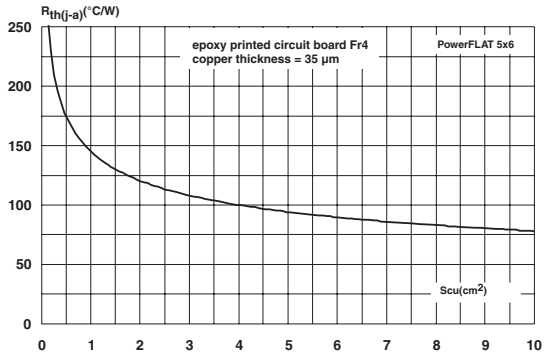


Figure 12. Thermal resistance junction to ambient versus copper surface under tab

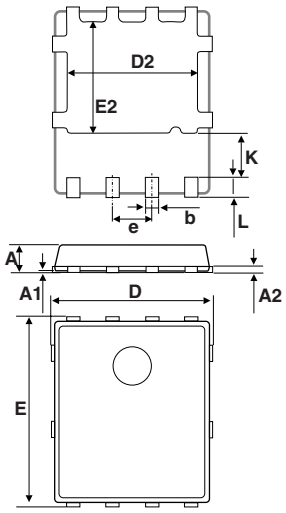


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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.

Table 7. PowerFLAT 5x6 dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
A1	0.02		0.05	0.001		0.002
A2		0.25			0.010	
b	0.30		0.50	0.012		0.020
D		5.20			0.205	
D2	4.11		4.31	0.162		0.170
e		1.27			0.050	
E		6.15			0.242	
E2	3.50		3.70	0.138		0.146
L	0.50		0.80	0.020		0.031
K	1.275		1.575	0.050		0.062

Figure 13. Footprint (dimensions in mm)

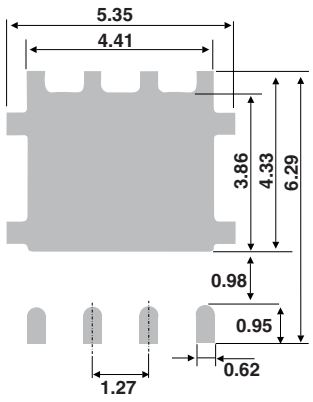
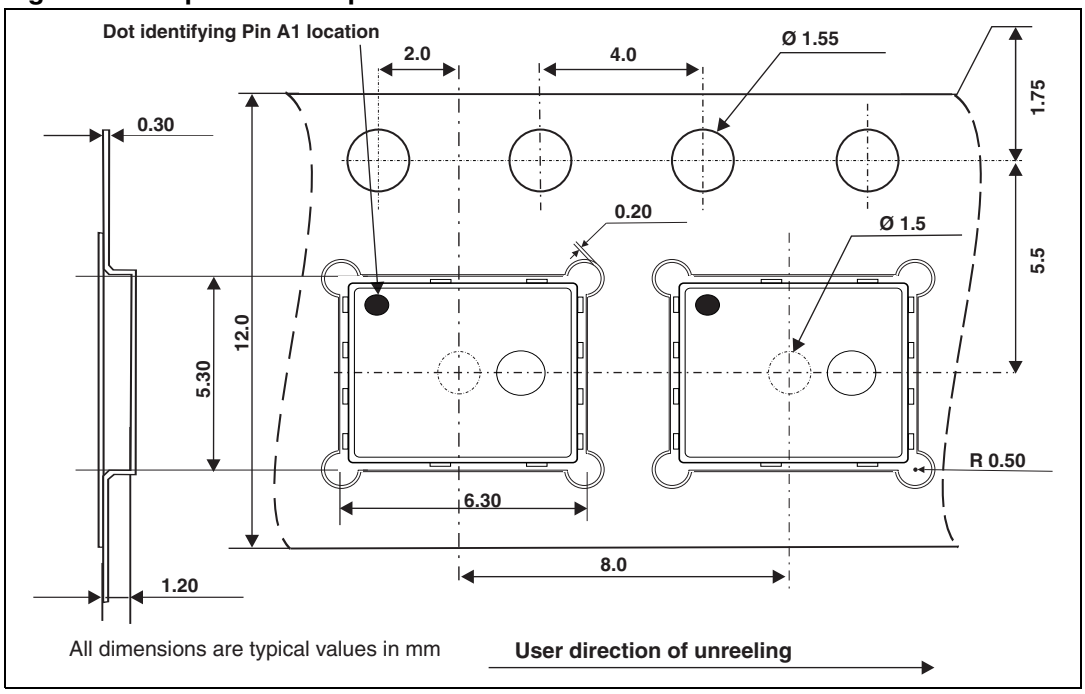


Figure 14. Tape and reel specifications



3 Ordering information

Table 8. Other information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH5R06DJF-TR	TH5R 06	PowerFLAT 5x6	0.095 g	3000	Tape and Reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
16-Mar-2012	1	First issue.

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