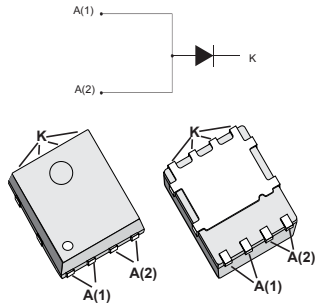
STTH5R06DJF

Datasheet

Ultrafast recovery diode high efficiency



PowerFLAT™ 5X6

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 to be used in low voltage high frequency inverters.

PowerFLAT is a trademark of STMicroelectronics.

Product status	
STTH5R06DJF	
Product summary	
$I_{F(AV)}$	5 A
V_{RRM}	600 V
T_j(max.)	175 °C
V_F(typ.)	0.95 V
t_{rr}(typ.)	30 ns

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		600	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current	T_C = 160 °C, δ = 0.5, square wave	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 2. Thermal parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	2.0	°C/W

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 = 600 V	-		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 conduction losses use the following equation:

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

Table 4. 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, V_R = 400 V, dI_F/dt = - 200 A/µs	-	6.0	8.0	A
S_{factor}	Reverse recovery softness factor			-	0.5		-
Q_{rr}	Reverse recovery charges			-	180		nC

Table 5. 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, V_{FR} = 1.6 V, dI_F/dt = - 100 A/µs	-		150	ns
V_{FP}	Forward recovery voltage			-	2.3	3.5	V

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

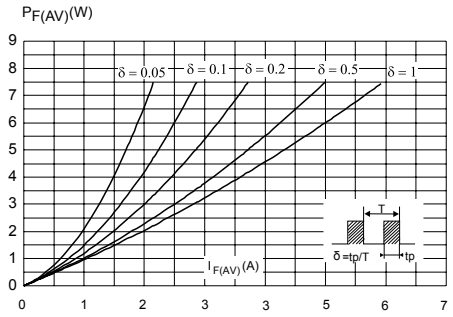


Figure 2. Forward voltage drop versus forward current

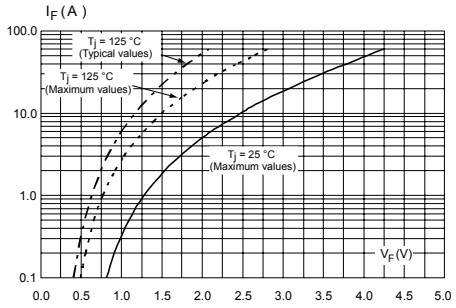


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

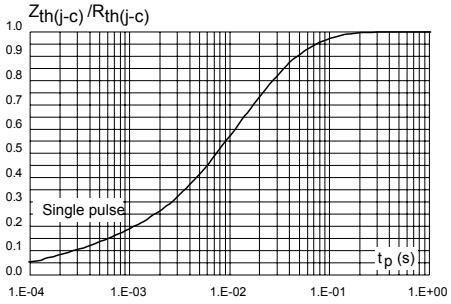


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

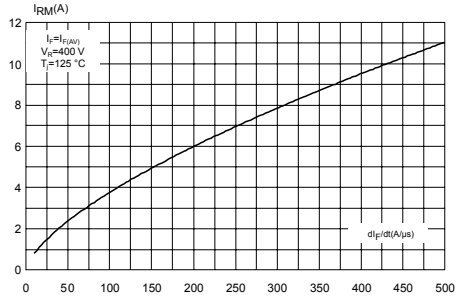


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

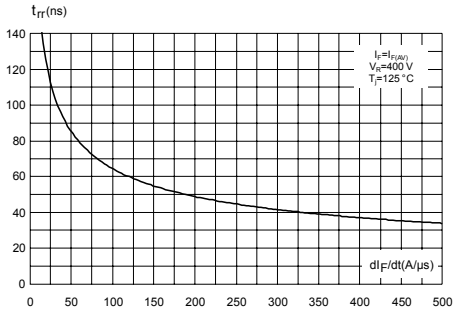


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

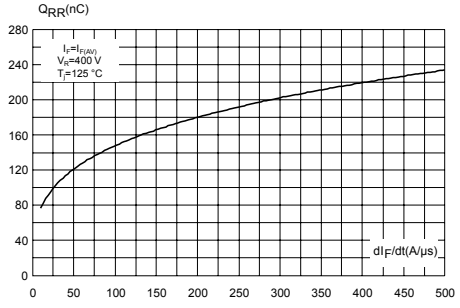


Figure 7. Softness factor versus dI_F/dt (typical values)

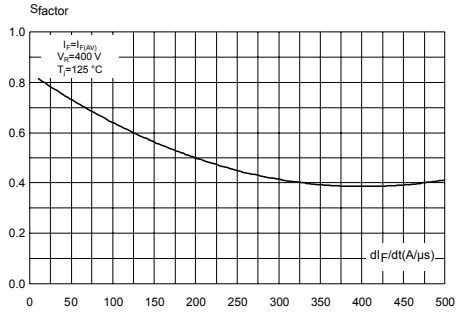


Figure 8. Relative variations of dynamic parameters versus junction temperature

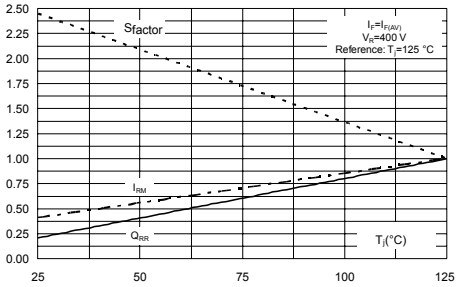


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

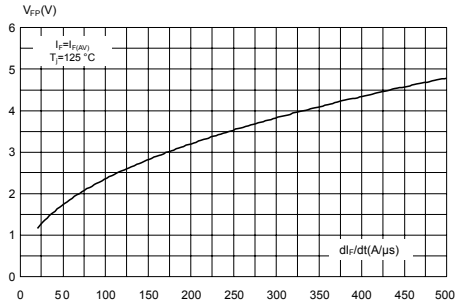


Figure 10. Forward recovery time versus dI_F/dt (typical values)

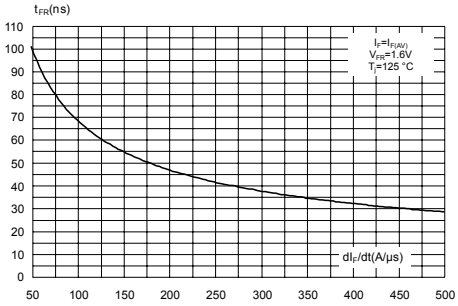


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

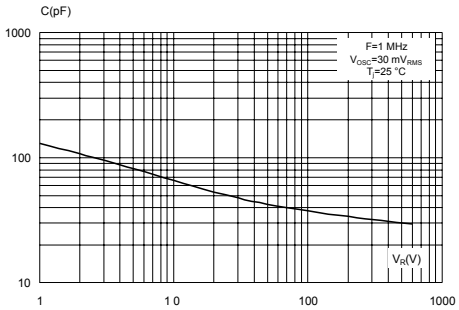
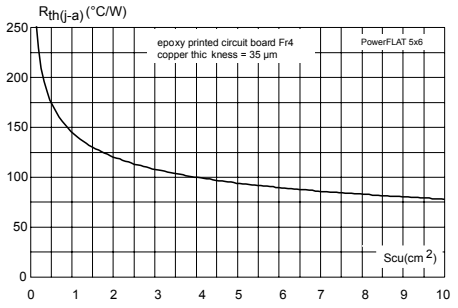


Figure 12. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

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 13. **PowerFLAT™ 5x6 package outline**

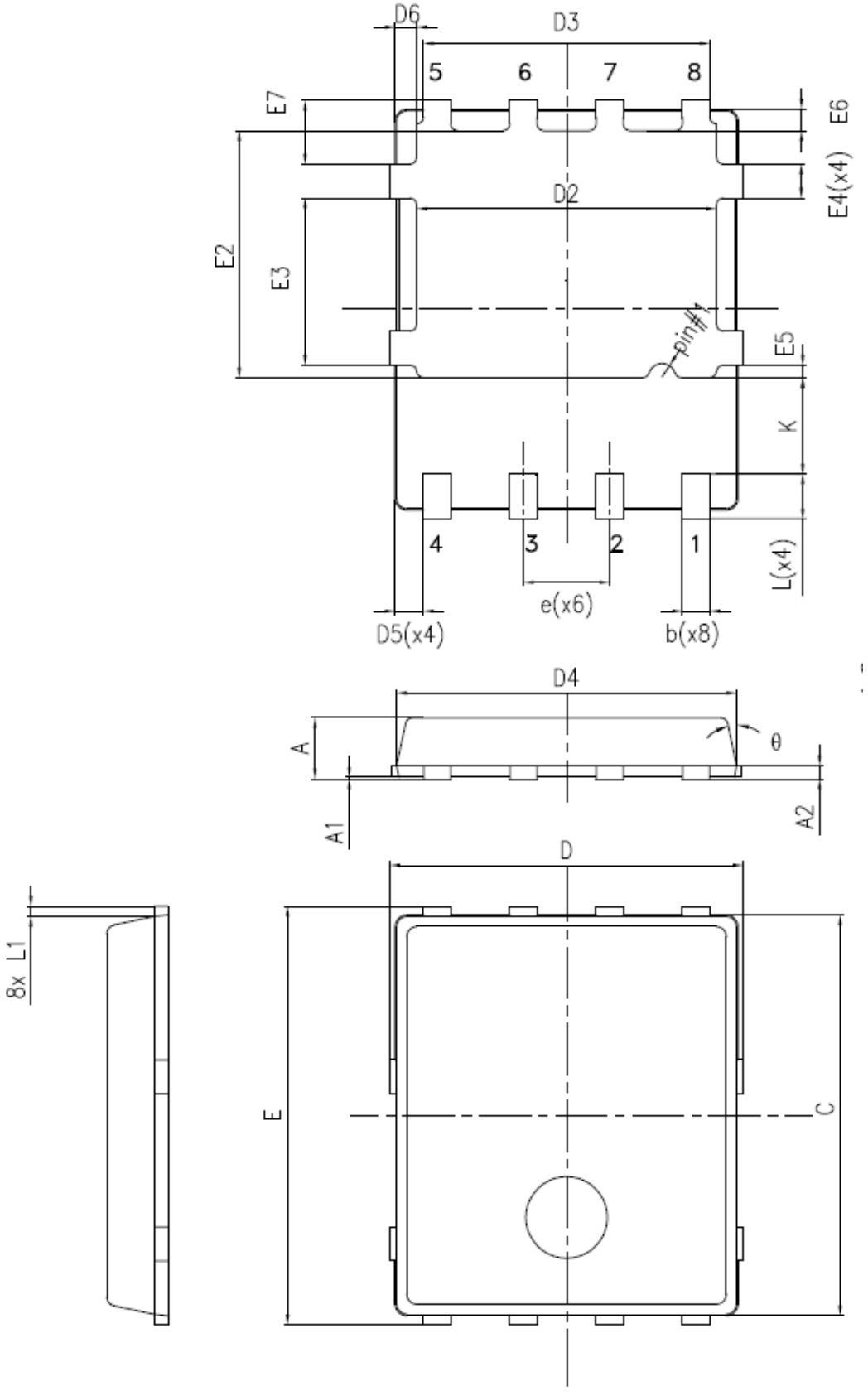


Table 6. **PowerFLAT™ 5x6 mechanical data**

Dim.						
Ref	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
C	5.80	6.00	6.20	0.228	0.236	0.244
D	5.00	5.20	5.40	0.196	0.205	0.212
D2	4.15		4.45	0.163		0.175
D3	4.05	4.20	4.35	0.159	0.165	0.171
D4	4.80	5.00	5.20	0.188	0.196	0.204
D5	0.25	0.40	0.55	0.009	0.015	0.021
D6	0.15	0.30	0.45	0.005	0.011	0.017
e		1.27			0.050	
E	5.95	6.15	6.35	0.234	0.242	0.250
E2	3.50		3.70	0.138		0.146
E3	2.35		2.55	0.092		0.100
E4	0.40		0.60	0.015		0.023
E5	0.08		0.28	0.003		0.011
E6	0.20	0.325	0.45	0.007	0.012	0.017
E7	0.75	0.90	1.05	0.029	0.035	0.041
K	1.275		1.575	0.050		0.062
L	0.60		0.80	0.023		0.031
L1	0.05	0.15	0.25	0.001	0.005	0.009
θ	0°		12°	0°		12°

Figure 14. **PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)**

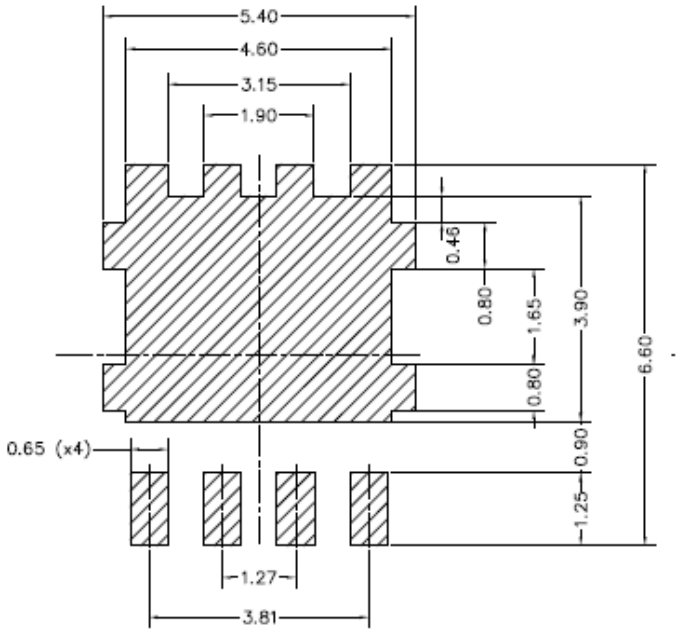
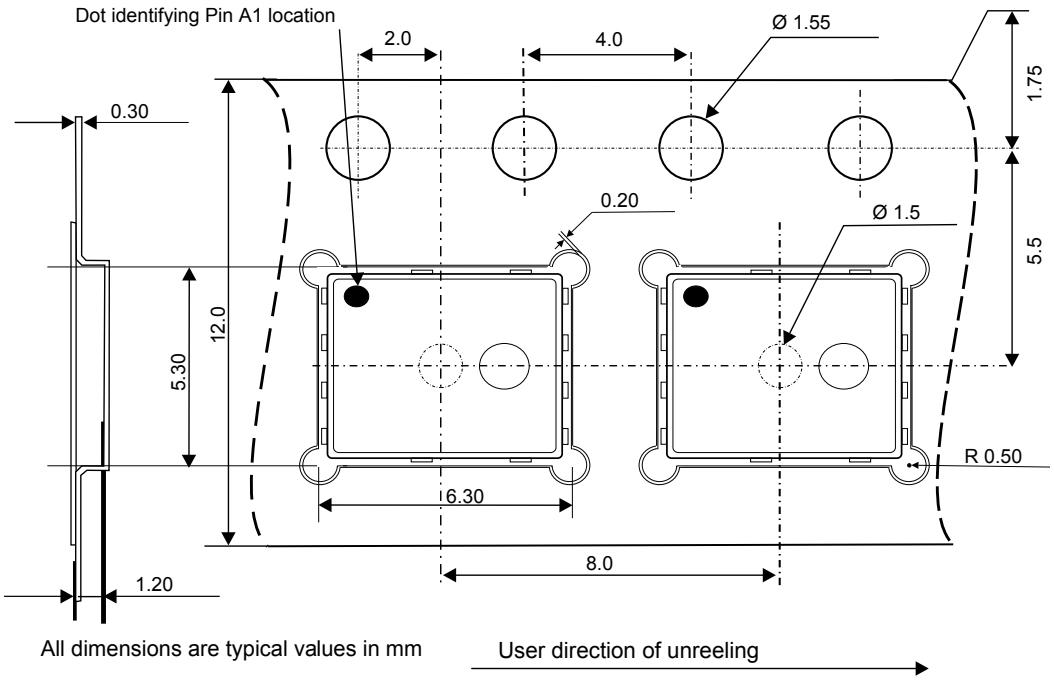


Figure 15. **Tape and reel specifications**



3 Ordering information

Table 7. **Ordering information**

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

Revision history

Table 8. **Document revision history**

Date	Revision	Changes
16-Mar-2012	1	Initial release.
12-Mar-2018	2	Updated package outline information.

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