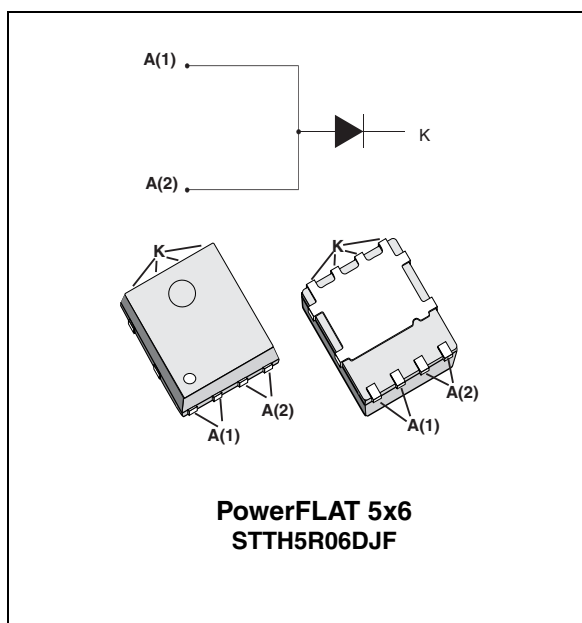


### Features

- Suited for DC/DC converts
- Low losses
- High  $T_j$
- High surge current capability
- High energy avalanche capability
- 1 mm package thickness
- ECOPACK<sup>®</sup>2 compliant component

### Description

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



**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	$T_c = 160\text{ °C}$ $\delta = 0.5$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	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	$T_j = 25\text{ °C}$			60	$\mu\text{A}$	
		$T_j = 125\text{ °C}$			60		600
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 5\text{ A}$		1.55	2.00	V
		$T_j = 125\text{ °C}$			0.95	1.20	

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation:

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

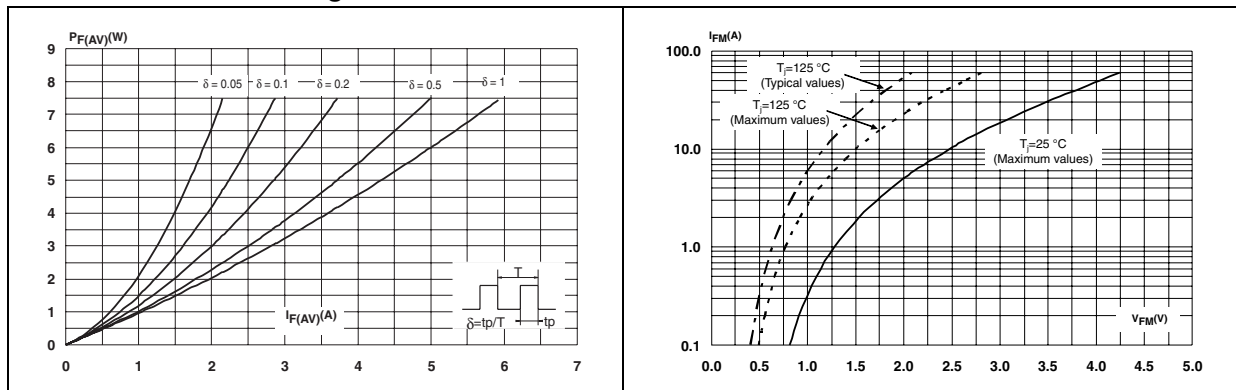
**Table 5. Recovery characteristics**

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

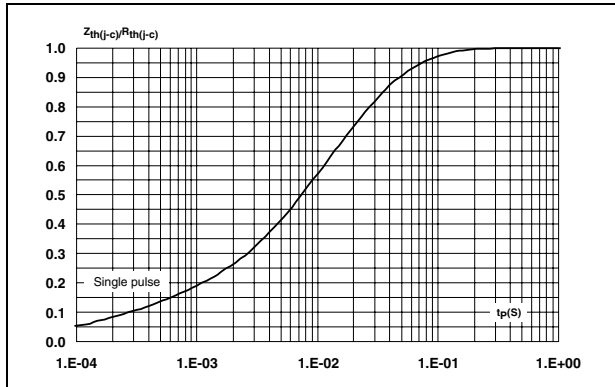
**Table 6. Turn-on switching characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$t_{fr}$	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 5\text{ A}$ $di_F/dt = -100\text{ A}/\mu\text{s}$ $V_{FR} = 1.6\text{ V}$			150	ns
$V_{FP}$	Forward recovery voltage				2.3	3.5	V

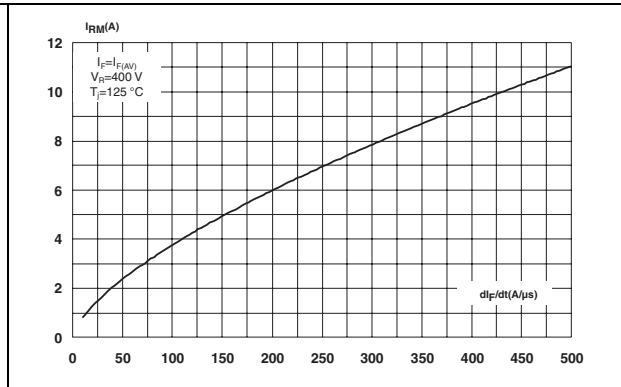
**Figure 1. Average forward power dissipation versus average forward current**      **Figure 2. Forward voltage drop versus forward current**



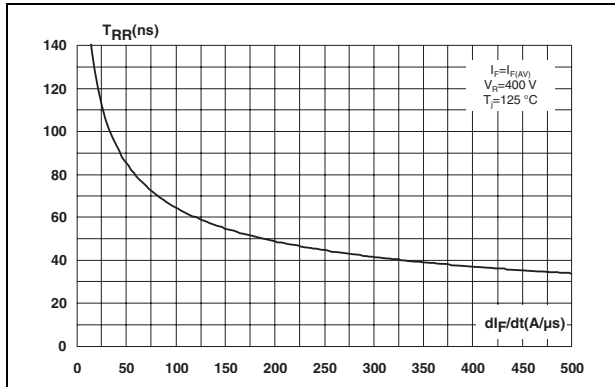
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



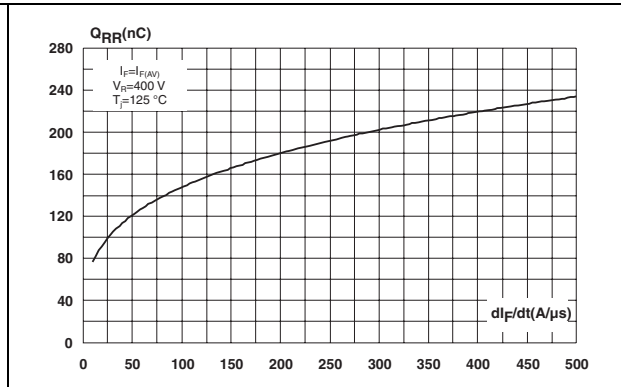
**Figure 4. Peak reverse recovery current versus  $di_F/dt$  (typical values)**



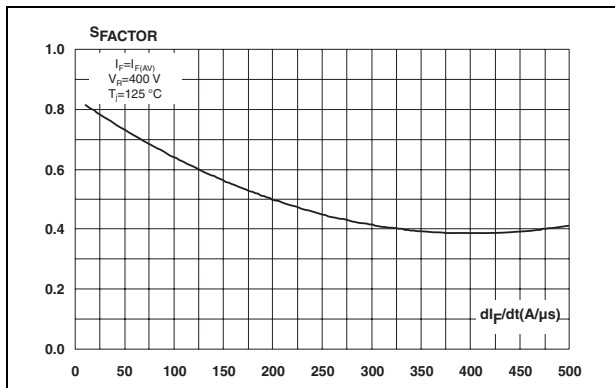
**Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values)**



**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**

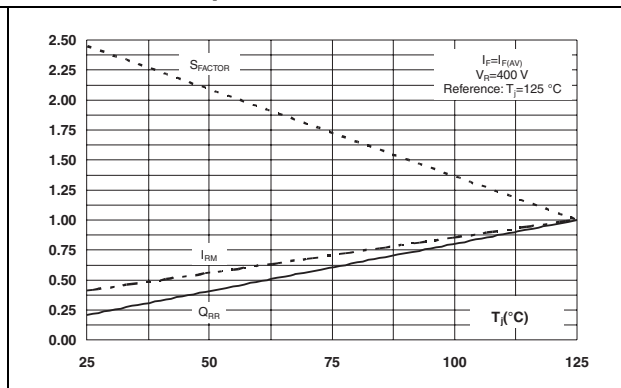


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)

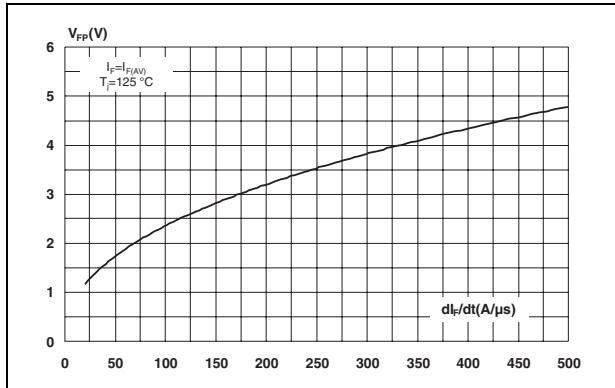


Figure 10. Forward recovery time versus  $di_F/dt$  (typical values)

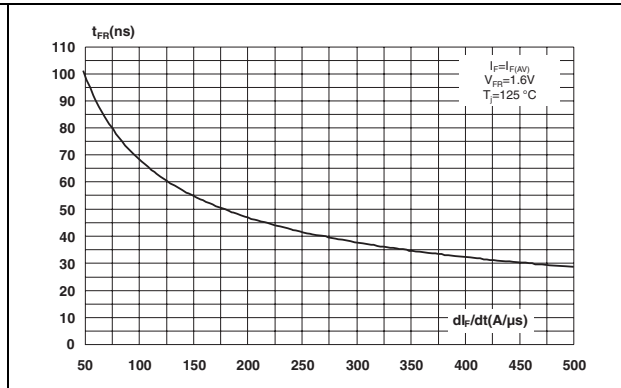


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

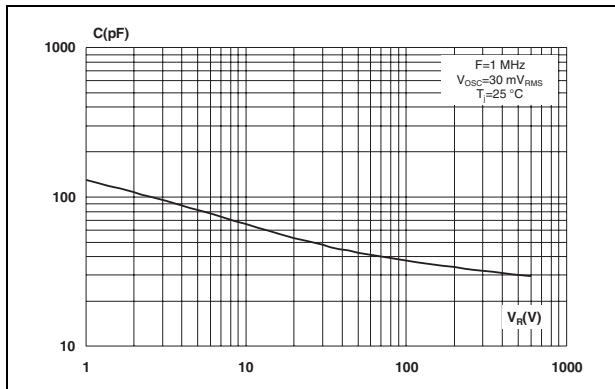
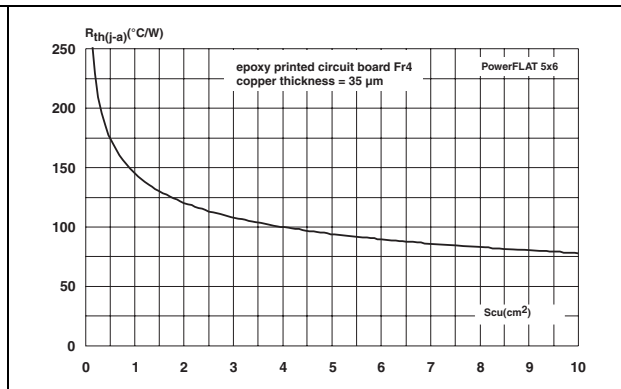


Figure 12. Thermal resistance junction to ambient versus copper surface under tab



## 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](http://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)**

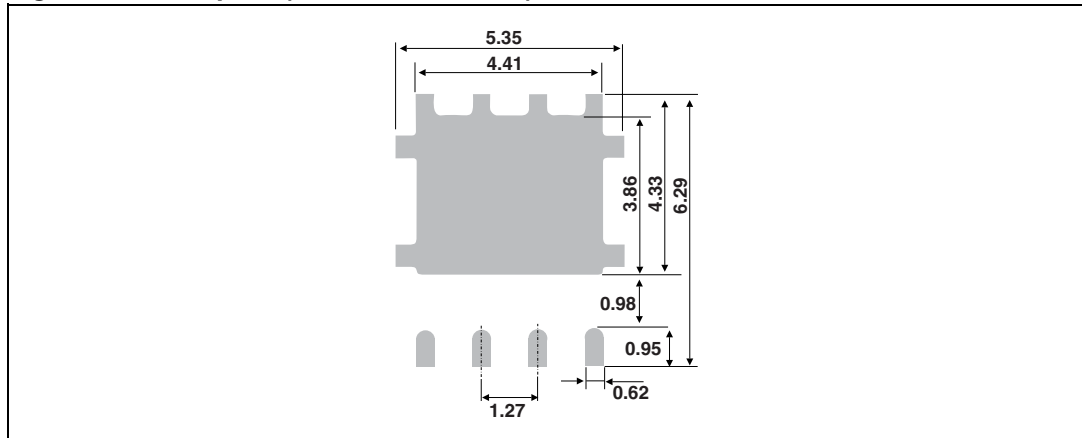
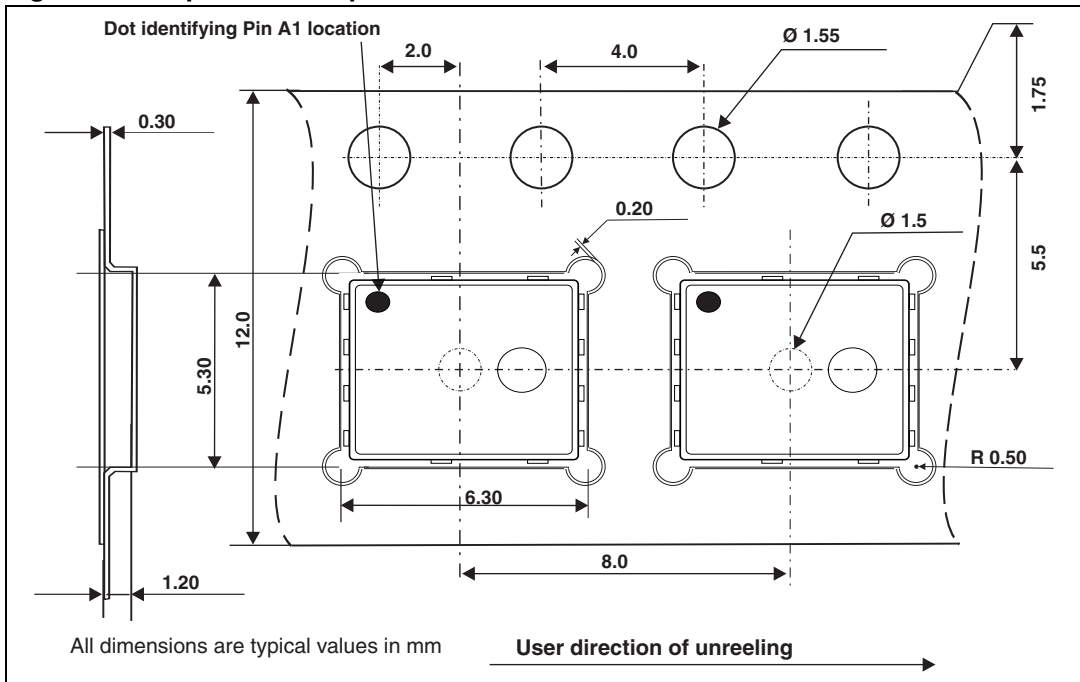


Figure 14. Tape and reel specifications



### 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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