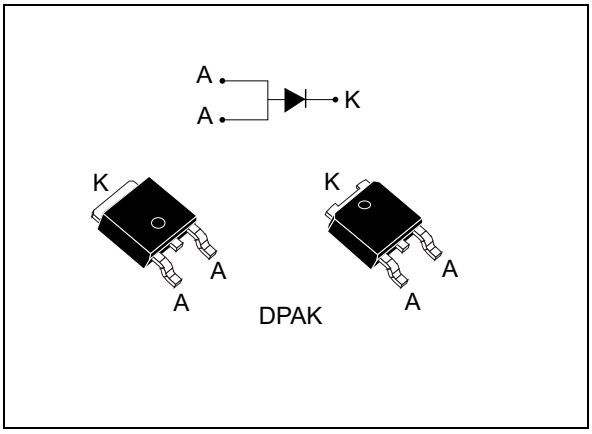
STTH1003S

High efficiency rectifier

Datasheet - production data



Features

- Ultrafast recovery
- Low power losses
- High surge capability
- Low leakage current
- High junction temperature
- ECOPACK®2 compliant component for DPAK on demand

Description

The STTH1003S is an ultrafast recovery power rectifier dedicated to energy recovery in PDP applications.

It is especially designed for clamping function in energy recovery block. The compromise between forward voltage drop and recovery time offers optimized performances.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	10 A
V_{RRM}	300 V
t_{rr}(typ)	13 ns
T_j (max)	175 °C
V_F(typ)	0.9 V

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)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	Forward rms current		20	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_c = 150 °C	10	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	100	A
I_{RSM}	Non repetitive peak reverse current	t_p = 20 µs square	4	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		175	°C

Table 3. Thermal resistance

Symbol	Parameter	Package	Max. value	Unit
$R_{th(j-c)}$	Junction to case	DPAK	4	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	10	µA
		T_j = 125 °C		-	10	100	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-	-	1.30	V
		T_j = 125 °C		-	0.90	1.10	

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:

$P = 0.86 \times I_{F(AV)} + 0.024 \times I_F{}^2{}_{(RMS))}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A I_{rr} = 0.25 A I_R = 1 A	-	13	17	ns
			I_F = 1 A V_R = 30 V dI_F/dt = -50 A/µs	-	28	35	
t_{fr}	Forward recovery time		I_F = 10 A V_{FR} = 1.1 x V_{Fmax} dI_F/dt = 100 A/µs	-	-	200	ns
V_{FP}	Peak forward voltage		I_F = 10 A dI_F/dt = 100 A/µs	-	2.5	3.5	V
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 10 A V_R = 200 V dI_F/dt = 200 A/µs	-	5.7	7.5	A
S_{factor}	Softness factor			-	0.3	-	-

Figure 1. Forward voltage drop versus forward current (maximum values)

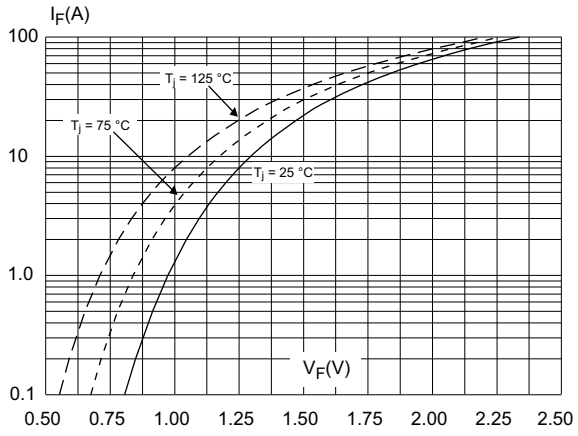


Figure 2. Peak reverse recovery current versus dI_F/dt (typical values)

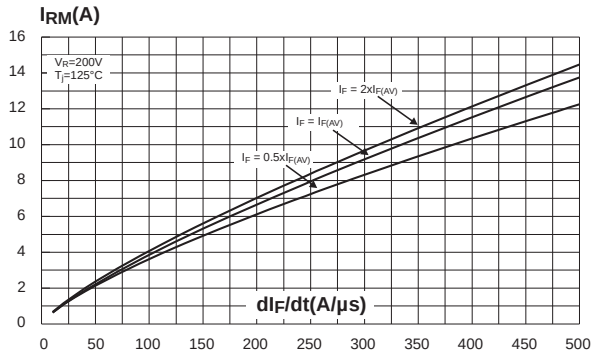


Figure 3. Reverse recovery time versus dI_F/dt (typical values)

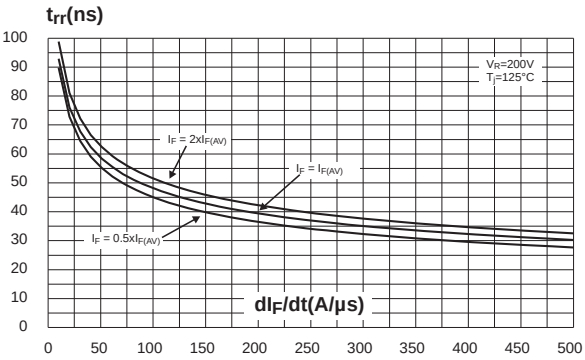


Figure 4. Softness factor versus dI_F/dt (typical values)

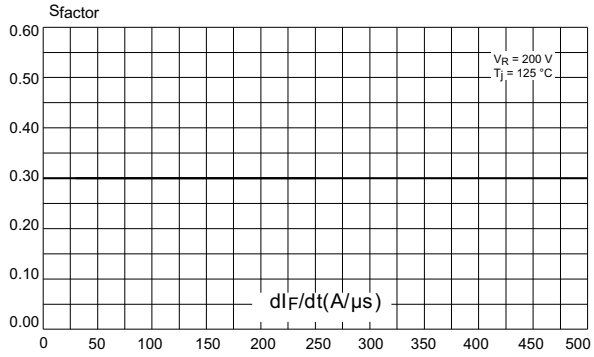


Figure 5. Relative variations of dynamic parameters versus junction temperature (reference: T_j = 125 °C)

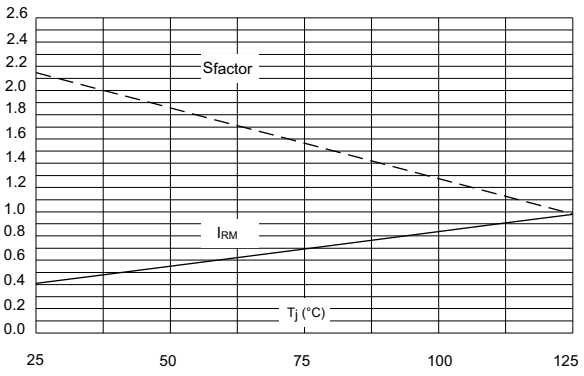


Figure 6. Transient peak forward voltage versus dI_F/dt (typical values)

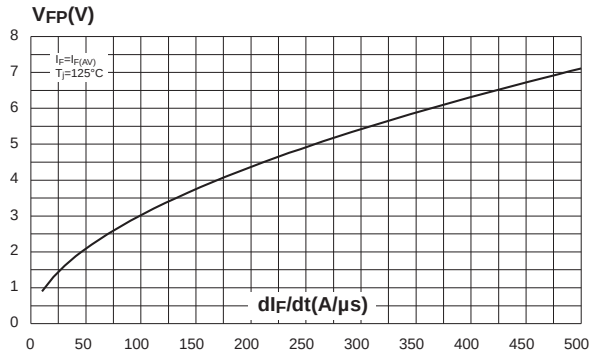
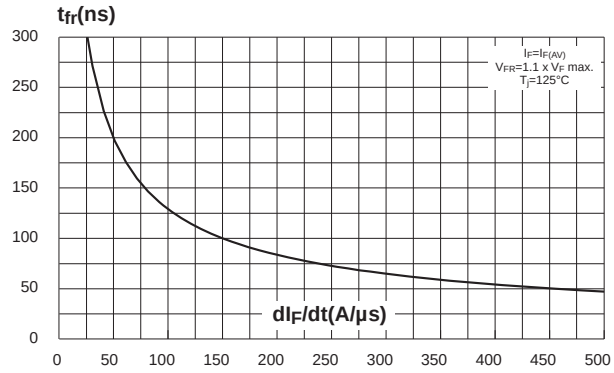


Figure 7. Forward recovery time versus dI_F/dt (typical values)



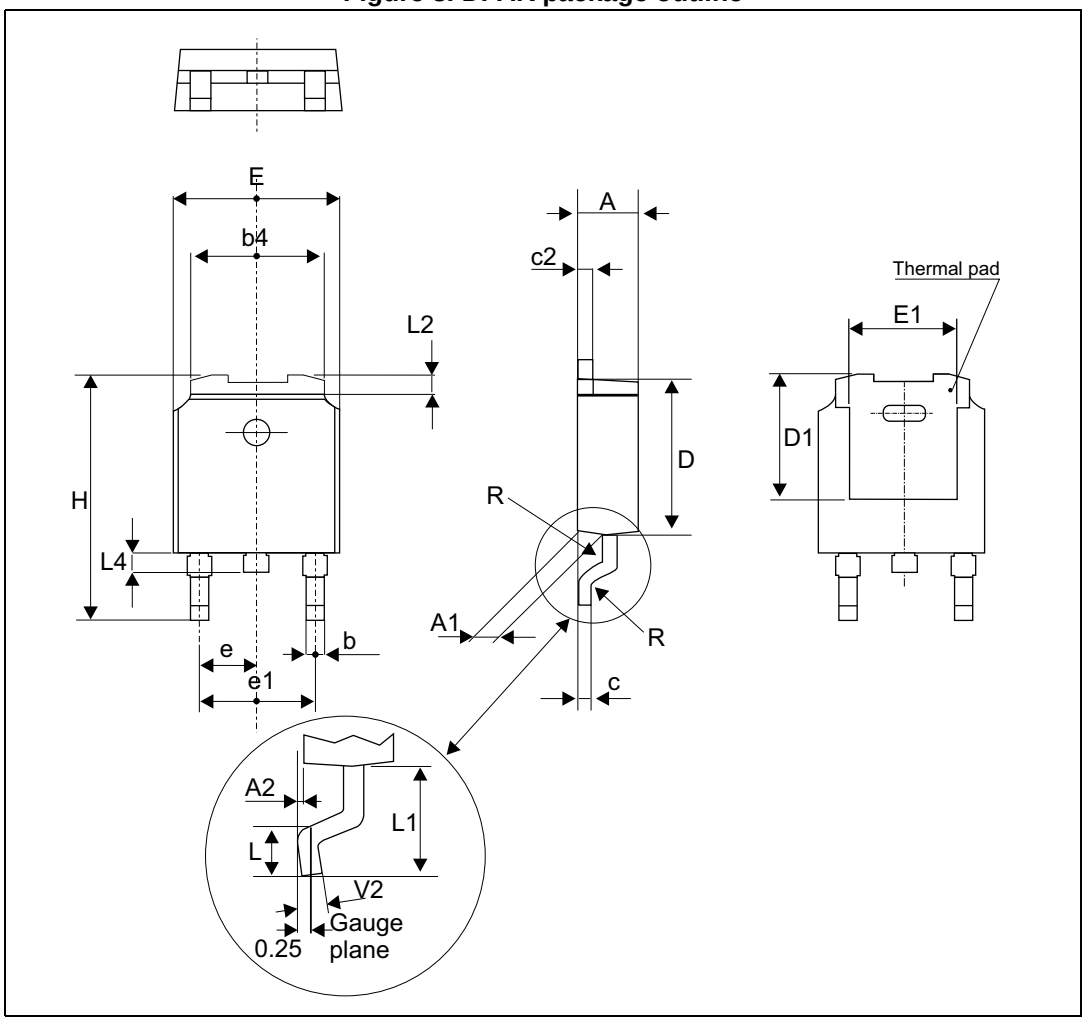
2 Package Information

- Epoxy meets UL94, V0

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 DPAK package information

Figure 8. DPAK package outline

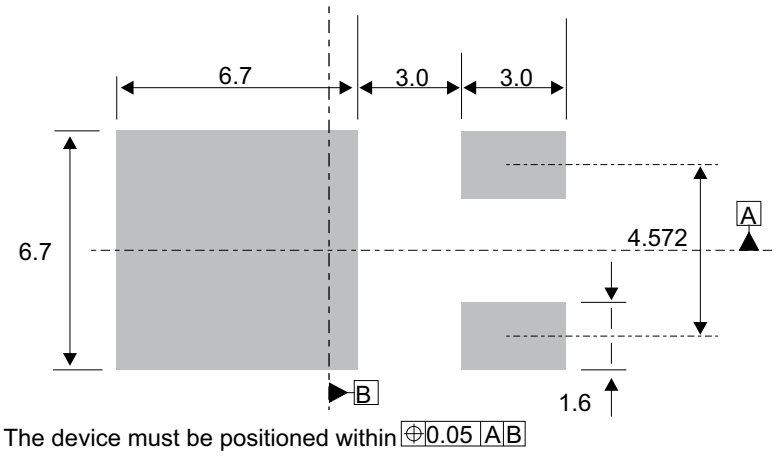


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.085		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.194		0.214
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	4.95		5.60	0.194		0.220
E	6.35		6.73	0.250		0.264
E1	4.32		5.50	0.170		0.216
e		2.28			0.090	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		1.78	0.039		0.070
L2			1.27			0.050
L4	0.60		1.02	0.023		0.040
V2	-8°		+8°	-8°		8°

Figure 9. DPAK footprint dimensions (in mm)



3 Ordering Information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH1003SB-TR	STTH1 003S	DPAK	0.32 g	2500	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Description of changes
24-Aug-2005	1	First issue.
18-May-2009	2	Reformatted to current standards. Modified configuration diagram on front page.
01-Apr-2014	3	Updated dimensions F1 and F2 in TO-220FPAB package dimensions.
01-Aug-2014	4	Updated DPAK package information and removed D²PAK and TO-220FPAB package and characteristics.
17-Sep-2014	5	Updated *Figure 8* and *Figure 9*.
14-Nov-2016	6	Updated DPAK package information and reformatted to current standard.

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