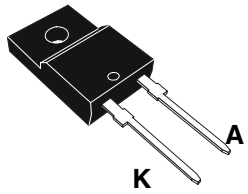
STTH1004

High efficiency rectifier

Custom Data

Main product characteristics

$I_{F(AV)}$	10 A
V_{RRM}	400 V
t_{rr} (typ)	15 ns
T_j	175° C
V_F (typ)	1.15 V



TO-220FPAC
STTH1004FP

Features and benefits

- Ultrafast recovery
- Low power losses
- High surge capability
- Low leakage current
- High junction temperature

Description

The **STTH1004** is an Ultrafast Recovery Power Rectifier dedicated to **energy recovery in PDP application**.

It is especially designed for clamping function in energy recovery block.

The compromise between forward voltage drop and recovery time offers optimized performances.

Order codes

Part Numbers	Marking
STTH1004FP	STTH1004

Table 1. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		400	V
$I_{F(RMS)}$	RMS forward current		20	A
$I_{F(AV)}$	Average forward current		10	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	100	A
T_{stg}	Storage temperature range		-65 to + 175	° C
T_j	Maximum operating junction temperature		175	° C

1 Characteristics

Table 2. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case		TO-220FPAC	6	° C/W

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min	Typ	Max	Unit
I_R (1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			1	µA
		T_j = 125° C			20	200	
V_F (2)	Forward voltage drop	T_j = 25° C	I_F = 10 A		1.5	1.7	V
		T_j = 125° C			1.15	1.35	

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:
$P = 1.05 \times I_{F(AV)} + 0.03\ I_F{}^2{}_{(RMS)}$

Table 4. Recovery characteristics

Symbol	Parameter	Test conditions		Min	Typ	Max	Unit
t_{rr}	Reverse recovery time	T_j = 25° C	I_F = 0.5 A, I_{rr} = 0.25 A I_R = 1 A		15	20	ns
			I_F = 1 A, V_R = 30 V dI_F/dt = -50 A/µs			40	
t_{fr}	Forward recovery time	T_j = 25° C	I_F = 10 A, dI_F/dt = 100 A/µs V_{FR} = 1.1 x V_{Fmax}			140	ns
V_{FP}	Peak forward voltage	T_j = 25° C	I_F = 10 A , dI_F/dt = 100 A/µs			3	V
I_{RM}	Reverse recovery current	T_j = 125° C	I_F = 10 A, V_{CC} = 200 V dI_F/dt = 200 A/µs		6.2	8	A
S_{factor}	Softness factor				0.3		

Figure 1. Conduction losses versus average forward current

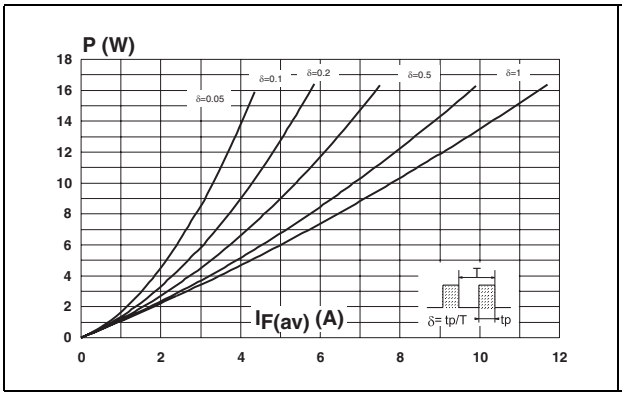


Figure 2. Forward voltage drop versus forward current

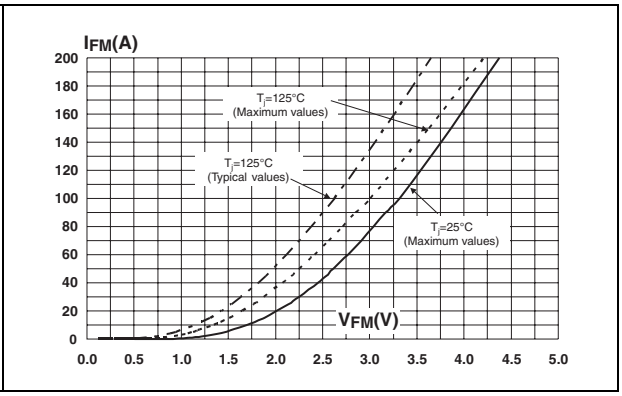


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

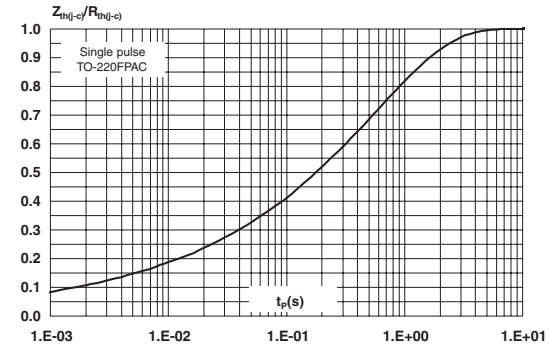


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

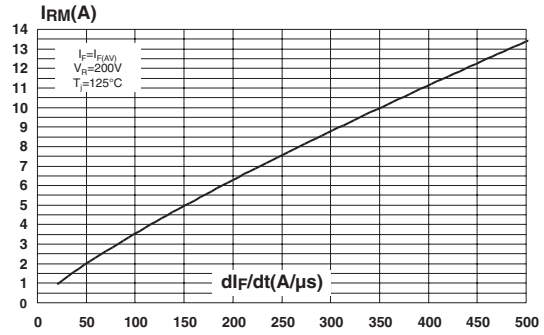


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

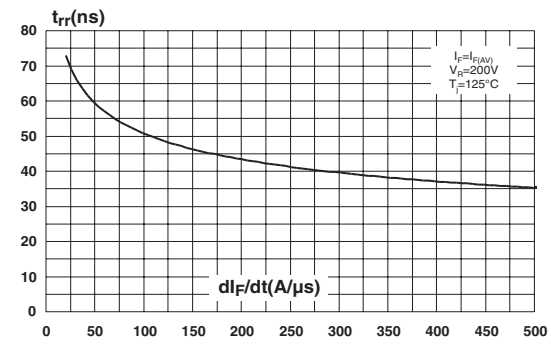


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

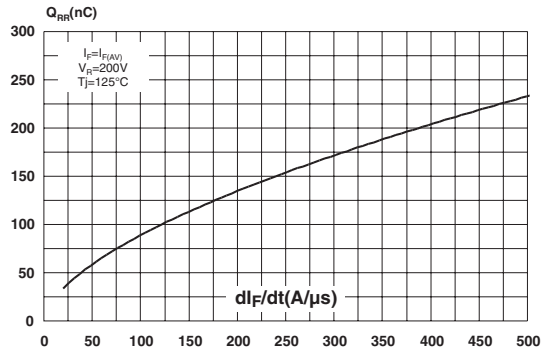


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values)

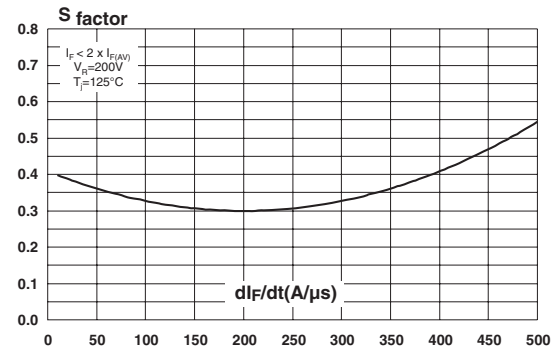


Figure 8. Relative variations of dynamic parameters versus junction temperature

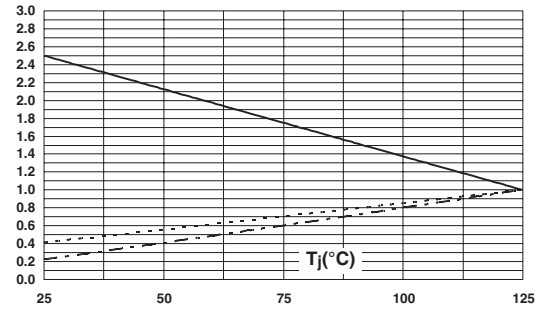


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

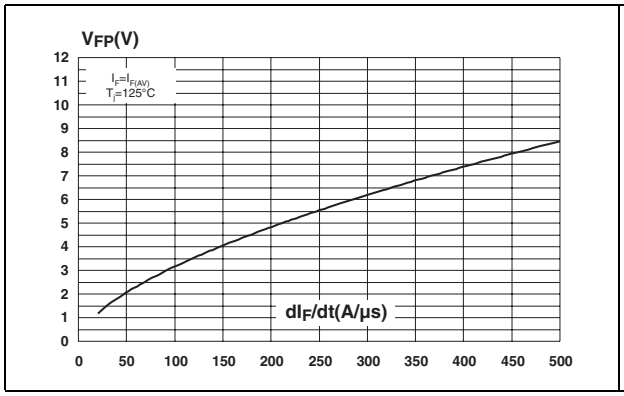


Figure 10. Forward recovery time versus dI_F/dt (typical values)

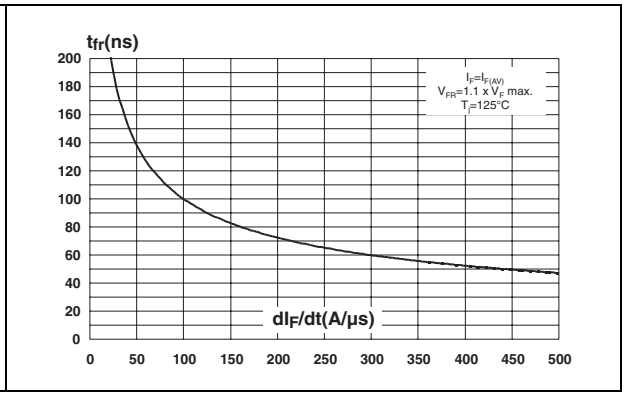
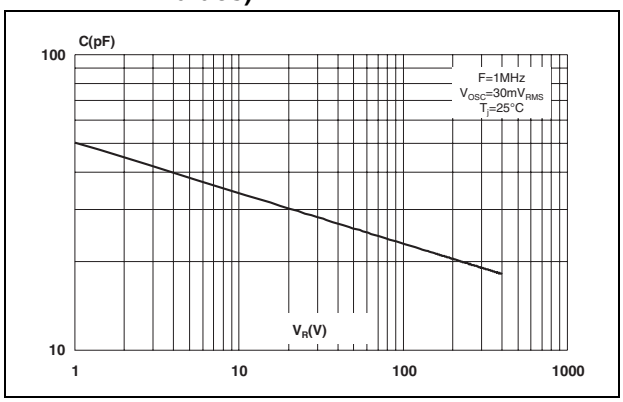


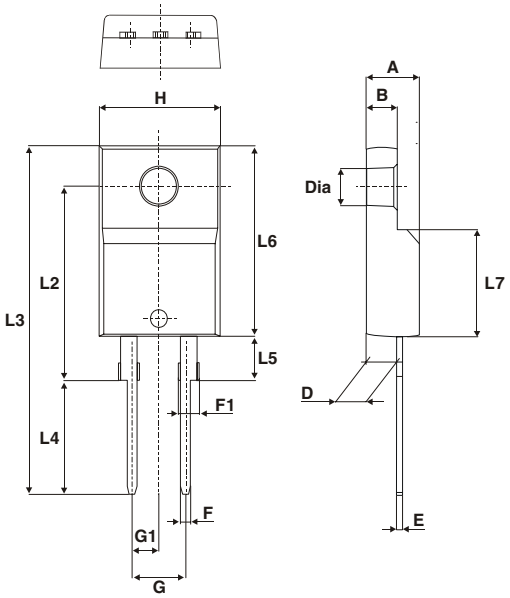
Figure 11. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque calue: 0.8 Nm
- Maximum torque value: 1.0 Nm

Table 5. TO-220FPAC Dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH1004FP	STTH1004	TO-220FPAC	1.8 g	50	Tube

4 Revision history

Date	Revision	Description of Changes
24-May-2005	1	First issue.