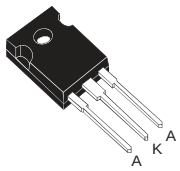
STTH60P03S

Ultrafast rectifier PDP energy recovery

Datasheet – production data

Features

- Ultrafast recovery allowing high sustain frequency
- Decrease charge evacuation time in the inductance
- Minimize switching-on and total power losses
- Increase luminous efficiency and brightness
- Soft and noise-free recovery
- High surge capability
- High junction temperature



TO-247
STTH60P03SW

Description

The STTH60P03SW is an ultrafast recovery power rectifier dedicated to energy recovery in PDP application.

The key parameters of the D_{ERC} diode for the energy recovery circuit have been optimized to decrease power losses.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	60 A
V_{RRM}	300 V
V_{FP} (typ)	2.5 V
I_{RM} (typ)	6 A
T_j	175 °C
V_F (typ)	0.9 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	Forward rms current		80	A
$I_{F(AV)}$	Average forward current		60	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal	250	A
I_{FRM}	Repetitive peak forward current	F = 200 kHz, t_p = 500 ns Sinusoidal, T_C = 155 °C	150	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		175	°C

Table 3. Thermal parameters

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	0.8	°C/W
$Z_{th(j-c)}$	Transient thermal resistance at 1 µs	0.002	°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 = 0.7 x V_{RRM}			100	µA
		T_j = 125 °C			0.1	1	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 30 A			1.5	V
		T_j = 125 °C			0.9	1.15	

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:

$P = 0.88 \times I_{F(AV)} + 0.009\ I_F{}^2{}_{(RMS)}$

Table 5. Switching characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_{RM}	Reverse recovery current	T_j = 100 °C	I_F = 60 A, V_R = 100 V dI_F/dt = 200 A/µs		6	7.5	A
S_{factor}	Softness factor				0.5		-
V_{FP}	Peak forward voltage	T_j = 25 °C	I_F = 60 A, dI_F/dt = 400 A/µs		2.5	3.5	V

Figure 1. Forward voltage drop versus forward current

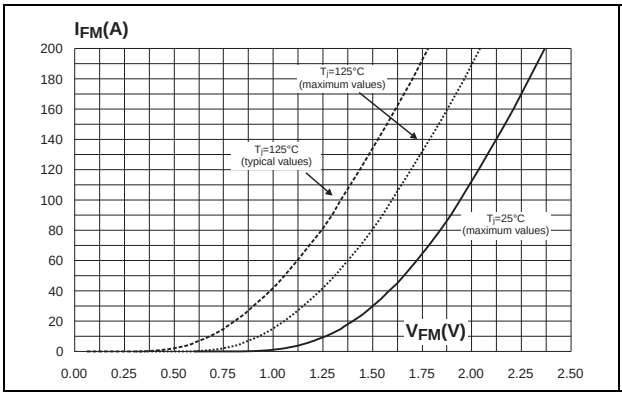


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration

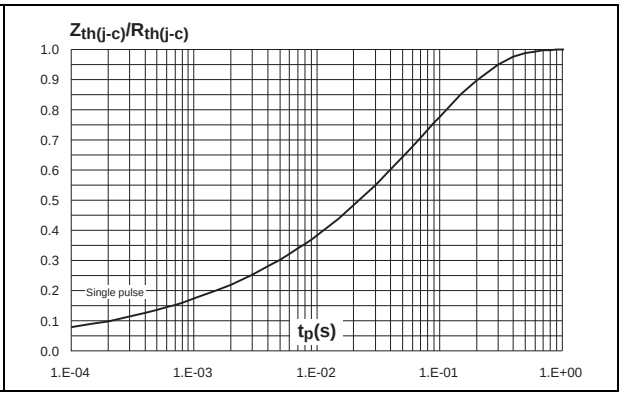


Figure 3. Peak reverse recovery current versus dI_F/dt (typical values)

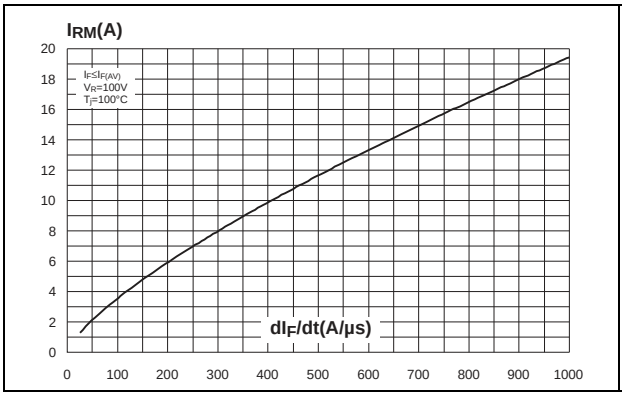


Figure 4. Reverse recovery time versus dI_F/dt (typical values)

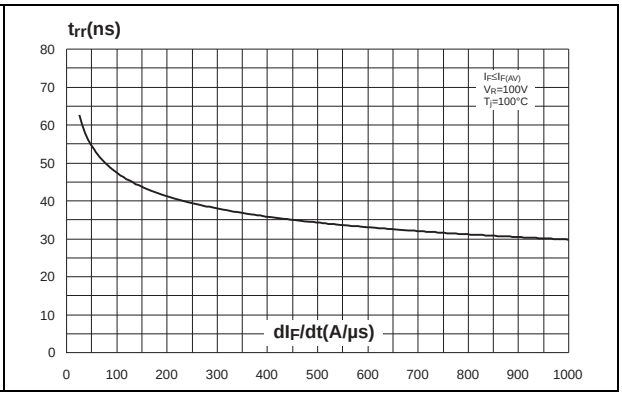


Figure 5. Reverse recovery softness factor versus dI_F/dt (typical values)

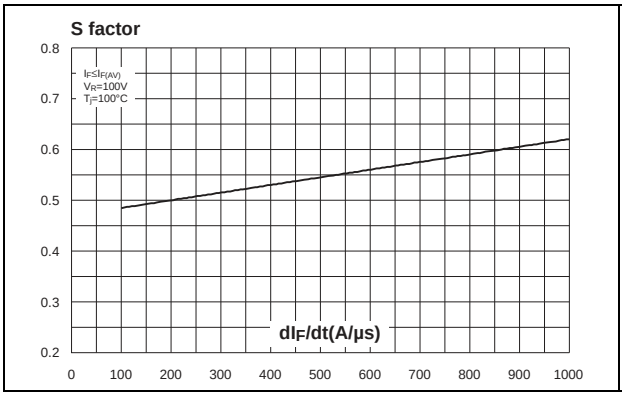


Figure 6. Relative variations of dynamic parameters versus junction temperature

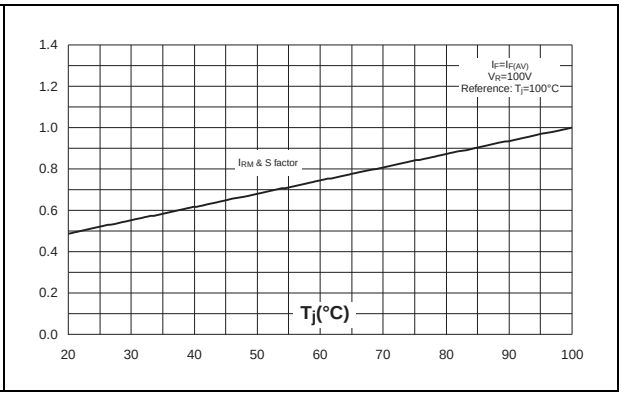


Figure 7. Transient peak forward voltage versus dI_F/dt (typical values)

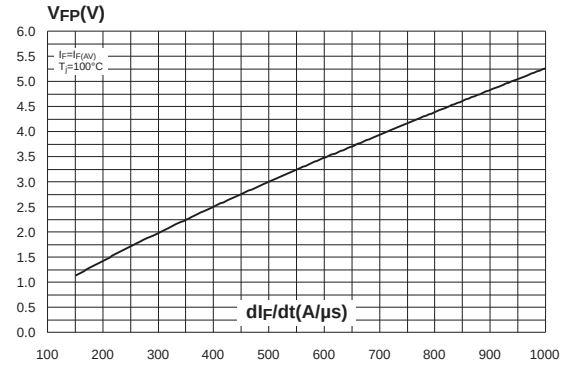


Figure 8. Forward recovery time versus dI_F/dt (typical values)

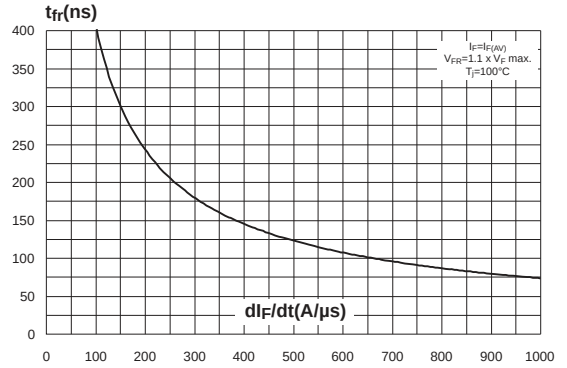
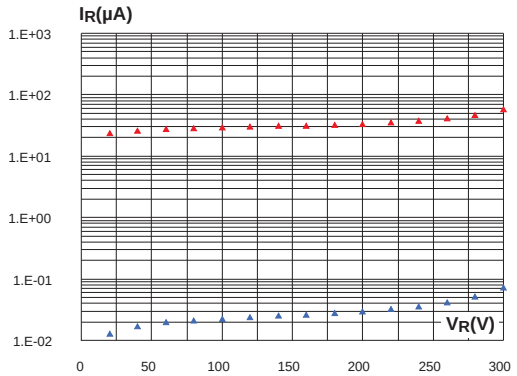


Figure 9. Reverse leakage current versus reverse voltage



2 Application information

Figure 10. Application characteristics

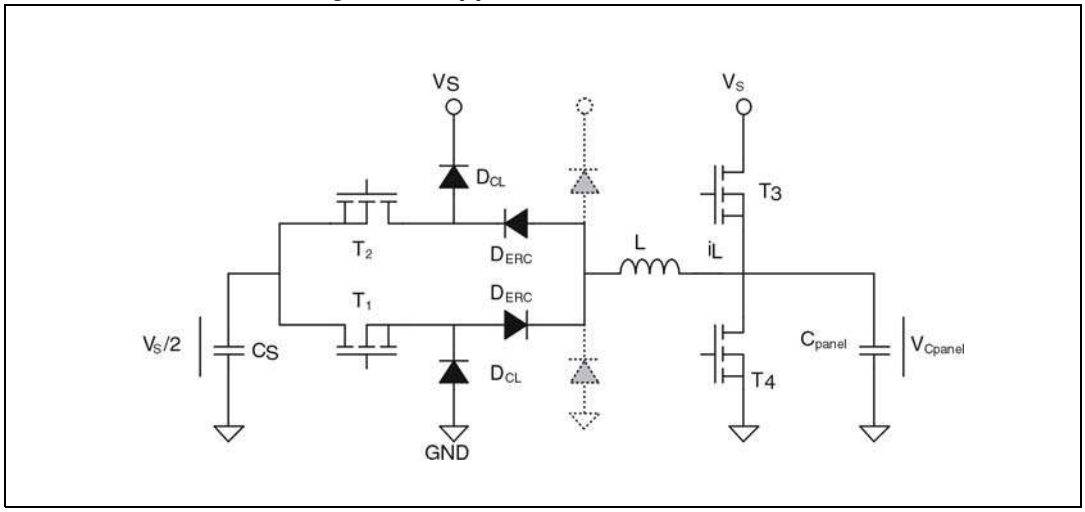
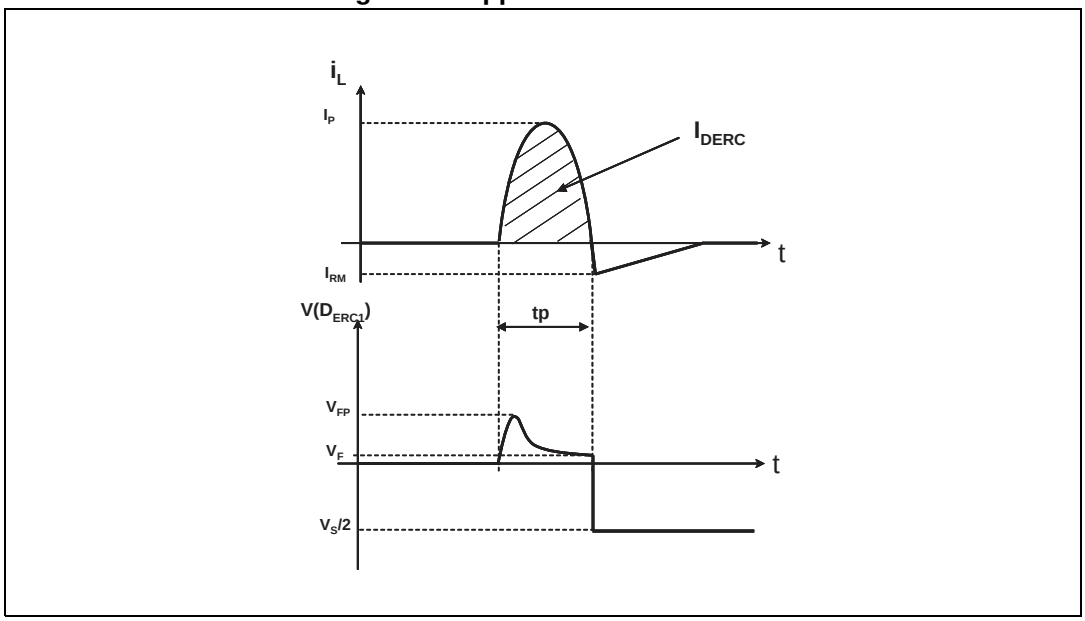


Figure 11. Application waveforms



3 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.5 N·m
- Maximum torque value: 1.0 N·m

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Figure 12. TO-247 dimension definitions

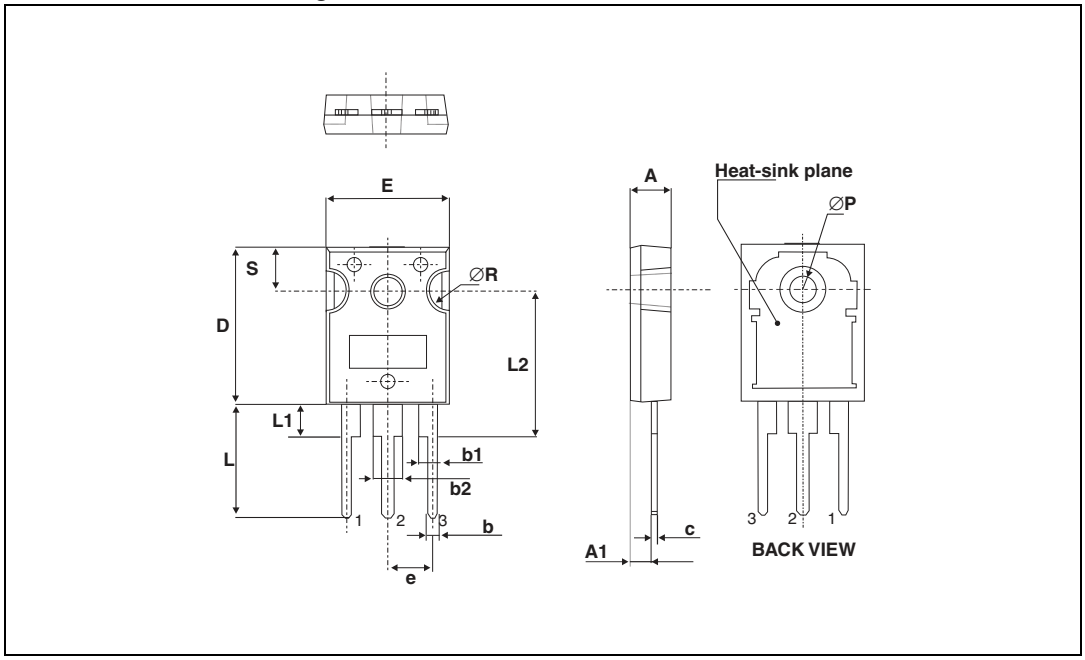

Table 6. TO-247 dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D(1)	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2	18.50 typ.			0.728 typ.		
∅P(2)	3.55		3.65	0.139		0.143
∅R	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

1. Dimension D plus gate protrusion does not exceed 20.5 mm.
2. Resin thickness around the mounting hole is not less than 0.9 mm.

4 Ordering information

Table 7. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH60P03SW	STTH60P03SW	TO-247	4.46 g	30	Tube

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
04-Nov-2004	1	First issue.
10-Jan-2005	2	Minor layout update. No content change.
04-03-2005	3	Table 7 on page 5: base quantity delivery from 50 to 30.
19-Mar-2013	4	Added ECOPACK statement.

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