

## ULTRAFAST RECTIFIER PDP ENERGY RECOVERY

**Table 1: Main Product Characteristics**

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

### FEATURES AND BENEFITS

- Ultrafast recovery allowing High Sustain Frequency
- Decrease charge evacuation time in the inductance (see figure 1)
- Minimize switching-on and total power losses
- Increase luminous efficiency and brightness
- Soft and noise-free recovery
- High surge capability
- High junction temperature

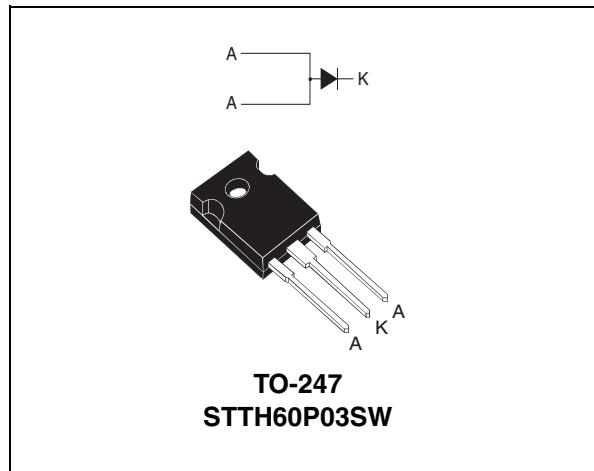
### DESCRIPTION

The **STTH60P03SW** is an Ultrafast Recovery Power Rectifier dedicated to **energy recovery in PDP application**.

The key parameters of the D<sub>ERC</sub> diode for the energy recovery circuit have been optimized in order to decrease power losses.

**Table 3: Absolute Ratings (limiting values)**

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



**Table 2: Order Code**

Part Number	Marking
STTH60P03SW	STTH60P03SW

## STTH60P03S

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**Table 4: Thermal Parameters**

Symbol	Parameter	Value	Unit
R <sub>th(j-c)</sub>	Junction to case	0.8	°C/W
Z <sub>th(j-c)</sub>	Transient thermal resistance at 1μs	0.002	°C/W

**Table 5: Static Electrical Characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I <sub>R</sub> *	Reverse leakage current	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			100	μA
		T <sub>j</sub> = 125°C			0.1	1	mA
V <sub>F</sub> **	Forward voltage drop	T <sub>j</sub> = 25°C	I <sub>F</sub> = 30A			1.5	V
		T <sub>j</sub> = 125°C			0.9	1.15	

Pulse test:

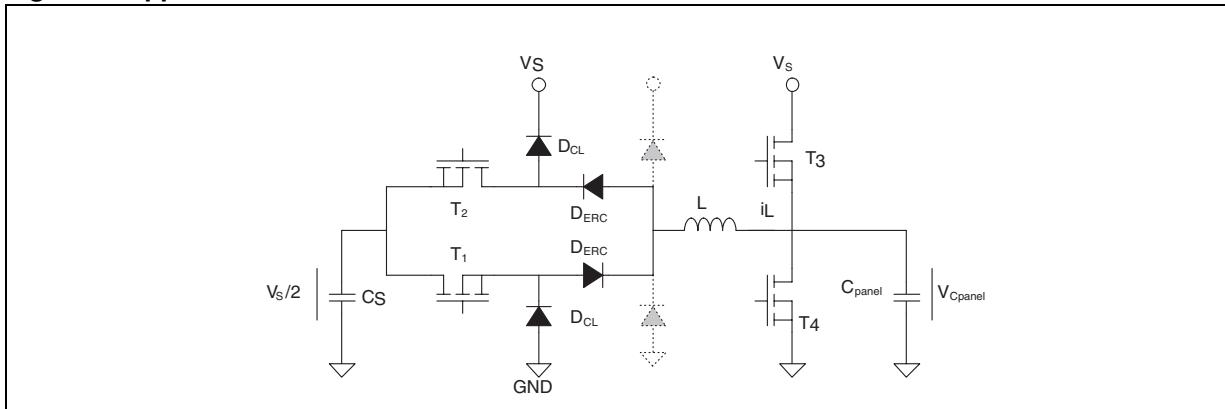
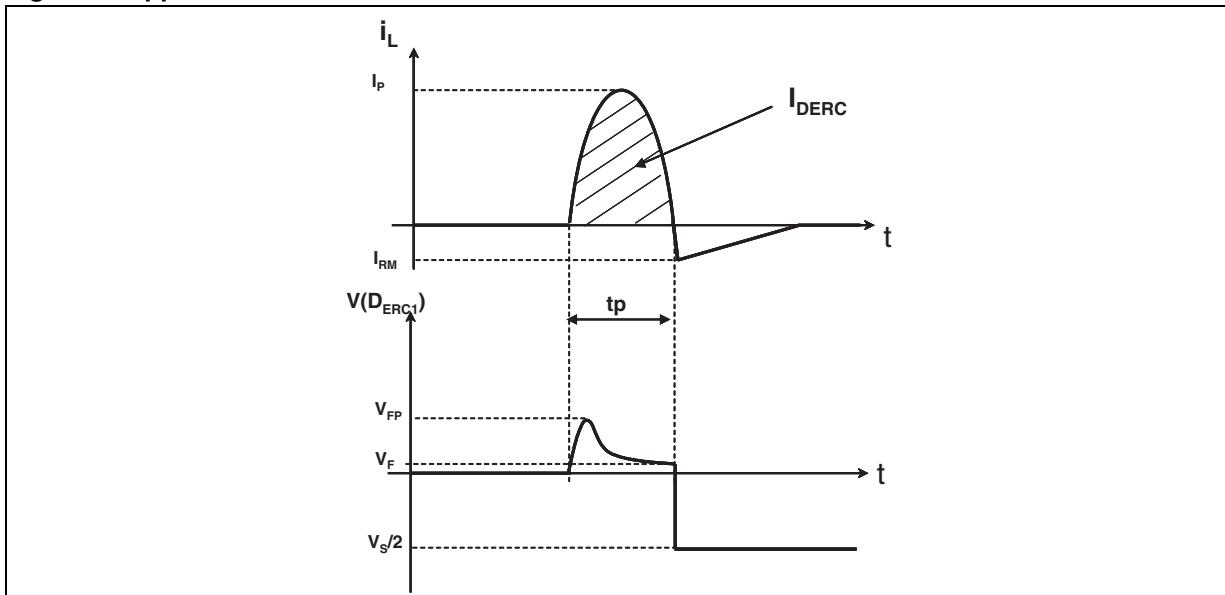
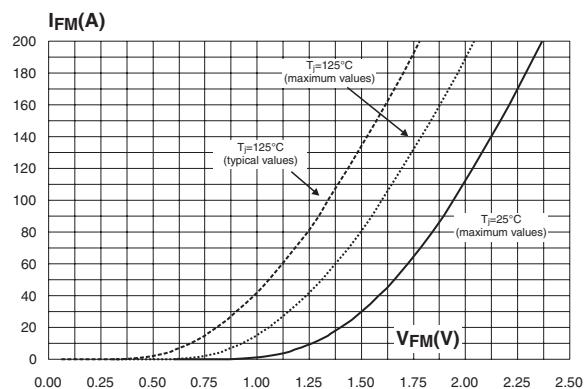
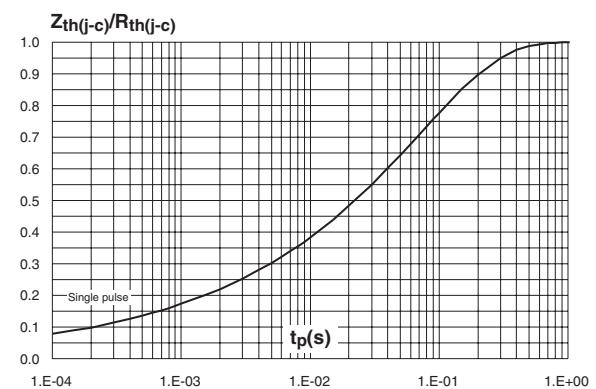
\* tp = 5 ms, δ < 2%

\*\* tp = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation: P = 0.88 × I<sub>F(AV)</sub> + 0.009 I<sub>F</sub><sup>2</sup> (RMS)

**Table 6: Switching Characteristics**

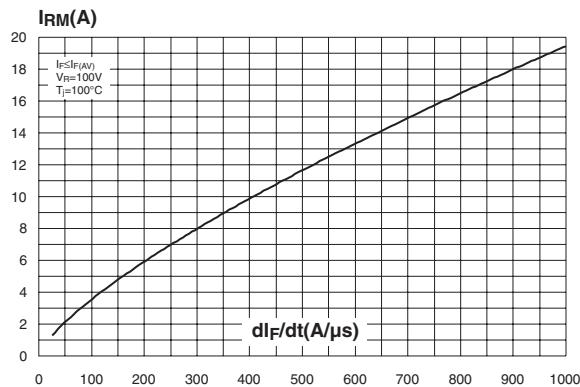
Symbol	Parameter	Test conditions			Min.	Typ	Max.	Unit
I <sub>RM</sub>	Reverse recovery current	T <sub>j</sub> = 100°C	I <sub>F</sub> = 60A V <sub>R</sub> = 100V dI <sub>F</sub> /dt = 200 A/μs			6	7.5	A
Sfactor					0.5			
V <sub>FP</sub>	Peak forward voltage	T <sub>j</sub> = 25°C	I <sub>F</sub> = 60A dI <sub>F</sub> /dt = 400 A/μs			2.5	3.5	V

**Figure 1: Application Characteristics****Figure 2: Application Waveforms****Figure 3: Forward voltage drop versus forward current****Figure 4: Relative variation of thermal impedance junction to case versus pulse duration**

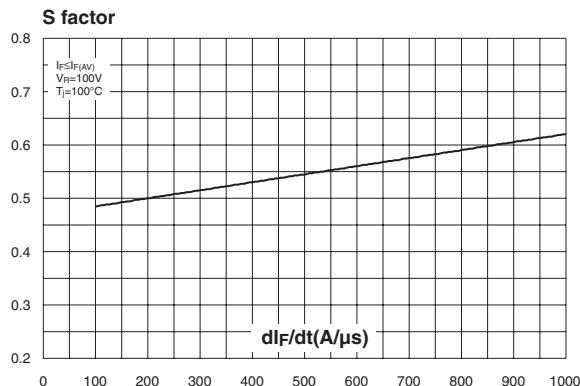
## STTH60P03S

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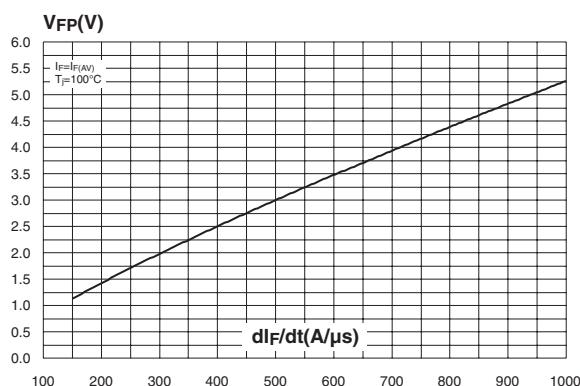
**Figure 5: Peak reverse recovery current versus  $dI_F/dt$  (typical values)**



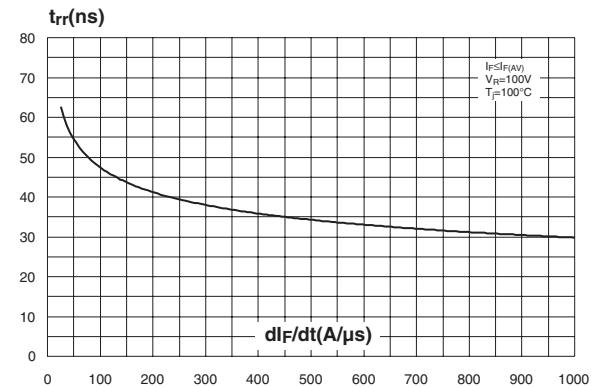
**Figure 7: Reverse recovery softness factor versus  $dI_F/dt$  (typical values)**



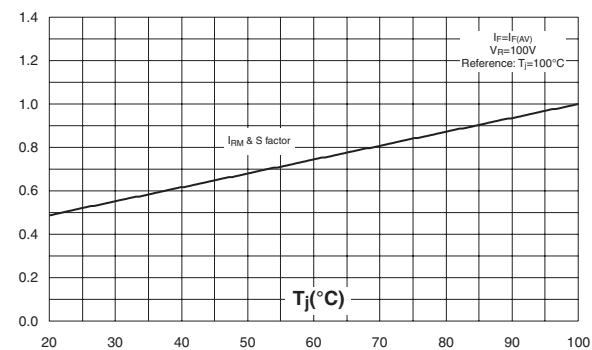
**Figure 9: Transient peak forward voltage versus  $dI_F/dt$  (typical values)**



**Figure 6: Reverse recovery time versus  $dI_F/dt$  (typical values)**



**Figure 8: Relative variations of dynamic parameters versus junction temperature**



**Figure 10: Forward recovery time versus  $dI_F/dt$  (typical values)**

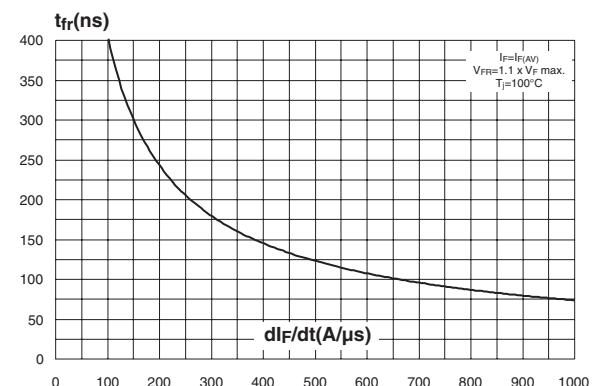


Figure 11: TO-247 Package Mechanical Data

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1	3.00			0.118		
F2	2.00			0.078		
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G	10.90			0.429		
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2	18.50			0.728		
L3	14.20		14.80	0.559		0.582
L4	34.60			1.362		
L5	5.50			0.216		
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

Table 7: Ordering Information

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

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

Table 8: Revision History

Date	Revision	Description of 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.

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