



## ULTRAFast RECTIFIER PDP ENERGY RECOVERY

**Table 1: Main Product Characteristics**

$I_{F(AV)}$	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

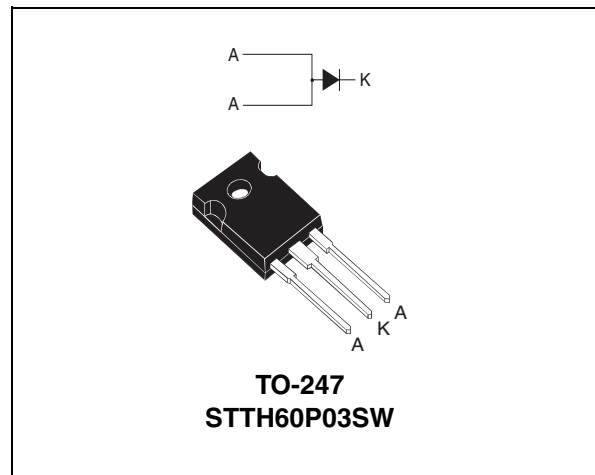
### FEATURES AND BENEFITS

- 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  $D_{ERC}$  diode for the energy recovery circuit have been optimized in order to decrease power losses.



**Table 2: Order Code**

Part Number	Marking
STTH60P03SW	STTH60P03SW

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

Symbol	Parameter	Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage	300	V	
$I_{F(RMS)}$	RMS forward current	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, Tc = 155°C	150	A
$T_{stg}$	Storage temperature range	-65 to + 175	°C	
$T_j$	Maximum operating junction temperature	175	°C	

## STTH60P03S

**Table 4: 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 1μs	0.002	°C/W

**Table 5: Static Electrical Characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			100	μA
		$T_j = 125^\circ\text{C}$			0.1	1	mA
$V_F^{**}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$			1.5	V
		$T_j = 125^\circ\text{C}$			0.9	1.15	

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

\*\*  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.88 \times I_{F(AV)} + 0.009 I_F^2 (RMS)$

**Table 6: Switching Characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_{RM}$	Reverse recovery current	$T_j = 100^\circ\text{C}$	$I_F = 60\text{A}$ $V_R = 100\text{V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$		6	7.5	A
$S_{factor}$	Softness factor				0.5		
$V_{FP}$	Peak forward voltage	$T_j = 25^\circ\text{C}$	$I_F = 60\text{A}$ $di_F/dt = 400\text{ A}/\mu\text{s}$		2.5	3.5	V

Figure 1: Application Characteristics

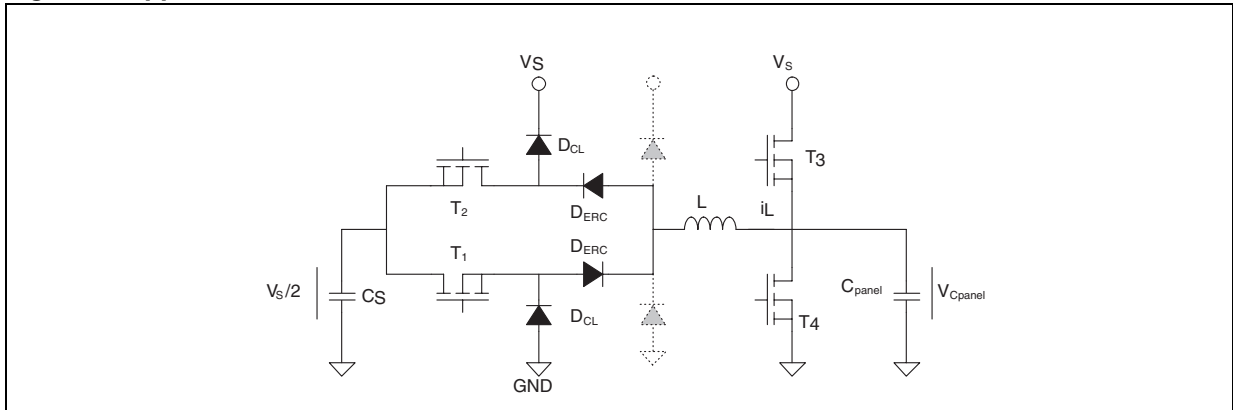


Figure 2: Application Waveforms

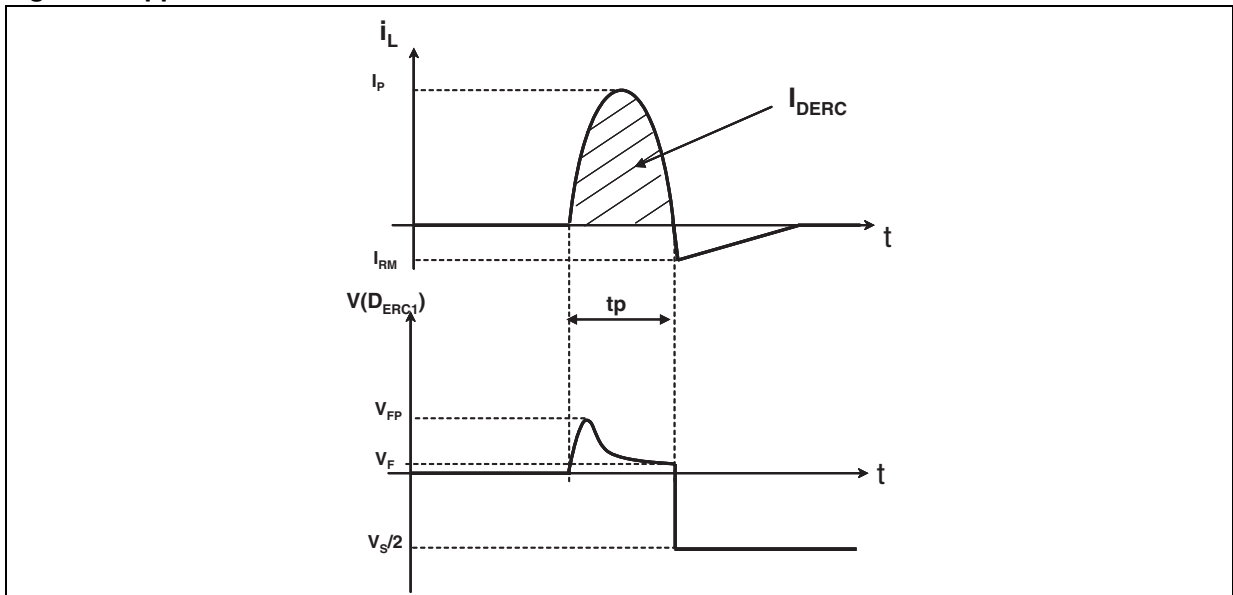


Figure 3: Forward voltage drop versus forward current

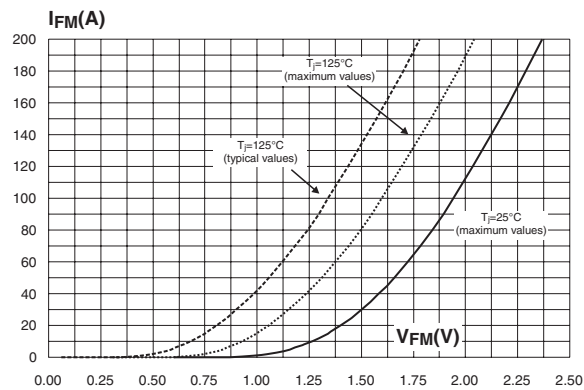


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

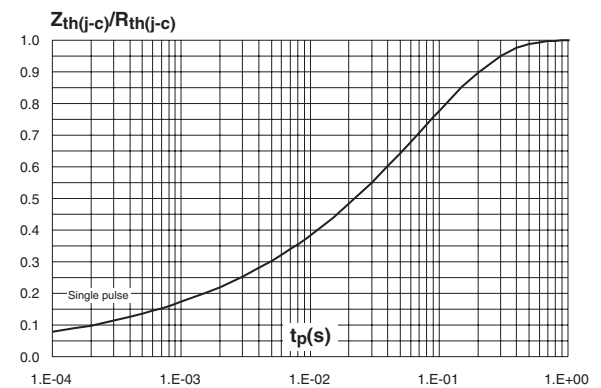


Figure 5: Peak reverse recovery current versus  $di_F/dt$  (typical values)

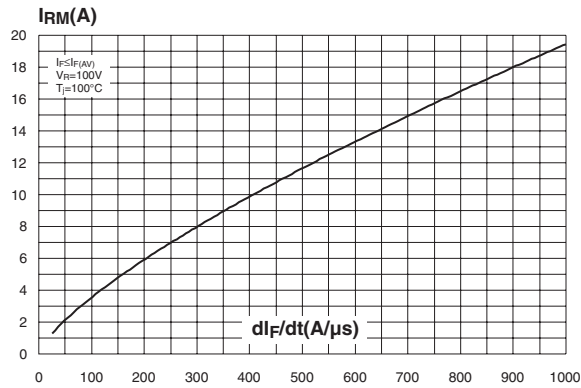


Figure 6: Reverse recovery time versus  $di_F/dt$  (typical values)

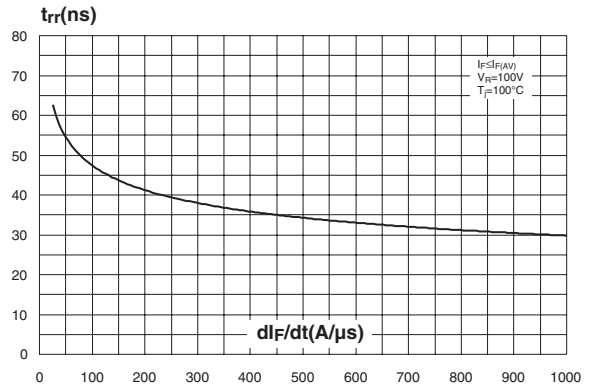


Figure 7: Reverse recovery softness factor versus  $di_F/dt$  (typical values)

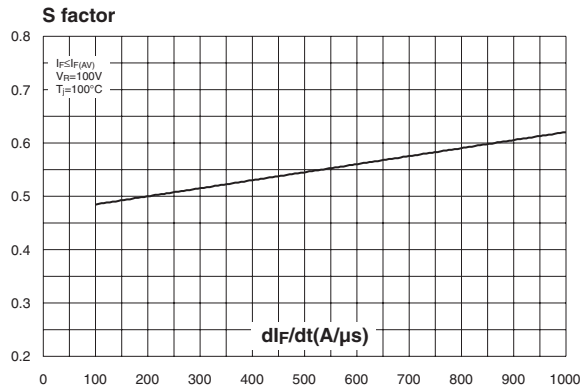


Figure 8: Relative variations of dynamic parameters versus junction temperature

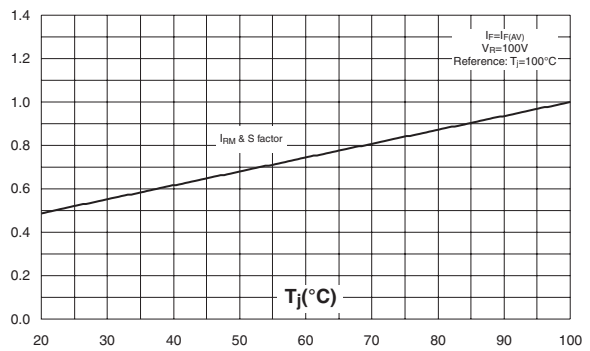


Figure 9: Transient peak forward voltage versus  $di_F/dt$  (typical values)

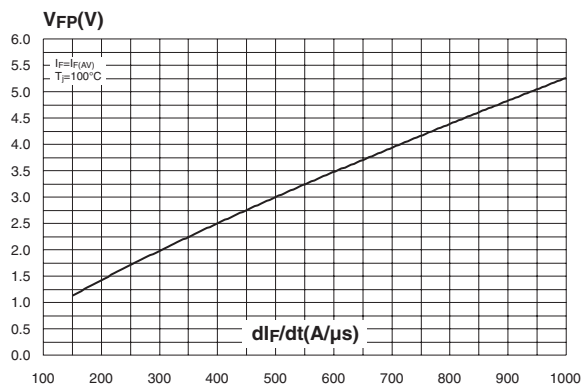


Figure 10: Forward recovery time versus  $di_F/dt$  (typical values)

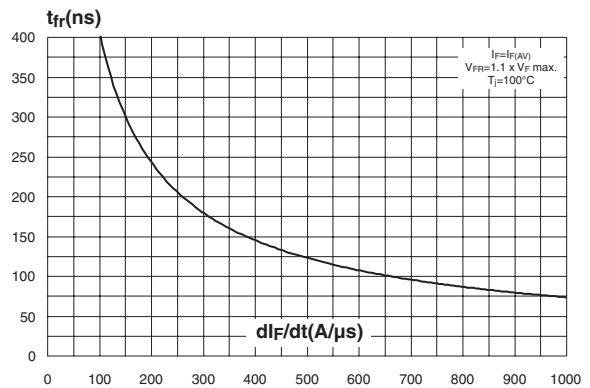


Figure 11: TO-247 Package Mechanical Data

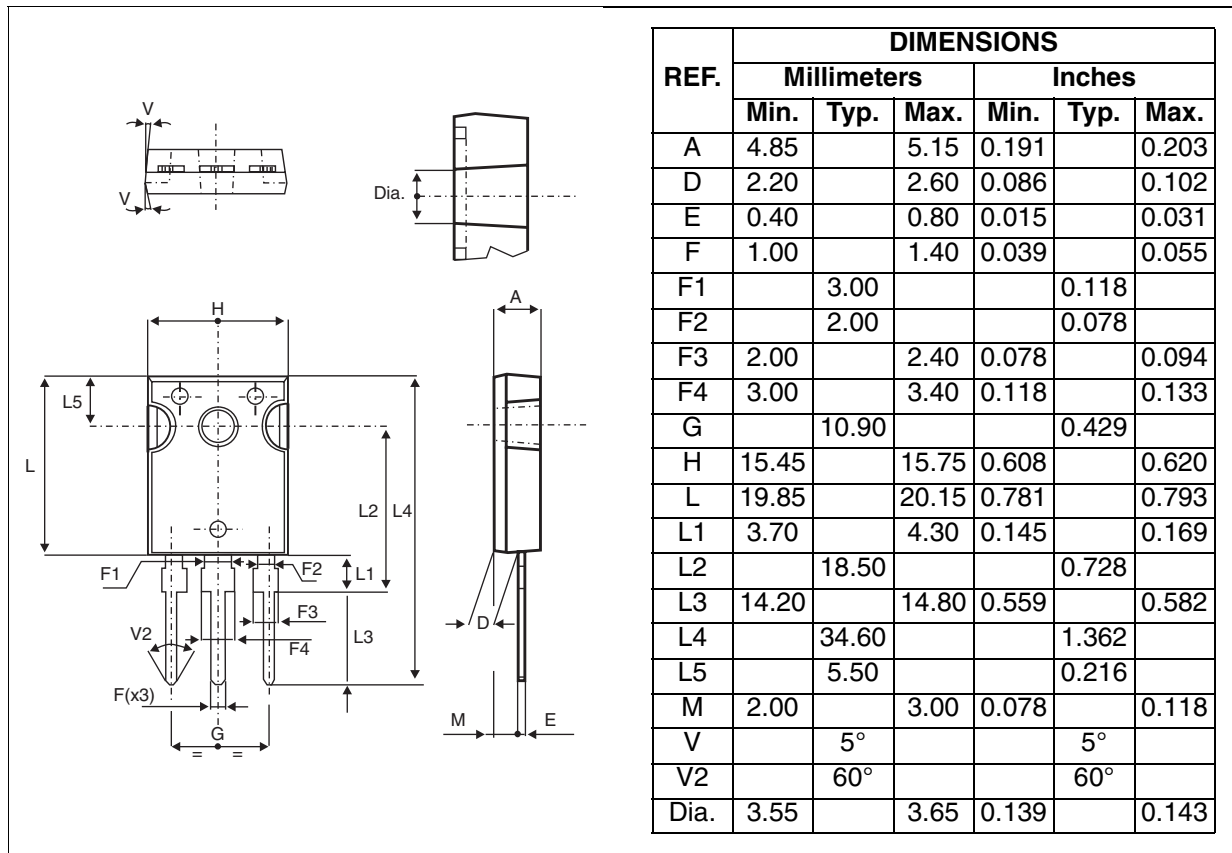


Table 7: Ordering Information

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.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics.  
All other names are the property of their respective owners

© 2005 STMicroelectronics - All rights reserved

**STMicroelectronics group of companies**

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan -  
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)