



## 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

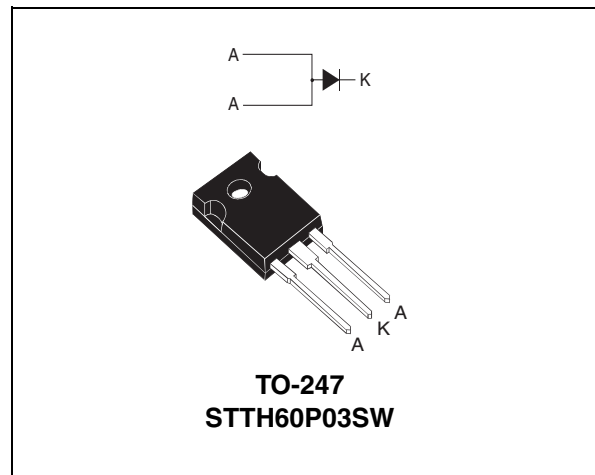
### FEATURES AND BENEFITS

- 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

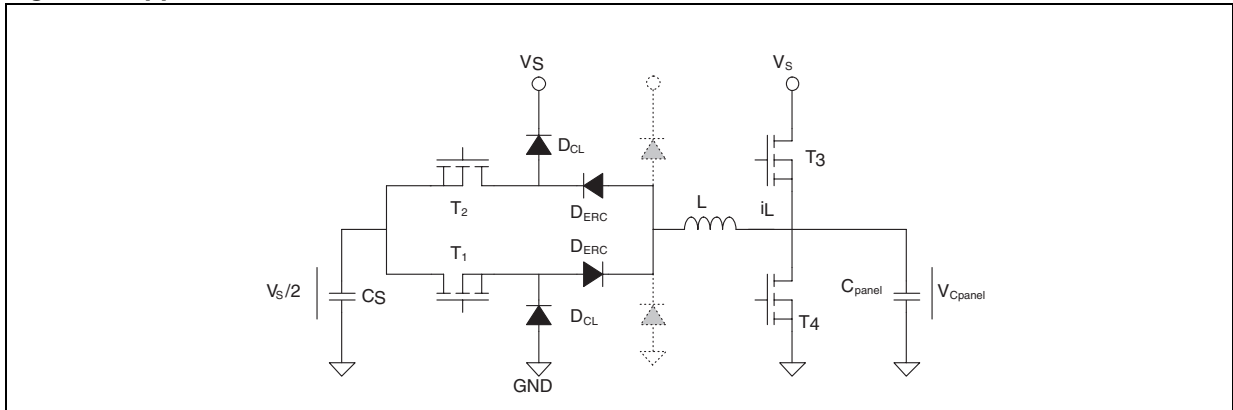


Figure 2: Application Waveforms

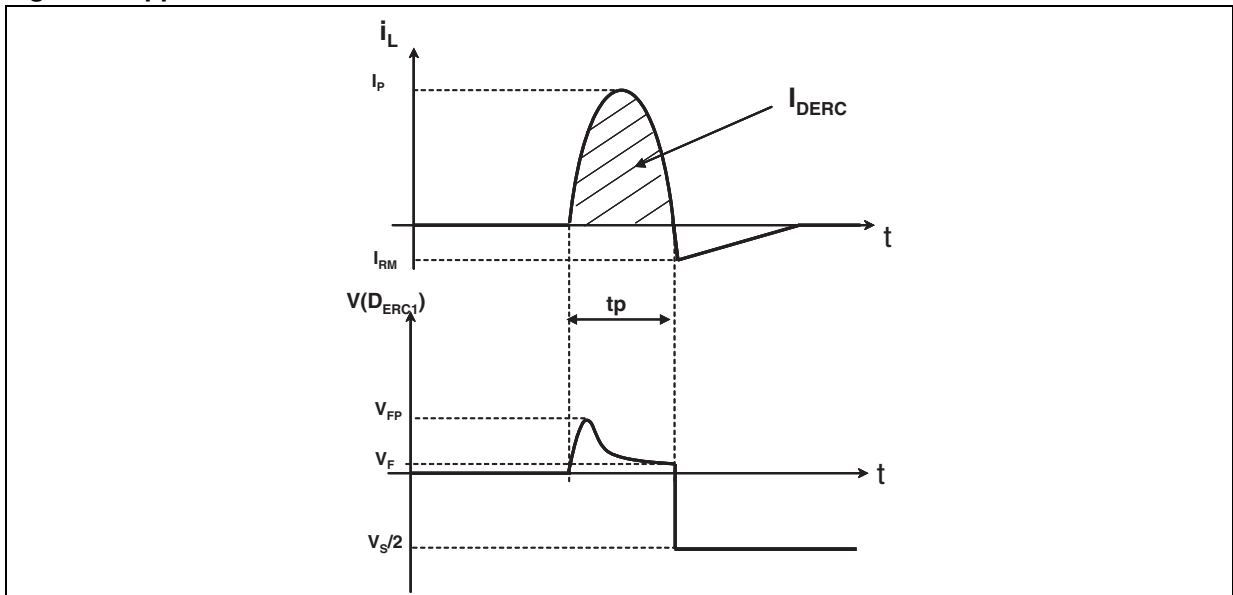


Figure 3: Forward voltage drop versus forward current

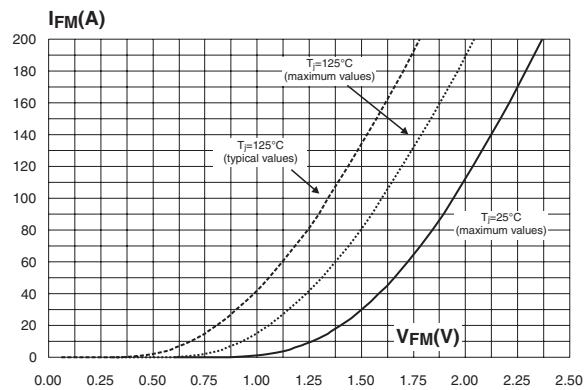


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

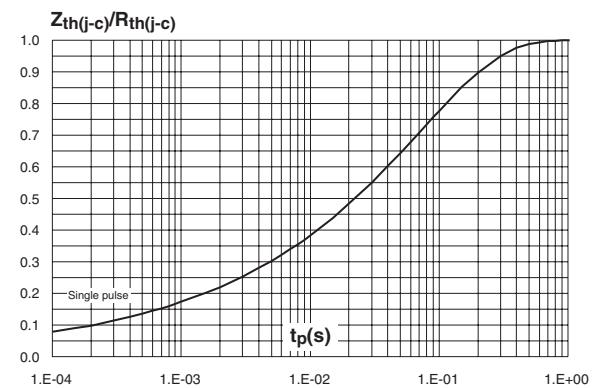


Figure 5: Peak reverse recovery current versus  $di_F/dt$  (typical values)

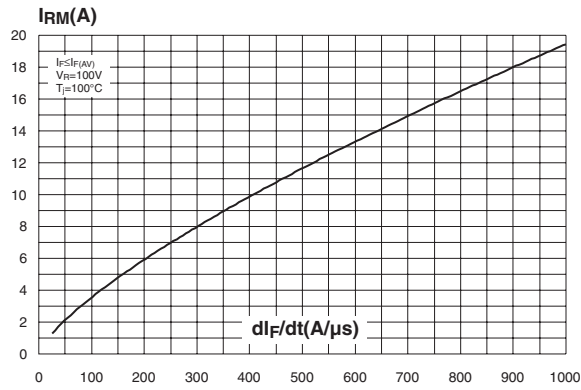


Figure 6: Reverse recovery time versus  $di_F/dt$  (typical values)

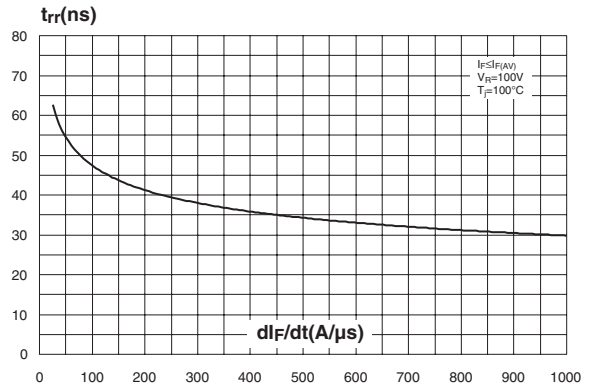


Figure 7: Reverse recovery softness factor versus  $di_F/dt$  (typical values)

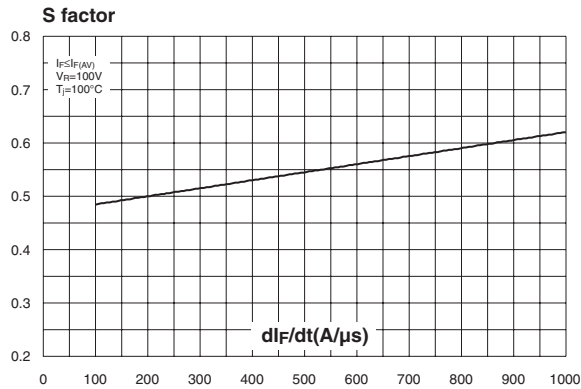


Figure 8: Relative variations of dynamic parameters versus junction temperature

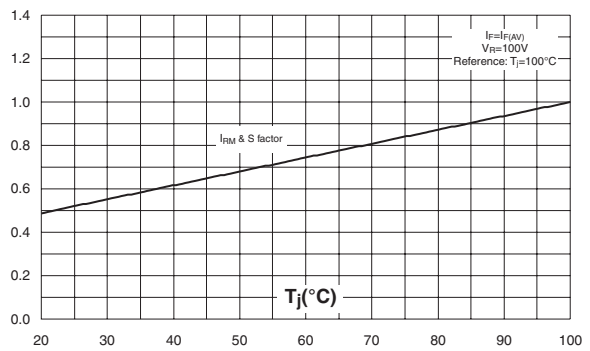


Figure 9: Transient peak forward voltage versus  $di_F/dt$  (typical values)

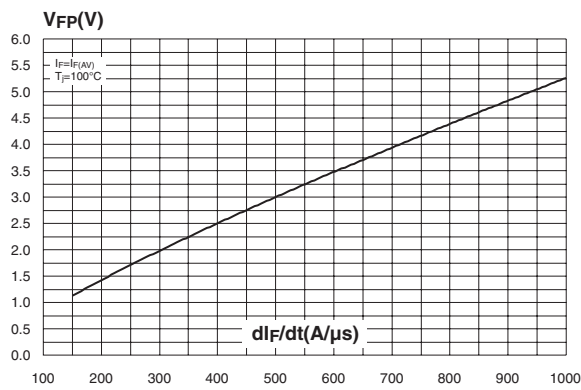


Figure 10: Forward recovery time versus  $di_F/dt$  (typical values)

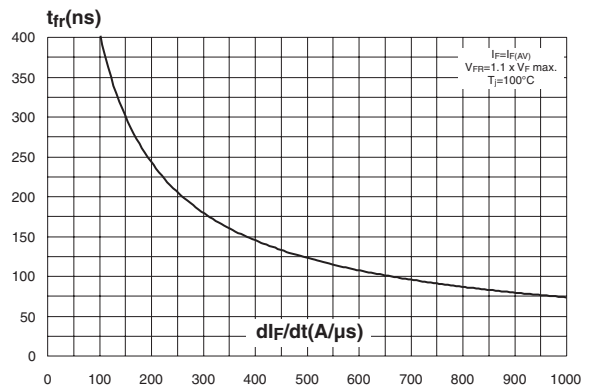


Figure 11: TO-247 Package Mechanical Data

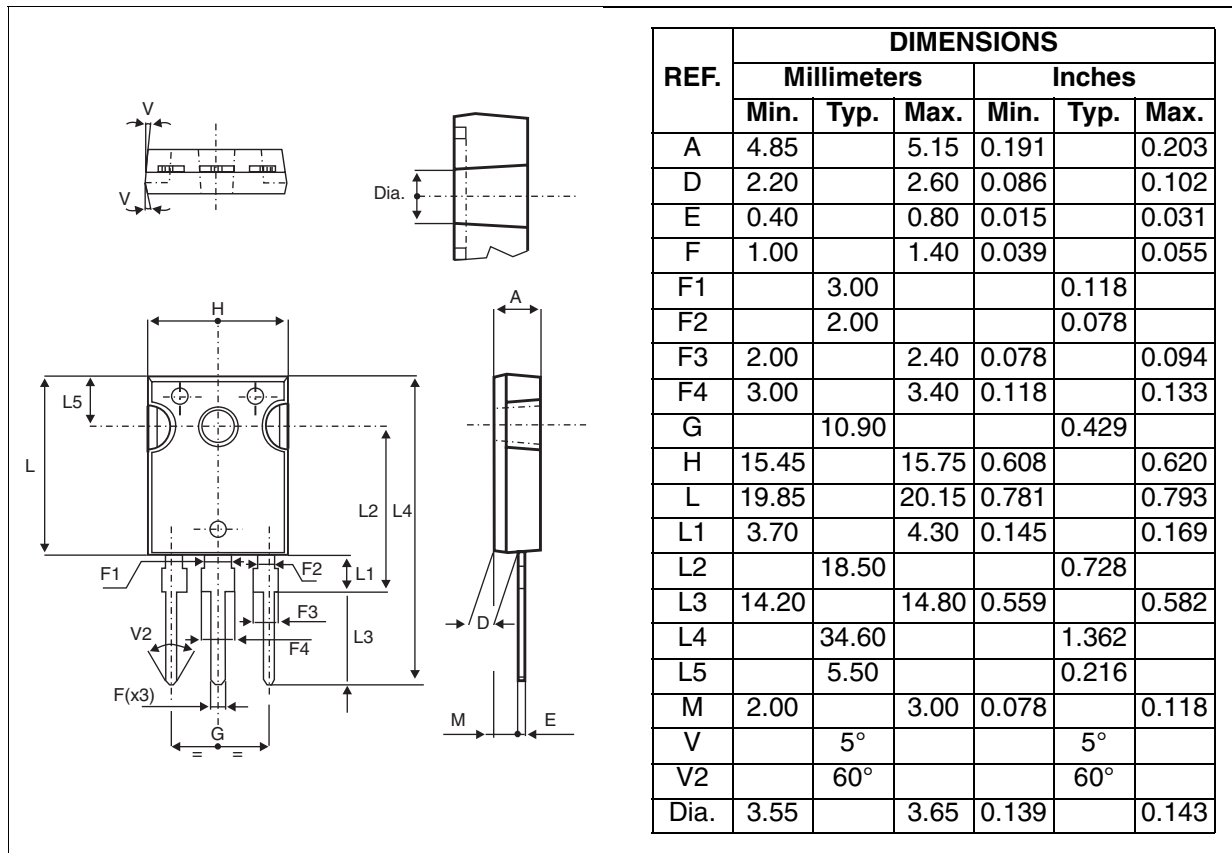


Table 7: Ordering Information

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.

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