



# STTH40P03S

## ULTRAFAST RECTIFIER PDP ENERGY RECOVERY

**Table 1: Main Product Characteristics**

$I_{F(AV)}$	40 A
$V_{RRM}$	300 V
$V_{FP} (\text{typ})$	2.5 V
$I_{RM} (\text{typ})$	5 A
$T_j$	175°C
$V_F (\text{typ})$	0.9 V

### FEATURES AND BENEFITS

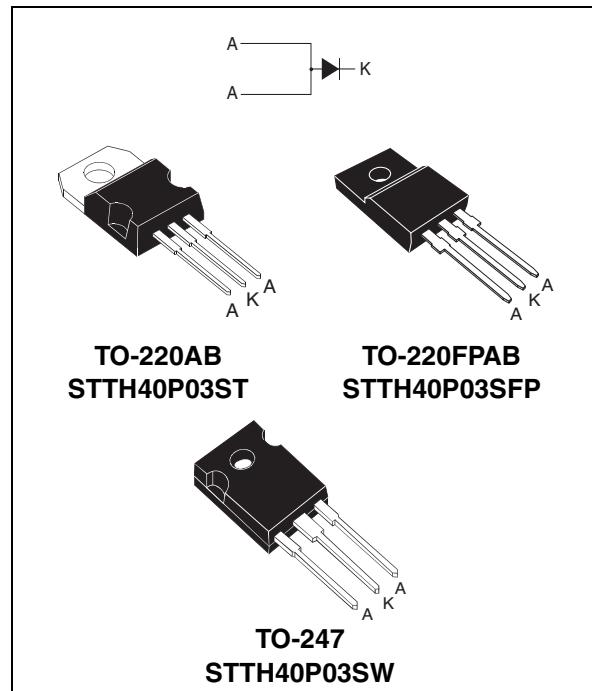
- Ultrafast recovery allowing High Sustain Frequency
- Decrease charge evacuation time ( $t_{\text{clamp}}$ ) in the inductance (see figures 1 and 2)
- Minimize switching-on and total power losses
- Increase luminous efficiency and brightness
- Soft and noise-free recovery
- High surge capability
- High junction temperature

### DESCRIPTION

The **STTH40P03S** 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 3: Absolute Ratings (limiting values)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		300	V
$I_{F(\text{RMS})}$	RMS forward voltage		80	A
$I_{F(AV)}$	Average forward current		40	A
$I_{FRM}$	Repetitive peak forward current	$F = 200\text{kHz}, t_p = 500\text{ns}$ Sinusoidal waveform	120	A
$T_{\text{stg}}$	Storage temperature range		-65 to + 175	°C
$T_j$	Maximum operating junction temperature		175	°C



**Table 2: Order Codes**

Part Number	Marking
STTH40P03ST	STTH40P03S
STTH40P03SFP	STTH40P03S
STTH40P03SW	STTH40P03S

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**Table 4: Thermal Parameters**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / TO-247	1.15	°C/W
		TO-220FPAB	4.5	
$Z_{th(j-c)}$	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	$T_j = 25^\circ C$	$V_R = V_{RRM}$			50	μA
		$T_j = 125^\circ C$			0.05	0.5	mA
$V_F$ **	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 20A$			1.5	V
		$T_j = 125^\circ C$			0.9	1.15	
		$T_j = 25^\circ C$	$I_F = 40A$		1.1	1.8	V
		$T_j = 125^\circ C$				1.42	

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

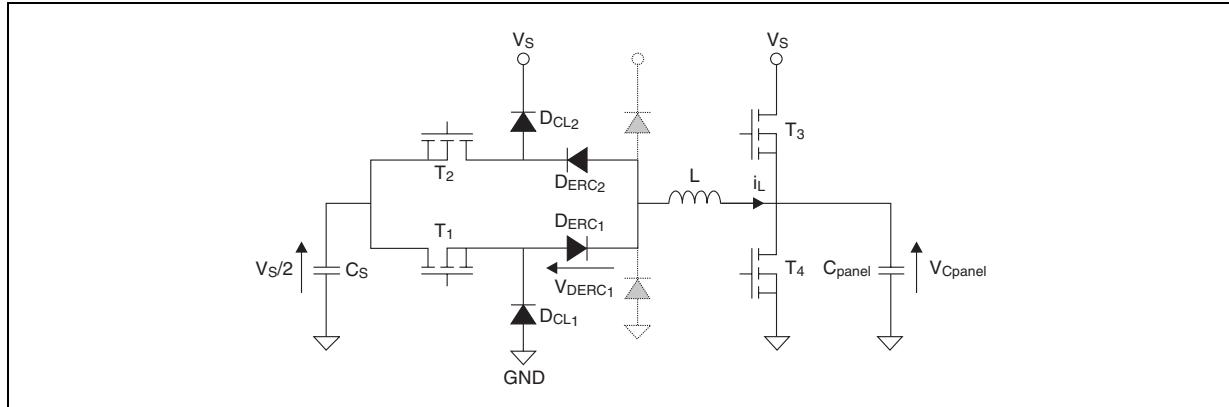
\*\*  $t_p = 380 \mu\text{s}, \delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.88 \times I_F(\text{AV}) + 0.0135 I_F^2(\text{RMS})$

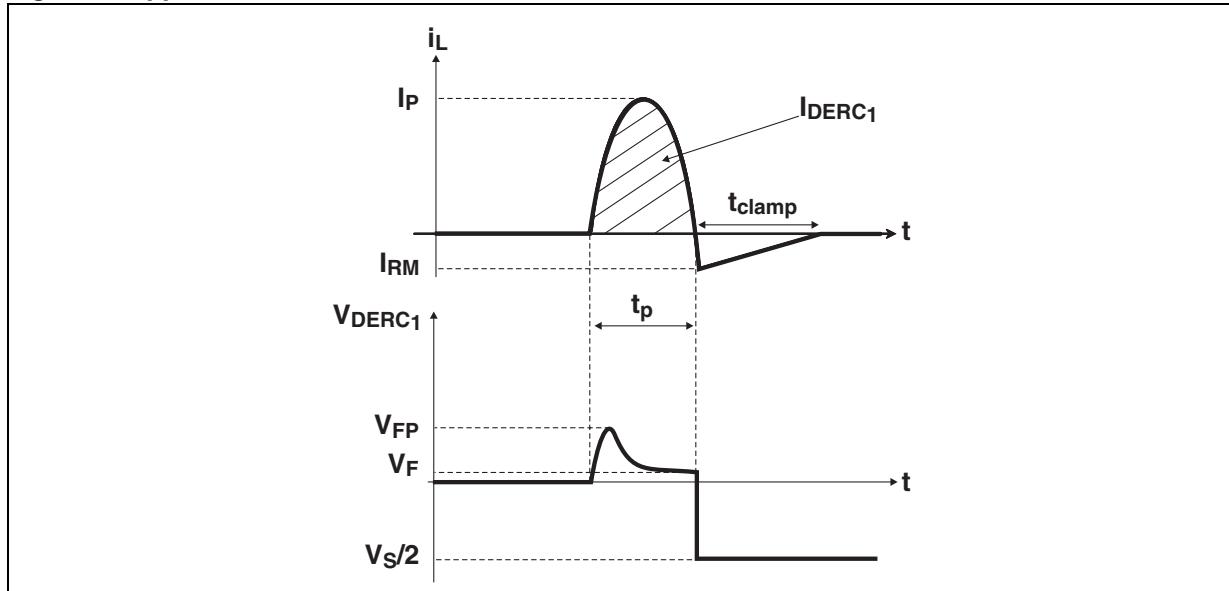
**Table 6: Switching Characteristics**

Symbol	Parameter	Test conditions			Min.	Typ	Max.	Unit
$I_{RM}$	Reverse recovery current	$T_j = 100^\circ C$	$I_F = 40A$	$V_R = 100V$		5	6.5	A
$S_{\text{factor}}$	Softness factor		$dI_F/dt = 200 \text{ A}/\mu\text{s}$			0.5		-

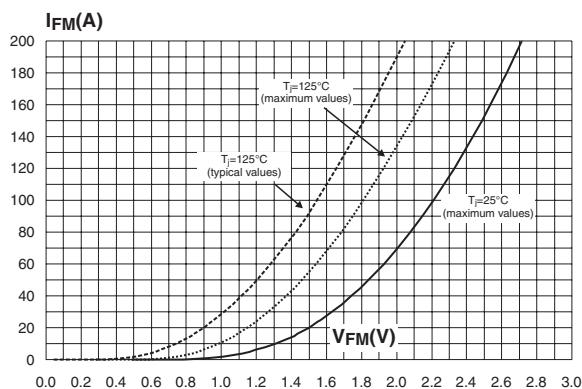
**Figure 1: Application Characteristics**



**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 (TO-220AB / TO-247)**

