

HIGH EFFICIENCY RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	10 A
V_{RRM}	300 V
$t_{rr}(typ)$	13 ns
T_j	175°C
$V_F(typ)$	0.9 V

FEATURES AND BENEFITS

- Ultrafast recovery
- Low power losses
- High surge capability
- Low leakage current
- High junction temperature

DESCRIPTION

The **STTH1003S** is an Ultrafast Recovery Power Rectifier dedicated to **energy recovery in PDP application**.

It is especially designed for clamping function in energy recovery block.

The compromise between forward voltage drop and recovery time offer optimized performances.

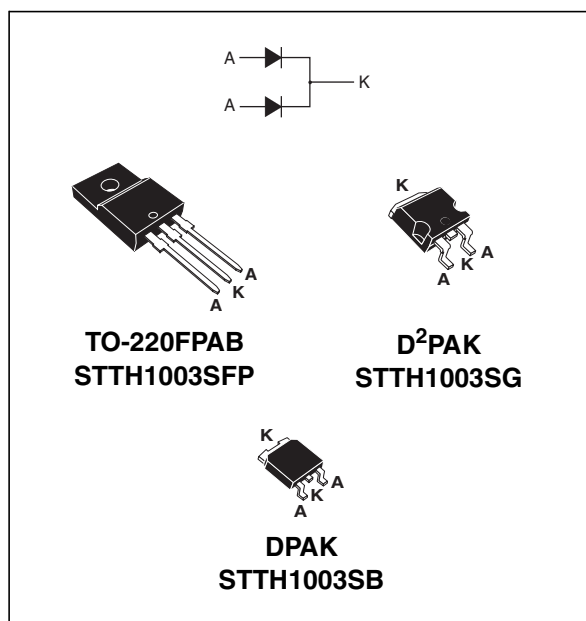


Table 2: Order Codes

Part Numbers	Marking
STTH1003SFP	STTH1003SFP
STTH1003SB	STTH1003SB
STTH1003SB-TR	STTH1003SB
STTH1003SG	STTH1003SG
STTH1003SG-TR	STTH1003SG

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		300	V
$I_{F(RMS)}$	RMS forward voltage		20	A
$I_{F(AV)}$	Average forward current	$T_c = 150^\circ\text{C} \quad \delta = 0.5$	10	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ms sinusoidal}$	100	A
I_{RSM}	Non repetitive avalanche current	$t_p = 20 \mu\text{s square}$	4	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		175	°C

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Table 4: Thermal Parameters

Symbol	Parameter	Package	Value	Unit
$R_{th(j-c)}$	Junction to case	DPAK	4	$^{\circ}\text{C/W}$
		D ² PAK	4	
		TO220FP	6	

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^{\circ}\text{C}$	$V_R = V_{RRM}$			10	μA
		$T_j = 125^{\circ}\text{C}$			10	100	
V_F^{**}	Forward voltage drop	$T_j = 25^{\circ}\text{C}$	$I_F = 10\text{A}$			1.30	V
		$T_j = 125^{\circ}\text{C}$			0.9	1.1	

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: $P = 0.86 \times I_F(AV) + 0.024 I_F^2(RMS)$

Table 6: Recovery Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25^{\circ}\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$		13	17	ns
			$I_F = 1\text{A}$ $V_R = 30\text{V}$ $di_F/dt = -50\text{ A}/\mu\text{s}$		28	35	
t_{fr}	Forward recovery time	$T_j = 25^{\circ}\text{C}$	$I_F = 10\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			200	ns
I_{RM}	Reverse recovery current	$T_j = 125^{\circ}\text{C}$	$I_F = 10\text{A}$ $V_{CC} = 200\text{V}$ $di_F/dt = 200\text{ A}/\mu\text{s}$		5.7	7.5	A
S_{factor}	Softness factor				0.3		
V_{FP}	Peak forward voltage	$T_j = 25^{\circ}\text{C}$	$I_F = 10\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		2.5	3.5	V

Figure 1: Forward voltage drop versus current (maximum values)

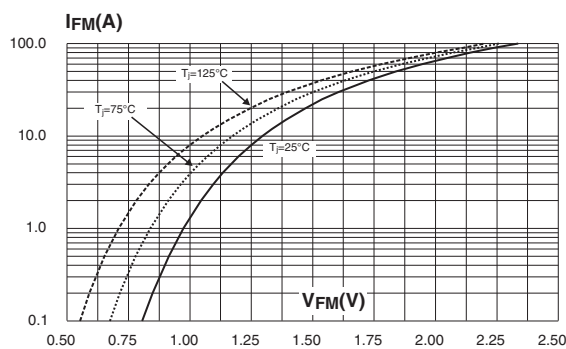
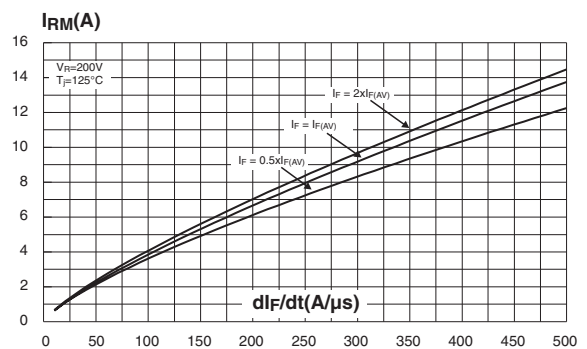


Figure 2: Peak reverse recovery current versus di_F/dt (90% confidence)



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Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH1003SFP	STTH1003SFP	TO-220FPAB	1.70 g	50	Tube
STTH1003SB	STTH1003SB	DPAK	0.3 g	75	Tube
STTH1003SB-TR	STTH1003SB			2500	Tape & reel
STTH1003SG	STTH1003SG	D ² PAK	1.48 g	50	Tube
STTH1003SG-TR	STTH1003SG			1000	Tape & reel

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