STPS30M100S

100 V, 30 A power Schottky rectifier

Features

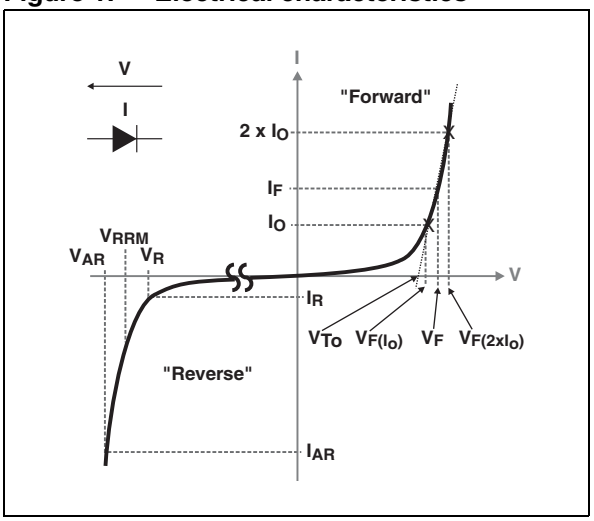
- Avalanche rated
- Low V_F
- Good trade off between leakage current and forward voltage drop
- High frequency operation
- Avalanche capability specified

Description

The STPS30M100S device is a single Schottky rectifier, suited for high frequency switch mode power supply.

Packaged in TO-220AB, TO-220FPAB, and I^2PAK this device is intended to be used in notebook and game station adaptors, providing in these applications a good efficiency at both low and high load.

Figure 1. Electrical characteristics (a)



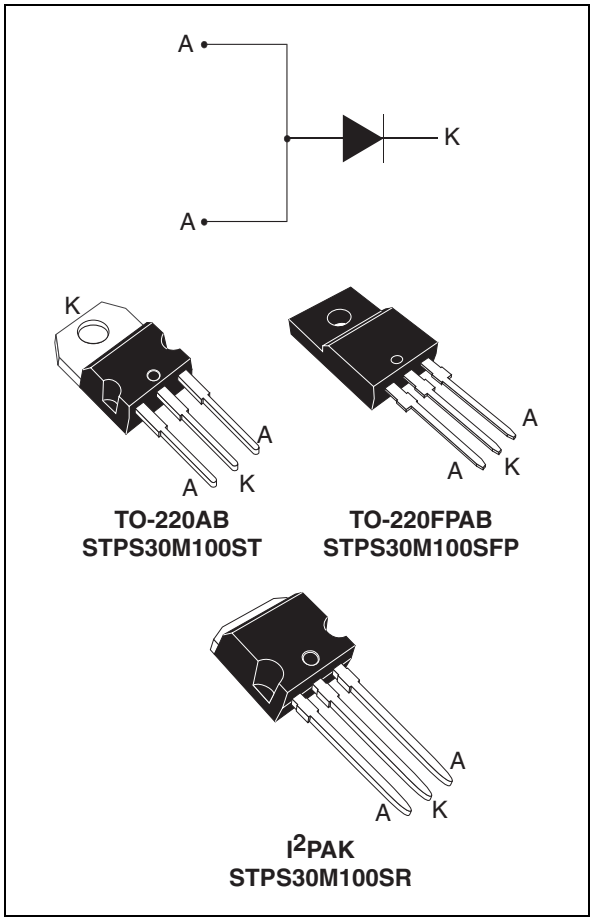


Table 1. Device summary

$I_{F(AV)}$	30 A
V_{RRM}	100 V
T_j (max)	150 °C
V_F(typ)	0.385 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		100	V
$I_{F(RMS)}$	Forward rms current		60	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 125$ °C	30	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	300	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 1$ µs $T_j = 25$ °C	26400	W
V_{ARM} (1)	Maximum repetitive peak avalanche voltage	$t_p < 1$ µs $T_j < 150$ °C $I_{AR} < 66$ A	120	V
V_{ASM} (1)	Maximum single pulse peak avalanche voltage	$t_p < 1$ µs $T_j < 150$ °C $I_{AR} < 66$ A	120	V
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature (2)		150	°C

1. Refer to *Figure 14.*
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, I^2PAK	1	°C/W
		TO-220FPAB	4	

Table 4. Static electrical characteristics with all leads connected on board

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	$T_j = 25$ °C	$V_R = V_{RRM}$	-	-	175	µA
		$T_j = 125$ °C		-	20	50	mA
		$T_j = 25$ °C	$V_R = 70$ V	-	-	60	µA
		$T_j = 125$ °C		-	10	20	mA
V_F(2)	Forward voltage drop	$T_j = 25$ °C	$I_F = 5$ A	-	0.475	-	V
		$T_j = 125$ °C		-	0.385	-	
		$T_j = 25$ °C	$I_F = 10$ A	-	0.555	-	
		$T_j = 125$ °C		-	0.475	--	
		$T_j = 25$ °C	$I_F = 15$ A	-	0.620	0.660	
		$T_j = 125$ °C		-	0.525	0.565	
		$T_j = 25$ °C	$I_F = 30$ A	-	0.740	0.800	
		$T_j = 125$ °C		-	0.605	0.655	

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$
2. Pulse test: $t_p = 380$ µs, $\delta < 2\%$

To evaluate the conduction losses use the following equation:
$P = 0.475 \times I_{F(AV)} + 0.006 \times I_{F}^{2}{}_{(RMS)}$

Figure 2. Conduction losses versus average current

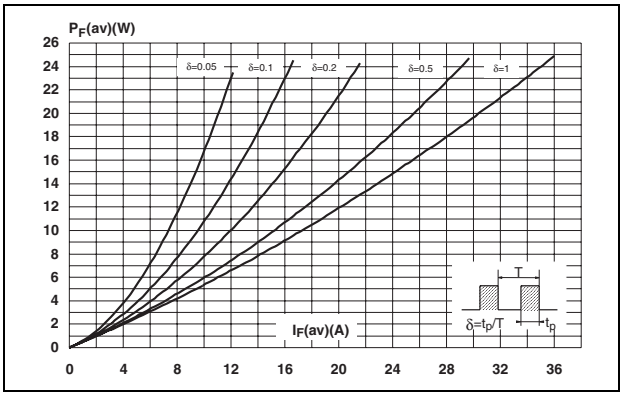


Figure 3. Average forward current versus ambient temperature (δ = 0.5)

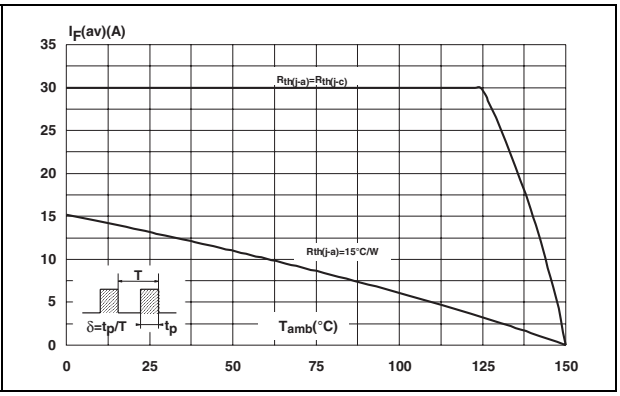


Figure 4. Normalized avalanche power derating versus pulse duration

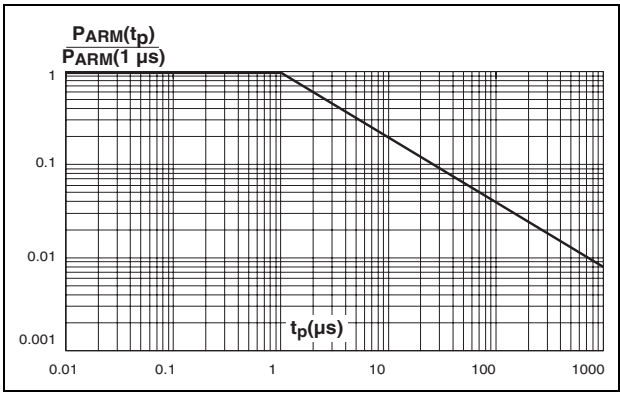


Figure 5. Normalized avalanche power derating versus junction temperature

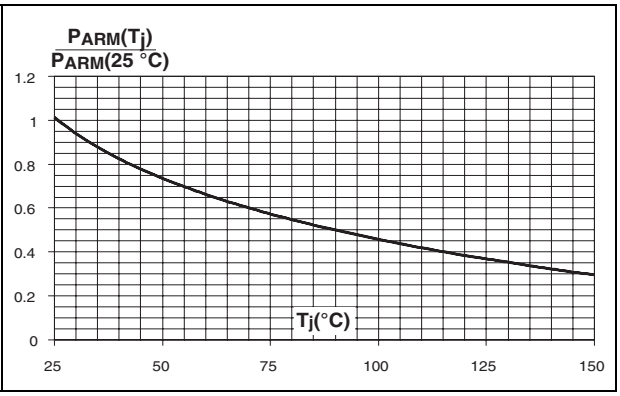


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values)

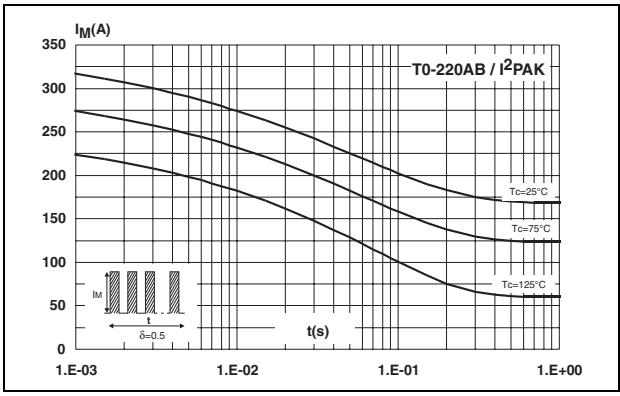
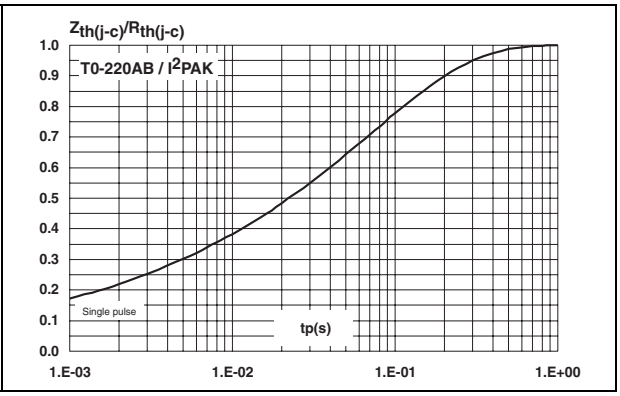


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30M100ST	STPS30M100ST	TO-220AB	2.3 g	50	Tube
STPS30M100SFP	STPS30M100SFP	TO-220FPAB	2.0 g	50	Tube
STPS30M100SR	STPS30M100SR	I^2PAK	1.49 g	50	Tube