STPS40M100C

Power Schottky rectifier

Features

- High current capability
- Avalanche rated
- Low forward voltage drop current
- High frequency operation

Description

This dual diode Schottky rectifier is suited for high frequency switch mode power supply.

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

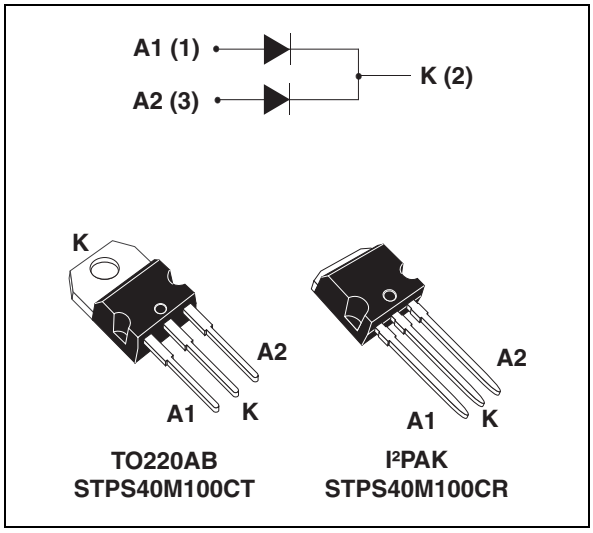
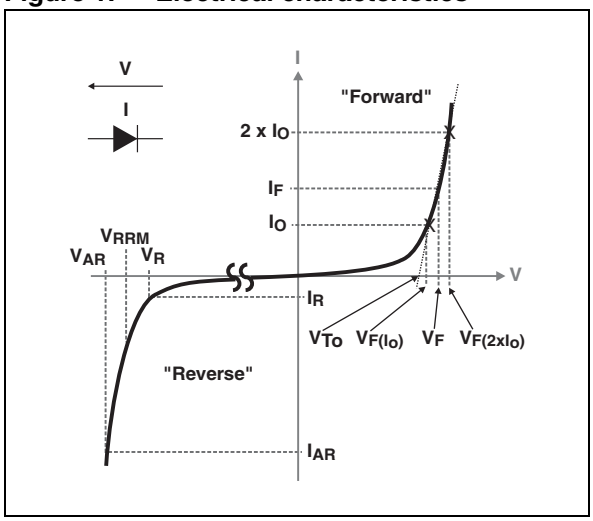


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
T_j (max)	150 °C
V_F(typ)	0.420 V

Figure 1. Electrical characteristics (a)



1 Characteristics

Table 2. Absolute ratings (limiting values per diode at 25 °C unless otherwise stated)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(RMS)}$	Forward current rms			60	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	T_c = 125 °C	Per diode	20	A
		T_c = 120 °C	Per package	40	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		530	A
P_{ARM} (1)	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C		23 200	W
V_{ARM} (2)	Maximum repetitive peak avalanche voltage	t_p < 1 µs T_j < 150 °C, I_{AR} < 58 A		120	V
V_{ASM} (2)	Maximum single pulse peak avalanche voltage	t_p < 1 µs T_j < 150 °C, I_{AR} < 58 A		120	V
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature (3)			150	°C

3. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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	Per diode	1.4	°C/W
		Total	0.95	
$R_{th(c)}$	Coupling		0.5	°C/W

When diodes 1 and 2 are used simultaneously

T_j(diode 1) = P(diode 1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	70	µA
		T_j = 125 °C		-	15	70	mA
		T_j = 25 °C	V_R = 70 V	-	-	40	µA
		T_j = 125 °C		-	7.5	40	mA
V_F (2)	Forward voltage drop	T_j = 125 °C	I_F = 5 A	-	0.415	0.500	V
		T_j = 125 °C	I_F = 10A	-	0.500	0.560	-
		T_j = 25 °C	I_F = 20 A	-	-	0.780	-
		T_j = 125 °C		-	0.585	0.640	-

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.560 \times I_{F(AV)} + 0.004 \times I_F^2{}_{(RMS)}$

Figure 2. Average forward power dissipation versus average forward current (per diode)

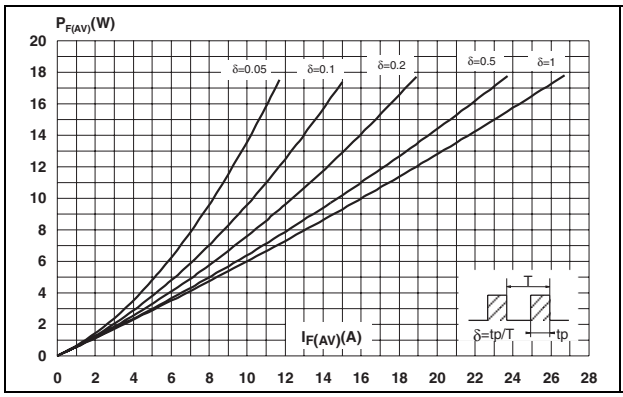


Figure 3. Average forward current per diode versus ambient temperature (δ = 0.5)

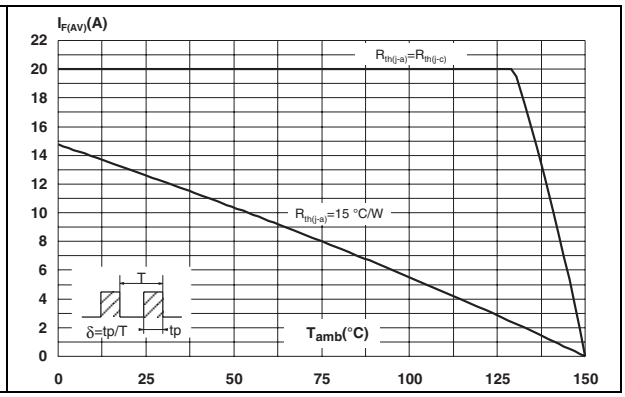


Figure 4. Normalized avalanche power derating versus pulse duration

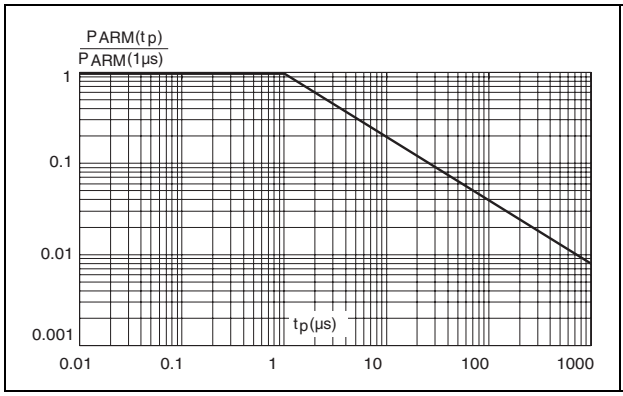


Figure 5. Normalized avalanche power derating versus junction temperature

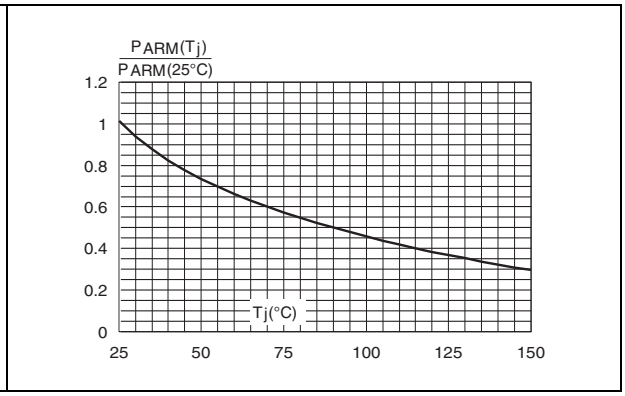


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values per diode)

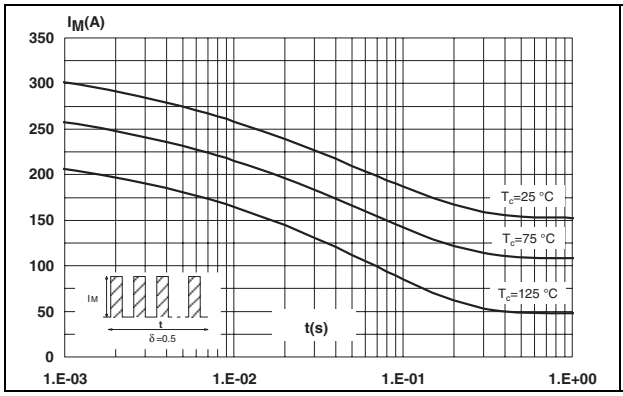
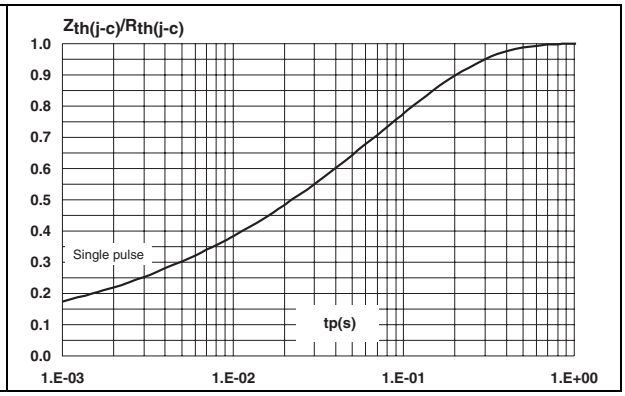


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS40M100CT	STPS40M100CT	TO-220AB	1.9 g	50	Tube
STPS40M100CR	STPS40M100CR	I^2PAK	1.5 g	50	Tube