

Power Schottky rectifier

Features

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

Description

The STPS40SM60C is a dual diode Schottky rectifier, suited for high frequency switch mode power supply.

Packaged in TO-220AB, I²PAK and D²PAK, this device is intended to be used in notebook, game station and desktop adapters, 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}	60 V
V _F (typ)	0.405 V
T _j (max)	150 °C

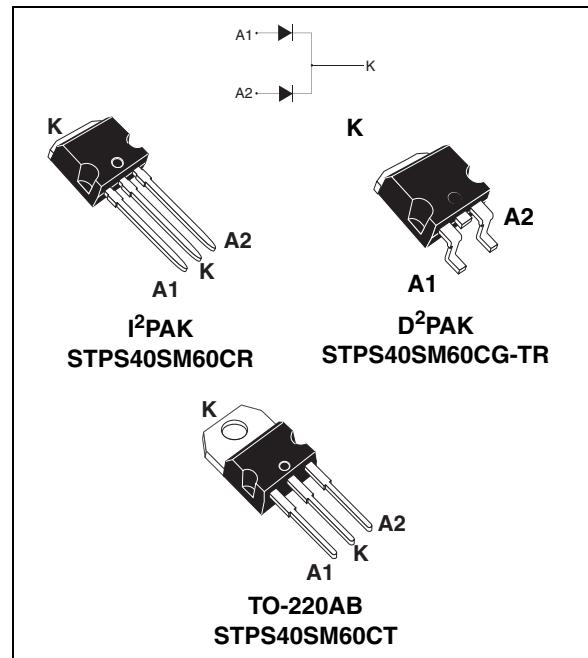
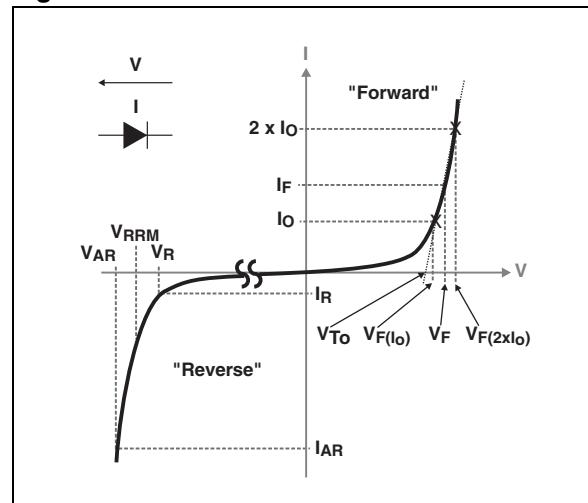


Figure 1. Electrical characteristics^(a)



1 Characteristics

Table 2. Absolute ratings (limiting values, per diode, at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			60	V
$I_{F(RMS)}$	Forward rms current			60	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 130^{\circ}\text{C}$	Per diode	20	A
		$T_c = 125^{\circ}\text{C}$	Per device	40	
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms sine-wave}$		400	A
$P_{ARM}^{(1)}$	Repetitive peak avalanche power	$T_j = 25^{\circ}\text{C}$, $t_p = 1\text{ }\mu\text{s}$		18800	W
$V_{ARM}^{(2)}$	Maximum repetitive peak avalanche voltage	$t_p < 1\text{ }\mu\text{s}$, $T_j < 150^{\circ}\text{C}$, $I_{AR} < 70.5\text{ A}$		80	V
$V_{ARM}^{(2)}$	Maximum single-pulse peak avalanche voltage	$t_p < 1\text{ }\mu\text{s}$, $T_j < 150^{\circ}\text{C}$, $I_{AR} < 70.5\text{ A}$		80	V
T_{stg}	Storage temperature range			-65 to +175	$^{\circ}\text{C}$
T_j	Maximum operating junction temperature ⁽³⁾			150	$^{\circ}\text{C}$

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	per diode	1.3	$^{\circ}\text{C/W}$
		total	0.73	
$R_{th(c)}$	Coupling		0.15	$^{\circ}\text{C/W}$

When the two diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

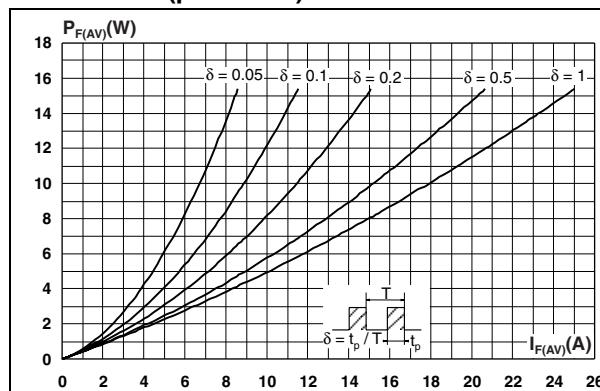
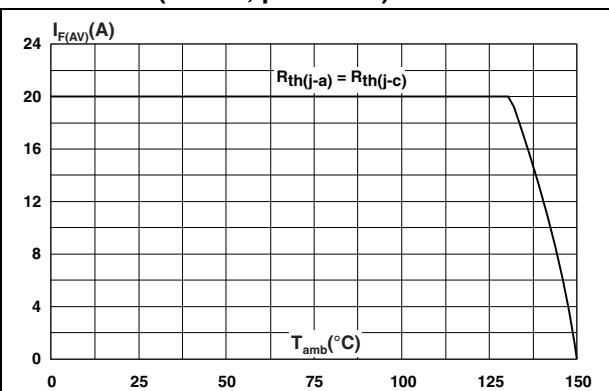
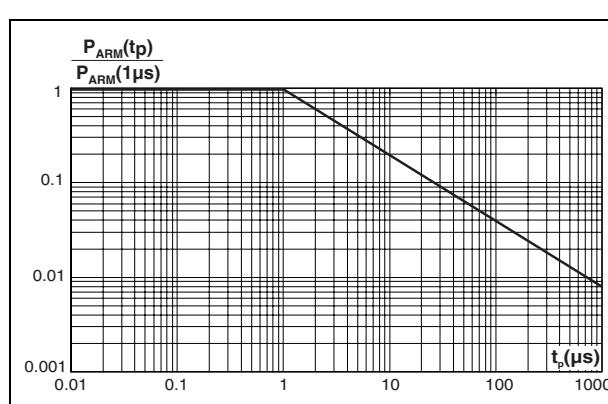
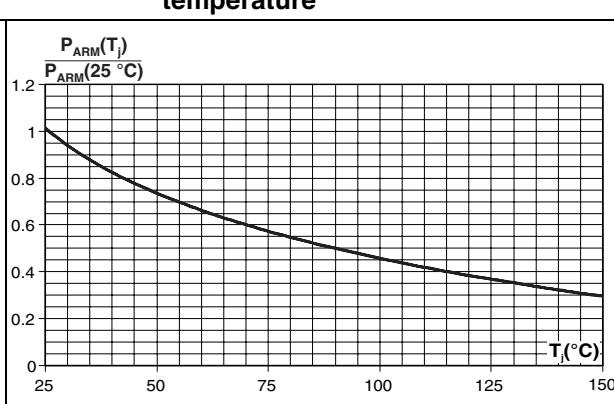
Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$	-	20	90	μA
		$T_j = 125^\circ\text{C}$		-	15	50	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 10 \text{ A}$	-	0.495	0.535	V
		$T_j = 125^\circ\text{C}$		-	0.405	0.460	
		$T_j = 25^\circ\text{C}$	$I_F = 20 \text{ A}$	-	0.565	0.625	
		$T_j = 125^\circ\text{C}$		-	0.510	0.575	

1. Pulse test: $t_p = 5 \text{ ms}$, $\delta < 2\%$ 2. Pulse test: $t_p = 380 \mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.415 \times I_{F(AV)} + 0.008 \times I_F^2(\text{RMS})$$

Figure 2. Average forward power dissipation versus average forward current (per diode)**Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)****Figure 4. Normalized avalanche power derating versus pulse duration****Figure 5. Normalized avalanche power derating versus junction temperature**

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS40SM60CT	STPS40SM60CT	TO-220AB	2.20 g	50	Tube
STPS40SM60CR	STPS40SM60CR	I ² PAK	1.49 g	50	Tube
STPS40SM60CG-TR	STPS40SM60CG	D ² PAK	1.48 g	1000	Tape and reel