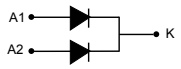
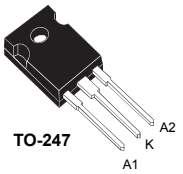
STPS40H100CW

Datasheet

100 V power Schottky rectifier





Features

- Negligible switching losses
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche specification
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

Description

This dual diode common cathode Schottky rectifier is suited for switch mode power supply and high frequency DC to DC converters.

Packaged in TO-247, the STPS40H100CW is optimized for use in high frequency inverters.

Product status link	
STPS40H100CW	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
T_j	175 °C
V_F (typ.)	0.58 V

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1 Characteristics

Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			100	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_c = 160 °C	Per diode	20	A
			Per device	40	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		300	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		1900	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature range[1]			+175	°C

1. *$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.*

Table 2. Thermal resistance parameters

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.9	°C/W
		Total	0.50	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously :

ΔT_j(diode 1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

For more information, please refer to the following application note:

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R[1]	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		10	µA
		T_j = 125 °C		-	5	15	mA
V_F[2]	Forward voltage drop	T_j = 25 °C	I_F = 20 A	-		0.73	V
		T_j = 125 °C		-	0.58	0.61	
		T_j = 25 °C	I_F = 40 A	-		0.85	
		T_j = 125 °C		-	0.67	0.72	

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: $P = 0.5 \times I_{F(AV)} + 0.0055 \times I_F^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

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1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current (per diode)

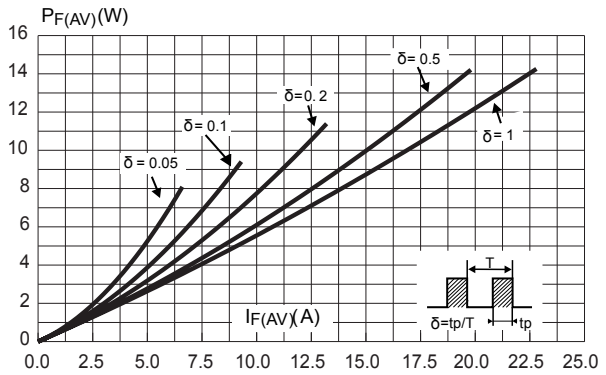

Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

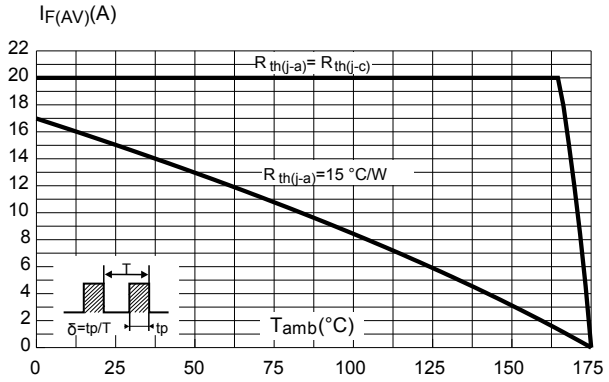

Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

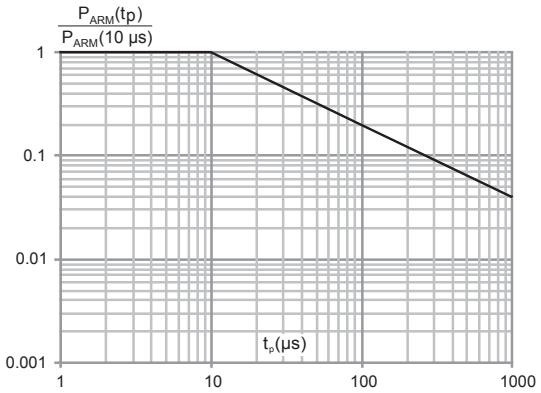

Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

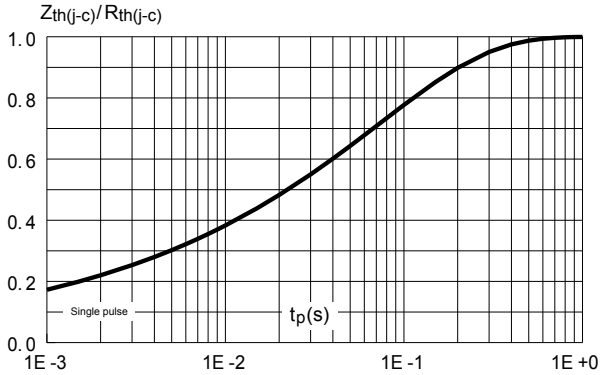

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Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

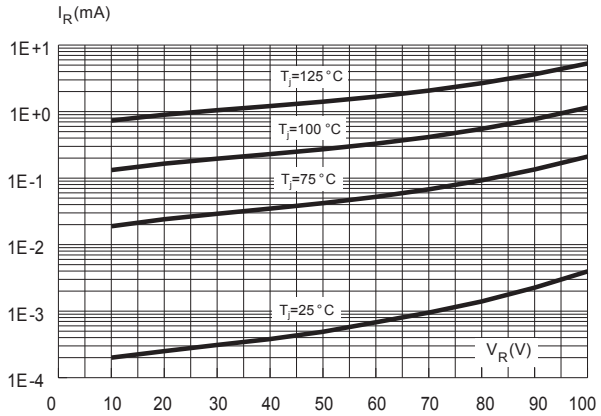


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

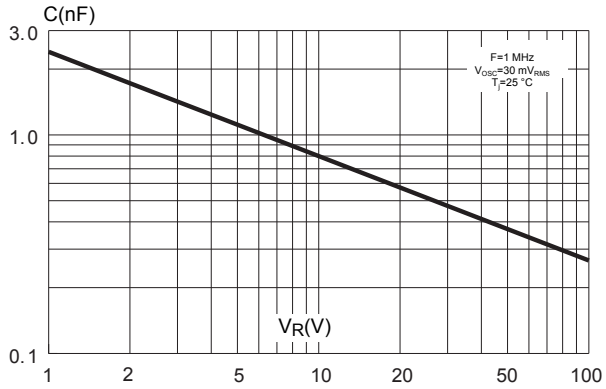
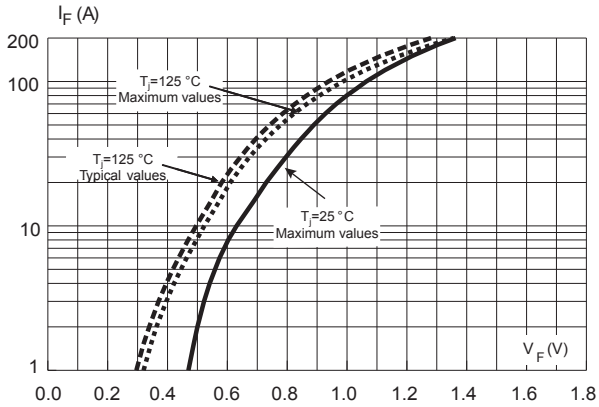


Figure 7. Forward voltage drop versus forward current (per diode)



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2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

2.1 TO-247 package information

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

Figure 8. TO-247 package outline

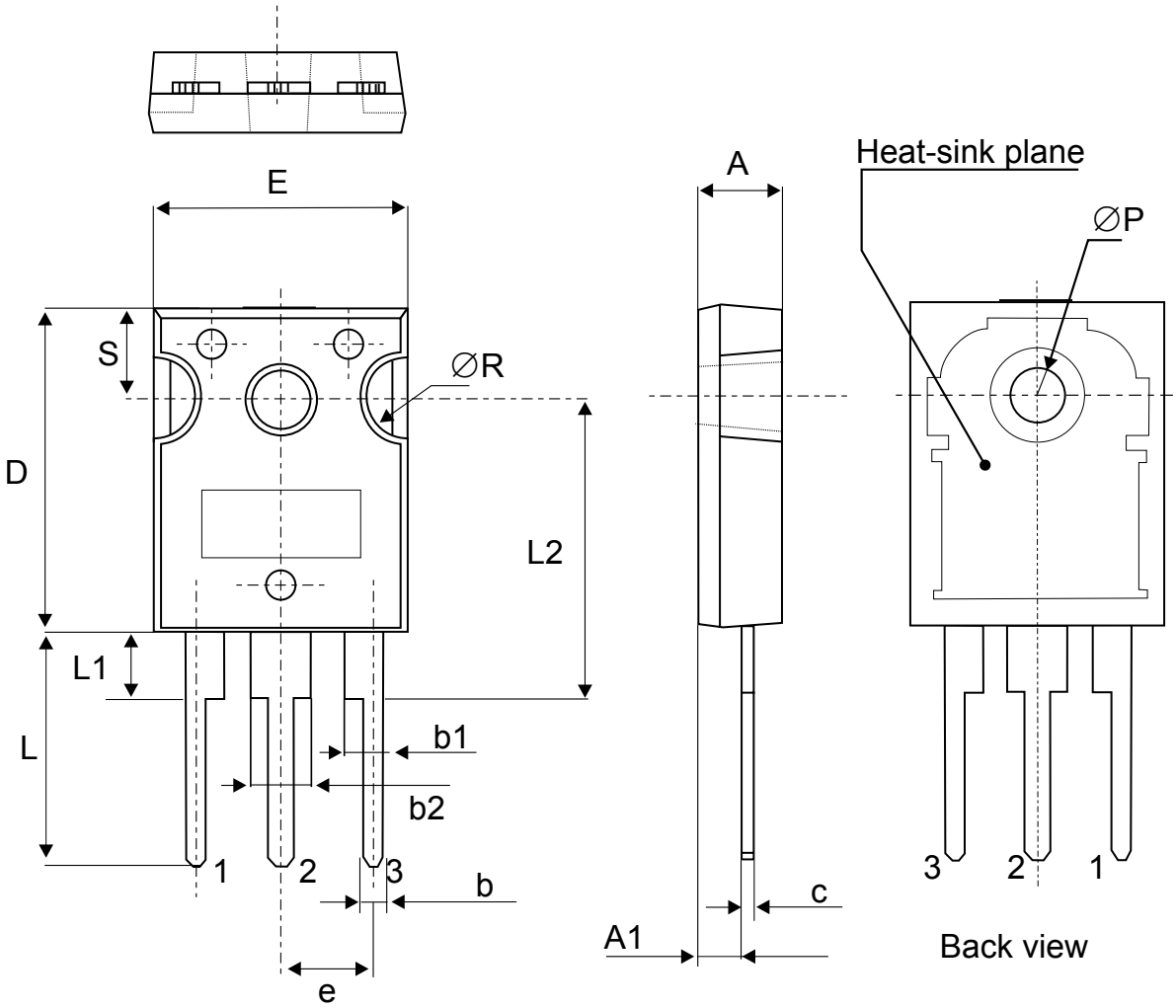

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Table 4. TO-247 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
ØP	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

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3 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS40H100CW	STPS40H100CW	TO-247	4.36 g	30	Tube

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Revision history

Table 6. Document revision history

Date	Version	Changes
Jul-2003	4D	Previous release.
16-Jan-2013	5	Updated package graphic to clarify lead length.
03-Jul-2018	6	Updated Table 1. Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified) and Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C).

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