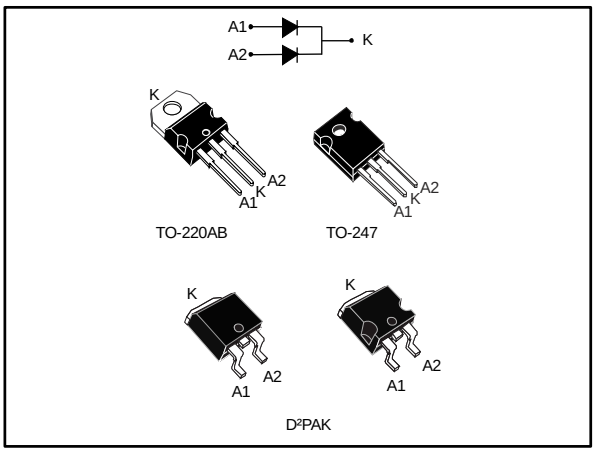
STPS3045C

Power Schottky rectifier

Datasheet - production data



Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Avalanche rated
- ECOPACK®2 compliant component for D²PAK on demand

Description

Dual center tap Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters. Packaged either in TO-220AB, TO-247, or D²PAK, this device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 15 A
V_{RRM}	45 V
V_F (typ.)	0.5 V
T_j (max.)	175 °C (up to 200 °C in forward mode for D²PAK)

1 Characteristics

Table 2: Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 155 °C	Per diode	15	A
			Per device	30	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	220	A
P_{ARM} (1)	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	430	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature (2)			175	
	Maximum operating junction temperature (DC forward current without reverse bias, t = 1 hour for D²PAK			200	

Notes:

(1)For pulse time duration deratings, please refer to Figure 3. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, “Admissible avalanche power of Schottky diodes” and AN2025, “Converter improvement using Schottky rectifier avalanche specification”.

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

Table 3: Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB / D²PAK	Per diode	1.60	°C/W
			Total	0.95	
		TO-247	Per diode	1.5	
			Total	0.9	
$R_{th(c)}$	Coupling	TO-220AB / D²PAK/ TO-247		0.3	

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)}$ (per diode) $+ P_{(diode2)} \times R_{th(c)}$

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R[(1)]	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		200	µA
		T_j = 125 °C		-	11	40	mA
V_F[(1)]	Forward voltage drop	T_j = 125 °C	I_F = 15 A	-	0.5	0.57	V
		T_j = 25 °C	I_F = 30 A	-		0.84	
		T_j = 125 °C		-	0.65	0.72	

Notes:

(1)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

$P = 0.42 \times I_{F(AV)} + 0.01 \times I_{F}^{2}{}_{(RMS)}$

1.2 Characteristics (curves)

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

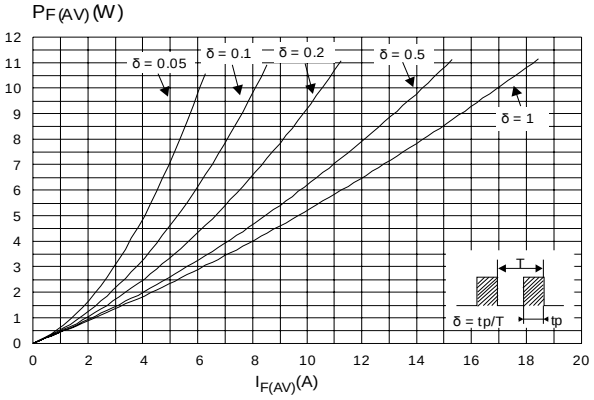


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

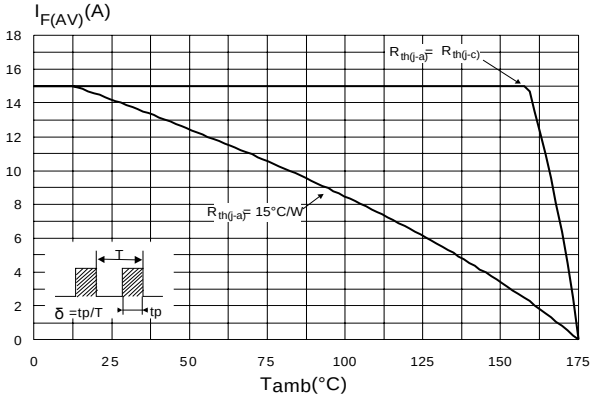


Figure 3: Normalized avalanche power derating versus pulse duration (Tj = 125 °C)

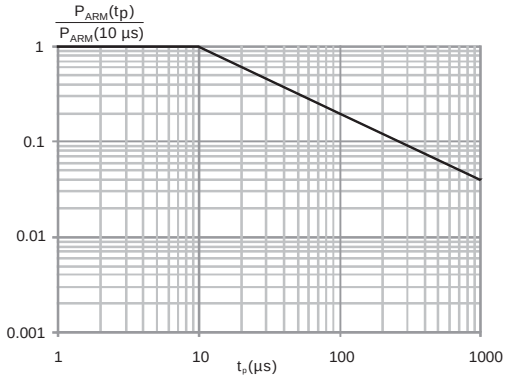


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

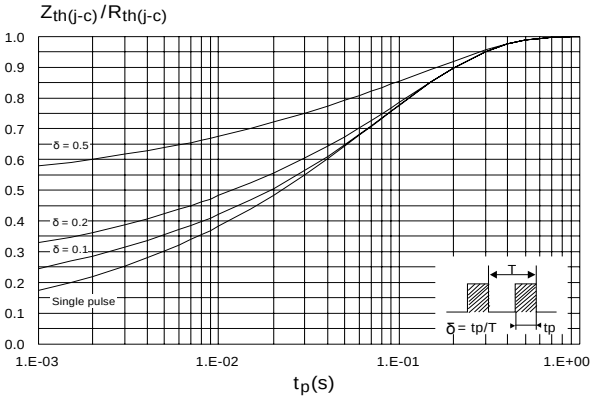


Figure 5: Junction capacitance versus reverse voltage applied (typical values, per diode)

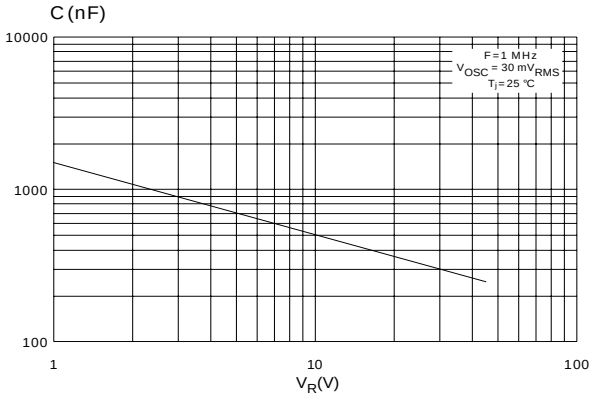


Figure 6: Reverse leakage current versus reverse voltage applied (typical values, per diode)