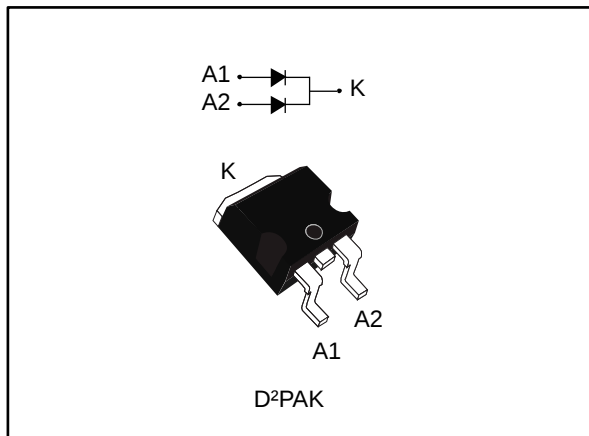


Automotive power Schottky rectifier

Datasheet - production data



Description

Dual center tap Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters. This device is 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 12.5 A
V_{RRM}	45 V
V_F (typ.)	0.5 V
T_J (max.)	175 °C

Features

- AEC-Q101 qualified
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- PPAP capable



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 $\delta = 0.5$, square wave	T _C = 160 °C	Per diode	12.5	A
I _{FSM}	Surge non repetitive forward current		t _p = 10 ms sinusoidal	200	A
I _{RRM}	Repetitive peak reverse current		t _p = 2 μs square, F = 1 kHz	1	A
I _{RSM}	Non repetitive peak reverse current		t _p = 100 μs square	2	A
P _{ARM} ⁽¹⁾	Repetitive peak avalanche power		t _p = 10 μs, T _j = 125 °C	340	W
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature ⁽²⁾			-40 to +175	
dV / dt	Critical rate of rise reverse voltage			10000	V / μs

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	Per diode	1.6	°C/W
		Total	1.1	
R _{th(c)}	Coupling		0.6	

When the diodes 1 and 2 are used simultaneously:

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

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-		125	μA
		$T_J = 125\text{ }^{\circ}\text{C}$		-	9	25	mA
$V_F^{(1)}$	Forward voltage drop	$T_J = 125\text{ }^{\circ}\text{C}$	$I_F = 12.5\text{ A}$	-	0.50	0.57	V
		$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 25\text{ A}$	-		0.84	
		$T_J = 125\text{ }^{\circ}\text{C}$		-	0.65	0.72	

Notes:

⁽¹⁾Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.012 I_F^2 (RMS)$$

1.1 Characteristics (curves)

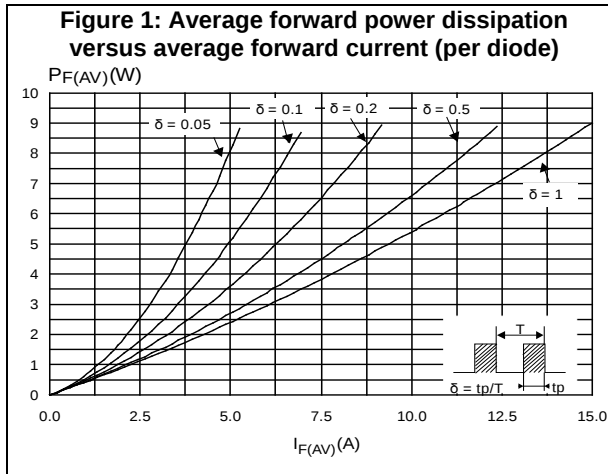


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

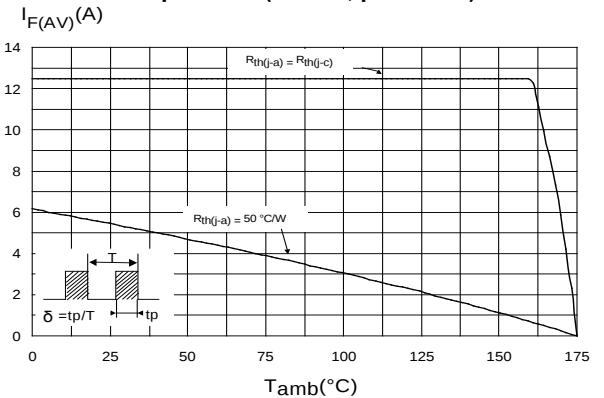


Figure 3: Normalized avalanche power deratings versus pulse duration ($T_j = 125 \text{ } ^\circ C$)

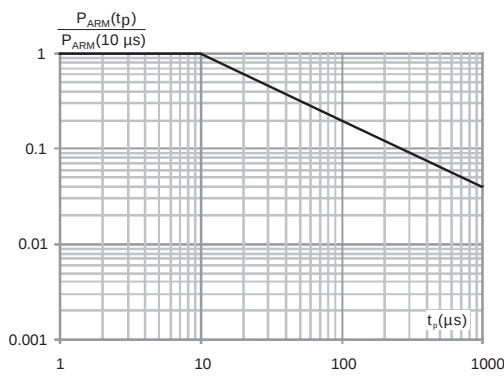


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration

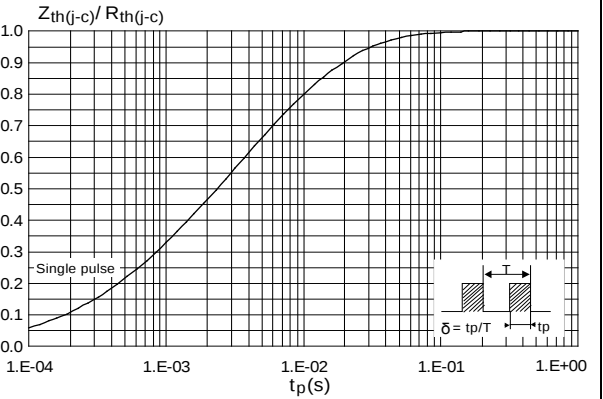


Figure 5: Junction capacitance versus reverse voltage applied (typical values, per diode)

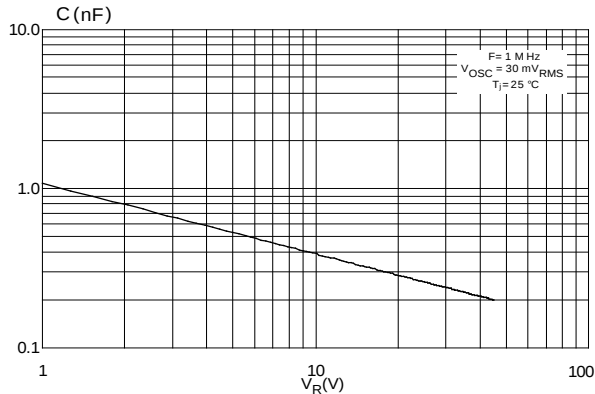


Figure 6: Reverse leakage current versus reverse voltage applied (typical values, per diode)

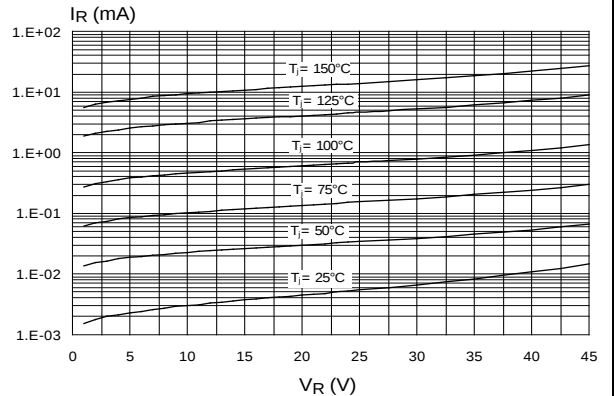


Figure 7: Forward voltage drop versus forward current

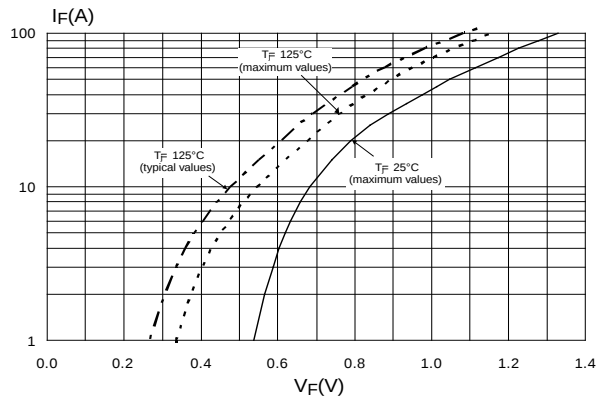
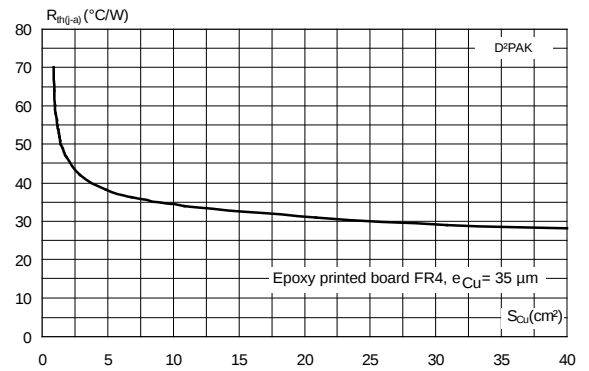


Figure 8: Thermal resistance junction to ambient versus copper surface under tab for D²PAK (typical values)



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 D²PAK package information

Figure 9: D²PAK package outline

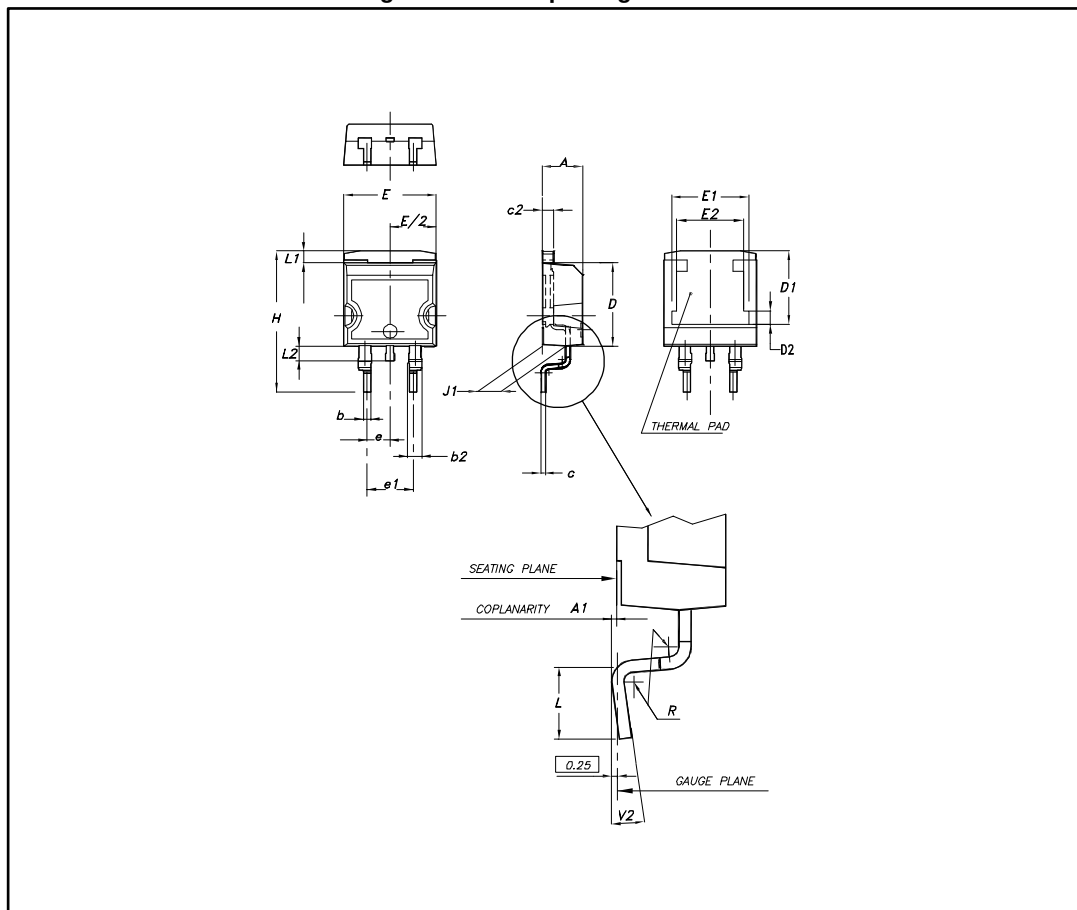
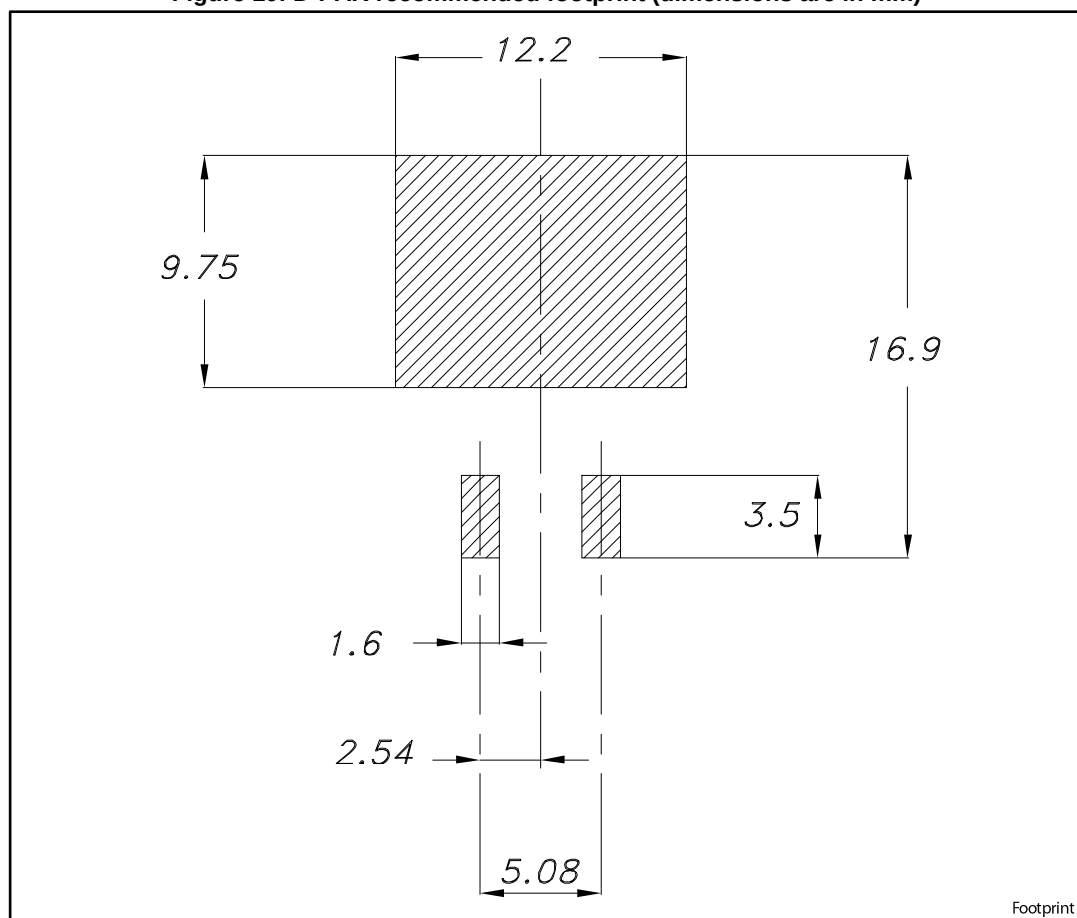


Table 5: D²PAK package mechanical data

Dim.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
A1	0.03		0.23	0.001		0.009
b	0.70		0.93	0.028		0.037
b2	1.14		1.70	0.045		0.067
c	0.45		0.60	0.018		0.024
c2	1.23		1.36	0.048		0.054
D	8.95		9.35	0.352		0.368
D1	7.50	7.75	8.00	0.295	0.305	0.315
D2	1.10	1.30	1.50	0.043	0.051	0.059
E	10		10.40	0.394		0.409
E1	8.50	8.70	8.90	0.335	0.343	0.350
E2	6.85	7.05	7.25	0.270	0.278	0.285
e		2.54			0.100	
e1	4.88		5.28	0.192		0.208
H	15		15.85	0.591		0.624
J1	2.49		2.69	0.098		0.106
L	2.29		2.79	0.090		0.110
L1	1.27		1.40	0.05		0.055
L2	1.30		1.75	0.051		0.069
R		0.4			0.016	
V2	0°		8°	0°		8°

Figure 10: D²PAK recommended footprint (dimensions are in mm)

3 Ordering information

Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2545CGY-TR	STPS2545CGY	D ² PAK	1.43 g	1000	Tape and reel

4 Revision history

Table 7: Document revision history

Date	Revision	Changes
03-Nov-2011	1	Initial release.
28-Jun-2012	2	Corrected typographical error in <i>Table 3</i> .
05-Oct-2016	3	Updated <i>Figure 4: "Relative variation of thermal impedance junction to case versus pulse duration"</i> and <i>Figure 8: "Thermal resistance junction to ambient versus copper surface under tab for D²PAK (typical values)"</i> and <i>Table 2: "Absolute ratings (limiting values, per diode, at 25 °C, unless otherwise specified)"</i> .

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