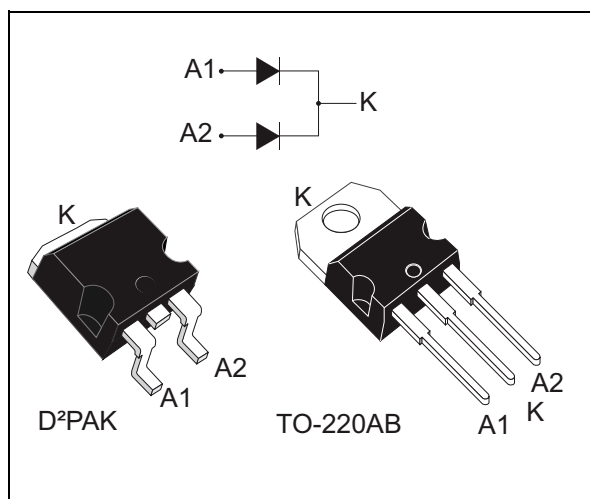


Automotive low drop power Schottky rectifier

Datasheet — production data



Description

Dual center tap Schottky rectifier designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters for automotive applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
$T_{J(max)}$	175 °C
$V_F (Typ)$	0.62 V

Features

- Negligible switching losses
- High junction temperature capability
- Good trade off between leakage current and forward voltage drop
- Low leakage current
- Avalanche rated
- AEC-Q101 qualified
- PPAP capable
- ECOPACK®2 compliant component on TO-220AB

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, $T_j = -40\text{ °C}$		100	V
$I_{F(RMS)}$	Forward rms current		30	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$, $T_c = 150\text{ °C}$	Per diode	20	A
		Per device	40	
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	220	A
$P_{ARM}^{(1)}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}$, $T_j = 125\text{ °C}$	1300	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature ⁽²⁾		-40 to +175	°C

1. For pulse time duration derating, 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. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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	1.5	°C/W
		Per device	0.8	
$R_{th(c)}$	Coupling		0.1	

When the 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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	-	10	μA
		$T_j = 125\text{ °C}$		-	3	10	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$	-	-	0.80	V
		$T_j = 125\text{ °C}$		-	0.62	0.67	
		$T_j = 25\text{ °C}$	$I_F = 40\text{ A}$	-	-	0.90	
		$T_j = 125\text{ °C}$		-	0.70	0.76	

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

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

To evaluate the conduction losses use the following equation:

$$P = 0.58 \times I_{F(AV)} + 0.0045 \times I_{F(RMS)}^2$$

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

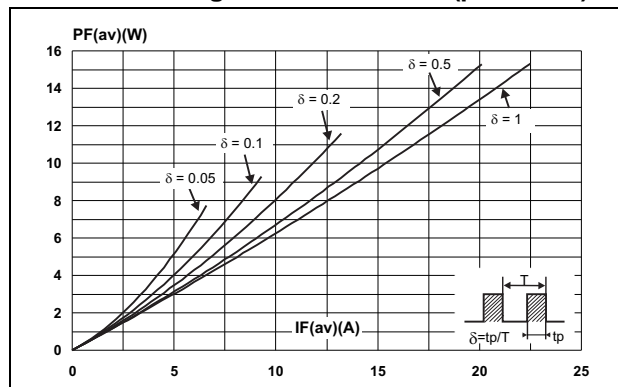
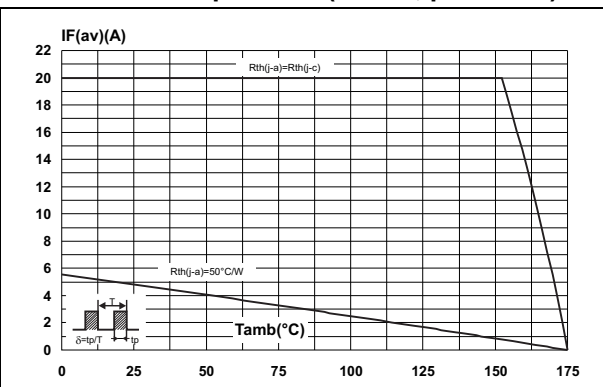
Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

Figure 3. Normalized avalanche power derating versus pulse duration

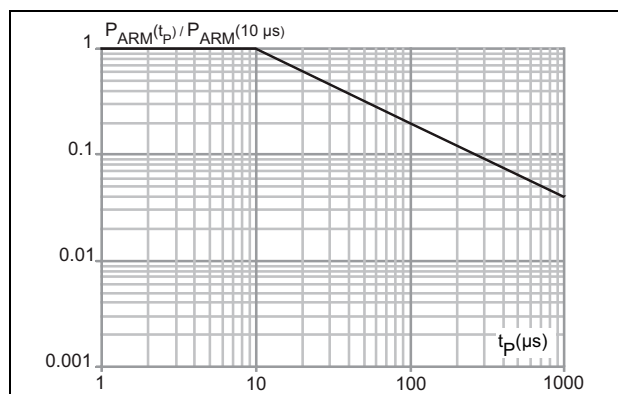


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (per diode)

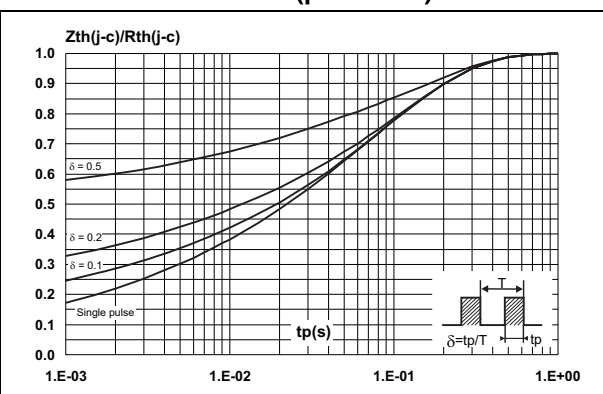


Figure 5. Forward voltage drop vs. forward current (per diode)

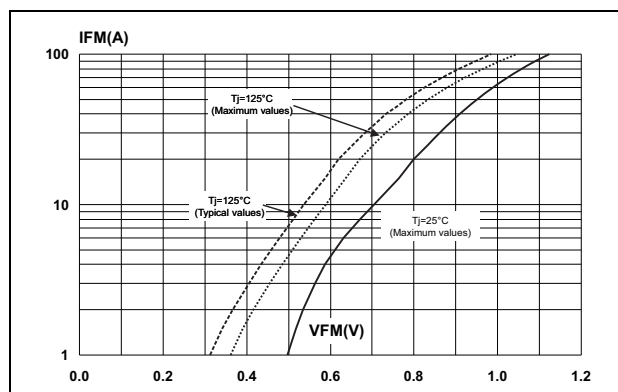


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)

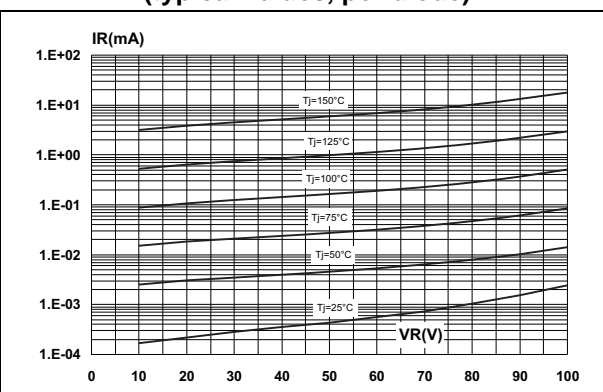


Figure 7. Junction capacitance vs. reverse voltage applied (typical values, per diode)

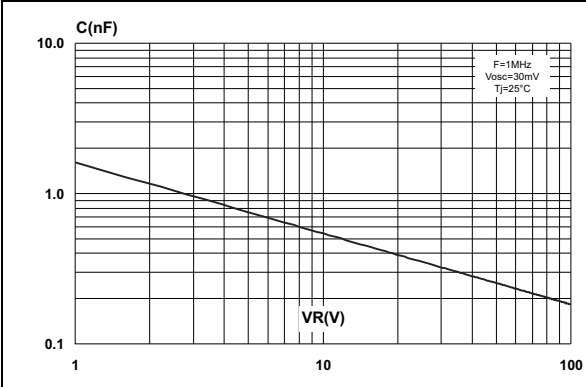
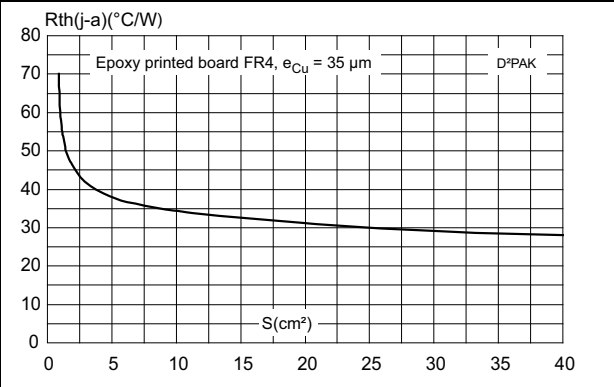


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Cooling method: by conduction (C)
- Recommended torque value for TO-220AB: 0.55 N·m
- Maximum torque value for TO-220AB: 0.7 N·m

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.

Figure 9. D²PAK dimension definitions

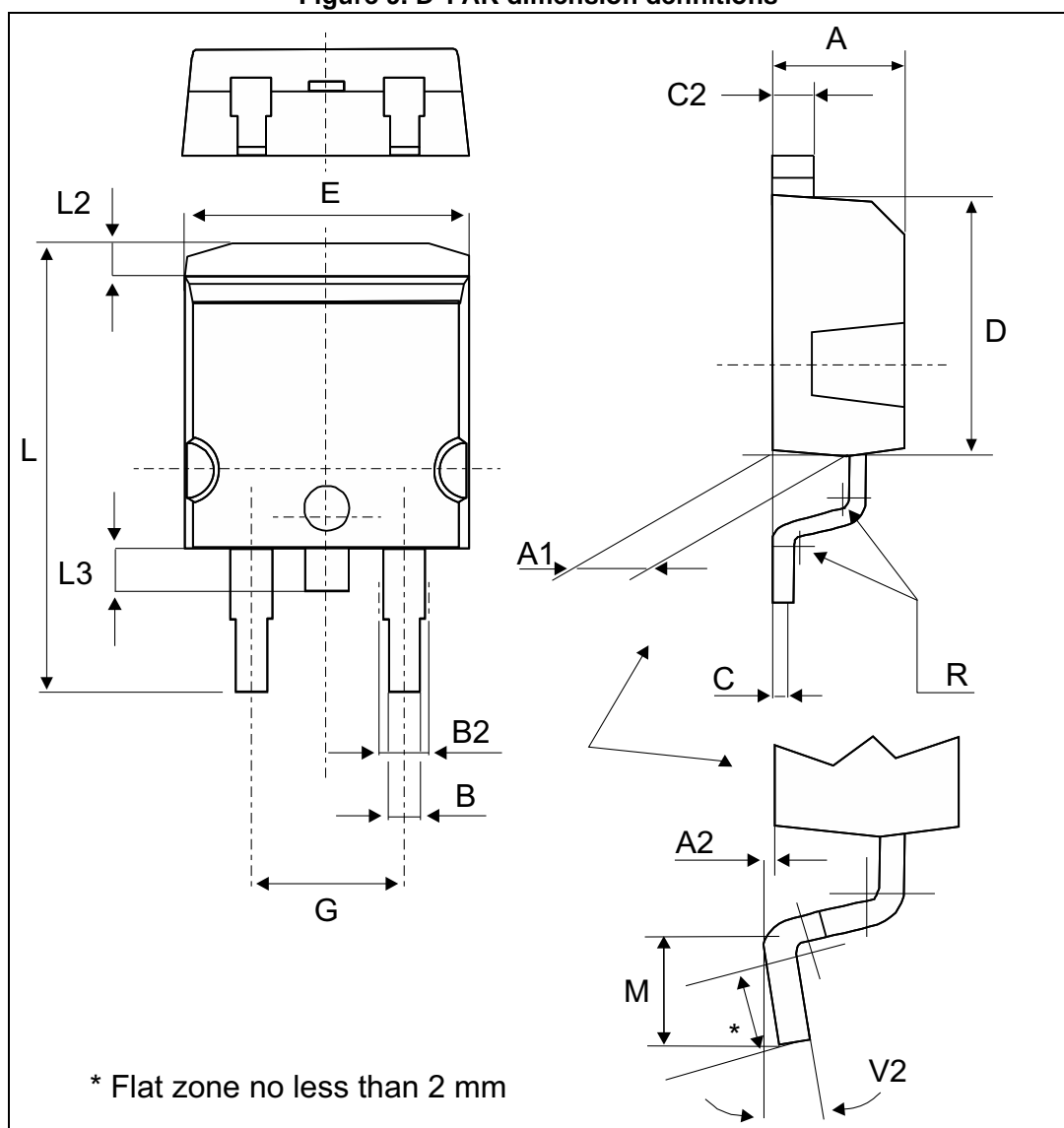


Table 5. D²PAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.70		0.93	0.027		0.037
B2	1.14		1.70	0.045		0.067
C	0.45		0.60	0.017		0.024
C2	1.23		1.36	0.048		0.054
D	8.95		9.35	0.352		0.368
E	10.00		10.40	0.393		0.409
G	4.88		5.28	0.192		0.208
L	15.00		15.85	0.590		0.624
L2	1.27		1.40	0.050		0.055
L3	1.30		1.75	0.051		0.069
M	2.29		2.79	0.090		0.110
R		0.40 typ.		0.016 typ.		
V2	0°		8°	0°		8°

Figure 10. Footprint (dimensions in mm)

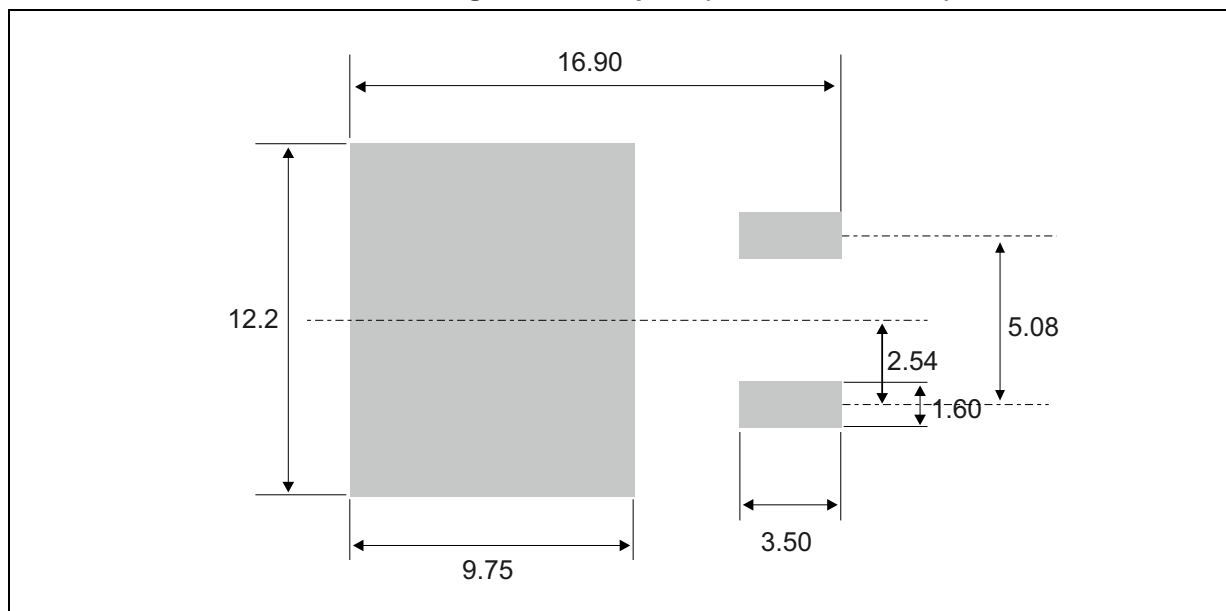


Figure 11. TO-220AB dimension definitions

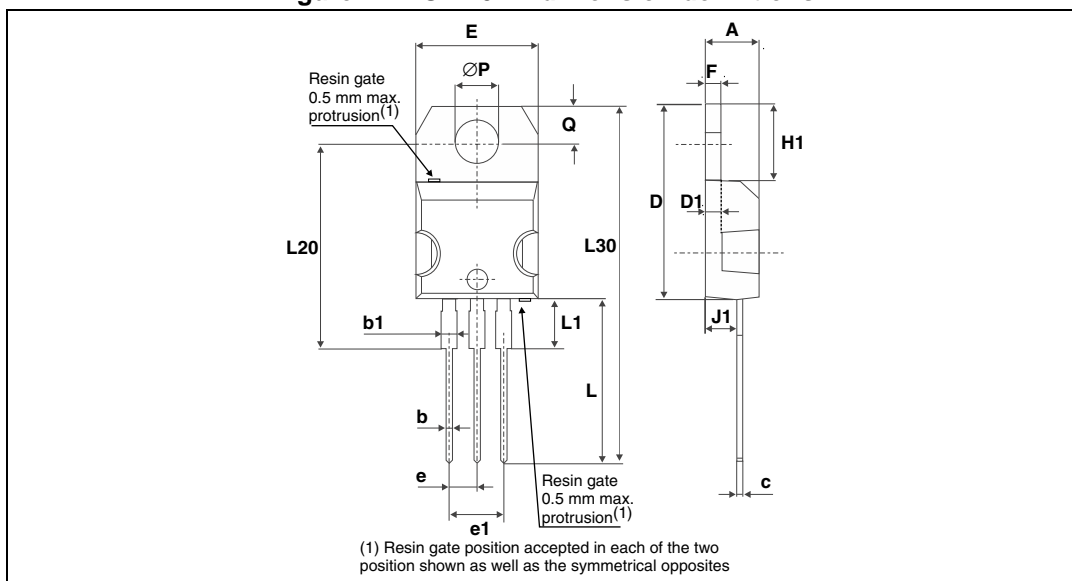


Table 6. TO-220AB dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.17	0.18
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.027
D	15.25	15.75	0.60	0.62
D1	1.27 typ.		0.05 typ.	
E	10	10.40	0.39	0.41
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.19	0.20
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.24	0.26
J1	2.40	2.72	0.094	0.107
L	13	14	0.51	0.55
L1	3.50	3.93	0.137	0.154
L20	16.40 typ.		0.64 typ.	
L30	28.90 typ.		1.13 typ.	
ØP	3.75	3.85	0.147	0.151
Q	2.65	2.95	0.104	0.116

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS41H100CGY-TR	STPS41H100CGY	D ² PAK	1.48 g	1000	Tape and reel
STPS41H100CTY	STPS41H100CY	TO-220AB	2.20 g	50	Tube

4 Revision history

Table 8. Revision history

Date	Revision	Changes
21-Oct-2011	1	Initial release.
14-Jan-2015	2	Added TO-220AB package information. Updated Table 2 and Figure 3 . Removed Figure 4 .

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