STPS41H100C-Y

Automotive low drop power Schottky rectifier

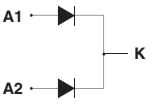
Features

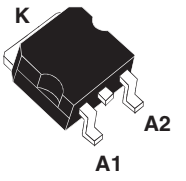
- Negligible switching losses
- Low leakage current
- Good trade off between leakage current and foward voltage drop
- Low thermal resistance
- Avalanche capability specified
- AEC-Q101 qualified

Description

Dual center tab Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in D^2PAK, this device is intended for use in high frequency inverters for automotive application.





D^2PAK
STPS41H100CG-Y

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
T_j (max)	175 °C
V_F(max)	0.67 V

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

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	T_c = 50 °C δ = 0.5	Per diode	20	A
			Per device	40	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		220	A
I_{RRM}	Repetitive peak reverse current	t_p = 2 µs square F = 1 kHz		1	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C		18100	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature range(1)			-40 to + 175	°C
dV/dt	Critical rate of rise of reverse voltage			10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.5	°C/W
		Total	0.8	
$R_{th(c)}$	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

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

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	$V_R = V_{RRM}$			10	µA
		T_j = 125 °C			3	10	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 20 A			0.80	V
		T_j = 125 °C	I_F = 20 A		0.62	0.67	
		T_j = 25 °C	I_F = 40 A			0.90	
		T_j = 125 °C	I_F = 40 A		0.70	0.76	

1. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

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

Figure 1. Conduction losses versus average current

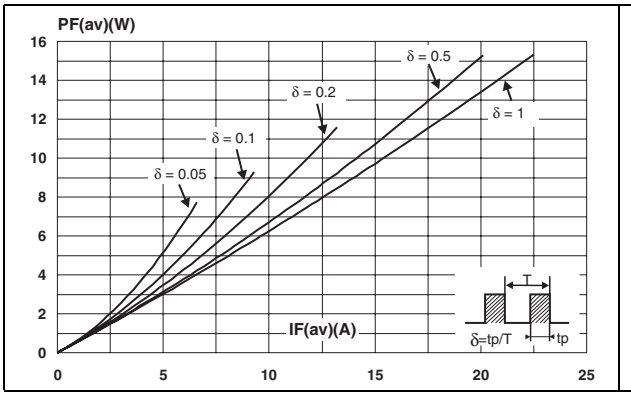


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

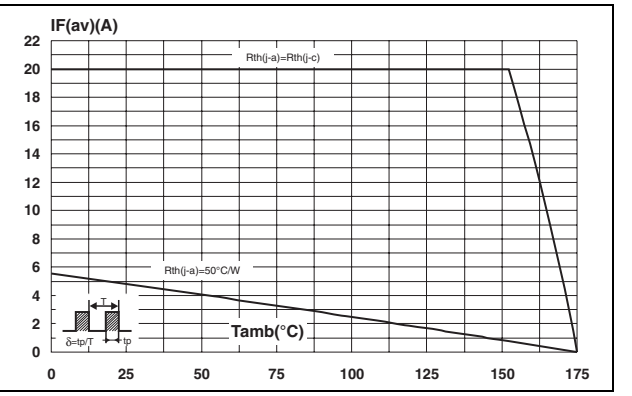


Figure 3. Normalized avalanche power derating versus pulse duration

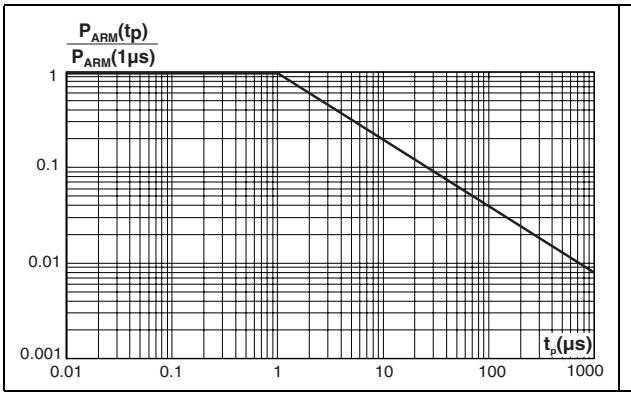


Figure 4. Normalized avalanche power derating versus junction temperature

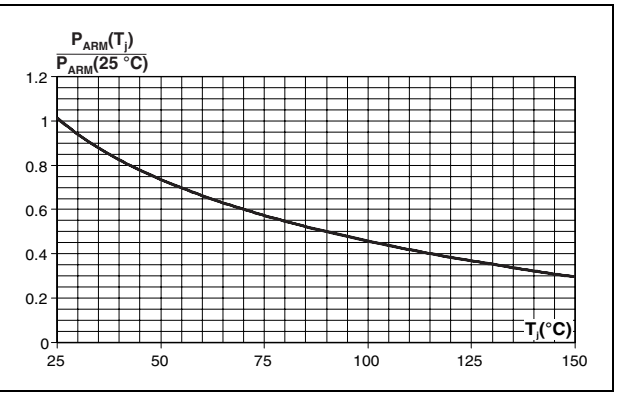


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

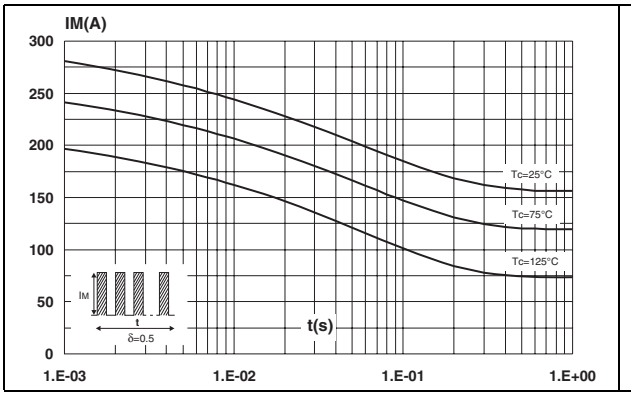


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

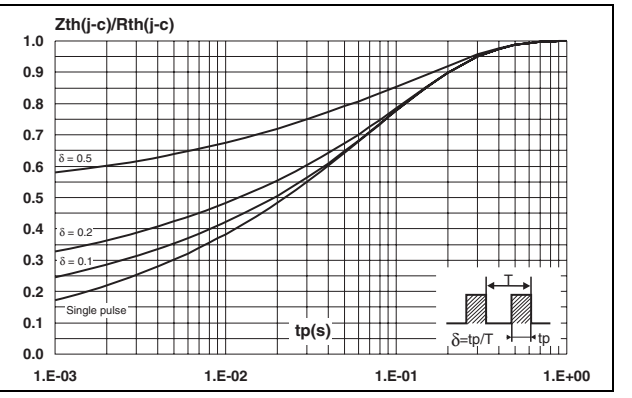


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

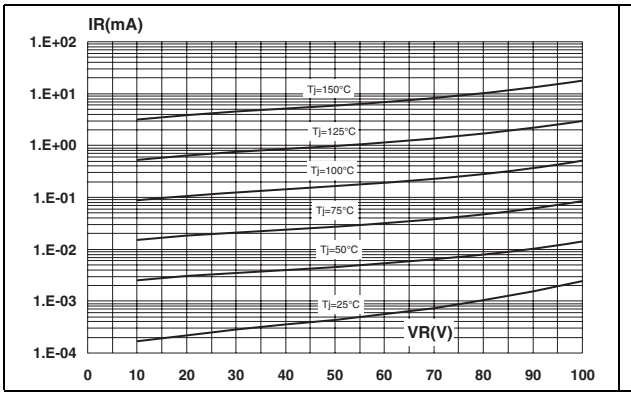


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

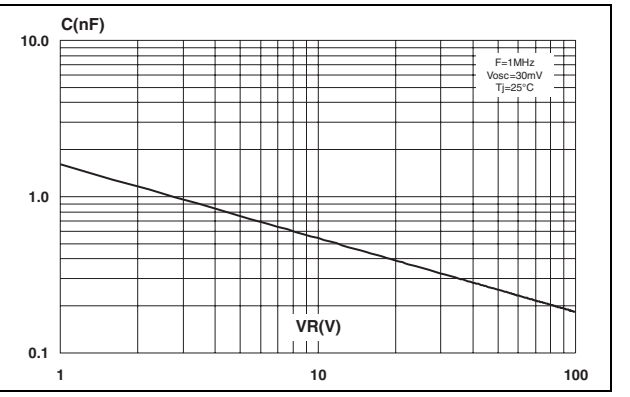


Figure 9. Forward voltage drop versus forward current

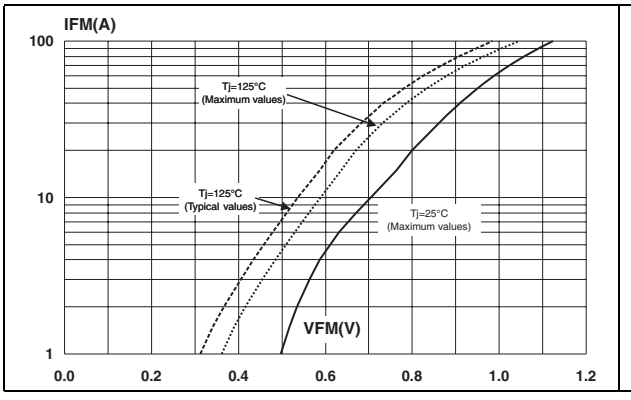
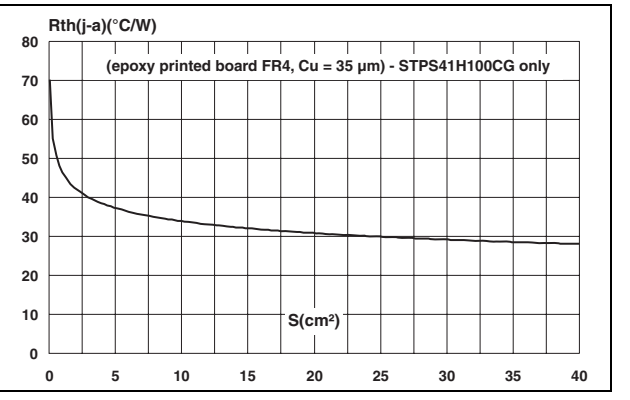


Figure 10. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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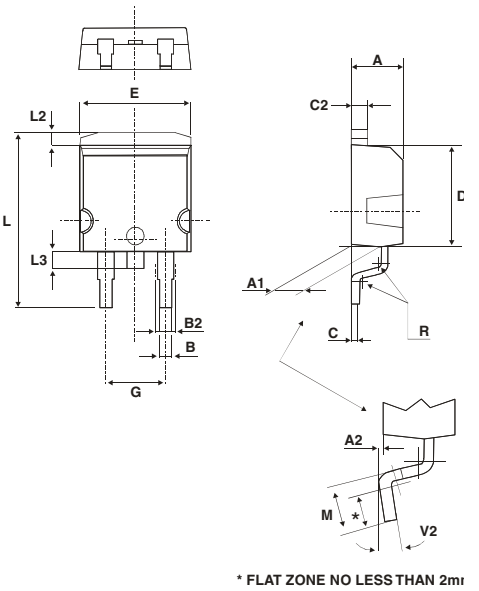
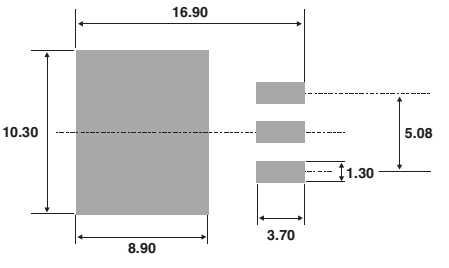
Table 5. D²PAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 11. Footprint (dimensions in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS41H100CGY-TR	STPS41H100CGY	D^2PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
21-Oct-2011	1	Initial release.

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