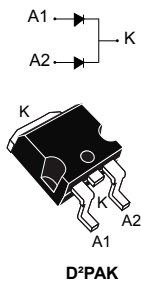



## Automotive 150 V, 2 x 20 A high voltage power Schottky rectifier



### Features

- AEC-Q101 qualified revision C 
- PPAP capable
- High junction temperature capability
- Low leakage current
- Low thermal resistance
- High frequency operation
- ECOPACK<sup>®2</sup> compliant

### Applications

- Switching mode power supply
- Automotive DC/DC converter

### Description

Dual center tab Schottky rectifier suited for high frequency switched mode power supplies.

#### Product status links

[STPS40150C-Y](#)

#### Product summary

$I_{F(AV)}$	2 x 20 A
$V_{RRM}$	150 V
$T_{j(max.)}$	175 °C
$V_F(typ.)$	0.69 V

# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage	T <sub>j</sub> from -40 °C to 175 °C	150	V	
I <sub>F(RMS)</sub>	Forward rms current		60	A	
I <sub>F(AV)</sub>	Average forward current, δ = 0.5, square wave	T <sub>C</sub> = 150 °C	Per diode	20	A
		T <sub>C</sub> = 145 °C	Per device	40	
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	250	A	
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C	1080	W	
T <sub>stg</sub>	Storage temperature range		-65 to +175	°C	
T <sub>j</sub>	Operating junction temperature <sup>(1)</sup>		-40 to +175	°C	

1. (dP<sub>tot</sub>/dT<sub>j</sub>) < (1/R<sub>th(j-a)</sub>) condition to avoid thermal runaway for a diode on its own heatsink.

**Table 2. Thermal parameters**

Symbol	Parameter		Value	Unit
			Max.	
R <sub>th(j-c)</sub>	Junction to case	Per diode	1.2	°C/W
		Total	0.85	
R <sub>th(c)</sub>	Coupling		0.5	°C/W

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 3. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		15	μA
		T <sub>j</sub> = 125 °C		-	4	17	mA
V <sub>F</sub>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 20 A	-		0.92	V
		T <sub>j</sub> = 125 °C		-	0.69	0.75	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 40 A	-		1.00	
		T <sub>j</sub> = 125 °C		-	0.79	0.86	

1. Pulse test: t<sub>p</sub> = 5 ms, δ < 2%

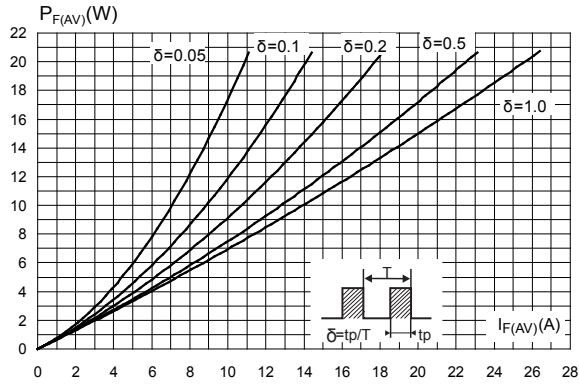
2. Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses, use the following equation:

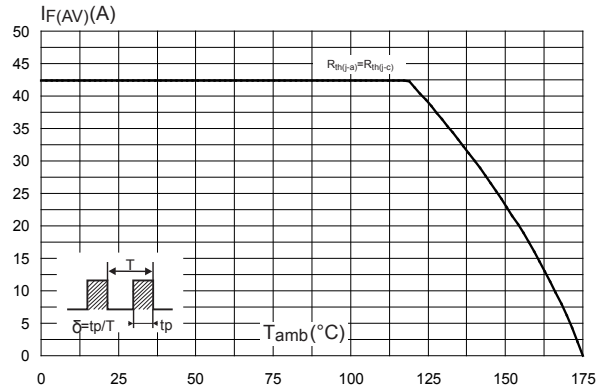
$$P = 0.64 \times I_{F(AV)} + 0.0055 \times I_F^2 (\text{RMS})$$

### 1.1 Characteristics (curves)

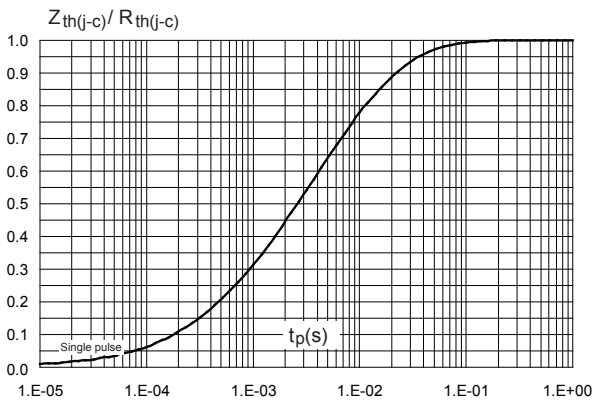
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



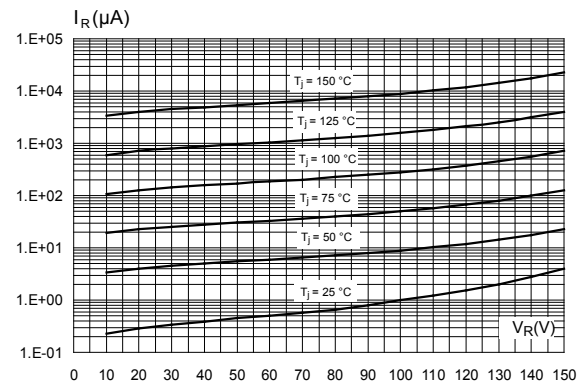
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



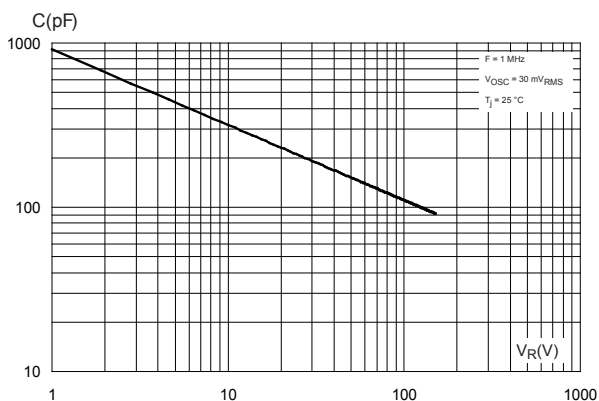
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



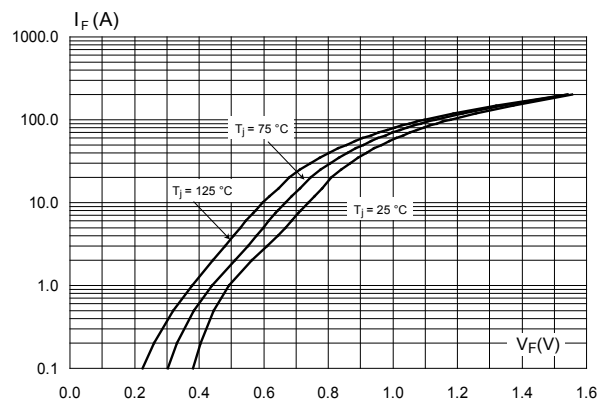
**Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



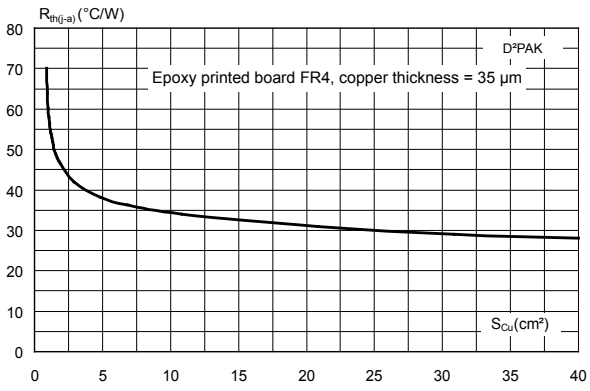
**Figure 5. Junction capacitance versus reverse voltage applied (typical values, per diode)**



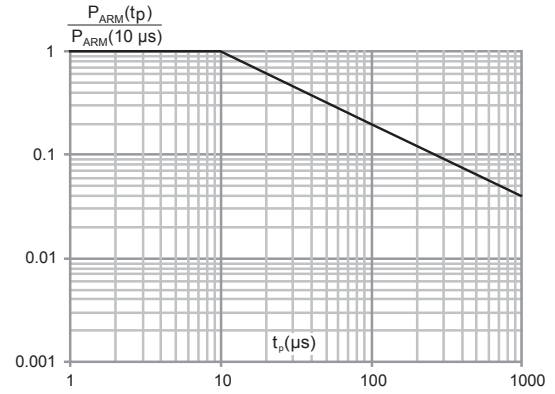
**Figure 6. Forward voltage drop versus forward current (typical values, per diode)**



**Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4,  $e_{Cu} = 35 \mu\text{m}$ )**



**Figure 8. Normalized avalanche power derating versus pulse duration ( $T_j = 125 \text{ }^{\circ}\text{C}$ )**



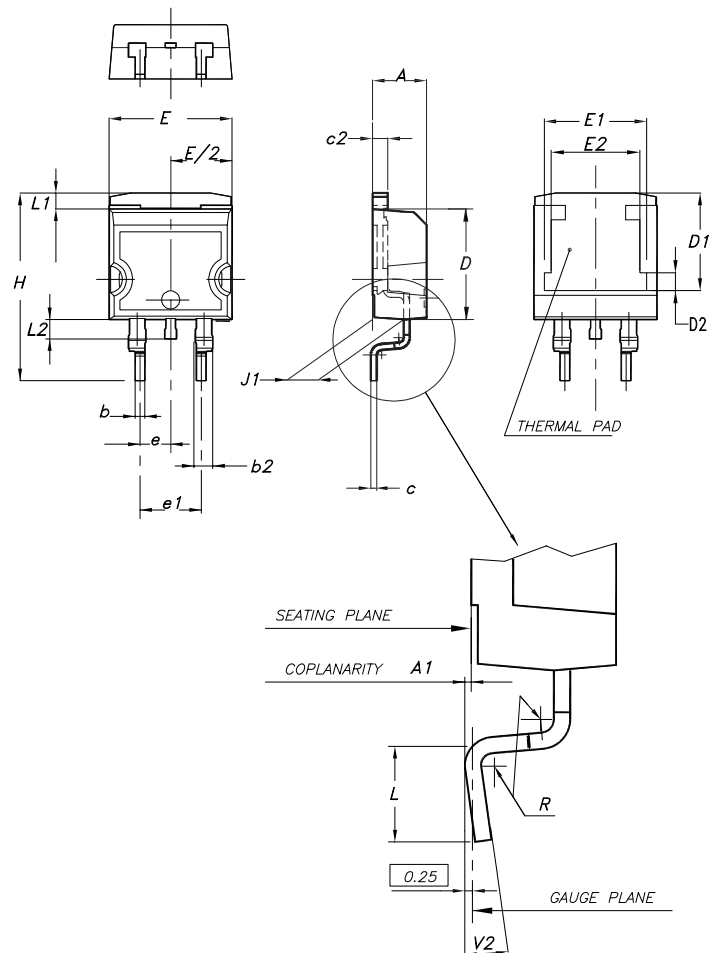
## 2 Package information

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

### 2.1 D<sup>2</sup>PAK package information

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

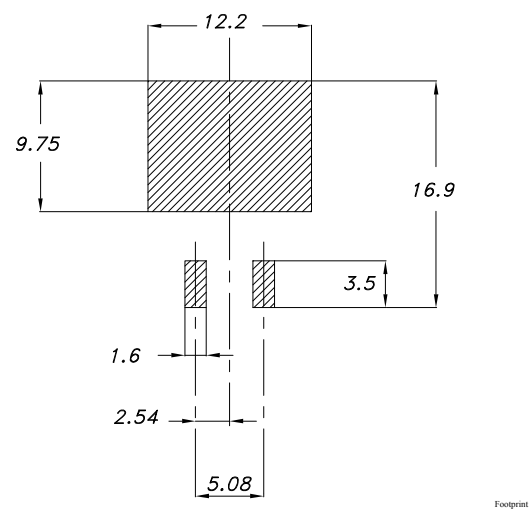
Figure 9. D<sup>2</sup>PAK package outline



**Note:** This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

**Table 4. D<sup>2</sup>PAK package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	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		0.053
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	0.060
E	10.00		10.40	0.394		0.409
E1	8.30	8.50	8.70	0.335	0.343	0.346
E2	6.85	7.05	7.25	0.266	0.278	0.282
e		2.54			0.100	
e1	4.88		5.28	0.190		0.205
H	15.00		15.85	0.591		0.624
J1	2.49		2.69	0.097		0.106
L	2.29		2.79	0.090		0.110
L1	1.27		1.40	0.049		0.055
L2	1.30		1.75	0.050		0.069
R		0.40			0.015	
V2	0°		8°	0°		8°

**Figure 10. D<sup>2</sup>PAK recommended footprint (dimensions are in mm)**


### 3 Ordering information

**Table 5. Order code**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS40150CGY-TR	STPS40150CGY	D <sup>2</sup> PAK	1.48 G	1000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
12-Mar-2018	1	First issue.
07-Dec-2018	2	Added <a href="#">Figure 8</a> . Updated <a href="#">Table 1</a> .
12-Dec-2018	3	Updated <a href="#">Table 3</a> .



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