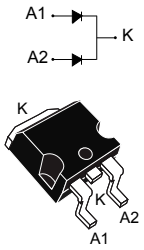
STPS40150C-Y

Datasheet

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



D²PAK

Features

- AEC-Q101 qualified revision C
- PPAP capable
- High junction temperature capability
- Low leakage current
- Low thermal resistance
- High frequency operation
- ECOPACK®2 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_{RRM}	Repetitive peak reverse voltage	T_j from -40 °C to 175 °C		150	V
$I_{F(RMS)}$	Forward rms current			60	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_C = 150 °C	Per diode	20	A
		T_C = 145 °C	Per device	40	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		250	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		1080	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature(1)			-40 to +175	°C

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

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
			Max.	
$R_{th(j-c)}$	Junction to case	Per diode	1.2	°C/W
		Total	0.85	
$R_{th(c)}$	Coupling		0.5	°C/W

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 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		15	µA
		T_j = 125 °C		-	4	17	mA
V_F	Forward voltage drop	T_j = 25 °C	I_F = 20 A	-		0.92	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 40 A	-		1.00	
		T_j = 125 °C		-	0.79	0.86	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p =380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

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

1.1 Characteristics (curves)

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

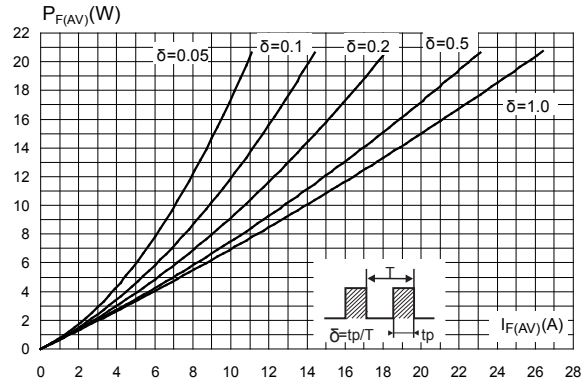


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

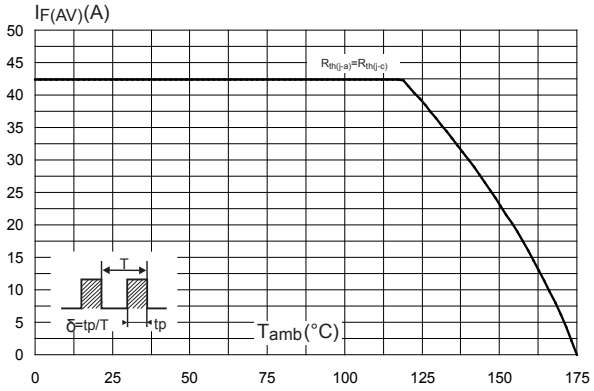


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

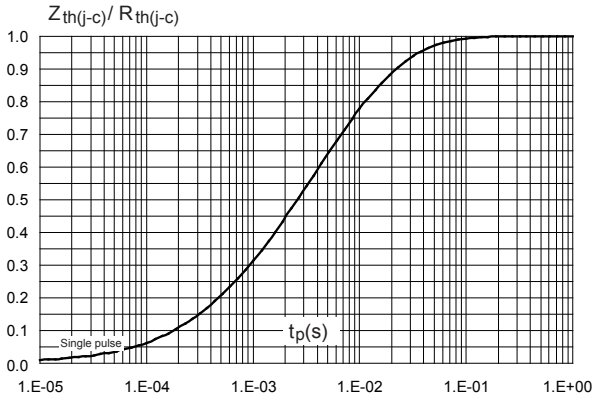


Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)

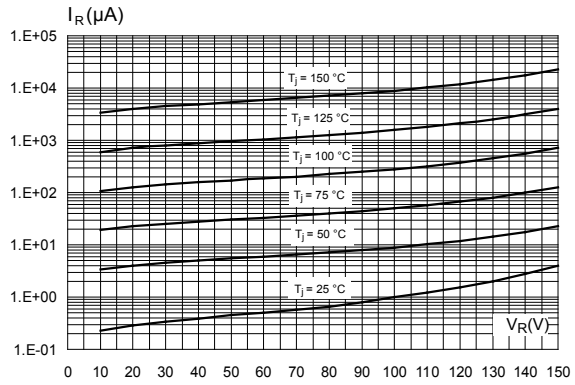


Figure 5. Junction capacitance versus reverse voltage applied (typical values, per diode)

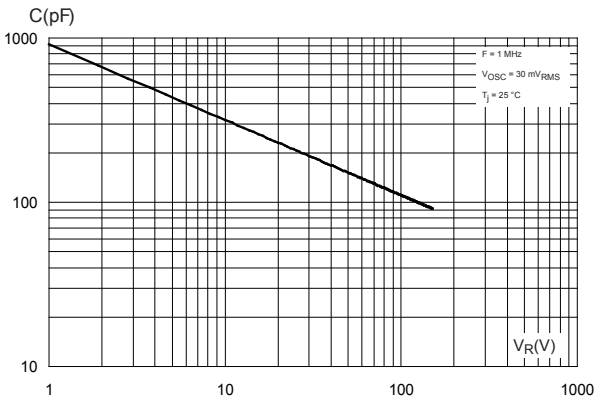


Figure 6. Forward voltage drop versus forward current (typical values, per diode)

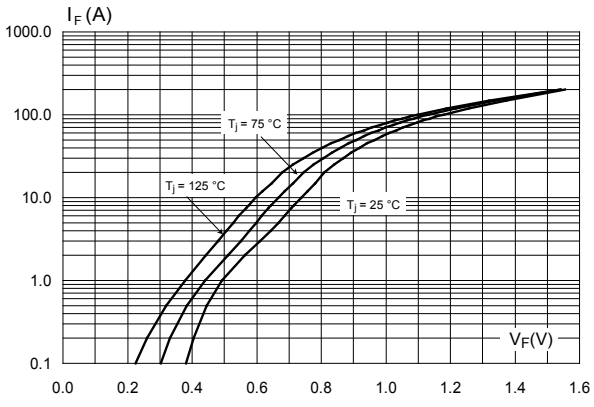


Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu} = 35 µm)

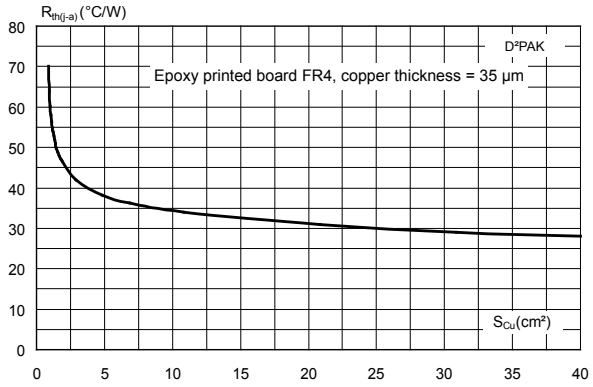
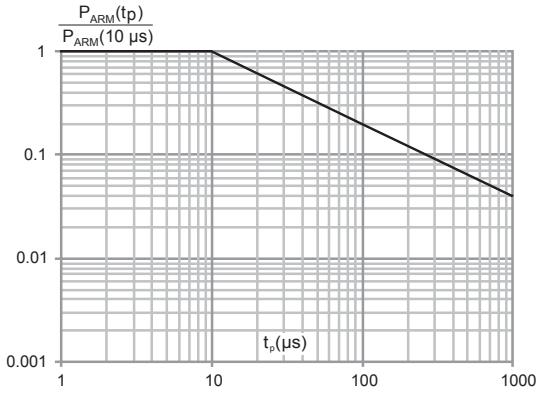


Figure 8. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)



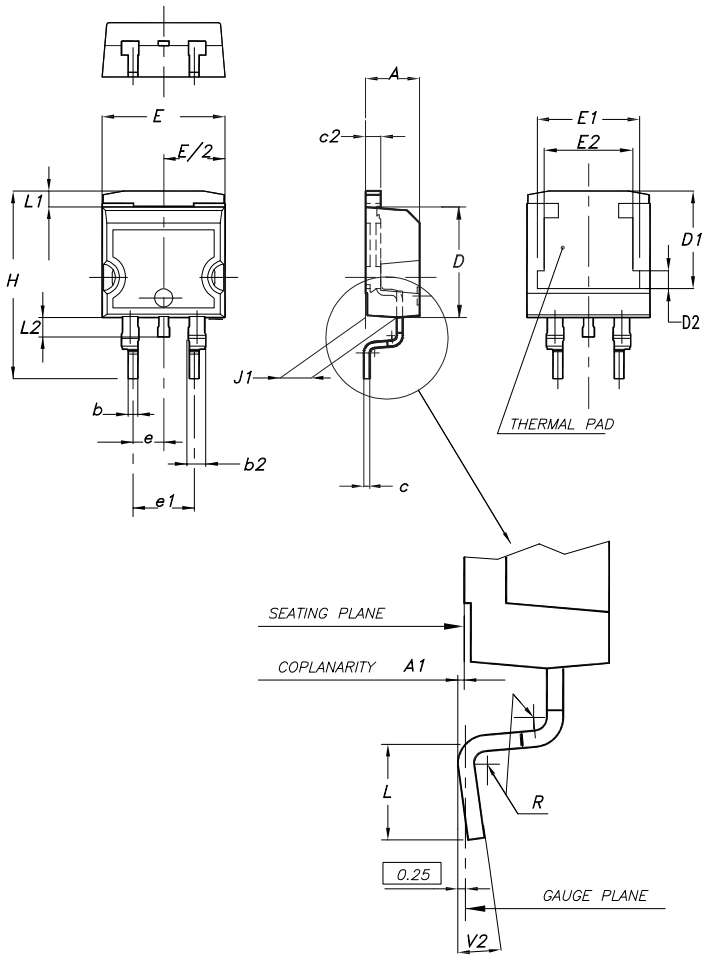
2 Package information

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

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

Figure 9. D²PAK package outline

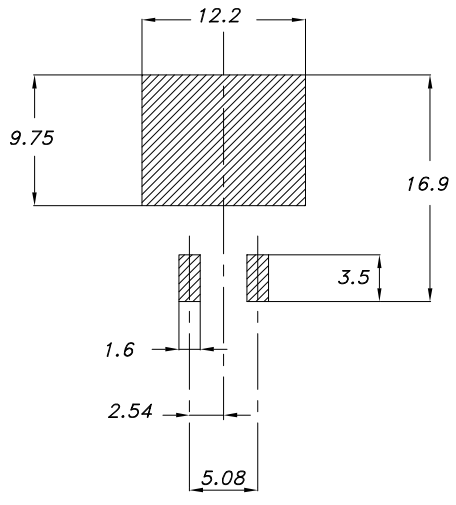


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. D²PAK 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. D²PAK 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	D²PAK	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 Figure 8. Updated Table 1.
12-Dec-2018	3	Updated Table 3.

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