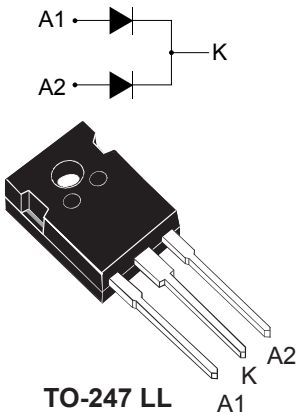
STPS80H100C-Y

Datasheet

Automotive 100 V, dual 40 A low voltage drop power Schottky rectifier



TO-247 LL

Features

- AEC-Q101 qualified
- PPAP capable
- Negligible switching losses
- High junction temperature capability
- Low leakage current
- VRRM guaranteed from -40 °C to +175 °C
- Avalanche capability specified
- ECOPACK2 compliant

Applications

- DC/DC converters
- Freewheeling diodes
- LLC topology
- Phase shift topology
- Electrical vehicles (EV) and hybrid electrical vehicles

Description

The STPS80H100C-Y has been designed for high frequency switched mode power supply applications for DC/DC converters used in electrical cars.

Product status
STPS80H100C-Y

Product summary	
$I_{F(AV)}$	2 x 40 A
V_{RRM}	100 V
$T_{j(max.)}$	175 °C
$V_{F(typ.)}$	0.62 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 = -40 to +175 °C		100	V
$I_{F(RMS)}$	Forward rms current			95	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_c = 160 °C	Per diode	40	A
		T_c = 160 °C	Per device	80	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		550	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		2900	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 resistance parameters

Symbol	Parameter		Typ. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.3	°C/W
		Total	0.15	

For more information, refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		20	µA
		T_j = 125 °C		-	7	17	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 40 A	-		0.82	V
		T_j = 125 °C		-	0.62	0.69	
		T_j = 25 °C	I_F = 80 A	-		0.94	
		T_j = 125 °C		-	0.74	0.82	

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: $P = 0.50 \times I_{F(AV)} + 0.0048 \times I_F{}^2{}_{(RMS)}$

For more information, refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward current versus case temperature (δ = 0.5, per diode)

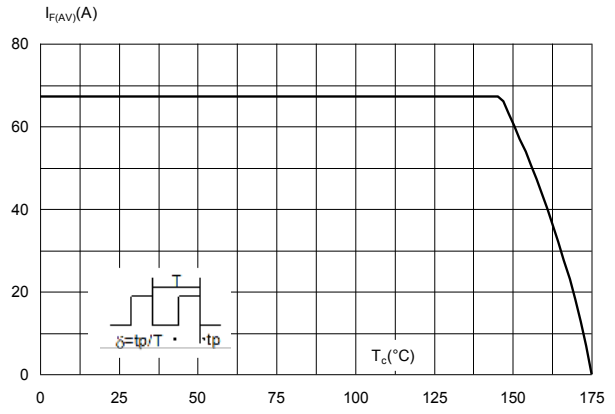


Figure 2. Normalized avalanche power derating versus pulse duration (T_j= 125 °C)

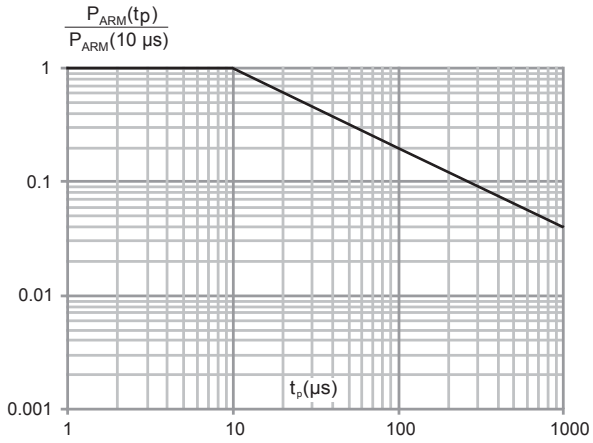


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

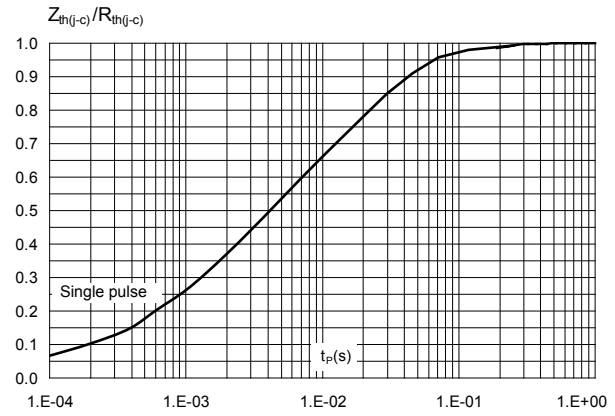


Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)

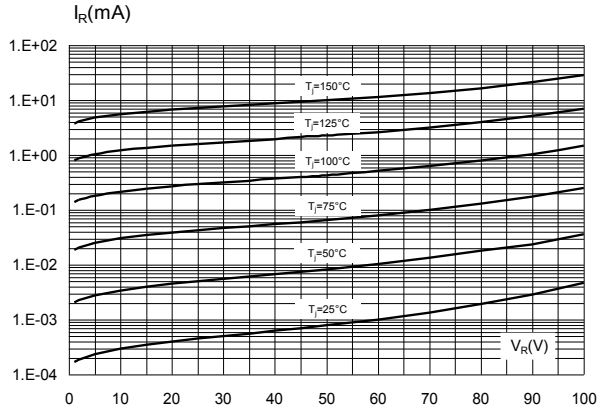


Figure 5. Junction capacitance versus reverse voltage applied (typical values, per diode)

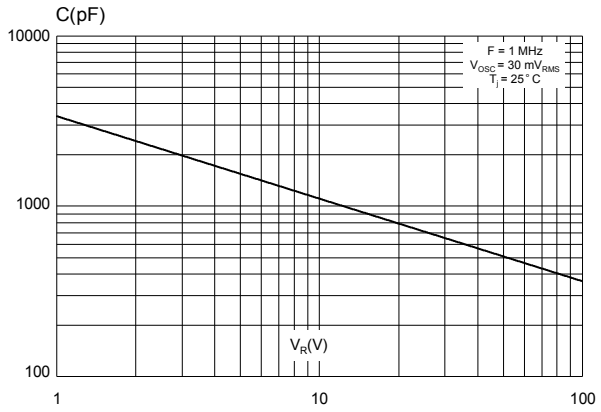
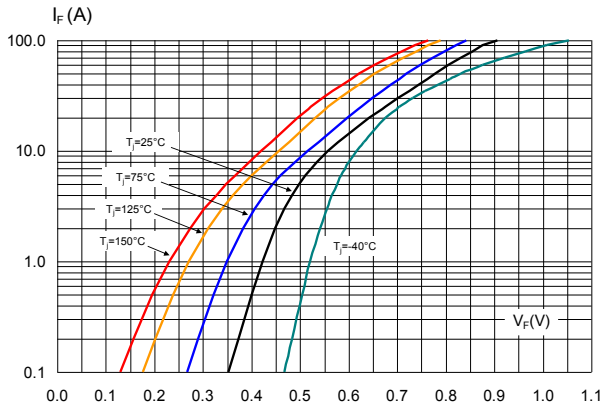


Figure 6. Forward voltage drop versus forward current (typical values, per diode)



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 TO-247 package_information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m
- Maximum torque value: 1.0 N·m

Figure 7. TO-247 long leads package outline

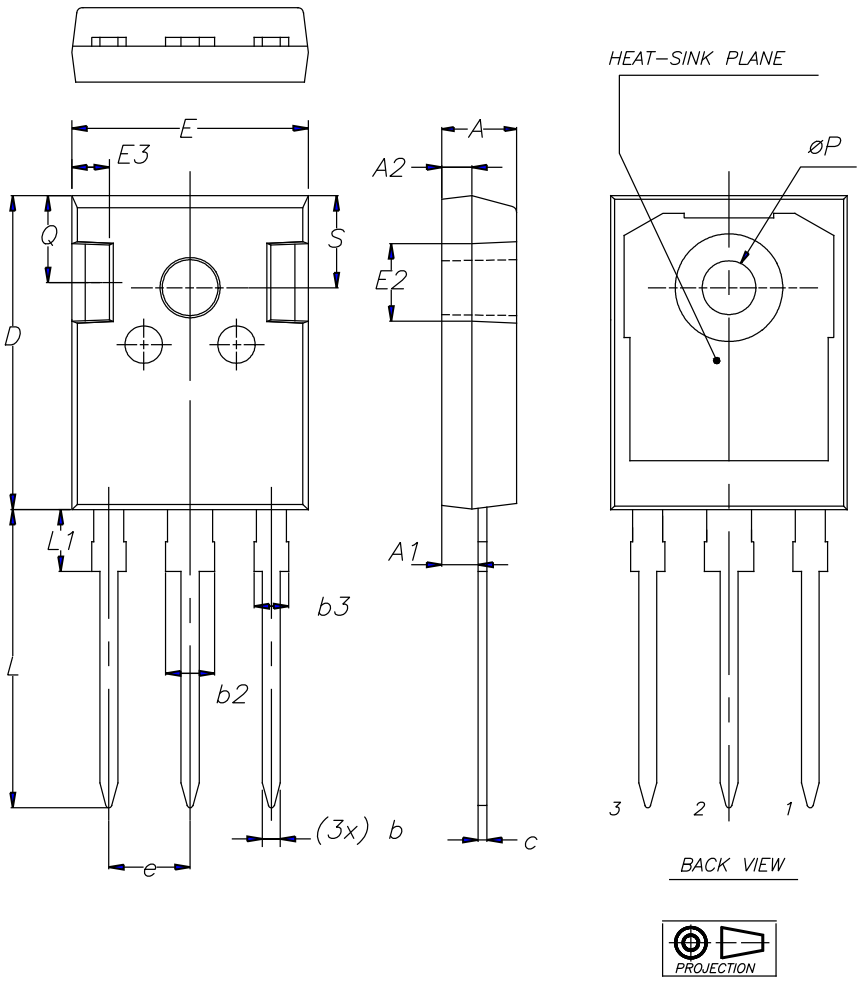


Table 4. **TO-247 long leads package mechanical data**

Dim.	mm.			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.90	-	5.15	0.192	-	0.203
A1	2.25	-	2.55	0.088	-	0.101
A2	1.85	-	2.10	0.072	-	0.083
b	1.07	-	1.32	0.042	-	0.052
b2	2.87	-	3.38	0.112	-	0.134
b3	1.90	-	2.38	0.074	-	0.094
C	0.55	-	0.67	0.021	-	0.027
D	20.82	-	21.10	0.819	-	0.831
E	15.70	-	16.02	0.618	-	0.631
E2	4.90	-	5.10	0.192	-	0.201
E3	2.40	-	2.60	0.094	-	0.103
e	5.34	-	5.54	0.210	-	0.219
L	19.80	-	20.30	0.779	-	0.800
L1	4.16	-	4.47	0.163	-	0.176
P	3.50	-	3.70	0.137	-	0.146
Q	5.49	-	6.00	0.216	-	0.237
S	6.04	-	6.29	0.237	-	0.248

3 Ordering information

Table 5. **Order code**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS80H100CWLY	STPS80H100CWLY	TO-247LL	4.4 g	30	Tube

Revision history

Table 6. **Document revision history**

Date	Revision	Changes
23-Aug-2021	1	Initial release.
17-Jul-2024	2	Updated Figure 4.

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