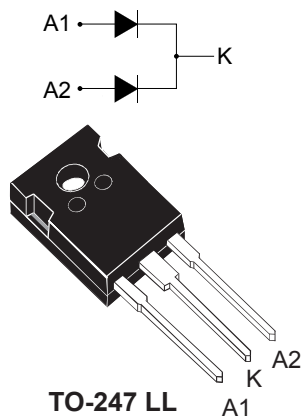



## Automotive 100 V, dual 40 A low voltage drop power Schottky rectifier



## 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, $\delta = 0.5$ , 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	$t_p = 10$ $\mu$ s, $T_j = 125$ °C	2900	W	
$T_{stg}$	Storage temperature range		-65 to +175	°C	
$T_j$	Operating junction temperature <sup>(1)</sup>		-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
$I_R$ <sup>(1)</sup>	Reverse leakage current	$T_j = 25$ °C	$V_R = V_{RRM}$	-		20	$\mu$ A
		$T_j = 125$ °C		-	7	17	mA
$V_F$ <sup>(2)</sup>	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,  $\delta < 2\%$

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

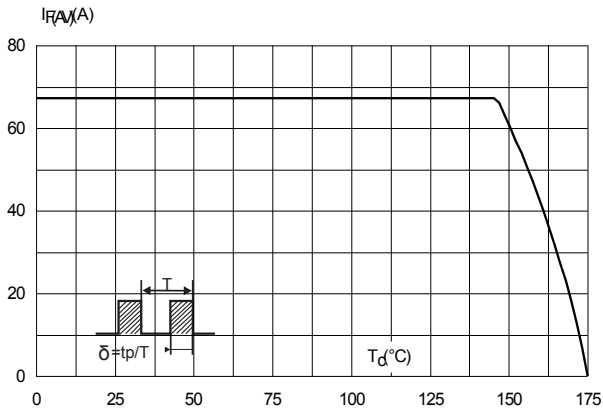
To evaluate the conduction losses, use the following equation:  $P = 0.50 \times I_{F(AV)} + 0.0048 \times I_F^2$  (RMS)

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

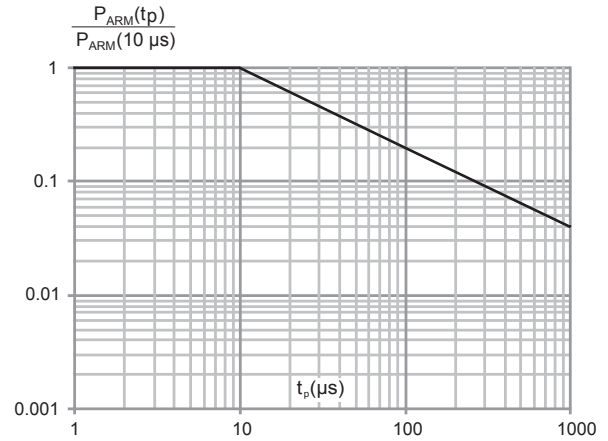
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

### 1.1 Characteristics (curves)

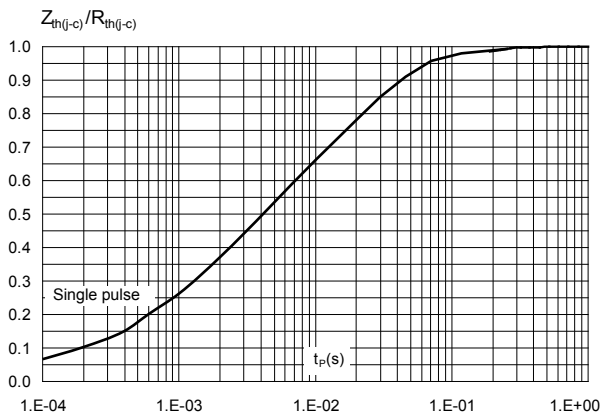
**Figure 1. Average forward current versus case temperature ( $\delta = 0.5$ , per diode)**



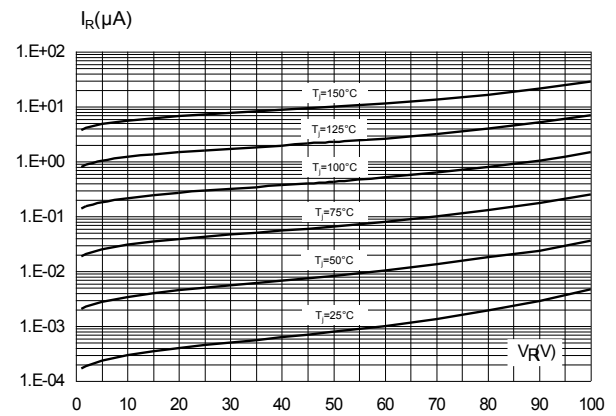
**Figure 2. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



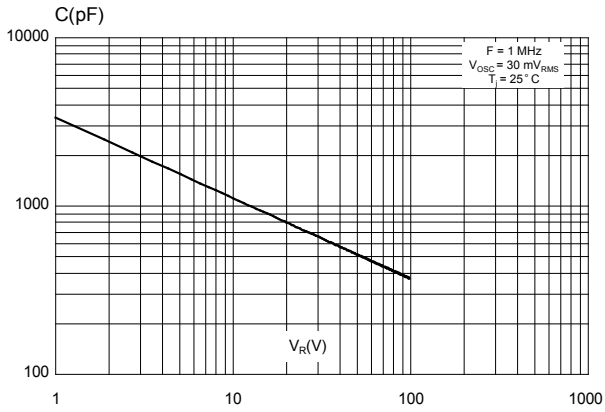
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



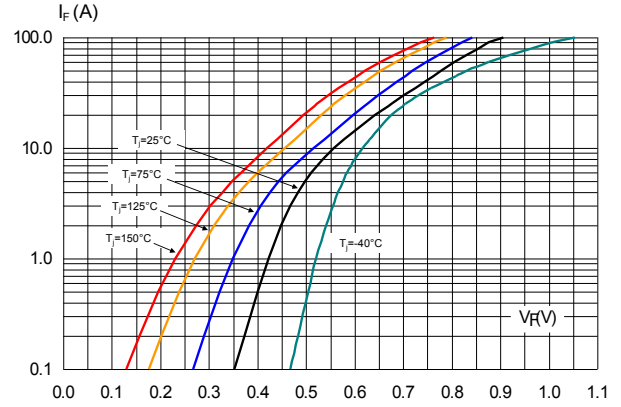
**Figure 4. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



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



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



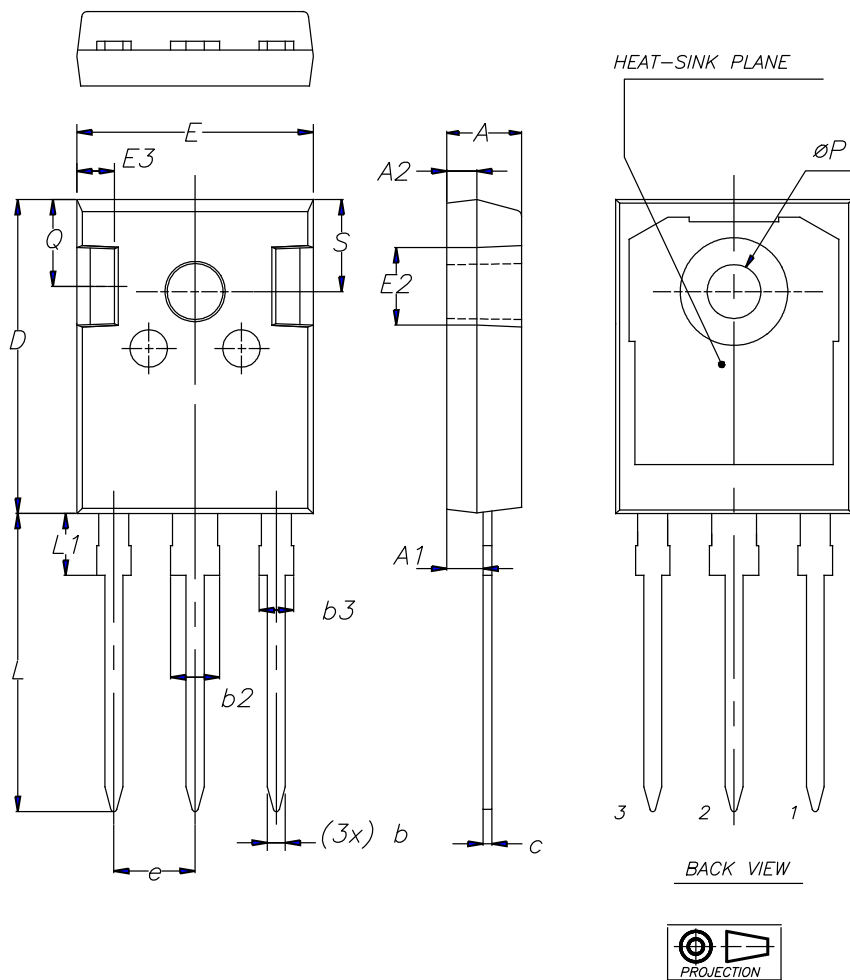
## 2 Package information

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](http://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.



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