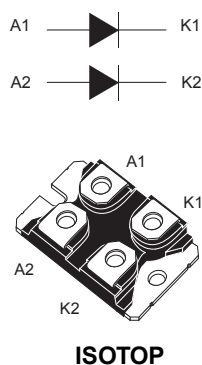



## Automotive 100 V, 2 x 120 A, power Schottky rectifier



### Features

- AEC-Q101 qualified 
- PPAP capable
- Operating  $T_j$  from  $-40\text{ }^{\circ}\text{C}$  to  $+175\text{ }^{\circ}\text{C}$
- Low thermal resistance
- Negligible switching losses
- Low  $C_{j0}$
- High forward surge capability
- Avalanche rated
- Insulated package ISOTOP:
  - Insulated voltage:  $2500\text{ V}_{\text{RMS}}$  sine
- ECOPACK2 compliant component
- Comply with UL1557 insulation:  $2.5\text{ kV}$ 
  - Reference file: E81734

### Applications

- DC/DC converter, especially in hybrid or electrical vehicles
- OBC
- Secondary rectification
- LLC topologies
- Phase shift topologies

### Description

The **STPS240H100TV1Y** is an automotive Schottky diode suitable for high frequency switch mode power supply.

Especially suited for DC-DC applications, this isolated ISOTOP Schottky diode will improve the thermal management in harshest environments. Its high forward surge capability ensures a good robustness during transient phases or in case of short circuit event.

Product status link	
<a href="#">STPS240H100TV1Y</a>	
Product summary	
Symbol	Value
$I_{F(AV)}$	$2 \times 120\text{ A}$
$V_{RRM}$	$100\text{ V}$
$T_j(\text{max.})$	$175\text{ }^{\circ}\text{C}$
$V_F(\text{typ.})$	$0.610\text{ V}$

# 1 Characteristics

**Table 1. Absolute ratings (limiting values, per diode at  $T_{amb} = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Parameter	Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage, $T_j = -40\text{ °C}$ to $+175\text{ °C}$	100	V
$I_{F(RMS)}$	Forward rms current	225	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ , square wave	$T_C = 140\text{ °C}$ , per diode	A
		$T_C = 140\text{ °C}$ , per device	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}$ , $T_j = 125\text{ °C}$	W
$T_{stg}$	Storage temperature range	-55 to +175	°C
$T_j$	Maximum 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	°C/W
		Total	

**Table 3. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R$ <sup>(1)</sup>	Reverse leakage current	$T_j = 25\text{ °C}$ $V_R = 15\text{ V}$	-		40	$\mu\text{A}$
		$T_j = 25\text{ °C}$ $V_R = V_{RRM}$	-		90	
		$T_j = 125\text{ °C}$	-	26	65	mA
$V_F$ <sup>(2)</sup>	Forward voltage drop	$T_j = 25\text{ °C}$ $I_F = 60\text{ A}$	-		0.700	V
		$T_j = 150\text{ °C}$	-	0.505	0.570	
		$T_j = 25\text{ °C}$ $I_F = 80\text{ A}$	-		0.750	
		$T_j = 150\text{ °C}$	-	0.545	0.610	
		$T_j = 25\text{ °C}$ $I_F = 120\text{ A}$	-		0.825	
		$T_j = 150\text{ °C}$	-	0.610	0.680	

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

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

To evaluate the maximum conduction losses, use the following equation:

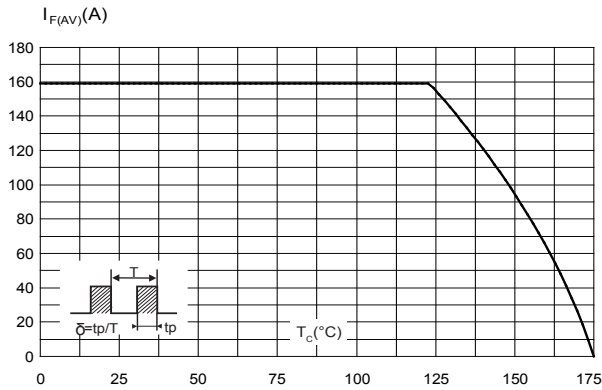
$$P = 0.46 \times I_{F(AV)} + 0.00183 \times I_F^2 \text{ (RMS)}$$

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

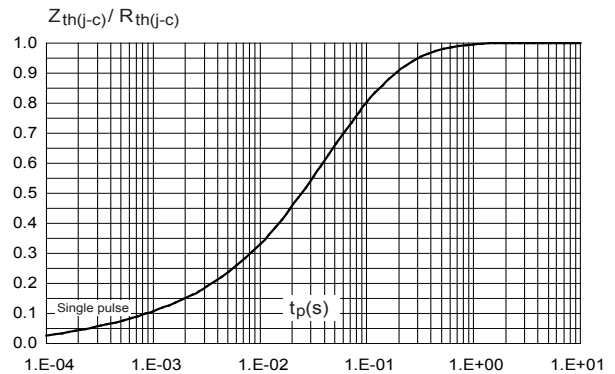
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

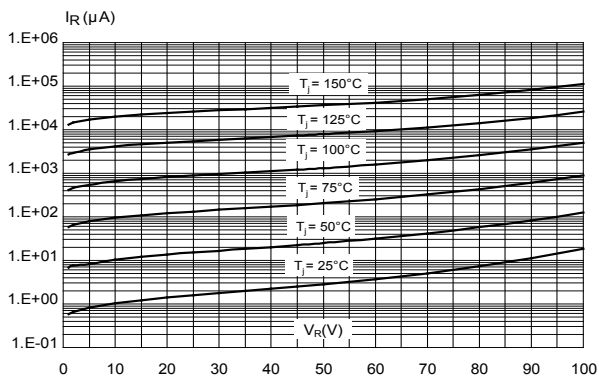
**Figure 1. Average forward current versus case temperature ( $\delta = 0.5$ , per diode)**



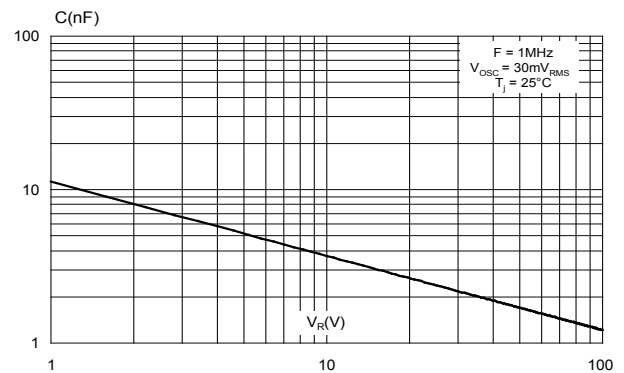
**Figure 2. Relative variation of thermal impedance junction to case versus pulse duration**



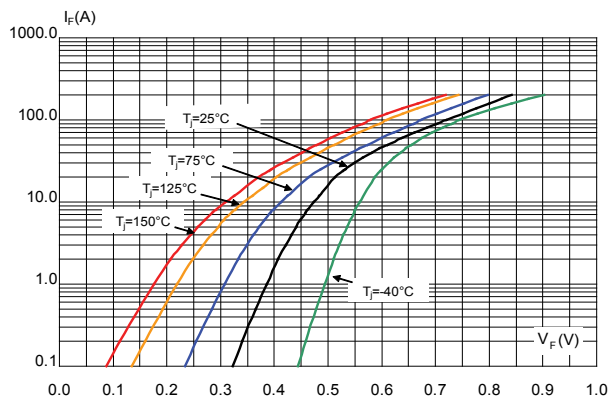
**Figure 3. Reverse leakage current versus reverse voltage applied (typical values per diode)**



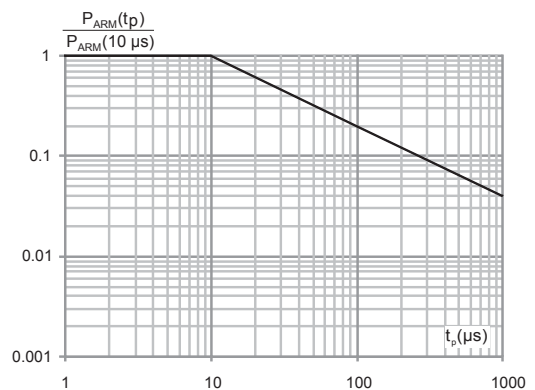
**Figure 4. Junction capacitance versus reverse voltage applied (typical values, per diode)**



**Figure 5. Forward voltage drop versus forward current (typical values, per diode)**



**Figure 6. Normalized avalanche power derating versus pulse duration ( $T_J = 125^\circ\text{C}$ )**



## 2 Package information

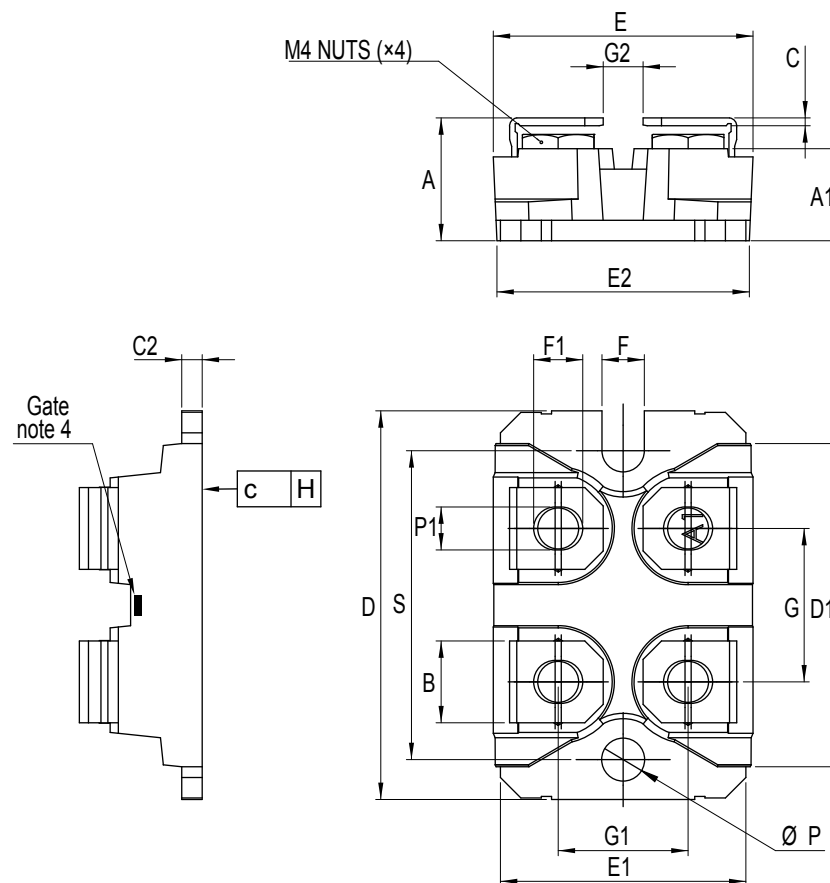
In order to meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 ISOTOP package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 1.3 N·m
- Maximum torque value: 1.5 N·m

STMicroelectronics strongly recommend the use of the screws delivered with this product.  
 The use of any other screws is entirely at the user's own risk and will invalidate the warranty.

**Figure 7. ISOTOP package outline**



**Table 4. ISOTOP package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches <sup>(1)</sup>	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.460	0.480
A1	8.90	9.10	0.350	0.358
B	7.80	8.20	0.307	0.323
C	0.75	0.85	0.030	0.033
C2	1.95	2.05	0.077	0.081
D	37.80	38.20	1.488	1.504
D1	31.50	31.70	1.240	1.248
E	25.15	25.50	0.990	1.004
E1	23.85	24.15	0.939	0.951
E2	24.80		0.976	
G	14.90	15.10	0.587	0.594
G1	12.60	12.80	0.496	0.504
G2	3.50	4.30	0.138	0.169
F	4.10	4.30	0.161	0.169
F1	4.60	5.00	0.181	0.197
H	-0.05	0.10	-0.002	0.004
Diam P	4.00	4.30	0.157	0.169
P1	4.00	4.40	0.157	0.173
S	30.10	30.30	1.185	1.193

1. Inches given for reference only

For more information, please refer to the following technical note related to the mounting :

- TN1331: Assembly recommendations for STMicroelectronics ISOTOP package

### 3 Ordering Information

**Table 5. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS240H100TV1Y	STPS 240H100TV1Y	ISOTOP	27 g without screws	10 with screws	Tube

## Revision history

**Table 6. Document revision history**

Date	Version	Changes
18-Feb-2020	1	First issue.
05-May-2020	2	Updated Table 1. Added Mounting information.
08-Jun-2020	3	Updated Figure 3 and inserted TN1331 reference.
12-Jun-2020	4	Removed section 3 Mounting information. Minor text changes to improve the readability.

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