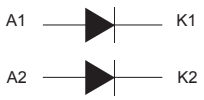
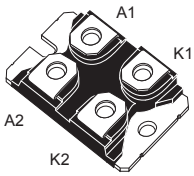
STPS240H100TV1Y

Datasheet

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





ISOTOP

Features

- AEC-Q101 qualified
- PPAP capable
- Operating T_j from -40 °C to +175 °C
- Low thermal resistance
- Negligible switching losses
- Low C_{J0}
- High forward surge capability
- Avalanche rated
- Insulated package ISOTOP:
  - Insulated voltage: 2500 V_{RMS} sine
- ECOPACK2 compliant component
- Comply with UL1557 insulation: 2.5 kV
  - Reference file: E81734

Applications

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

Product status link
STPS240H100TV1Y

Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 120 A
V_{RRM}	100 V
T_j (max.)	175 °C
V_F (typ.)	0.610 V

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.

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage, T_j = -40 °C to +175 °C		100	V
$I_{F(RMS)}$	Forward rms current		225	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_C = 140 °C, per diode	120	A
		T_C = 140 °C, per device	240	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	1150	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	9300	W
T_{stg}	Storage temperature range		-55 to +175	°C
T_j	Maximum 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	0.24	°C/W
		Total	0.12	

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 = 15 V	-		40	µA
		T_j = 25 °C	$V_R = V_{RRM}$	-		90	
		T_j = 125 °C		-	26	65	mA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 60 A	-		0.700	V
		T_j = 150 °C		-	0.505	0.570	
		T_j = 25 °C	I_F = 80 A	-		0.750	
		T_j = 150 °C		-	0.545	0.610	
		T_j = 25 °C	I_F = 120 A	-		0.825	
		T_j = 150 °C		-	0.610	0.680	

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

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

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

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 (δ = 0.5, per diode)

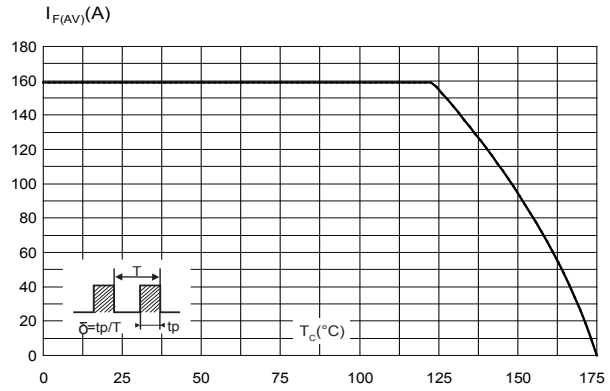


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration

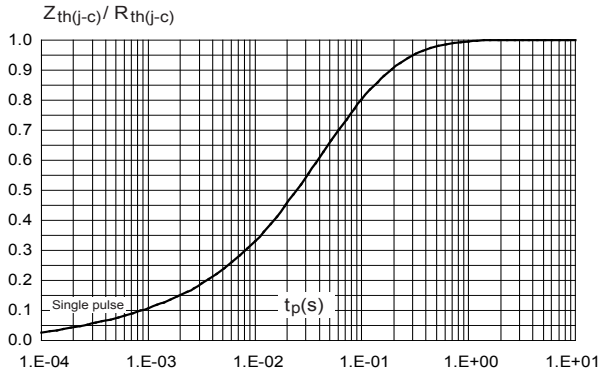


Figure 3. Reverse leakage current versus reverse voltage applied (typical values per diode)

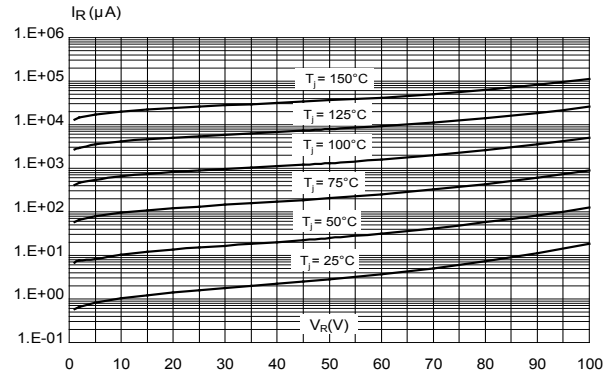


Figure 4. Junction capacitance versus reverse voltage applied (typical values, per diode)

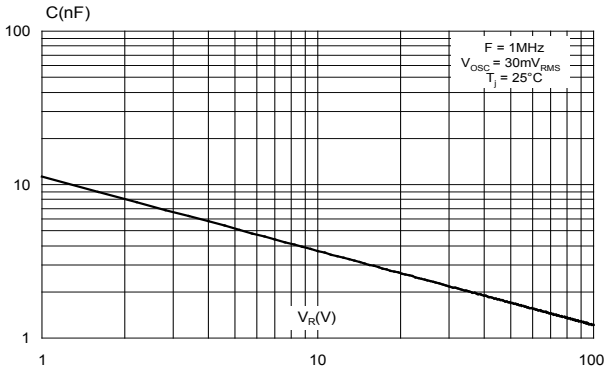


Figure 5. Forward voltage drop versus forward current (typical values, per diode)

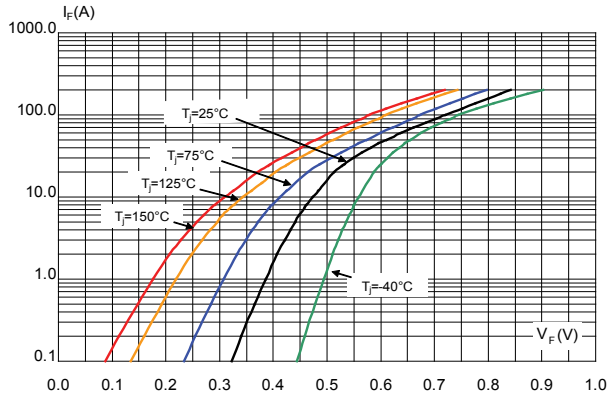
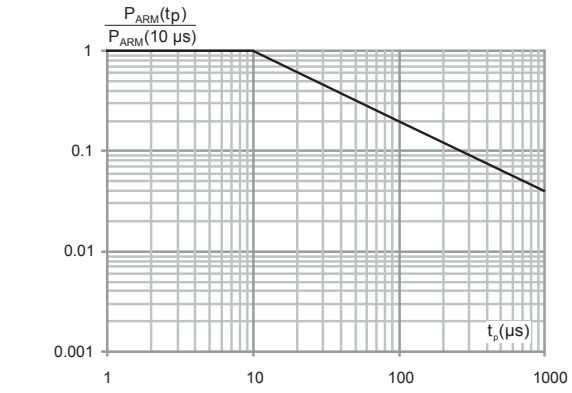


Figure 6. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)



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 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

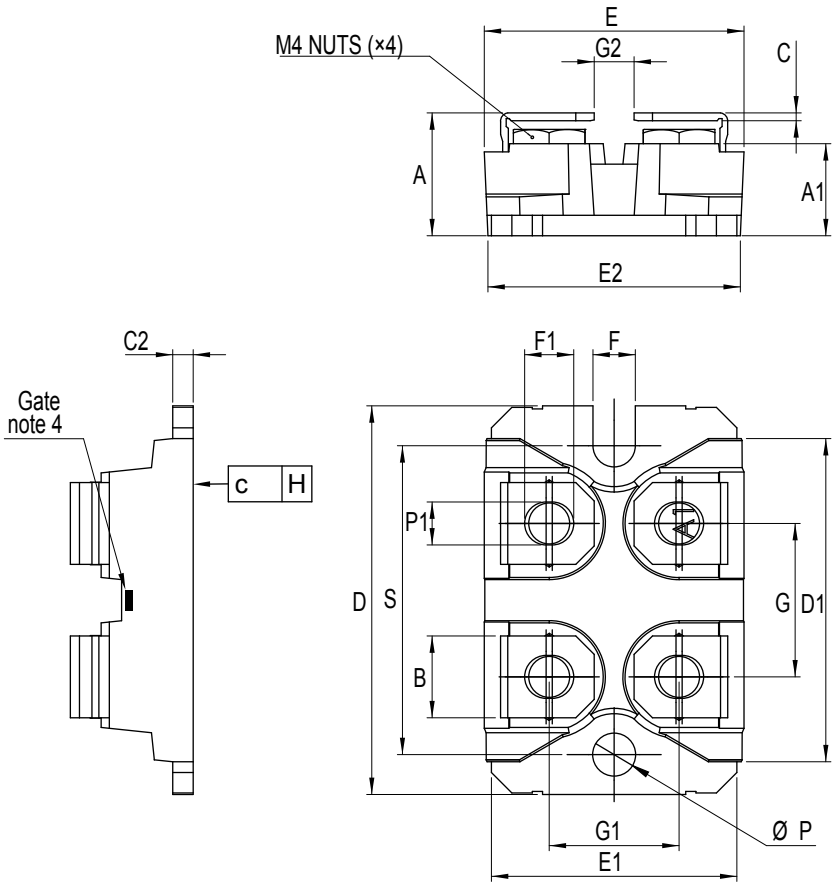


Table 4. ISOTOP package mechanical data

Ref.	Dimensions			
	Millimeters		Inches[1]	
	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 mouting :

- 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 readibility.

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