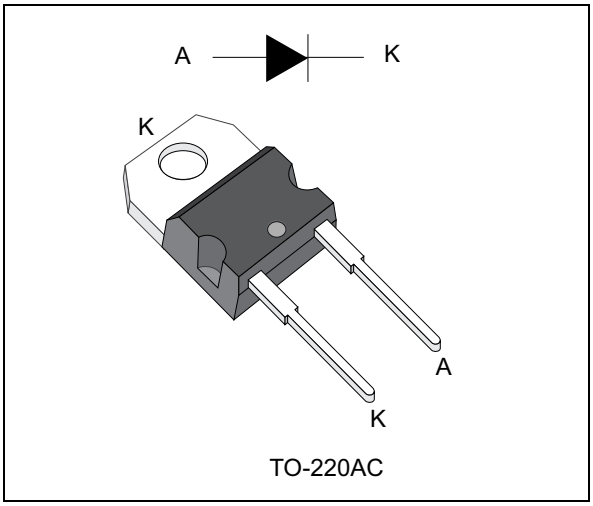
STPS1545-Y

Automotive power Schottky rectifier

Datasheet - production data



TO-220AC

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Avalanche capability specified
- AECQ-101 qualified
- ECOPACK®2 compliant component

Description

Single chip Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in TO-220AC, this device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection in automotive applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	15 A
V_{RRM}	45 V
T_j (max)	175 °C
V_F (typ)	0.50 V

This is information on a product in full production. www.st.com

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		45	V
$I_{F(RMS)}$	Forward rms current		30	A
$I_{F(AV)}$	Average forward current δ = 0.5	T_c = 155 °C	15	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	220	A
I_{RRM}	Peak repetitive reverse current	t_p = 2 µs square F = 1 kHz	1	A
I_{RSM}	Non repetitive peak reverse current	t_p = 100 µs square	3	A
P_{ARM}(1)	Repetitive peak avalanche power	T_j = 125 °C, t_p = 10 µs	400	W
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Operating junction temperature (2)		-40 to + 175	°C
dV/dt	Critical rate of rise of reverse voltage		10000	V/µs

1. For pulse time duration deratings, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, “Admissible avalanche power of Schottky diodes” and AN2025, “Converter improvement using Schottky rectifier avalanche specification”.
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistances

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	1.6	°C/W

Table 4. 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}	-	-	200	µA
		T_j = 125 °C		-	11	40	mA
V_F(1)	Forward voltage drop	T_j = 125°C	I_F = 15A	-	0.5	0.57	V
		T_j = 25°C	I_F = 30 A	-	-	0.84	
		T_j = 125 °C	I_F = 30 A	-	0.65	0.72	

1. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.42 \times I_{F(AV)} + 0.01\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

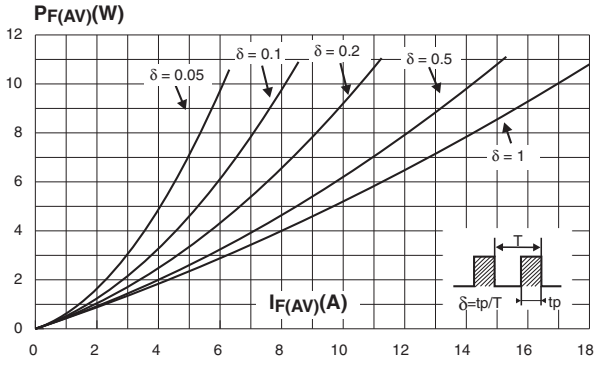


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

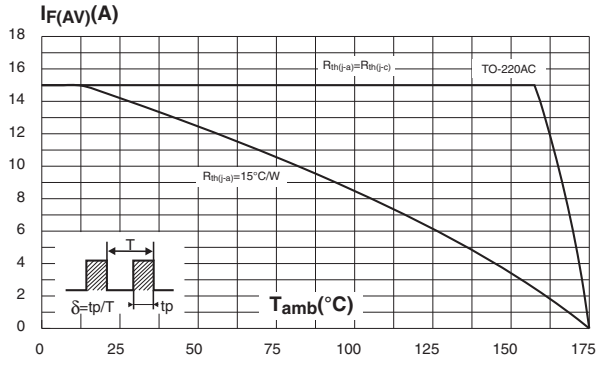


Figure 3. Normalized avalanche power deratings versus pulse duration (Tj = 125 °C)

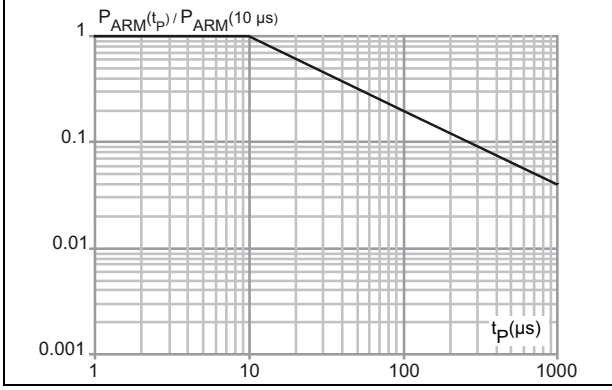


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

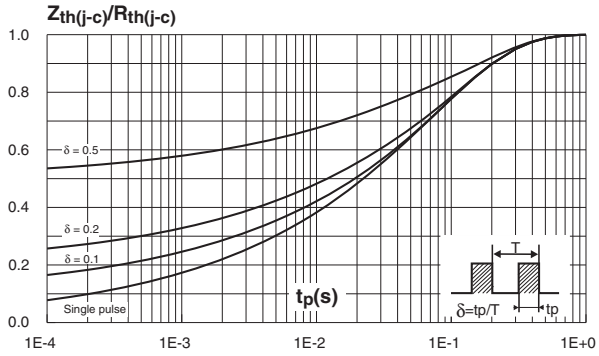


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

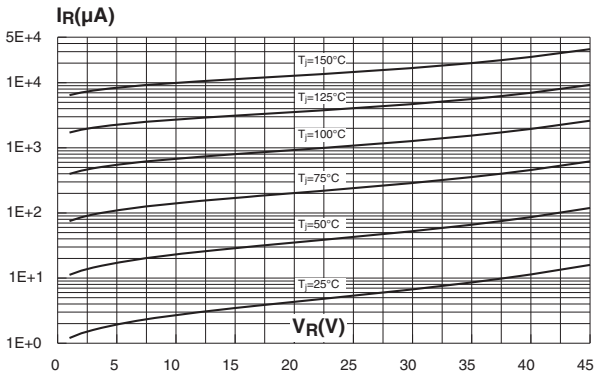


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

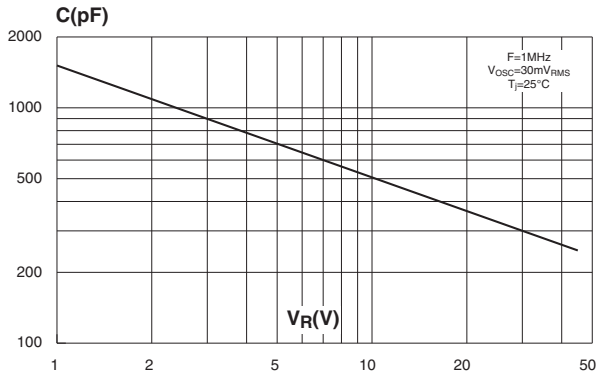
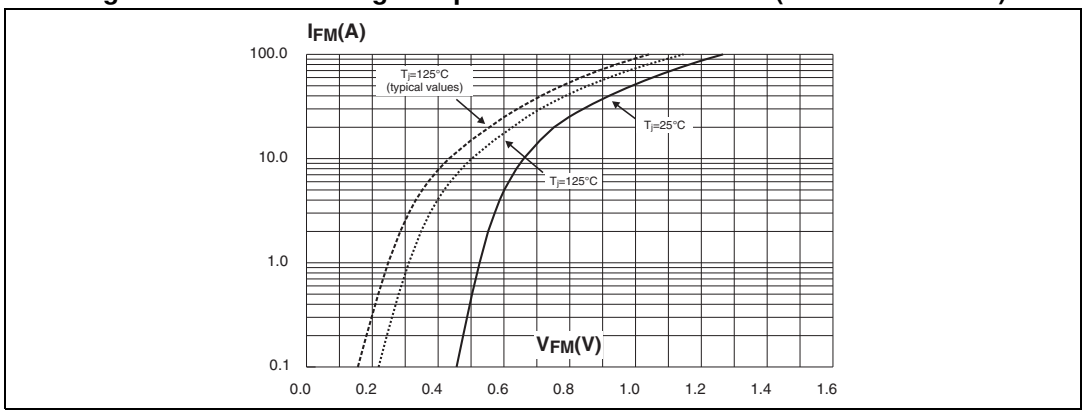


Figure 7. Forward voltage drop versus forward current (maximum values)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.7 N.m

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-220AC package information

Figure 8. TO-220AC package outline

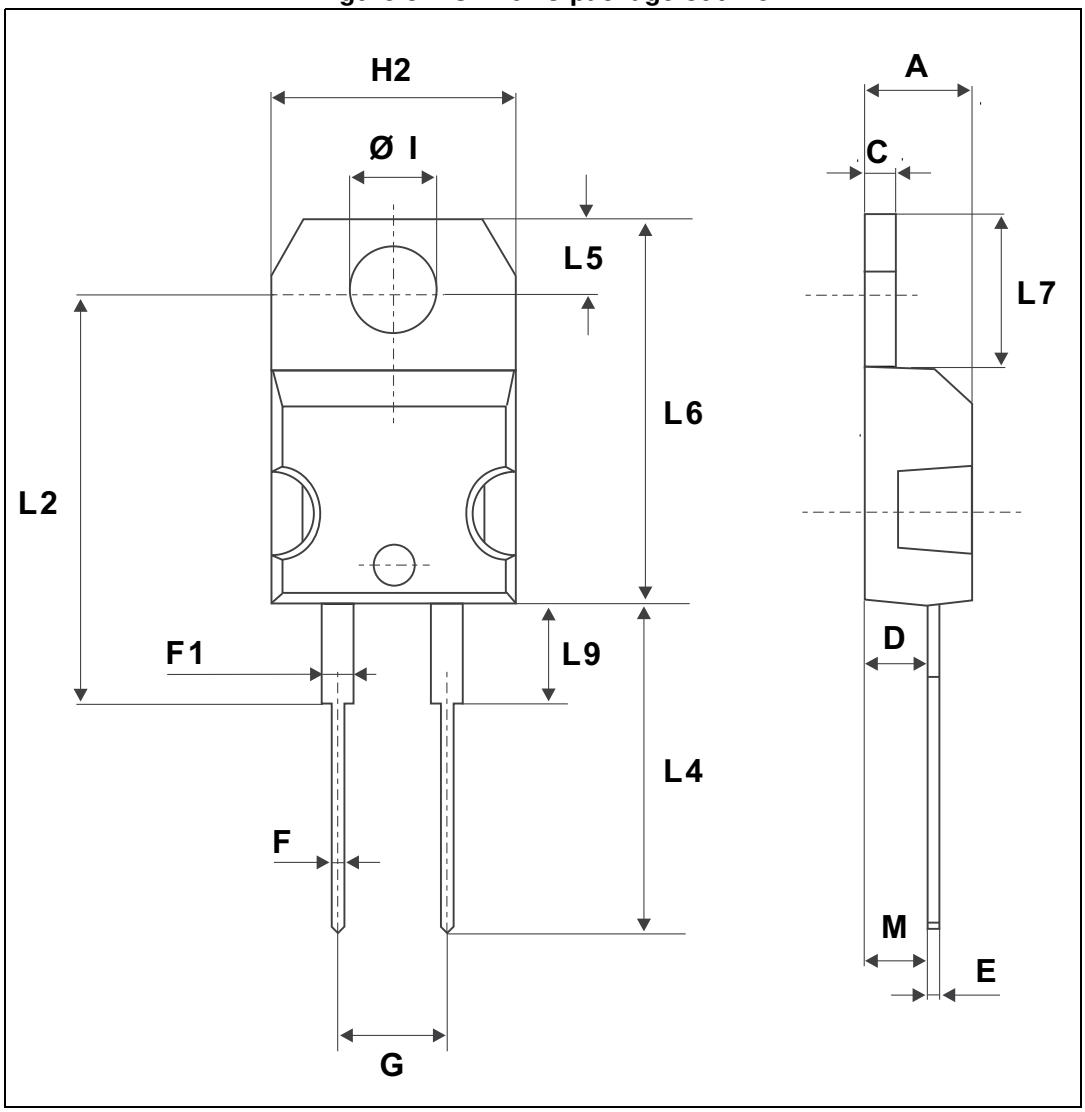


Table 5. TO-220AC package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.066
G	4.95		5.15	0.194		0.202
H2	10.00		10.40	0.393		0.409
L2		16.40 typ.			0.645 typ.	
L4	13.00		14.00	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.259
L9	3.50		3.93	0.137		0.154
M		2.6 typ.			0.102 typ.	
Diam. I	3.75		3.85	0.147		0.151

3 Ordering information

Table 6. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STPS1545DY	STPS1545DY	TO-220AC	1.86 mg	50	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
29-Oct-2012	1	First issue.
02-May-2016	2	Added pin name on package view and reformatted to current standards.

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