

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.

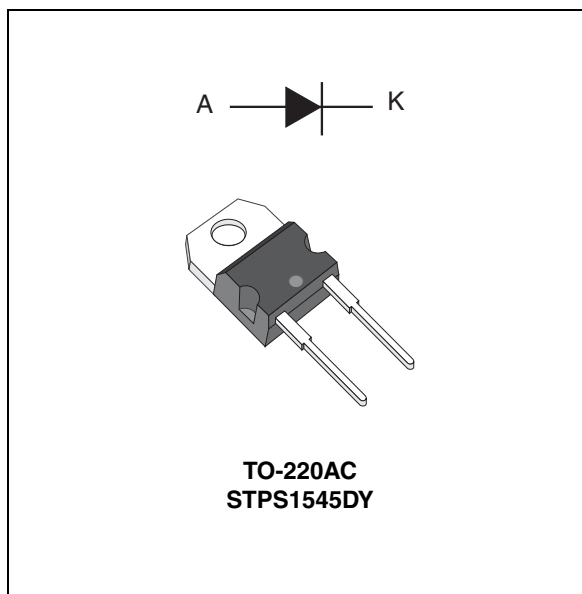


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	15 A
V_{RRM}	45 V
T_j (max)	175 °C
V_F (max)	0.57 V

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 $\delta = 0.5$	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 μ s square F = 1 kHz	1	A
I _{RSM}	Non repetitive peak reverse current	t _p = 100 μ s square	3	A
P _{ARM}	Repetitive peak avalanche power	t _p = 1 μ s T _j = 25 °C	6000	W
T _{stg}	Storage temperature range	-65 to + 175	°C	
T _j	Operating junction temperature ⁽¹⁾	-40 to + 175	°C	
dV/dt	Critical rate of rise of reverse voltage	10000	V/ μ s	

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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	μ A
		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: t_p = 380 μ s, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.01 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

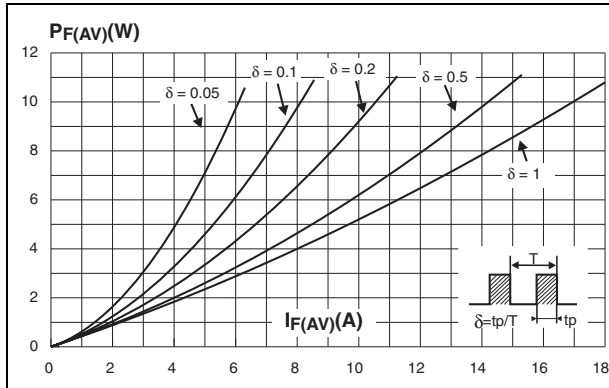


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

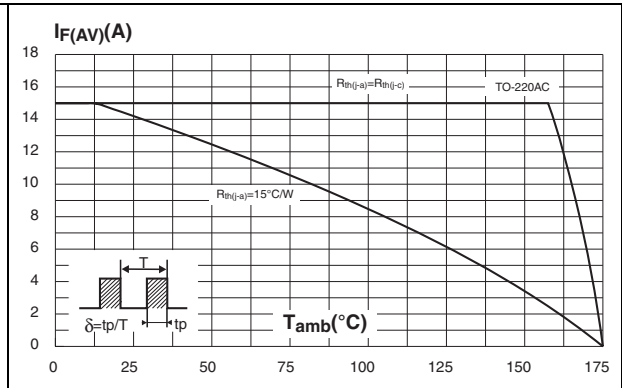


Figure 3. Normalized avalanche power derating versus pulse duration

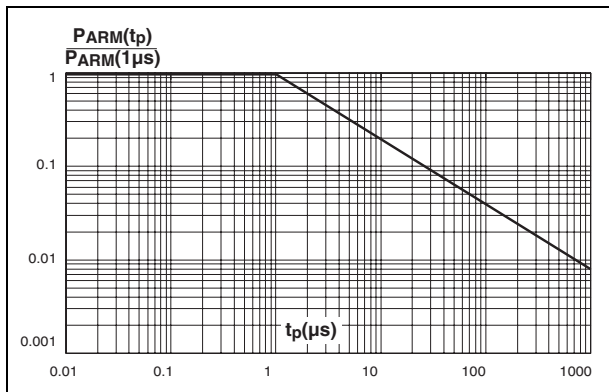


Figure 4. Normalized avalanche power derating versus junction temperature

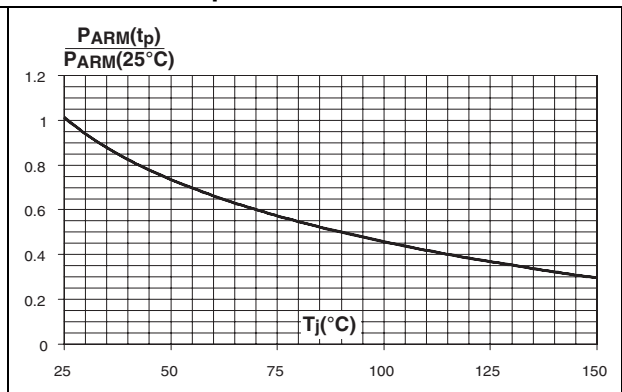


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

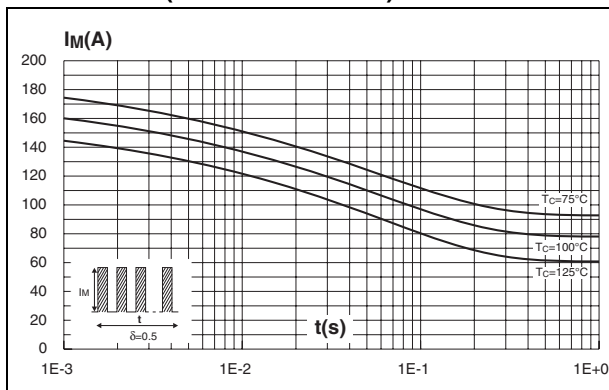


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

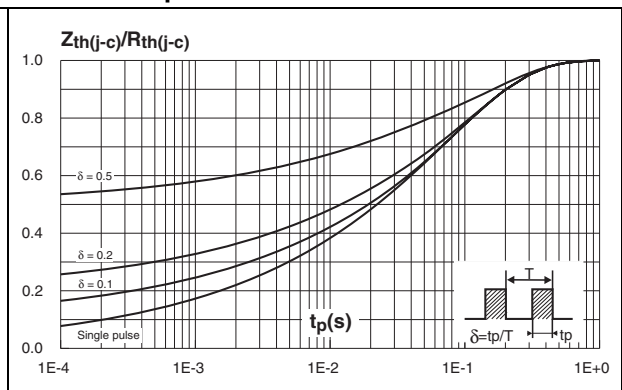


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

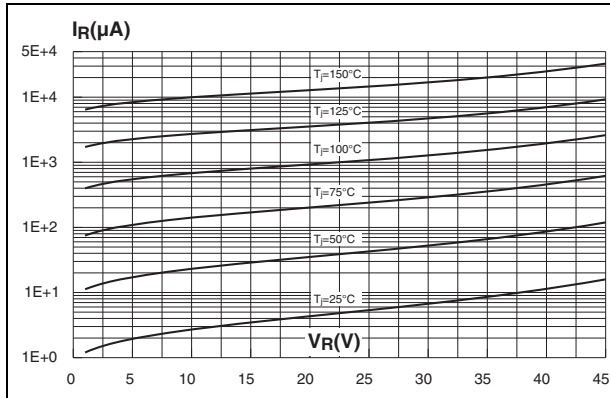


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

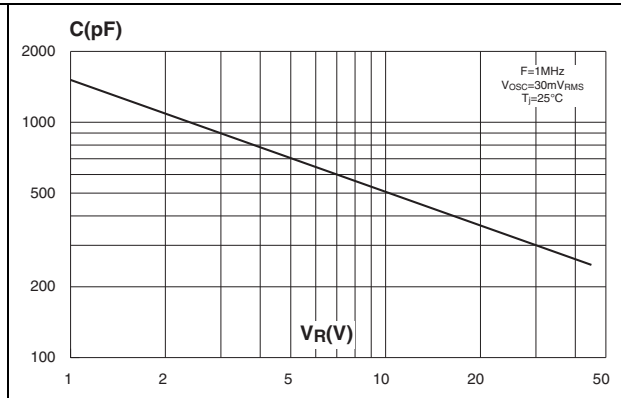
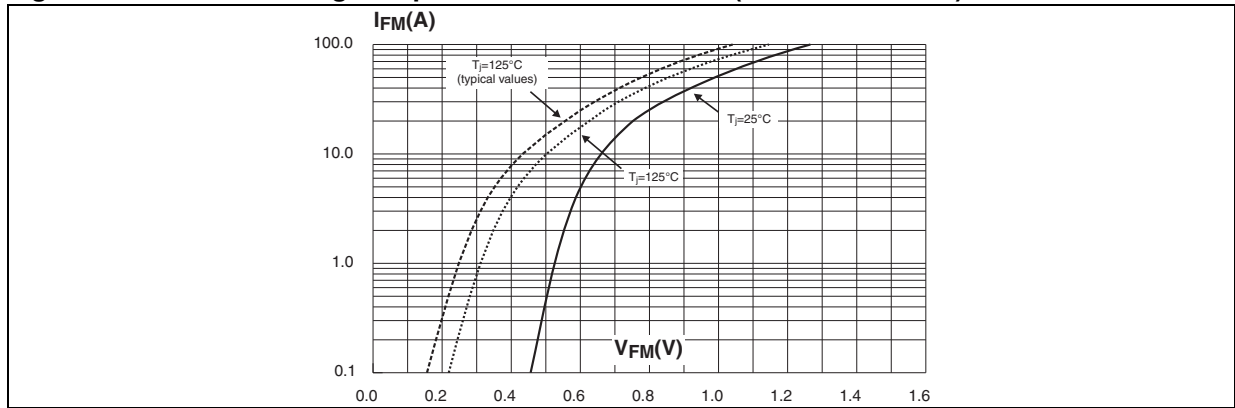


Figure 9. Forward voltage drop versus forward current (maximum values)



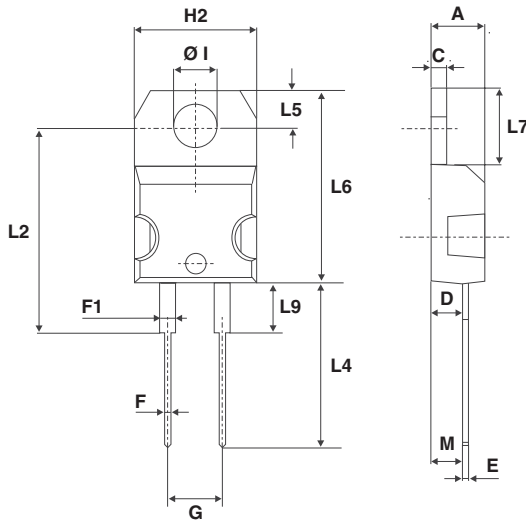
2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 to 0.6 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.

Table 5. TO-220AC Dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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 code	Marking	Package	Weight	Base qty	Delivery mode
STPS1545DY	STPS1545DY	TO-220AC	1.86 g	50	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
29-Oct-2012	1	First issue.

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➤ Sales :

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QQ 800077892

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➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com