STPS160-Y



Automotive power Schottky rectifier

Datasheet - production data

Features

- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature packages
- Avalanche capability specified
- ECOPACK[®]2 compliant components
- AEC-Q101 qualified

Description

Single chip Schottky rectifiers suited to switched mode power supplies and high frequency DC to DC converters.

Packaged in SMA and SMB, this device is especially intended for surface mounting and used in low voltage, high frequency inverters, free wheeling and polarity protection for automotive application.

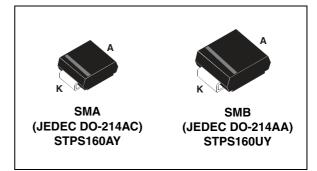


Table 1. Device summary

Symbol	Value
I _{F(AV)}	1 A
V_{RRM}	60 V
T _{j (max)}	150 °C
V _{F (max)}	0.57 V

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Table 2. Absolute ratings (limiting values)

Symbol	Paramete	Value	Unit	
V_{RRM}	Repetitive peak reverse voltage		60	V
I _{F(AV)}	Average forward current $T_L = 130$ °C, $\delta = 0.5$		1	Α
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$		75	Α
I _{RRM}	Repetitive peak reverse current $t_p = 2 \mu s F = 1 \text{ kHz square}$		1	Α
I _{RSM}	Non repetitive peak reverse current $t_p = 100 \mu s square$		1	Α
P _{ARM}	Repetitive peak avalanche power $t_p = 1 \mu s T_j = 25 °C$		2400	W
T _{stg}	Storage temperature range		-65 to + 150	°C
Tj	Operating junction temperature range ⁽¹⁾		-40 to + 150	°C
dV/dt	Critical rate of rise of reverse voltage		10000	V/µs

^{1.} $\frac{dPtot}{dT_j} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
R _{th(j-l)} Junction to le	SMA	30	°C/W
	SMB	23	- C/VV

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I _B ⁽¹⁾	Reverse leakage current	T _j = 25 °C	$V_R = V_{RRM}$			4	μΑ
'R`	IR' / neverse leakage current	T _j = 125 °C			1.1	4	mA
	V _F ⁽²⁾ Forward voltage drop	T _j = 25 °C	I _F = 1 A			0.67	
V (2)		T _j = 125 °C			0.49	0.57	V
VF` /		T _j = 25 °C	I _F = 2 A			0.8	
		T _j = 125 °C			0.58	0.65	

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

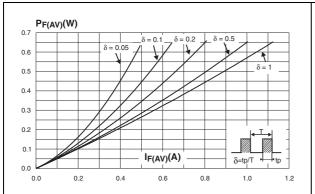
To evaluate the conduction losses use the following equation:

$$P = 0.49 \times I_{F(AV)} + 0.08 I_{F}^{2}_{(RMS)}$$

^{2.} Pulse test: tp = 380 μ s, δ < 2%

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Figure 1. Average forward power dissipation Figure 2. Average forward current versus versus average forward current ambient temperature (δ = 0.5)



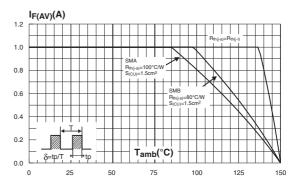
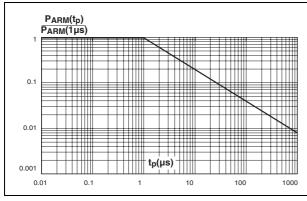


Figure 3. Normalized avalanche power derating versus pulse duration

Figure 4. Normalized avalanche power derating versus junction temperature



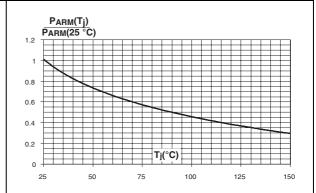
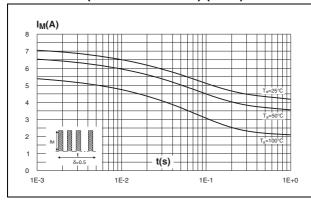
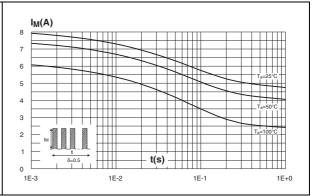


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)

Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

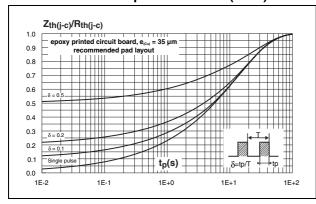




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Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)



Zth(j-c)/Rth(j-c)

1.0

epoxy printed circuit board, e_{c····} = 35 μm
recommended pad layout

0.8

0.7

0.6

-δ=0.5

0.4

0.3

δ=0.2

0.1

Single pulse

1E-2

1E-1

1E+0

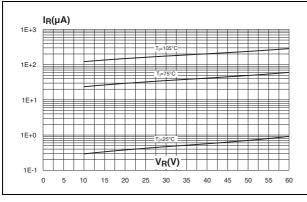
1E+1

1E+2

1E+3

Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

Figure 10. Junction capacitance versus reverse voltage applied (typical values)



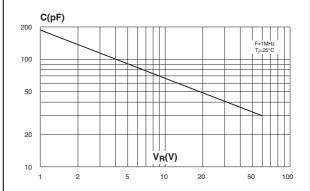
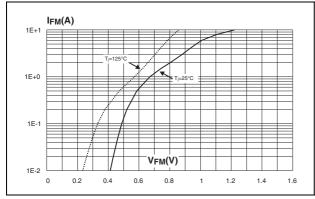
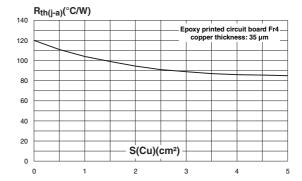


Figure 11. Forward voltage drop versus forward current (maximum values)

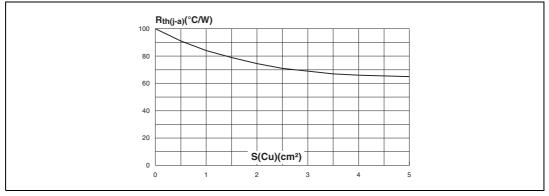
Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (SMA)





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Figure 13. Thermal resistance junction to ambient versus copper surface under lead (Epoxy printed circuit board FR4, copper thickness: 35 µm) (SMB)



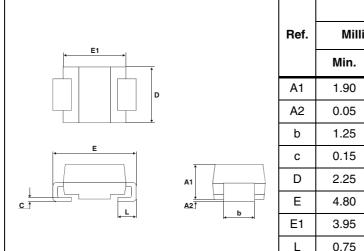
Package information STPS160-Y

2 Package information

- Epoxy meets UL94, V0
- Band indicates cathode

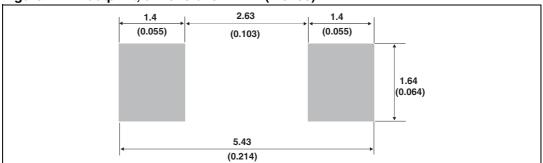
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Table 5. SMA dimensions



	Dimensions				
Ref.	Millimeters		Inc	nes	
	Min.	Max.	Min.	Max.	
A1	1.90	2.45	0.075	0.094	
A2	0.05	0.20	0.002	0.008	
b	1.25	1.65	0.049	0.065	
С	0.15	0.40	0.006	0.016	
D	2.25	2.90	0.089	0.114	
Е	4.80	5.35	0.189	0.211	
E1	3.95	4.60	0.156	0.181	
L	0.75	1.50	0.030	0.059	

Figure 14. Footprint, dimensions in mm (inches)



STPS160-Y Package information

Table 6. **SMB** dimensions

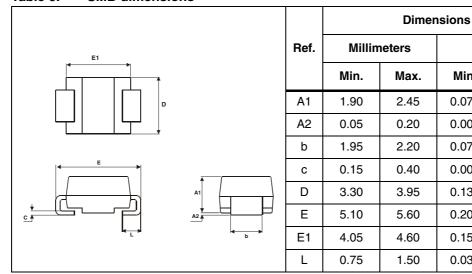
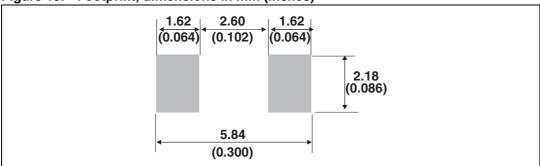


Figure 15. Footprint, dimensions in mm (inches)



Inches

Max.

0.096

0.008

0.087

0.016

0.156

0.220

0.181

0.059

Min.

0.075

0.002

0.077

0.006

0.130

0.201

0.159

0.030

Ordering information STPS160-Y

3 Ordering information

 Table 7.
 Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS160AY	GA6Y	SMA	0.068 g	5000	Tape and reel
STPS160UY	E16Y	SMB	0.107 g	2500	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
28-Jun-2012	1	Initial release.

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