

STPS20M60

Power Schottky rectifier

Features

- High current capability
- Avalanche rated
- Low forward voltage drop
- High frequency operation

Description

The STPS20M60D is a single diode Schottky rectifier, suited for high frequency switch mode power supply.

Packaged in TO-220AC, this device is intended to be used in notebook, game station and desktop adapters, providing in these applications a good efficiency at both low and high load.

Table 1. Device summary

Symbol	Value
I _{F(AV)}	20 A
V _{RRM}	60 V
V _F (typ)	0.37 V
T _j (max)	150 °C

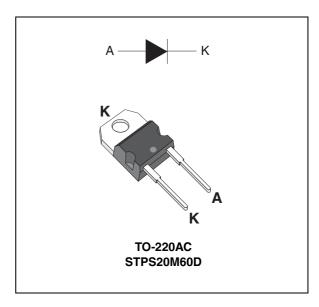
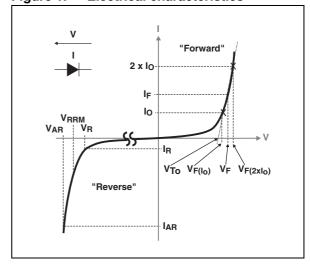


Figure 1. Electrical characteristics^(a)



V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in *Figure 11*. V_{AR} and I_{AR} are pulse measurements (t_p < 1 µs). V_R, I_R, V_{RRM} and V_F, are static characteristics

Characteristics STPS20M60

1 Characteristics

Table 2. Absolute ratings (limiting values, at T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			60	V
I _{F(RMS)}	Forward rms current			60	Α
I _{F(AV)}	Average forward current, δ = 0.5 T_c = 135 °C			20	Α
I _{FSM}	Surge non repetitive forward	d current	t _p = 10 ms sine-wave	400	Α
P _{ARM} ⁽¹⁾	Repetitive peak avalanche	power	$T_j = 25$ °C, $t_p = 1 \mu s$	26400	W
V _{ARM} ⁽²⁾	Maximum repetitive peak avalanche voltage	t _p < 1 μs, T _j < 150 °C, I _{AR} < 99 A		80	V
V _{ASM} ⁽²⁾	Maximum repetitive peak avalanche voltage	t _p < 1 μs, T _j <	80	V	
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature ⁽³⁾			150	°C

For temperature or pulse time duration deratings, please refer to Figure 4 and 5. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.

Table 3. Thermal parameters

Symbol	Parameter	Value	Unit
R _{th(j-c)}	Junction to case	1.0	°C/W

^{2.} See Figure 11

^{3.} $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

STPS20M60 Characteristics

Table 4.	Static electrical characteristics	
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Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I _R ⁽¹⁾ Reverse leakage curren	Povoroo lookogo ourront	T _j = 25 °C	V - V	-	30	125	μΑ
	neverse leakage current	T _j = 125 °C	$V_R = V_{RRM}$	-	20	75	mA
V _F ⁽²⁾ Forward voltage drop	T _j = 25 °C	I _F = 10 A	-	0.470	0.505		
	Forward voltage drop	T _j = 125 °C	IF = 10 A	-	0.370	0.415	v
	Polward voltage drop	T _j = 25 °C	I _F = 20 A	-	0.530	0.580	V
		T _j = 125 °C		-	0.460	0.530	

- 1. Pulse test: $t_p = 5 \text{ ms}, \delta < 2\%$
- 2. Pulse test: $t_p = 380 \mu s$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

 $P = 0.385 \times I_{F(AV)} + 0.0073 \times I_{F}^{2}_{(RMS)}$

Figure 2. Average forward power dissipation Figure 3. Average forward current versus versus average forward current ambient temperature (δ = 0.5)

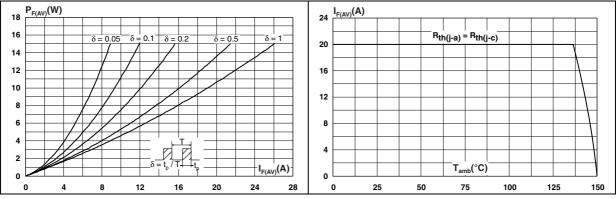
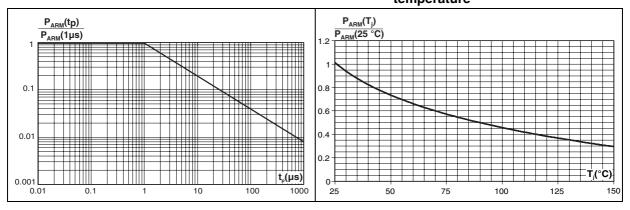


Figure 4. Normalized avalanche power derating versus pulse duration

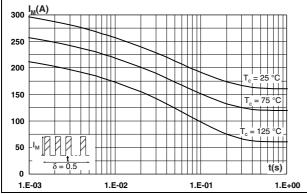
Figure 5. Normalized avalanche power derating versus junction temperature



Characteristics STPS20M60

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

Figure 7. Relative thermal impedance junction to case versus pulse duration



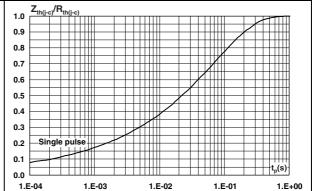
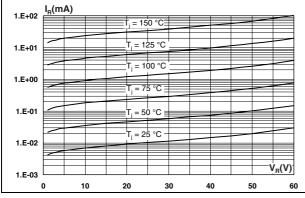


Figure 8. Reverse leakage current versus reverse voltage applied (typical values)

Figure 9. Junction capacitance versus reverse voltage applied (typical values)



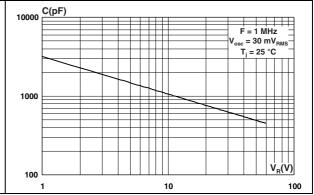
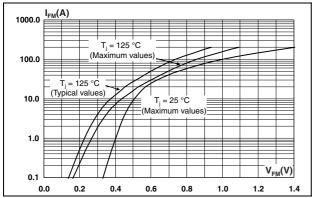
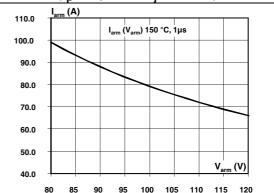


Figure 10. Forward voltage drop versus forward current

Figure 11. Reverse safe operating area $(t_p < 1 \mu s \text{ and } T_i < 150 \,^{\circ}\text{C})$



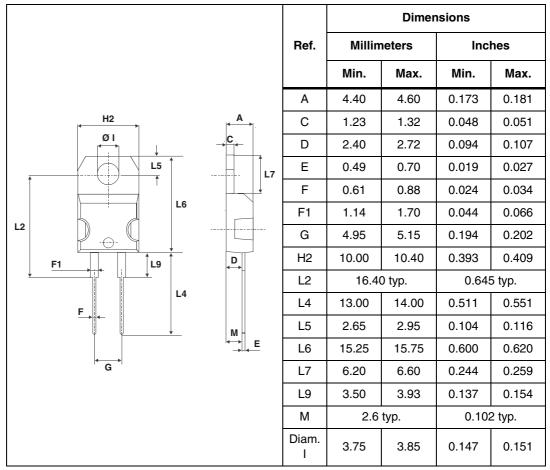


2 Package information

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

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Table 5. TO-220AC dimensions



Ordering information STPS20M60

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS20M60D	STPS20M60D	TO-220AC	1.86 g	50	Tube

4 Revision history

 Table 7.
 Revision history

Date	Revision	Changes
02-Nov-2011	1	First issue.

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