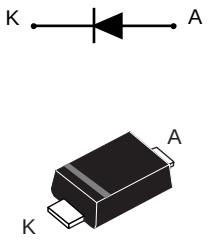
STTH1R02ZF

Ultrafast rectifier

Datasheet - production data



SOD123Flat

Features

- Very low conduction losses
- High surge capability
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- ECOPACK®2 compliant component
- Surface mount miniature packages

Description

The STTH1R02ZF is an ultrafast recovery rectifier used for energy recovery in switched mode power supplies, switching mode base drive and transistor circuits. Packaged in SOD123Flat, this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection.

The compromise between forward voltage drop and recovery time offers optimized performances.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	200 V
T_j (max.)	175 °C
V_F (typ.)	0.75 V
t_{rr} (typ.)	25 ns

This is information on a product in full production.

1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
$I_{F(AV)}$	Average forward current	T_{lead} = 153 °C , δ = 0.5 square wave	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	25	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		+175	°C

Table 3: Thermal parameter

Symbol	Parameter	Maximum	Unit
$R_{th(j-l)}$	Junction to lead	23	°C/W

Table 4: Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		0.5	µA
		T_j = 125 °C		-	1	10	µA
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A	-	0.87	1.00	V
		T_j = 125 °C		-	0.75	0.85	

Notes:

(1)Pulse test: t_p = 5 ms, δ < 2%

(2)Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses, use the following equation:

$P = 0.75 \times I_{F(AV)} + 0.1 \times I_F{}^2{}_{(RMS)}$

Table 5: Dynamic electrical characteristics

Symbol	Parameters	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A dI_F/dt = 50 A/µs V_R = 30 V T_j = 25 °C	-	25	32	ns
		I_F = 1 A dI_F/dt = 100 A/µs V_R = 160 V T_j = 125 °C	-	30		
I_{RM}	Reverse recovery current		-	2.2		A
Q_{rr}	Reverse recovery charges		-	34		nC

1.2 Characteristics (curves)

Figure 1: Average forward power dissipation versus average forward current

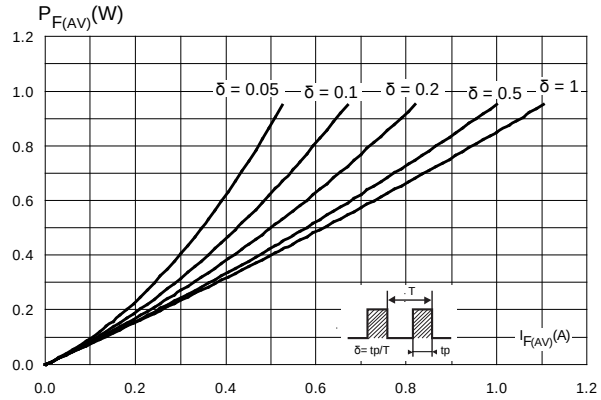


Figure 2: Forward voltage drop versus forward current (typical values)

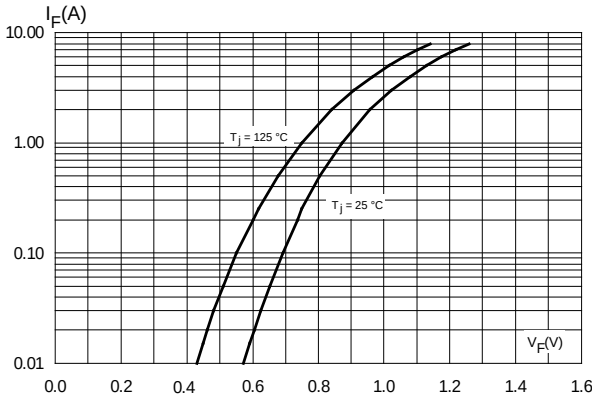


Figure 3: Forward voltage drop versus forward current (maximum values)

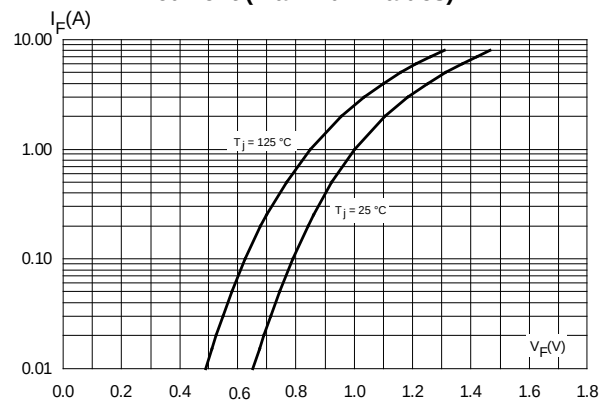


Figure 4: Relative variation of thermal impedance junction to lead versus pulse duration

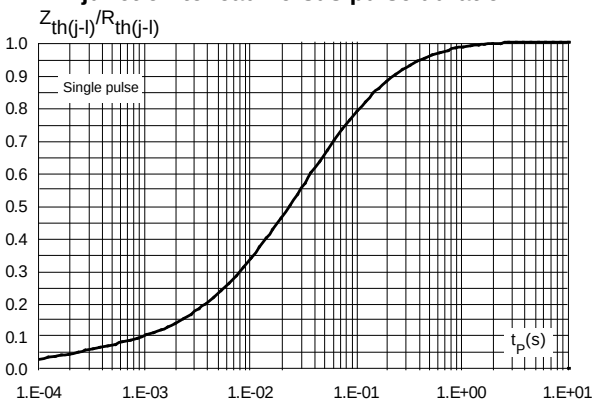


Figure 5: Peak reverse recovery current versus dI_F / dt (typical values)

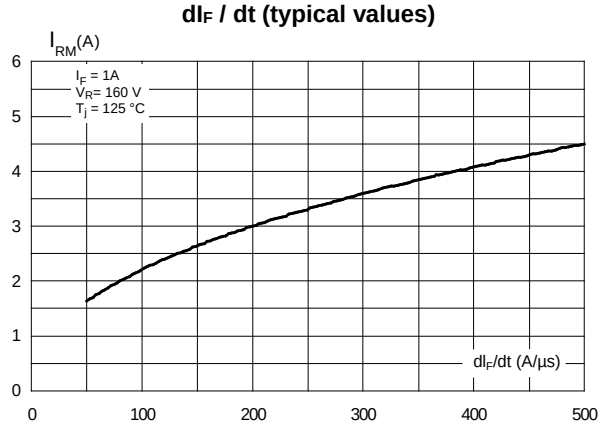


Figure 6: Reverse recovery charges versus dI_F / dt (typical values)

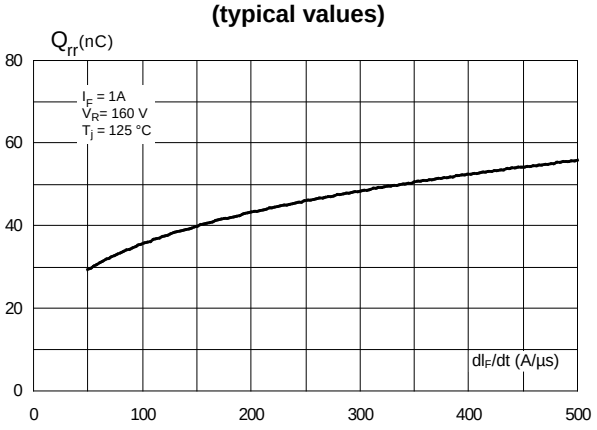


Figure 7: Reverse recovery time versus dI_F / dt (typical values)

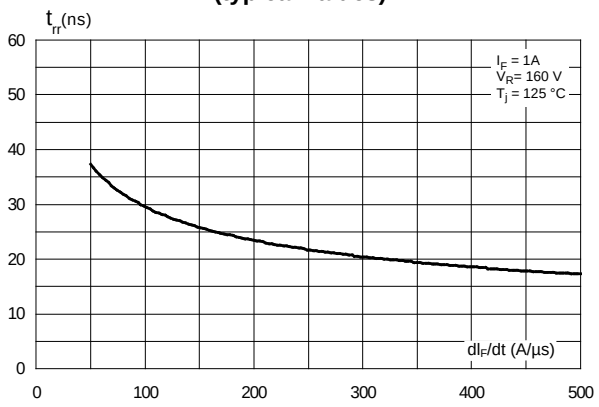


Figure 8: Reverse recovery softness factor versus dI_F / dt (typical values)

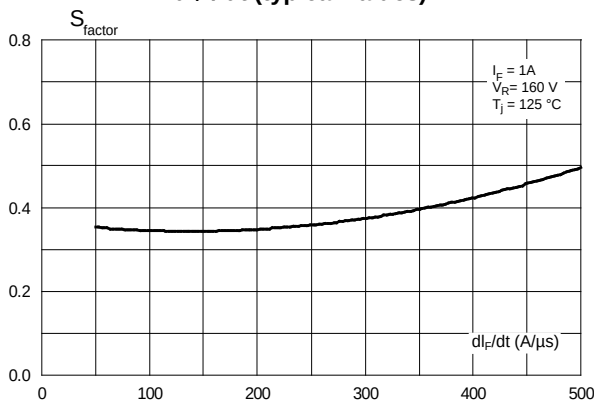


Figure 9: Dynamic parameters versus junction temperature (reference T_j = 125 °C)

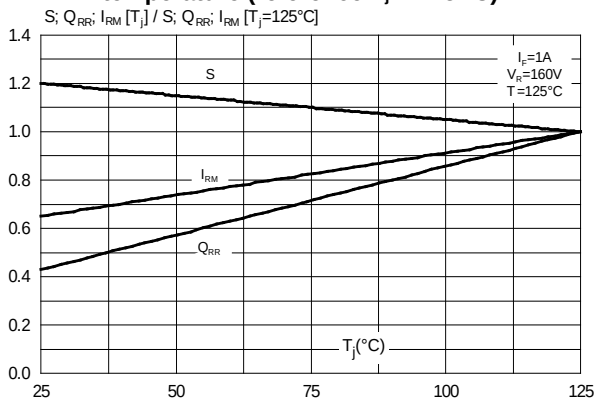


Figure 10: Junction capacitance versus reverse voltage applied (typical values)

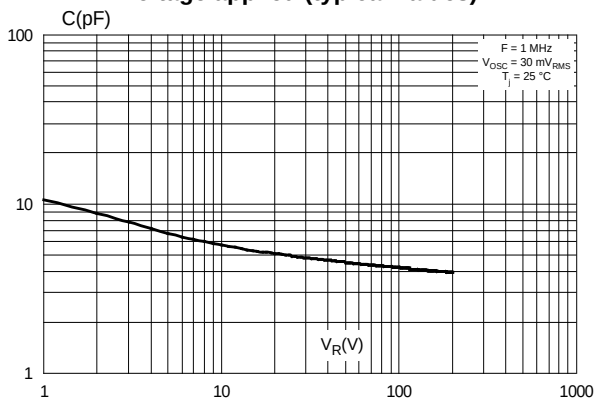
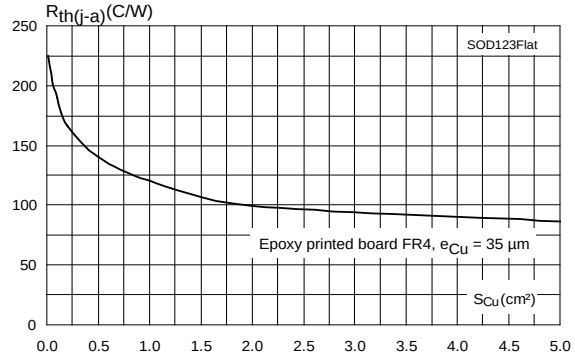


Figure 11: Thermal resistance junction to ambient total versus copper surface under each lead (typical values)



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.

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

2.1 SOD123Flat package information

Figure 12: SOD123Flat package outline

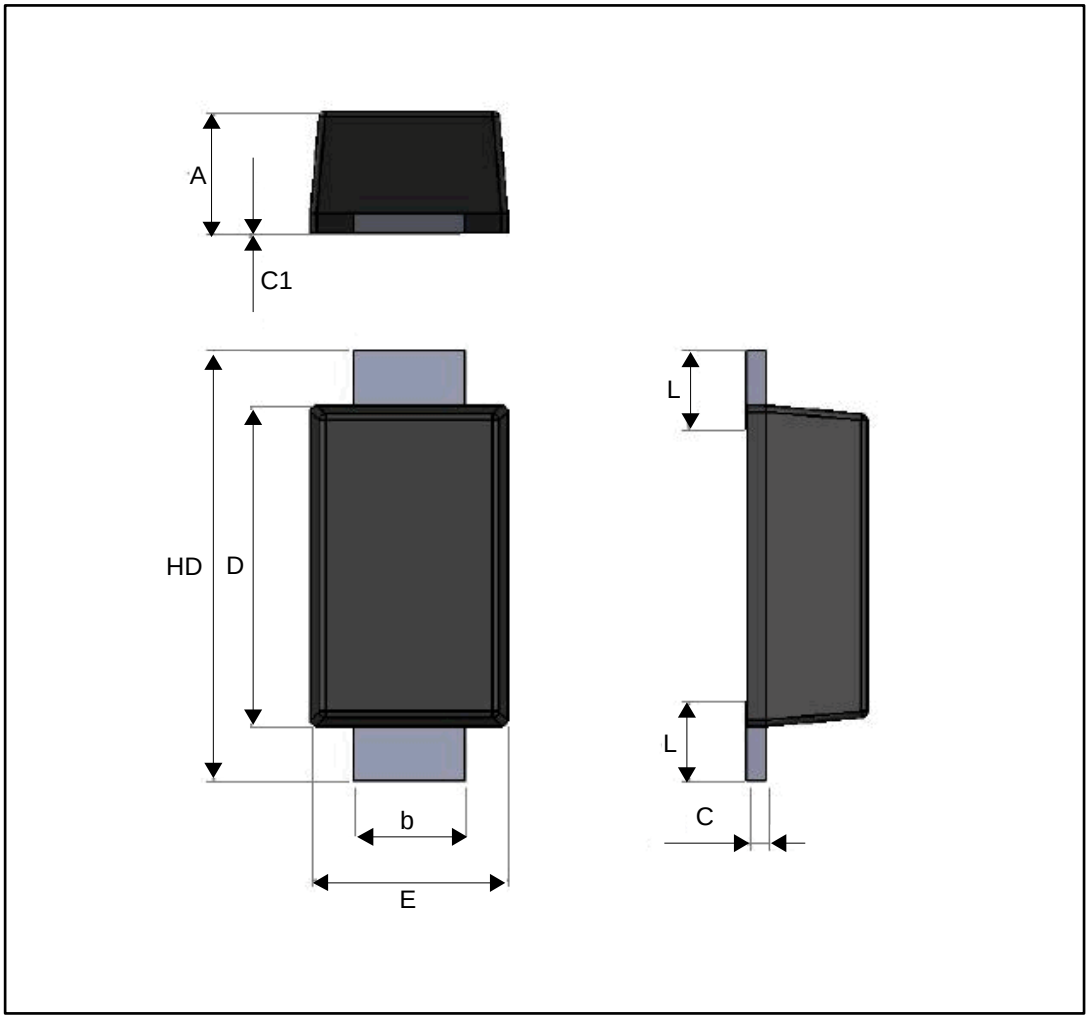
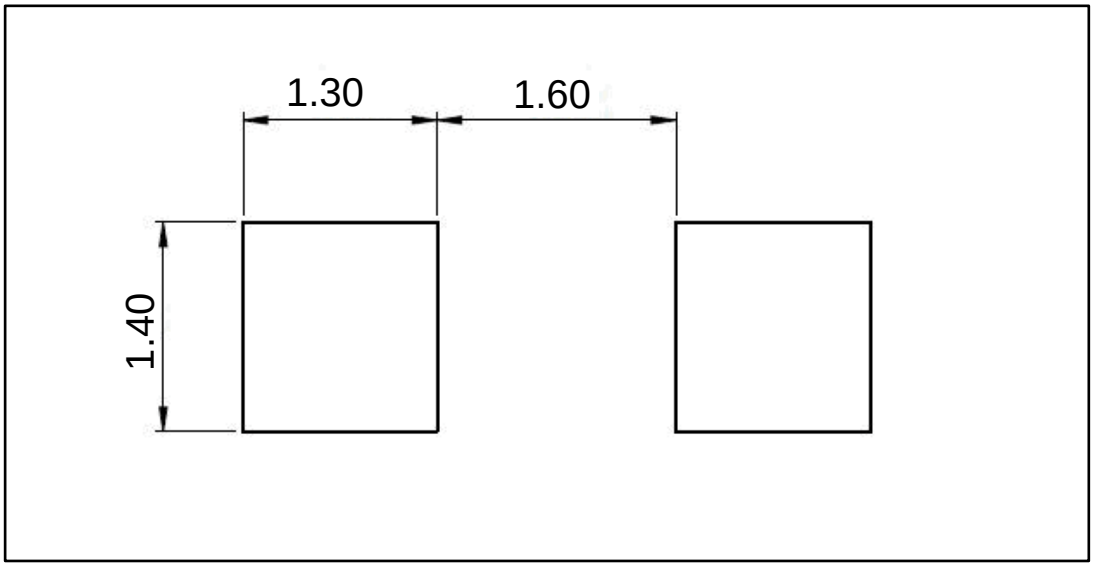


Table 6: SOD123Flat package mechanical data

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
A	0.86	0.98	1.10
b	0.80	0.90	1.00
c	0.08	0.15	0.25
c1	0.00		0.10
D	2.50	2.60	2.70
E	1.50	1.60	1.80
HD	3.30	3.50	3.70
L	0.45	0.65	0.85

Figure 13: SOD123Flat footprint dimensions (mm)



3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH1R02ZF	1R2	SOD123Flat	12.5 mg	3000	Tape and reel

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
06-Feb-2017	1	First issue

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