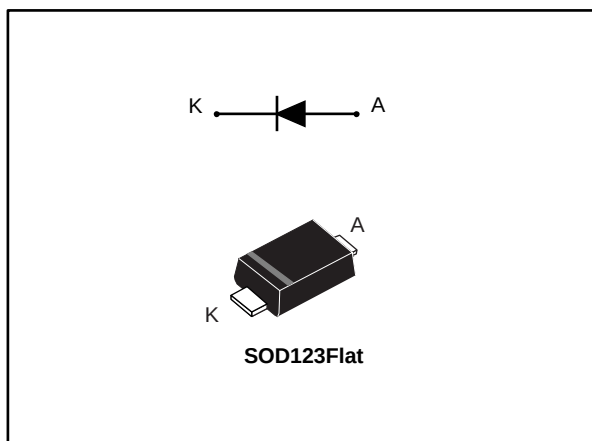


Automotive ultrafast rectifier

Datasheet - production data



Description

The STTH1R02-Y is an ultrafast recovery rectifier used for energy recovery in automotive applications, housed in a SOD123Flat package for improved space saving.

It is especially designed for reverse battery protection function in all automotive application.

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

Features

- AEC-Q101 qualified 
- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- ECOPACK®2 compliant component
- V_{RRM} guaranteed from -40 to +175 °C
- PPAP capable

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	$T_j = -40\text{ °C}$	200	V
$I_{F(AV)}$	Average forward current	$T_{lead} = 153\text{ °C}$, $\delta = 0.5$ square wave	1	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	25	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature		-40 to +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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		0.5	μA
		$T_j = 125\text{ °C}$		-	1	10	μA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$	-	0.87	1.00	V
		$T_j = 125\text{ °C}$		-	0.75	0.85	

Notes:

(1) Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

(2) Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

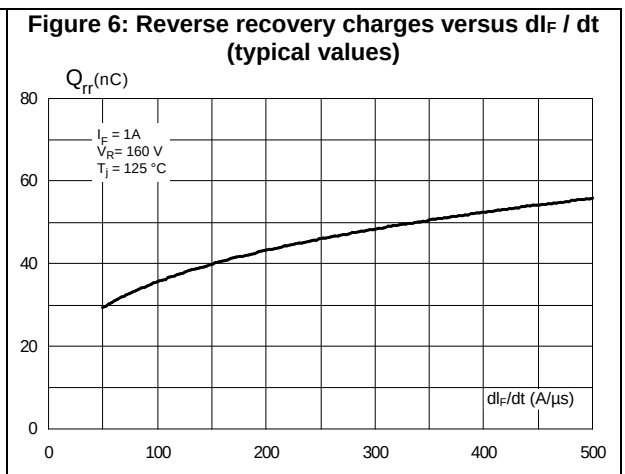
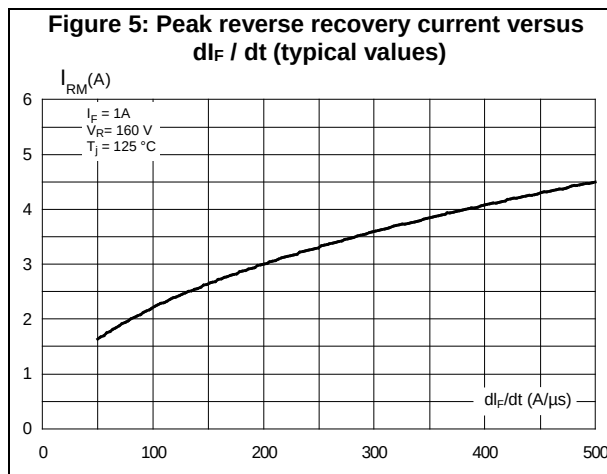
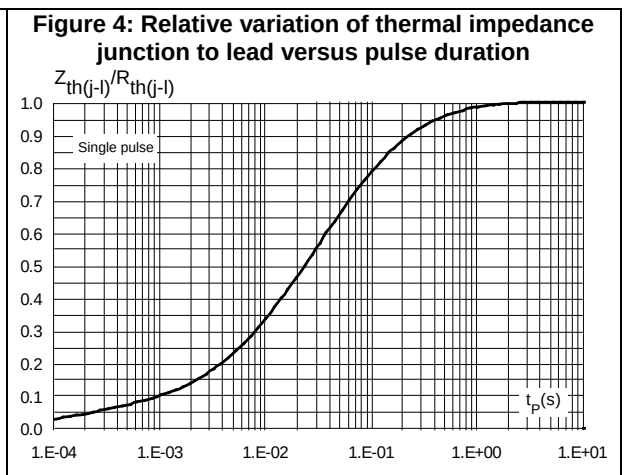
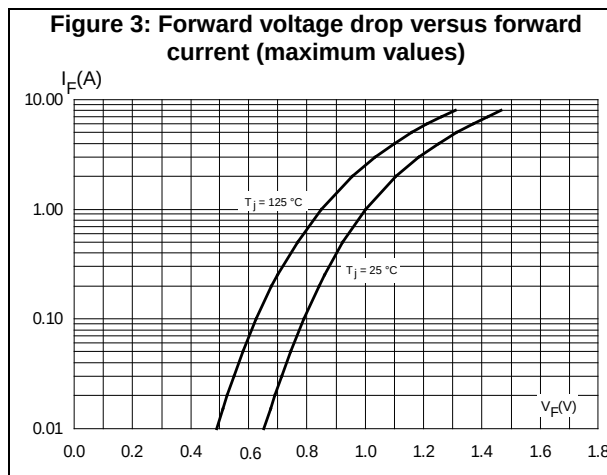
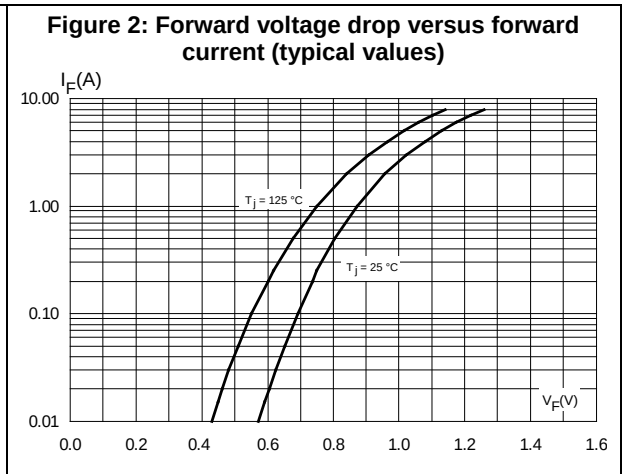
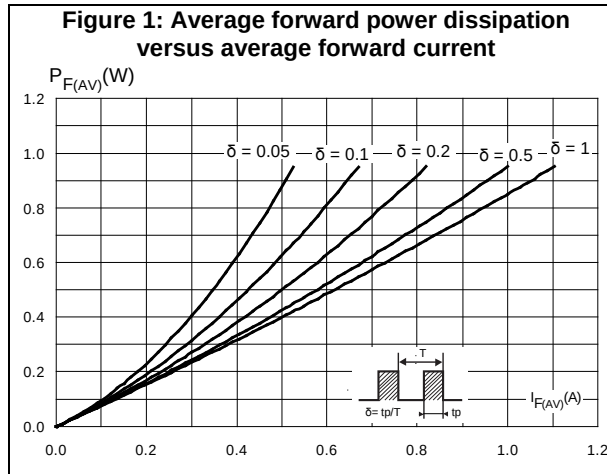
To evaluate the conduction losses, use the following equation:

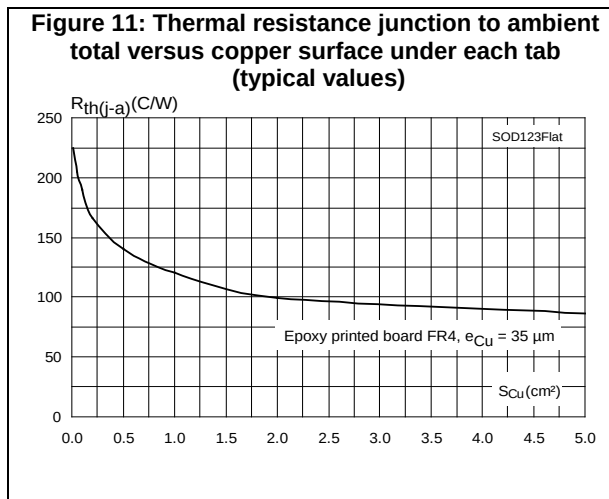
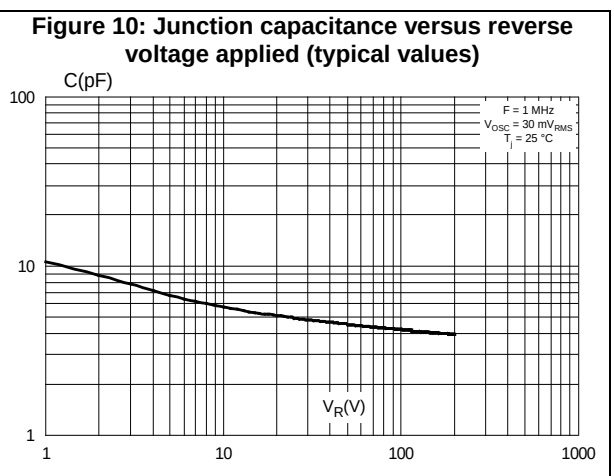
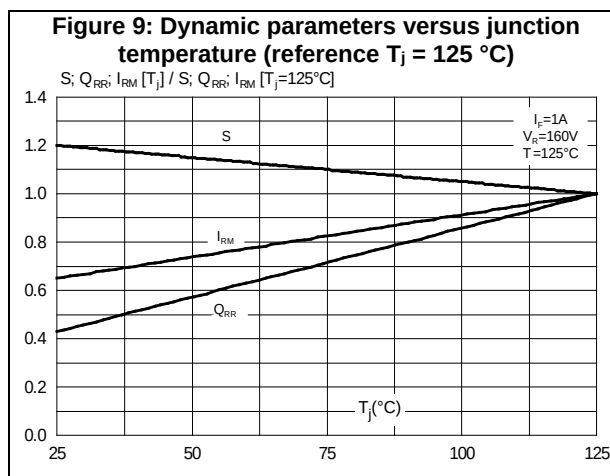
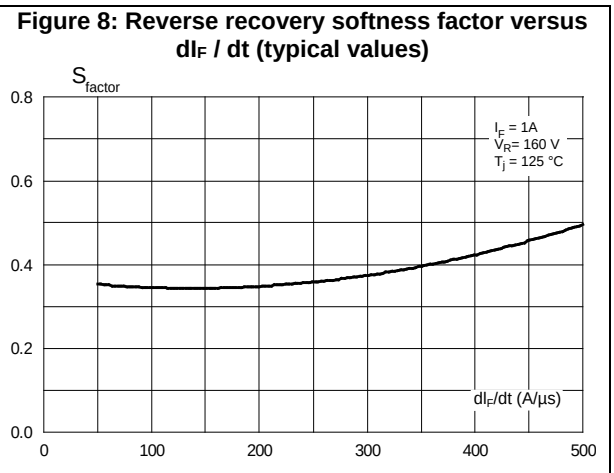
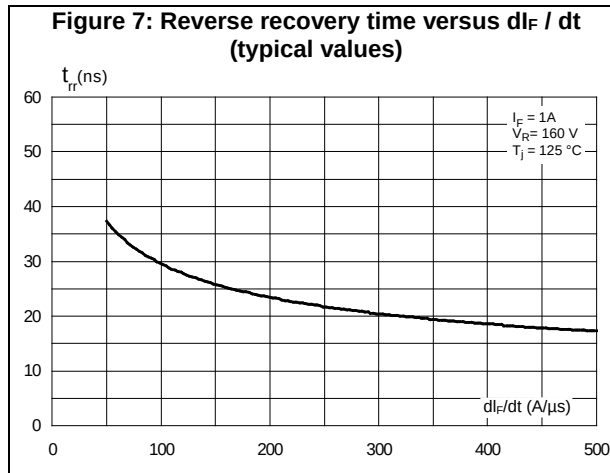
$$P = 0.75 \times I_{F(AV)} + 0.1 \times I_F^2(RMS)$$

Table 5: Dynamic electrical characteristics

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

1.1 Characteristics (curves)





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

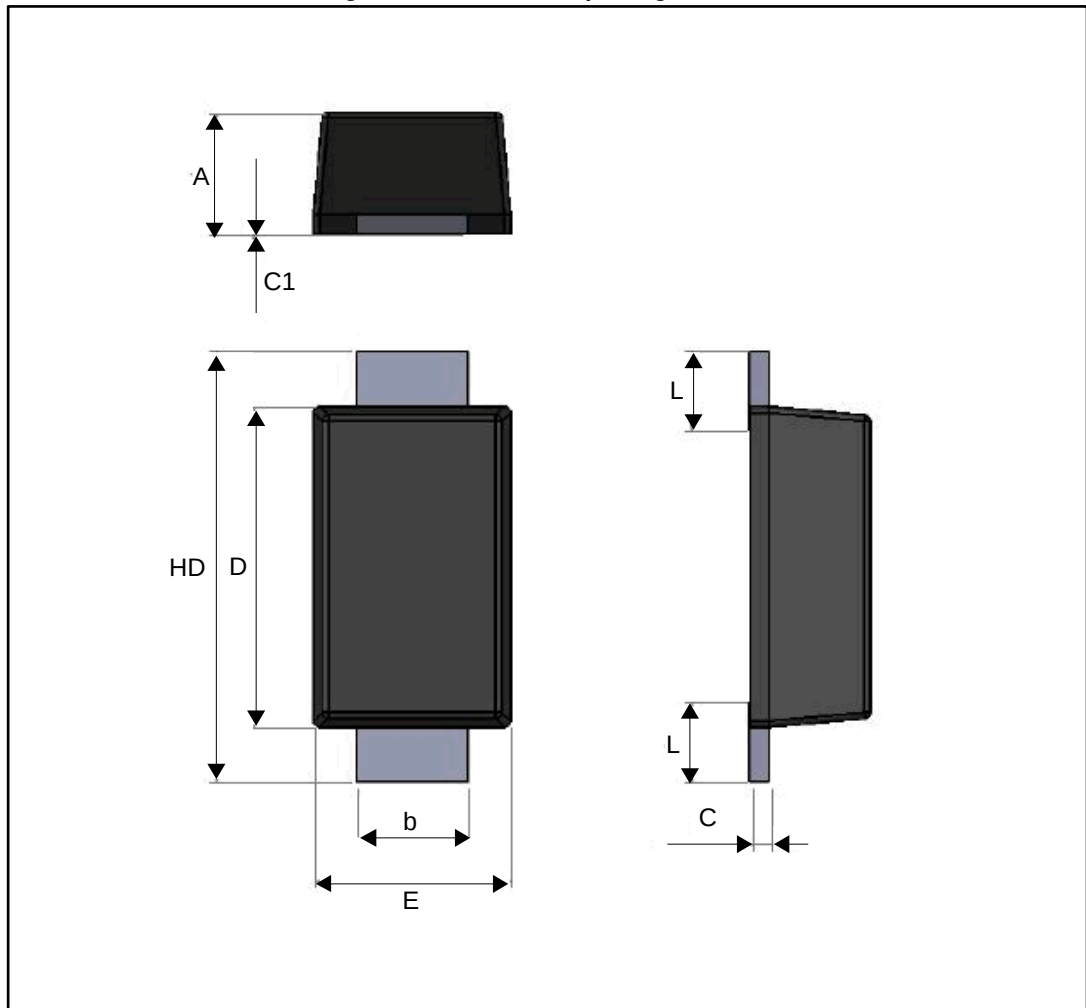
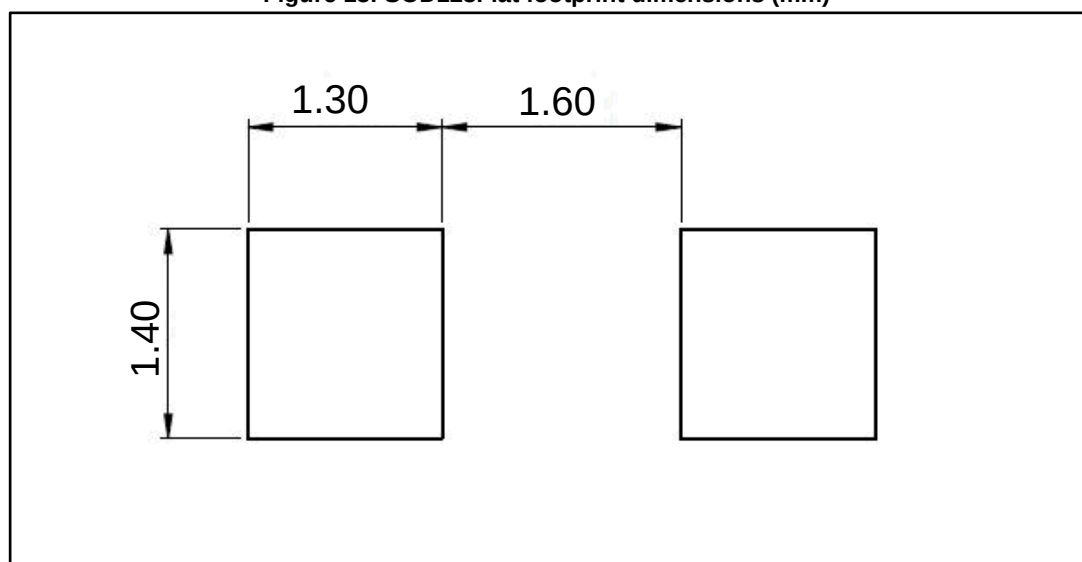


Table 6: SOD123Flat package mechanical data

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
STTH1R02ZFY	1Y2	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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