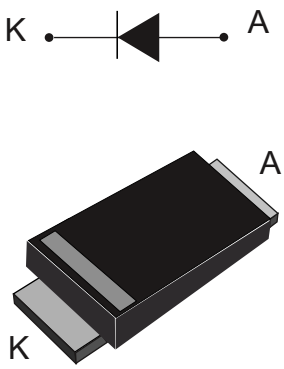
STTH3R02-Y

Automotive ultrafast rectifier

Datasheet - production data



SOD128Flat

Description

The STTH3R02-Y, implementing ST's new 200 V planar technology, is especially suited for switching mode base drive and transistor circuits. The device is also intended for use as a free wheeling diode in power supplies and other power switching applications in automotive functions.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	3 A
V_{RRM}	200 V
T_j (max)	175 °C
V_F (typ)	0.72 V
T_{rr} (typ)	16 ns

Features

- Low conduction losses
- Negligible switching losses
- Low forward and reverse recovery times
- High junction temperature
- AEC-Q101 qualified
- ECOPACK®2 compliant component
- PPAP capable

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	T_j = -40 °C	200	V
$I_{F(AV)}$	Average forward current, square waveform	T_L = 109 °C δ = 0.5	3	A
I_{FSM}	Surge current non repetitive forward current	t_p = 8.3 ms sinusoidal	80	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j(1)	Operating temperature range		-40 to + 175	°C

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

Table 3. Thermal resistance

Symbol	Parameter	Typ.	Max.	Unit
$R_{th(j-l)}$	Junction to lead	15	23	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			1.6	µA
		T_j = 125 °C			2	16	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3A		0.91	1.02	V
		T_j = 150 °C			0.72	0.83	

1. Pulse test: tp = 5 ms, δ < 2%
2. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.71 \times I_{F(AV)} + 0.04 \times I_F{}^2{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V		16	21	ns
			I_F = 1 A, dI_F/dt = 50 A/µs, V_R = 30 V		23		
		T_j = 125 °C	I_F = 3 A, dI_F/dt = 200 A/µs, V_R = 160 V		24		
Q_{RR}	Reverse recovery charge	T_j = 125 °C	I_F = 3 A, dI_F/dt = -200 A/µs, V_R = 160 V		50		nC
I_{RM}	Reverse recovery current				3.5		A

Figure 1. Average forward power dissipation versus average forward current

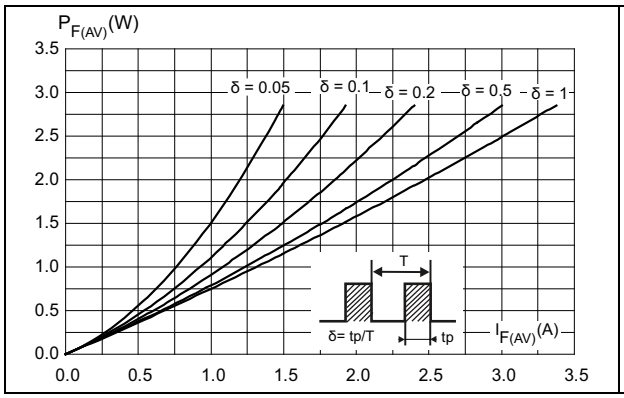


Figure 2. Forward voltage drop versus forward current (typical values)

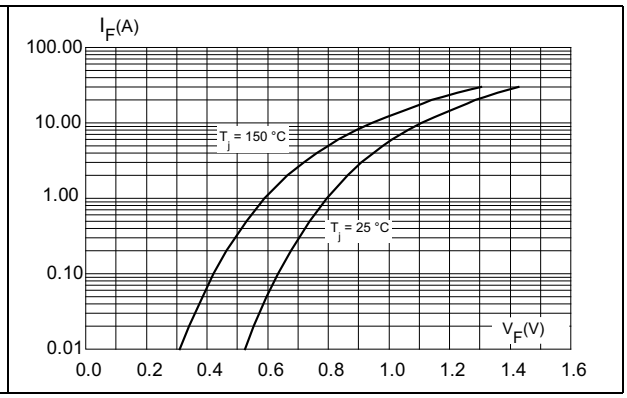


Figure 3. Forward voltage drop versus forward current (maximum values)

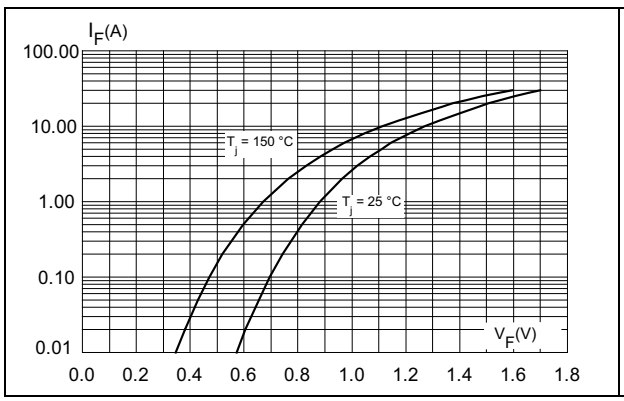


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

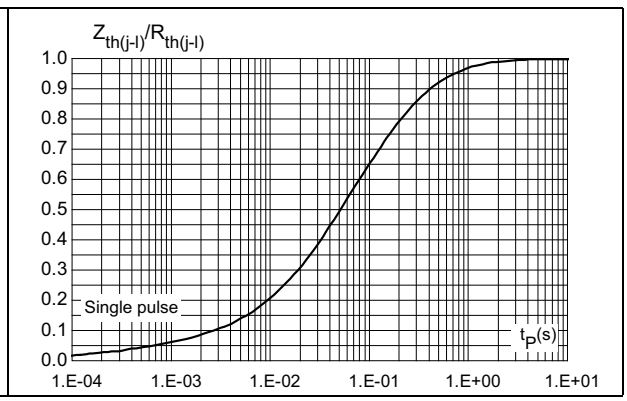


Figure 5. Reverse recovery charges versus dI_F/dt (typical values)

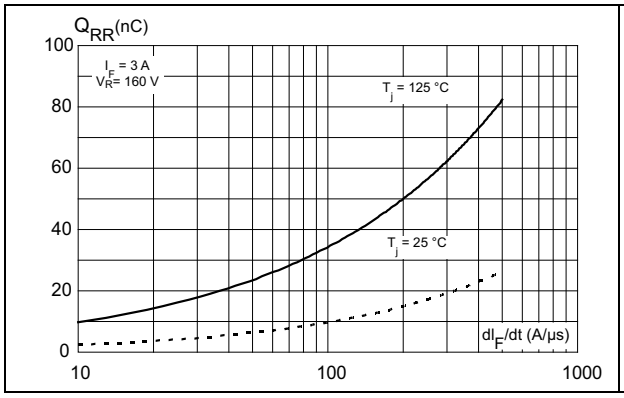


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

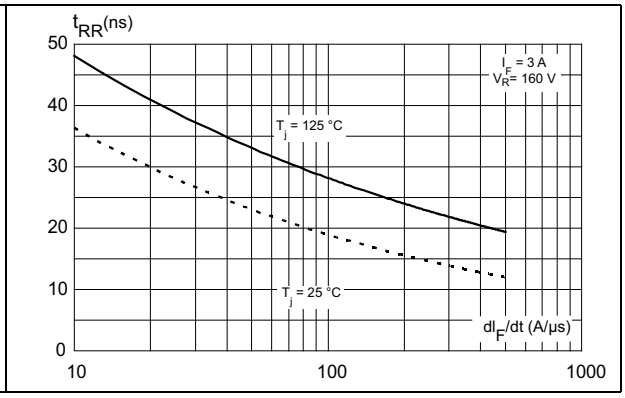


Figure 7. Peak reverse recovery current versus dI_F/dt (typical values)

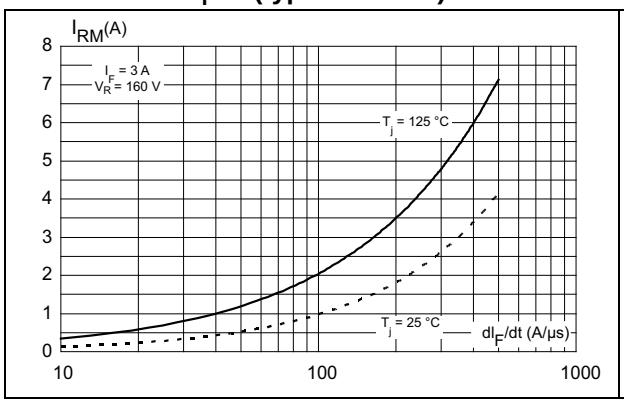


Figure 8. Dynamic parameters versus junction temperature

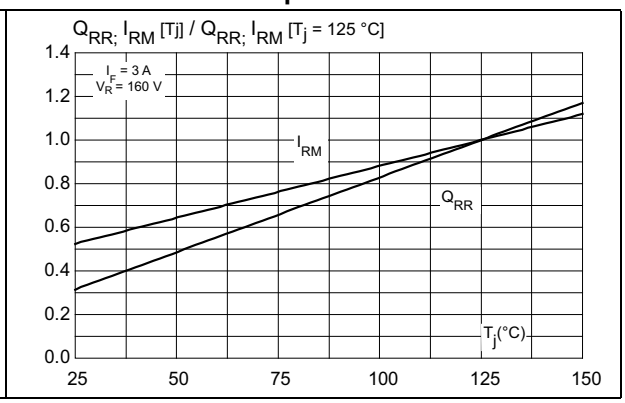


Figure 9. Junction capacitance versus reverse voltage applied (typical values)

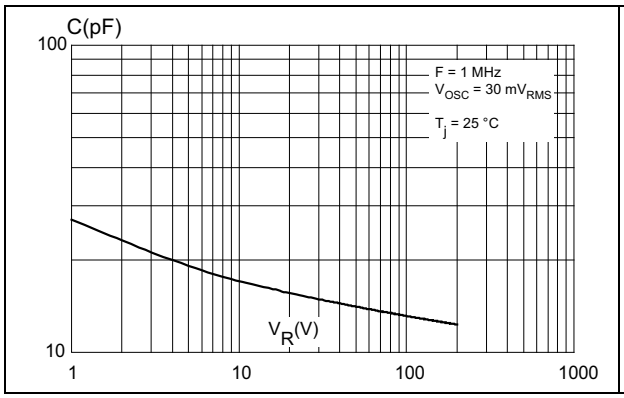
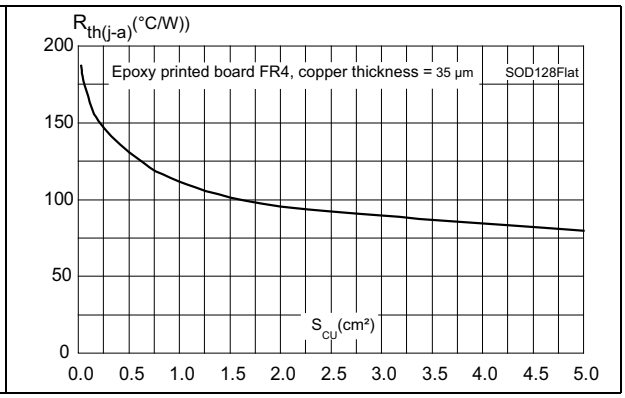


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



2 Package information

- Epoxy meets UL94,V0
- Lead-free package

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.

Figure 11. SOD128Flat package outline

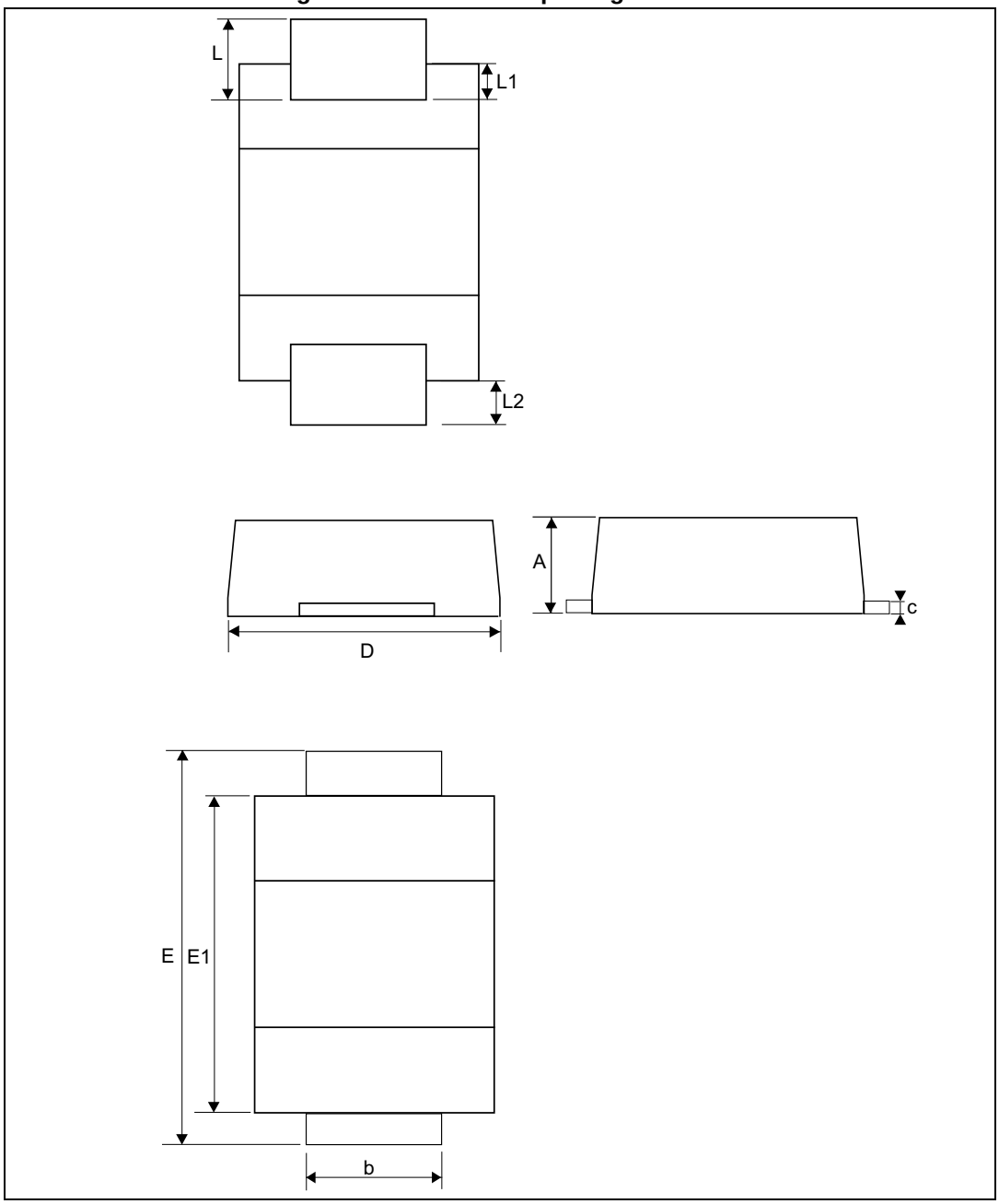
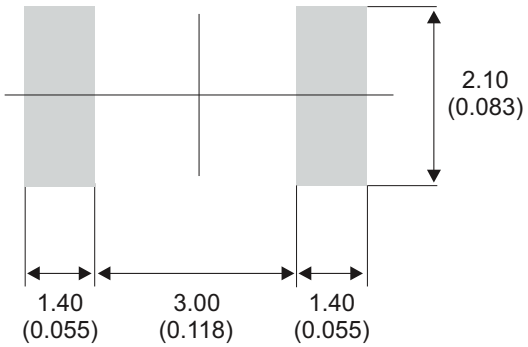


Table 6. SOD128Flat package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.93		1.03	0.037		0.041
b	1.69		1.81	0.067		0.071
c	0.10		0.22	0.004		0.009
D	2.30		2.50	0.091		0.098
E	4.60		4.80	0.181		0.189
E1	3.70		3.90	0.146		0.154
L	0.55		0.85	0.026		0.033
L1		0.30			0.012	
L2		0.45			0.018	

Figure 12. SOD128Flat footprint, dimensions in mm (inches)



3 Ordering information

Table 7. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STTH3R02AFY	3R2AY	SOD128Flat	26.4 mg	3000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
24-Feb-2015	1	Initial release.

Mouser Electronics

Authorized Distributor

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STTH3R02AFY