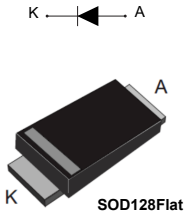
STTH1R06AFY

Datasheet

Automotive 600 V, 1 A, turbo 2 ultrafast rectifier



Features

- AEC-Q101 qualified
- Ultrafast recovery
- V_{RRM} 600 V up to -40 °C
- Low power losses
- High surge capability
- Low leakage current
- High junction temperature
- PPAP capable
- ECOPACK®2 compliant component

Applications

- Reverse polarity protection
- Clamping function
- Boost diode
- PFC

Description

The STTH1R06AFY is an ultrafast recovery power rectifier dedicated to energy recovery in automotive application housed in SOD128Flat to improve space saving.

It is especially designed for clamping function in energy recovery block.

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

Product status
STTH1R06AFY

Product summary	
$I_{F(AV)}$	1 A
V_{RRM}	600 V
t_{rr}	30 ns
T_j	175 °C
$V_{F(typ.)}$	1.08 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage (T_j = -40 °C to +175 °C)		600	V
$I_{F(AV)}$	Average forward current	T_L = 135 °C, δ = 0.5	1	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	20	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range		-40 to +175	°C

Table 2. Thermal parameters

Symbol	Parameter	Typ.	Max.	Unit
$R_{th(j-l)}$	Junction to lead	16	24	°C/W

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	T_j = 25 °C	V_R = 600 V	-		1	µA
		T_j = 150 °C		-	10	75	
V_F	Forward voltage drop	T_j = 25 °C	I_F = 1 A	-		1.9	V
		T_j = 150 °C		-	1.08	1.4	

To evaluate the conduction losses, use the following equation:

$P = 1.1 \times I_{F(AV)} + 0.30 \times I_F{}^2{}_{(RMS)}$

Table 4. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, V_R = 30 V, dI_F/dt = -50 A/µs	-	30	45	ns
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 1 A, V_R = 400 V, dI_F/dt = -200 A/µs	-	3		A
Q_{RR}	Reverse recovery charge			-	90		nC
t_{rr}	Reverse recovery time			-	65		ns

1.1 Characteristics (curves)

Figure 2. Average forward power dissipation versus average forward current

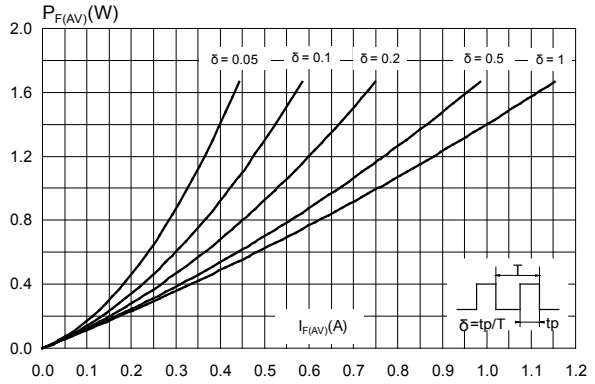


Figure 3. Forward voltage drop versus forward current (typical values)

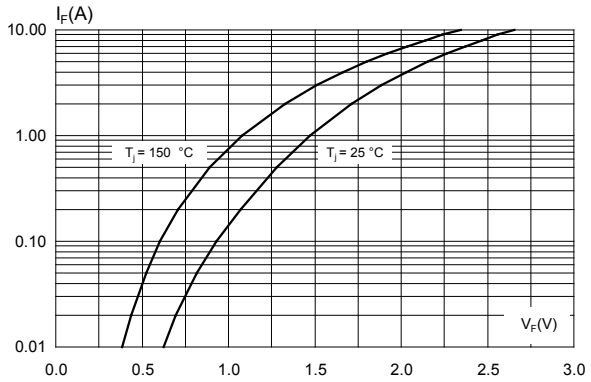


Figure 4. Forward voltage drop versus forward current (maximum values)

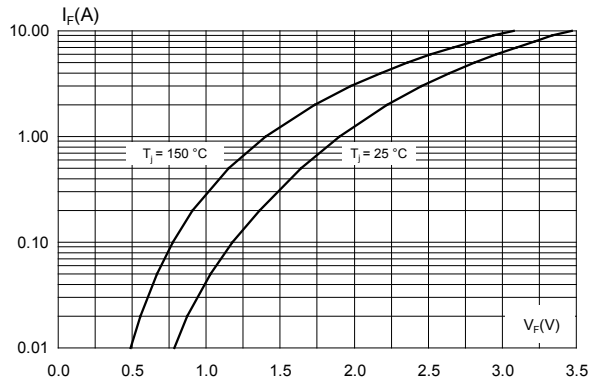


Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration

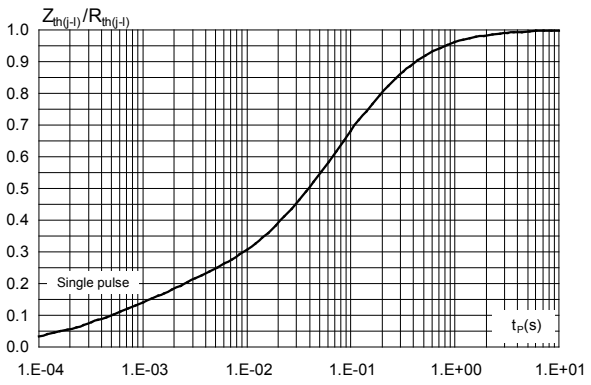


Figure 6. Peak reverse recovery current versus dI_F/dt (typical values)

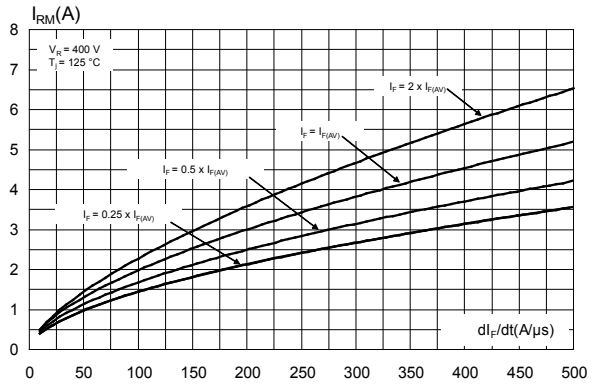


Figure 7. Reverse recovery time versus dI_F/dt (typical values)

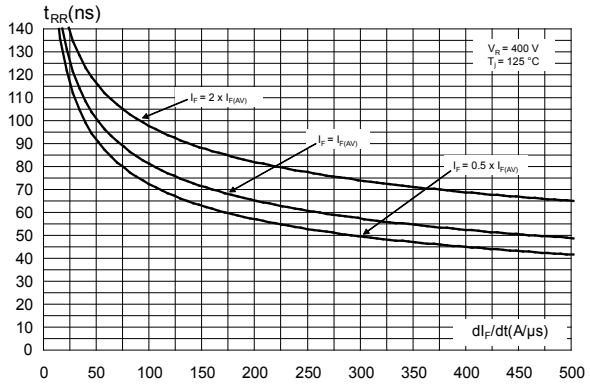


Figure 8. Reverse recovery charges versus dI_F/dt (typical values)

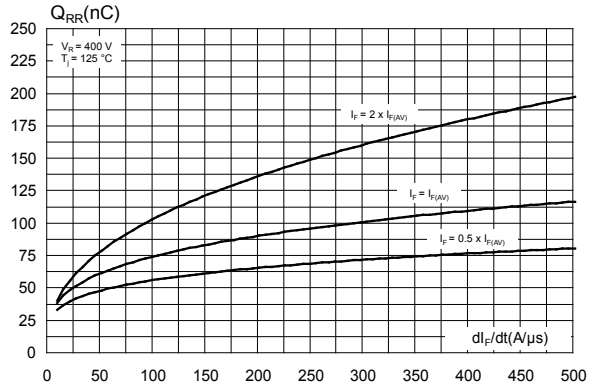


Figure 9. Softness factor versus dI_F/dt (typical values)

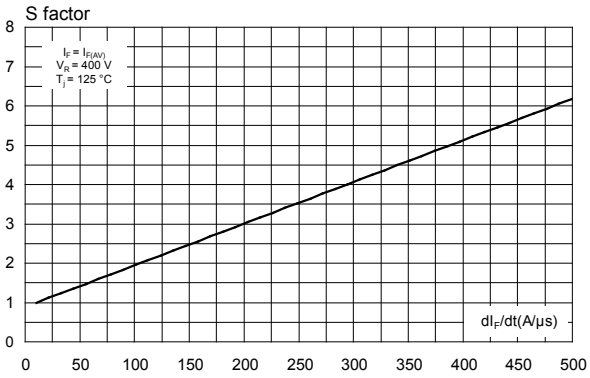


Figure 10. Relative variations of dynamic parameters versus junction temperature

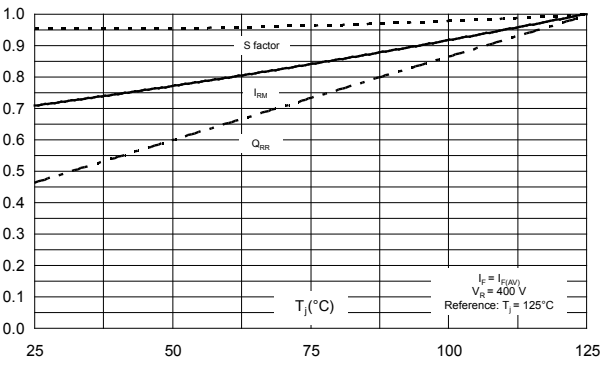


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

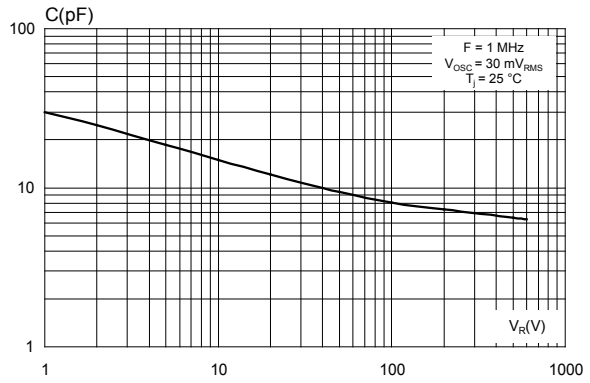
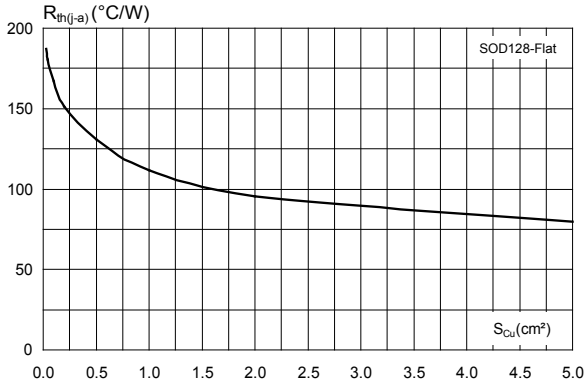


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (typical values, epoxy printed board FR4, e_{Cu} = 35 µm)



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.

2.1 SOD128Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 13. SOD128Flat package outline

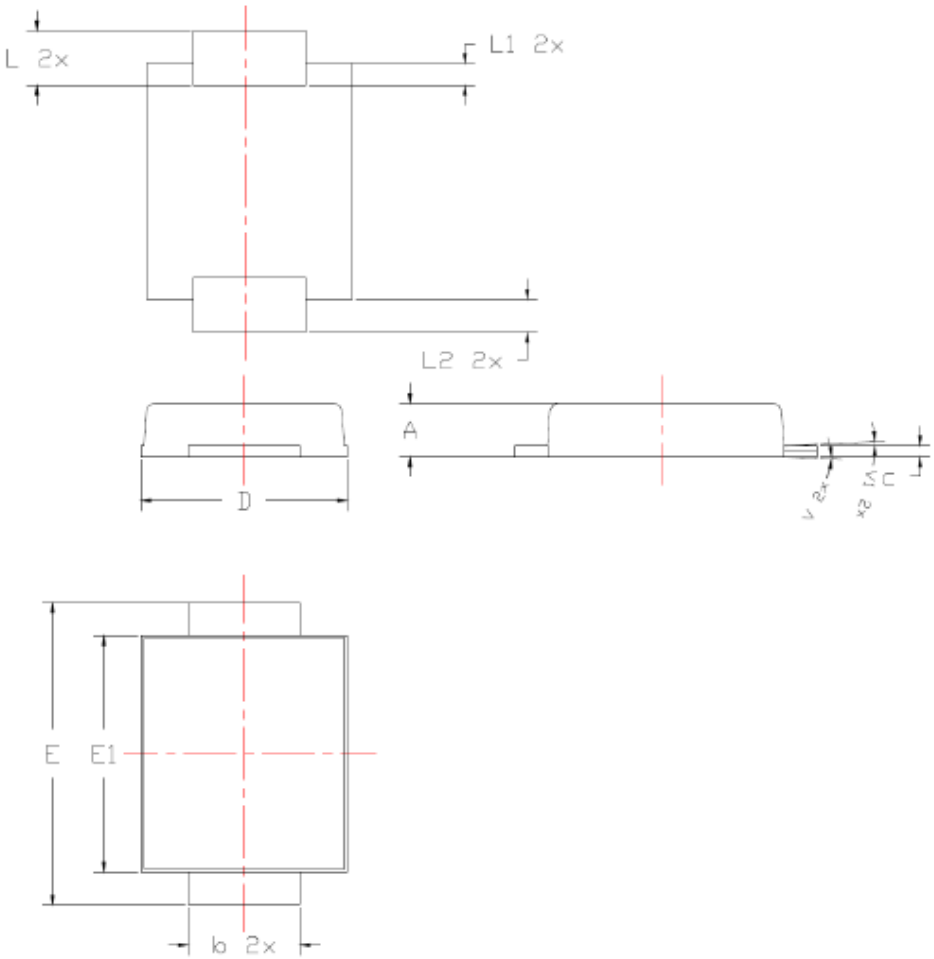
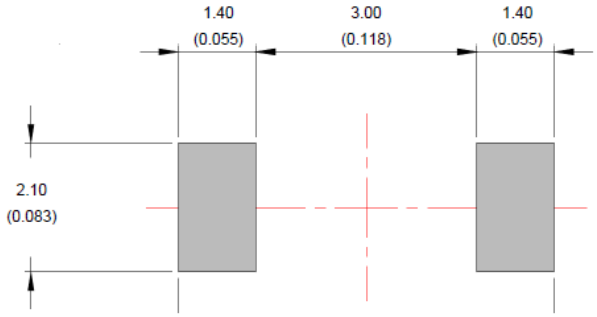


Table 5. SOD128Flat package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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 typ.		0.012 typ.	
L2	0.45 typ.		0.018 typ.	

Figure 14. SOD128Flat footprint in mm (inches)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH1R06AFY	1R6AY	SOD128Flat	26.4 mg	3000	Tape and reel

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
01-Feb-2018	1	Initial release.
06-Dec-2018	2	Added Section Applications. Updated title of document.

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