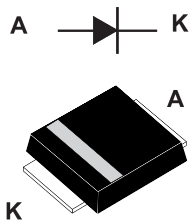
STTH1L06-Y

Automotive Turbo 2 ultrafast high voltage rectifier

Datasheet - production data



SMBflat

Features

- Ultrafast recovery
- Low conduction losses
- High surge capability
- Low leakage current
- High junction temperature
- AEC-Q101 qualified
- ECOPACK®2 compliant component
- V_{RRM} guaranteed from -40 to +175 °C

Description

The STTH1L06-Y is an ultrafast recovery power rectifier dedicated to energy recovery in automotive application housed in SMBflat 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 performances.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	1 A
V_{RRM}	600 V
$T_{j\ (max)}$	175 °C
$V_{F\ (typ)}$	0.9 V
$T_{rr\ (typ)}$	45 ns

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 to +175 °C	600	V
$I_{F(AV)}$	Average forward current, square waveform	T_L = 145 °C δ = 0.5	1	A
I_{FSM}	Forward Surge current	t_p = 10 ms	20	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	Value	Unit
$R_{th(j-l)}$	Junction to lead	21	°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 = 600 V			1	µA
		T_j = 150 °C			10	75	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 1 A			1.4	V
		T_j = 150 °C			0.9	1.15	

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:
$P = 0.95 \times I_{F(AV)} + 0.20 \times I_F{}^2{}_{(RMS)}$

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 = -50 A/µs V_R = 30 V		45	60	ns
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 2 A, dI_F/dt = 100 A/µs, V_{FR} = 3.5 V			90	
V_{FP}	Forward recovery voltage		I_F = 2 A, dI_F/dt = 100 A/µs			8	V

Figure 1. Average forward power dissipation versus average forward current

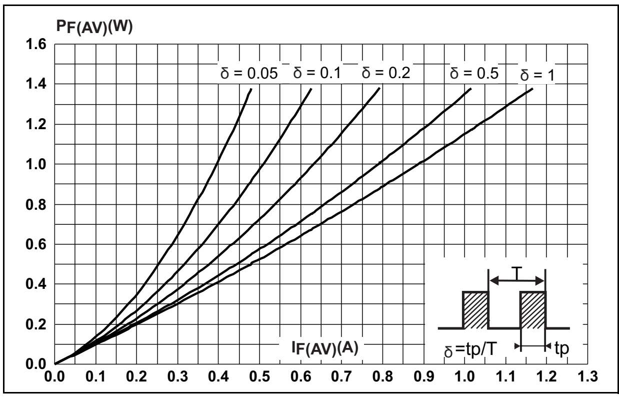


Figure 2. Forward voltage drop versus forward current (typical values)

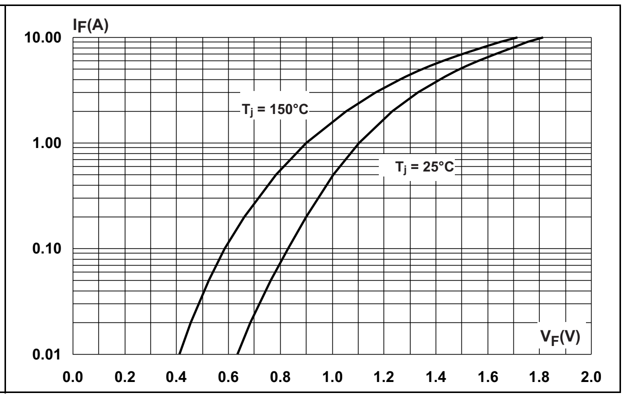


Figure 3. Forward voltage drop versus forward current (maximum values)

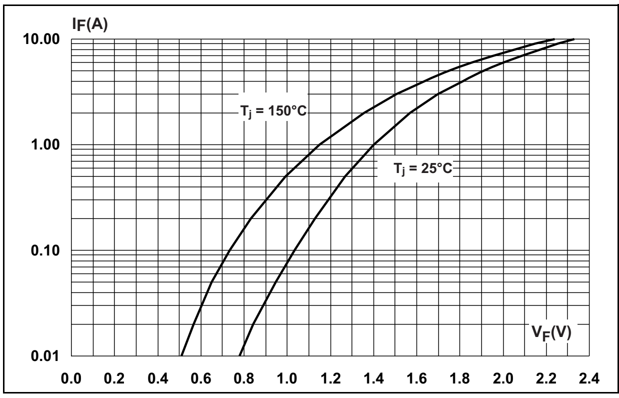


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

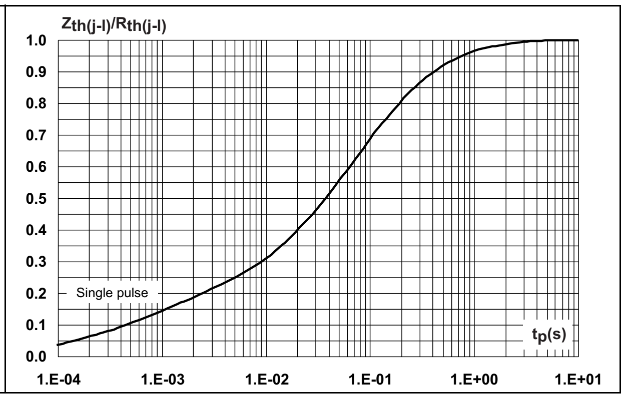


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

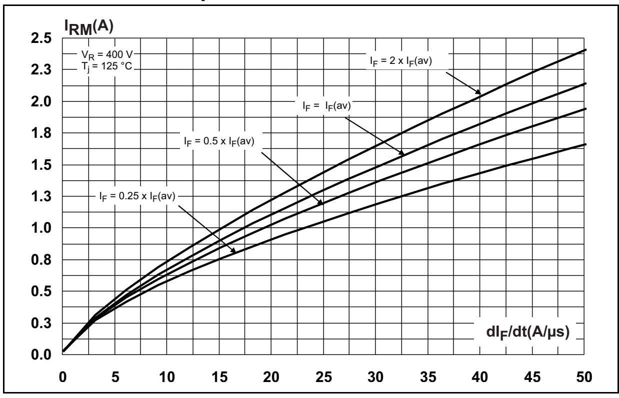


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

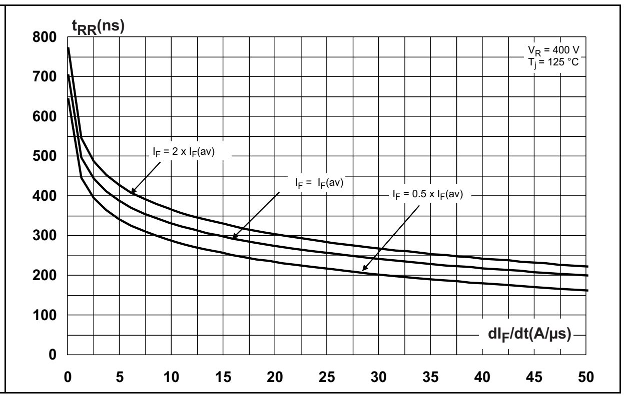


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

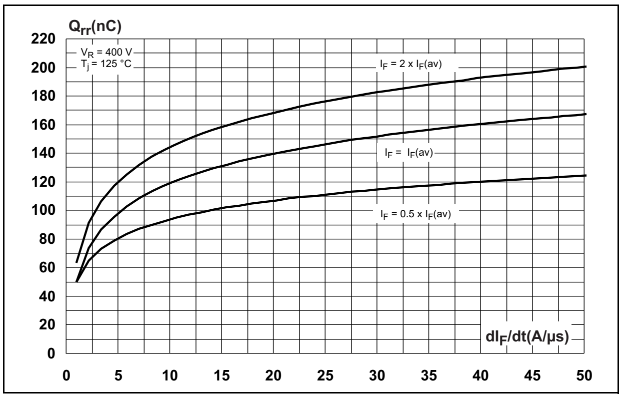


Figure 8. Reverse recovery softness factor versus dI_F/dt (typical values)

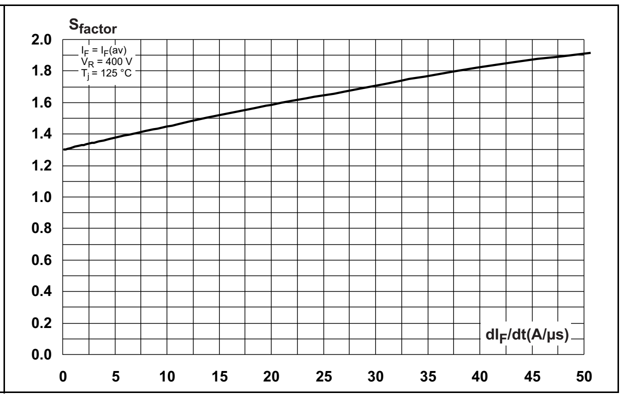


Figure 9. Relative variation of dynamic parameters versus junction temperature

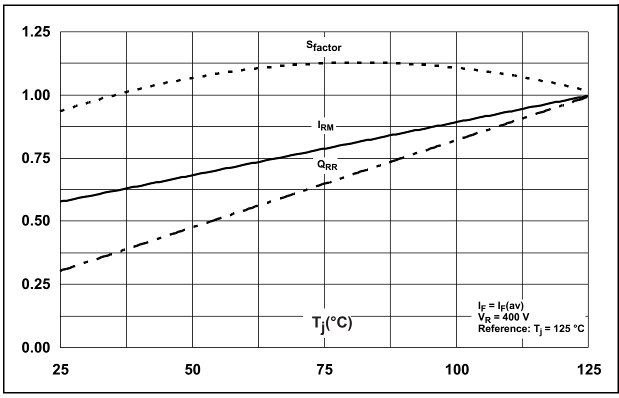


Figure 10. Transient peak forward voltage versus dI_F/dt (typical values)

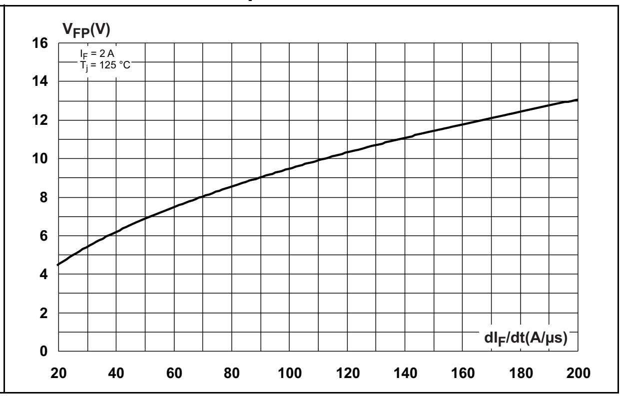


Figure 11. Forward recovery time versus dI_F/dt (typical values)

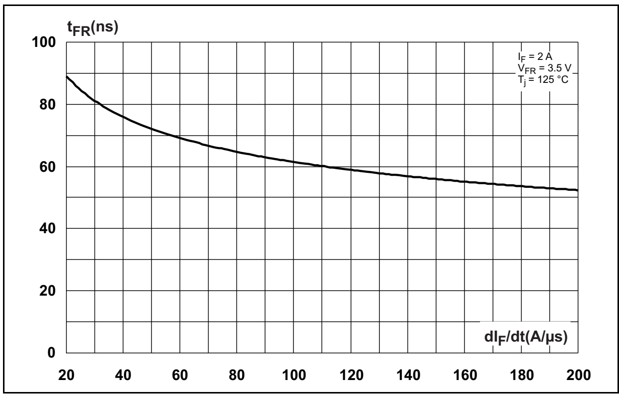


Figure 12. Junction capacitance versus reverse voltage applied (typical values)

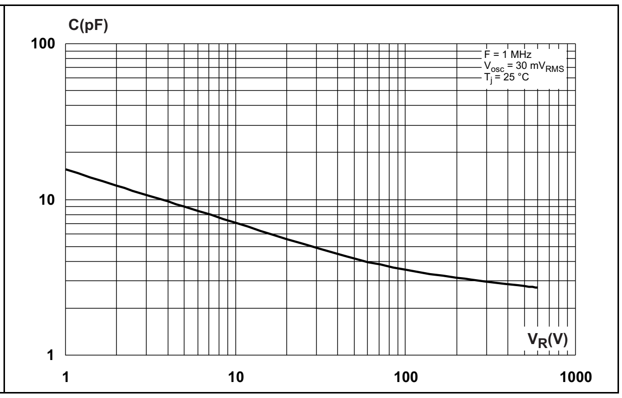
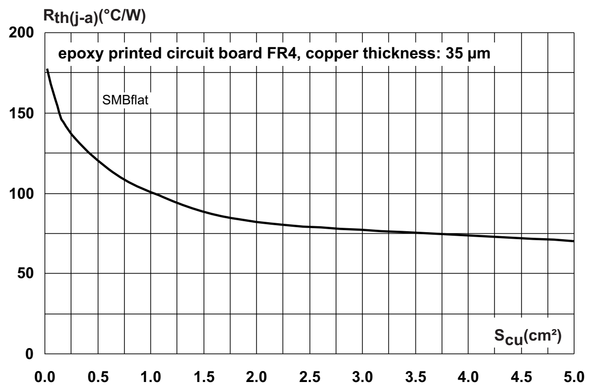


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- Band indicates cathode

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 14. SMBflat dimensions definitions

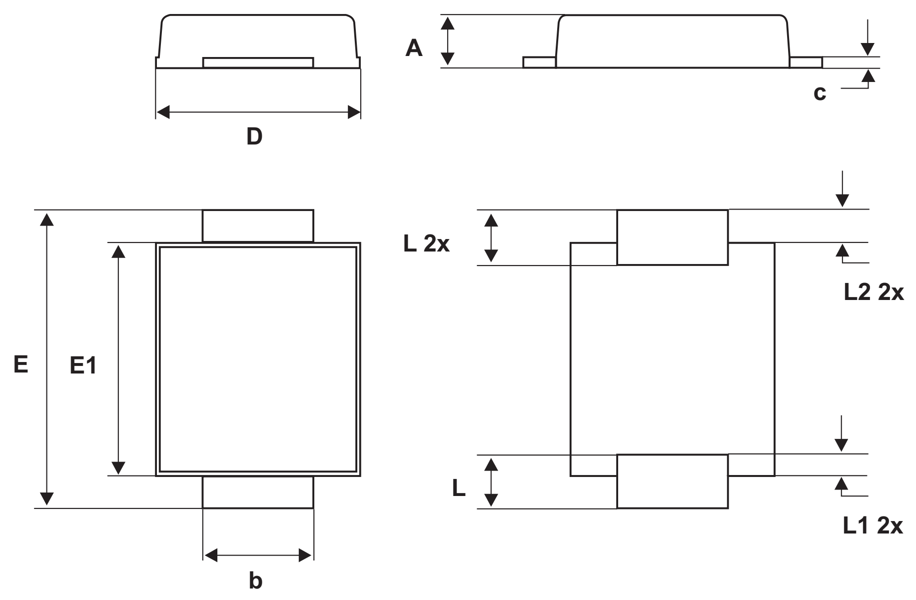
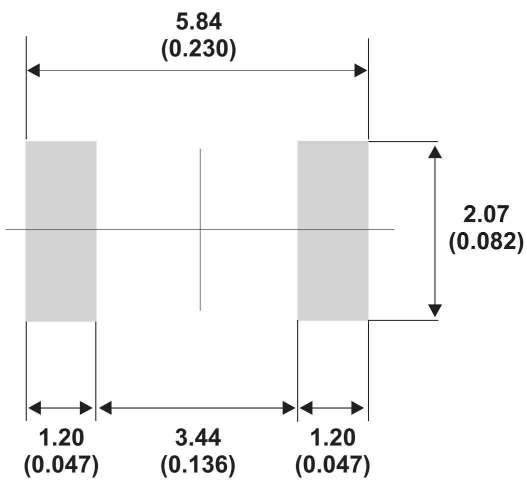


Table 6. SMBflat dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.155
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

Figure 15. SMBflat footprint, dimensions in mm (inches)



3 Ordering information

Table 7. Ordering information

Order codes	Marking	Package	Weight	Base qty	Delivery mode
STTH1L06UFY	F1L6Y	SMBflat	55 mg	5000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
01-Aug-2014	1	Initial release.