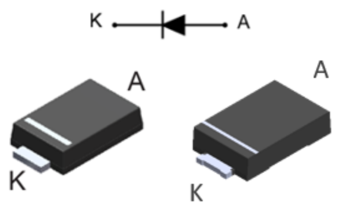
STTH1L06-Y

Datasheet

Automotive 1 A - 600 V turbo 2 ultrafast rectifier



SMB Flat

SMB Flat Wettable leads

Features

- AEC-Q101 qualified
- Ultrafast recovery
- Low switching losses
- High surge capability
- Low leakage current
- High junction temperature
- ECOPACK2 or ECOPACK3 compliant component on demand
- 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 SMB Flat 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.

Product status link
STTH1L06-Y

Product summary	
$I_{F(AV)}$	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 1. 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	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. *$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.*

Table 2. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to lead	21	°C/W

Table 3. Static electrical characteristic

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	V_R = 600 V	-		1	µA
		T_j = 125 °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. *Pulsetest: tp = 5 ms, δ < 2%*
2. *Pulsetest: tp = 380 µs, δ < 2%*

To evaluate the conduction losses use the following equation:

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

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; $dI_{F/dt}$ = -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

1.1 Electrical characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

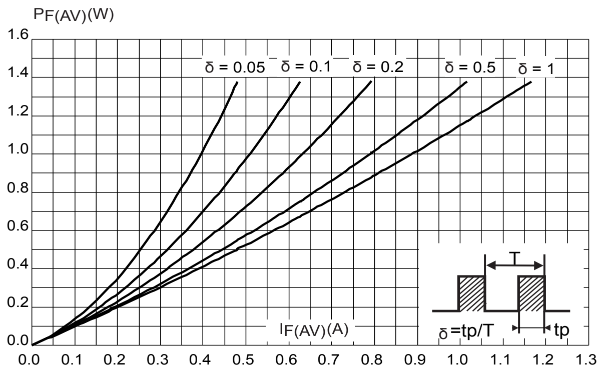


Figure 2. Forward voltage drop versus forward current (typical values)

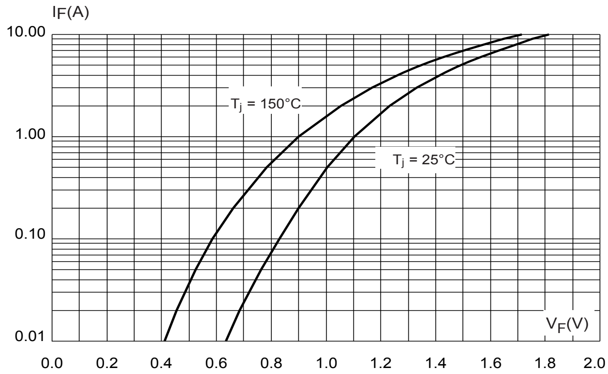


Figure 3. Forward voltage drop versus forward current (maximum values)

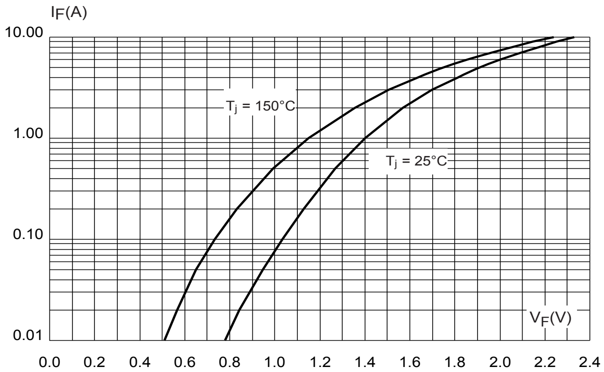


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

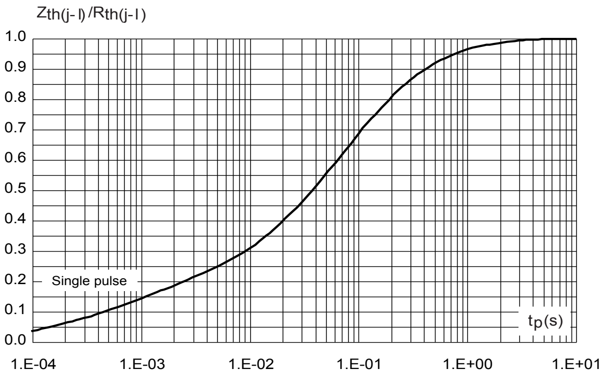


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

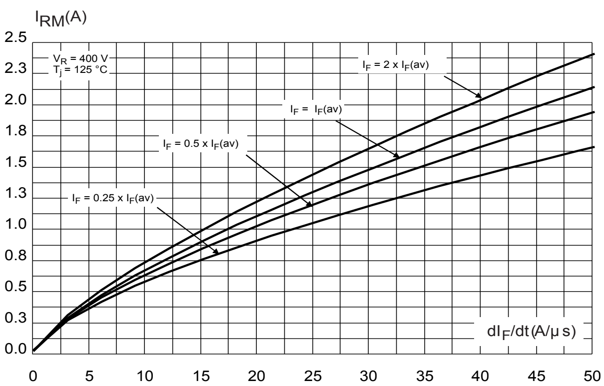


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

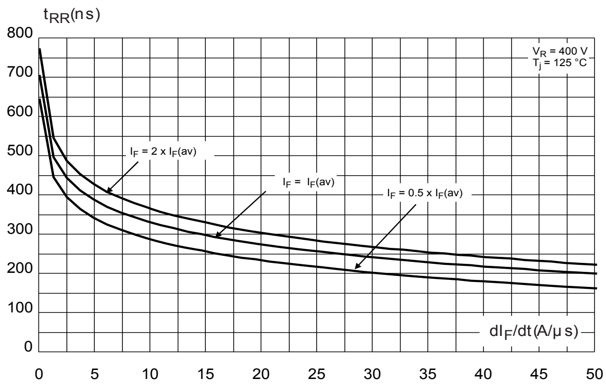


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

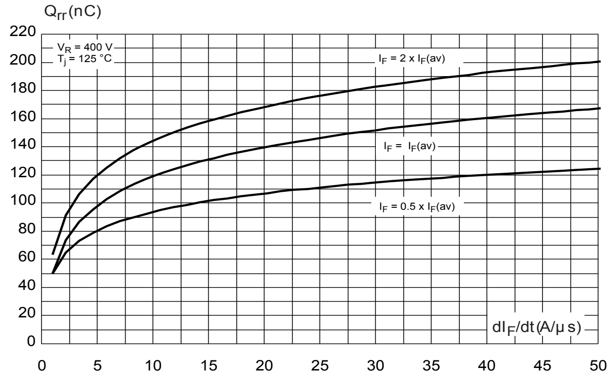


Figure 8. Reverse recovery softness factor versus dI_F/dt (typical values)

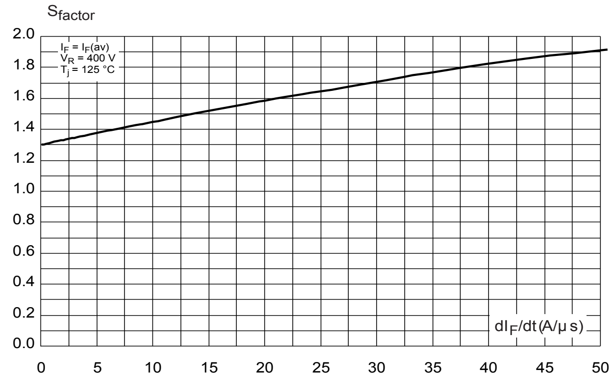


Figure 9. Relative variation of dynamic parameters versus junction temperature

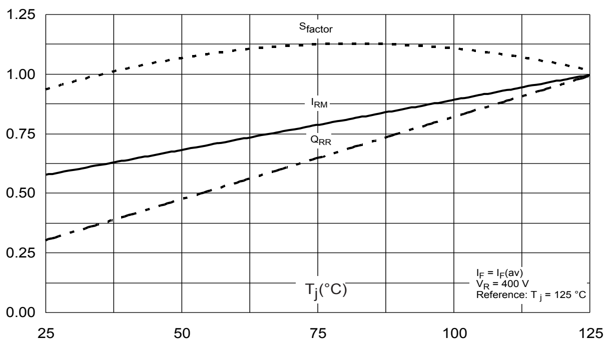


Figure 10. Transient peak forward voltage versus dI_F/dt (typical values)

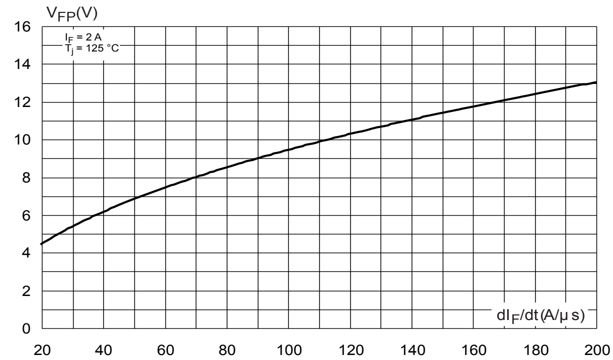


Figure 11. Forward recovery time versus dI_F/dt (typical values)

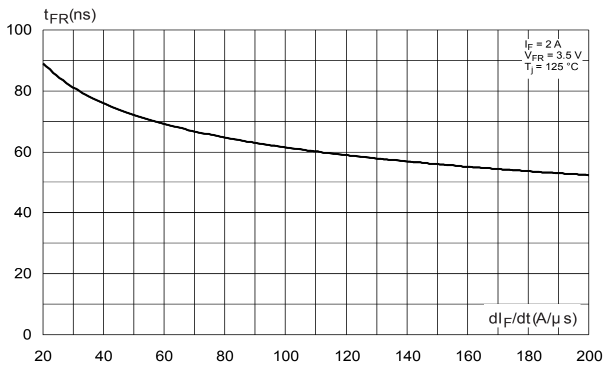


Figure 12. Junction capacitance versus reverse voltage applied (typical values)

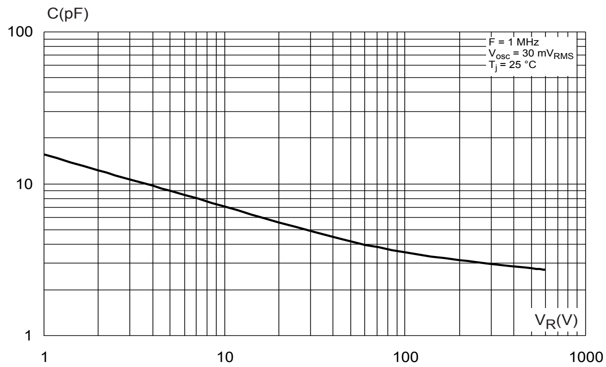
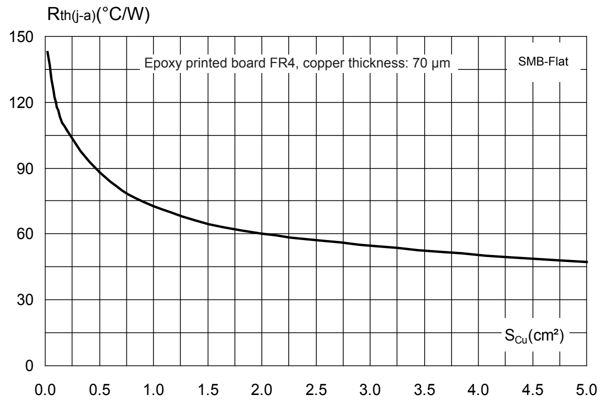


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead



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 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 14. SMB Flat package outline

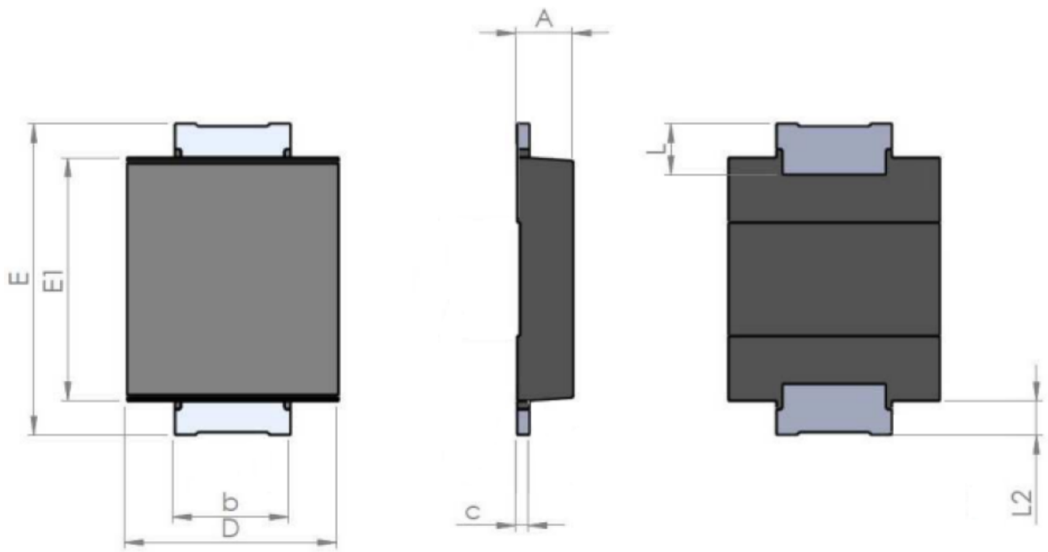
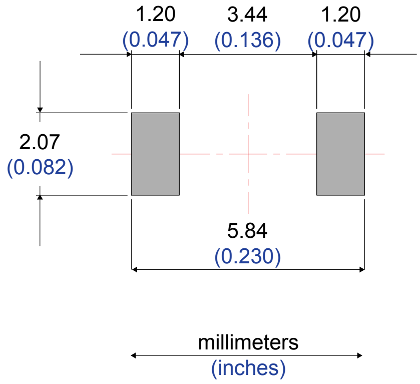


Table 5. SMB Flat mechanical data

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		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.030		0.060
L2		0.60			0.024	

Figure 15. Footprint recommendations, dimensions in mm (inches)



3 Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH1L06UFY	F1L6Y	SMBflat	50 mg	5000	Tape and reel

Revision history

Table 6. Document revision history

Date	Version	Changes
01-Aug-2014	1	Initial release.
02-May-2022	2	Updated Section 2.1 SMB Flat package information.