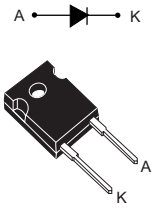
STTH60RQ06-Y

Datasheet

Automotive turbo 2 ultrafast high voltage rectifier



DO-247

Features

- AEC-Q101 qualified
- High junction temperature capability
- Ultrafast with soft recovery behavior
- Low reverse current
- Low thermal resistance
- Reduced switching and conduction losses
- PPAP capable

Description

The STTH60RQ06-Y has been developed for applications requiring a high-voltage secondary rectification for LLC full bridge topology.

Also it is ideal for switching power supplies, industrial and automotive applications, as rectification, freewheeling and clamping diode.

Product status link	
STTH60RQ06-Y	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	60 A
V_{RRM}	600 V
$V_{F(max)}$	1.45 V
$t_{rr\ (max)}$	35 ns
T_j	-40 to +175 °C

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
$I_{F(RMS)}$	Forward rms current		90	A
$I_{F(AV)}$	Average forward current		60	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	425	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range		-40 to +175	°C

Table 2. Thermal resistance parameters

Symbol	Parameter	Max.	Unit
$R_{th(j-c)}$	Junction to case	0.38	°C/W

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		80	µA
		T_j = 150 °C		-	160	1600	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 30 A	-		2.45	V
		T_j = 150 °C		-	1.15	1.45	
		T_j = 25 °C	I_F = 60 A	-		2.95	
		T_j = 150 °C		-	1.45	1.85	

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:

$P = 1.05 \times I_{F(AV)} + 0.013 \times I_F{}^2{}_{(RMS)}$

Table 4. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A	-		35	ns
			I_F = 1 A, V_R = 30 V, dI_F/dt = -50 A/µs	-	50	65	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 60 A, V_R = 400 V, dI_F/dt = -200 A/µs	-	12	16	A
Q_{rr}	Reverse recovery charge			-	660		nC
t_{rr}	Reverse recovery time			-	92		ns

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current (square waveform)

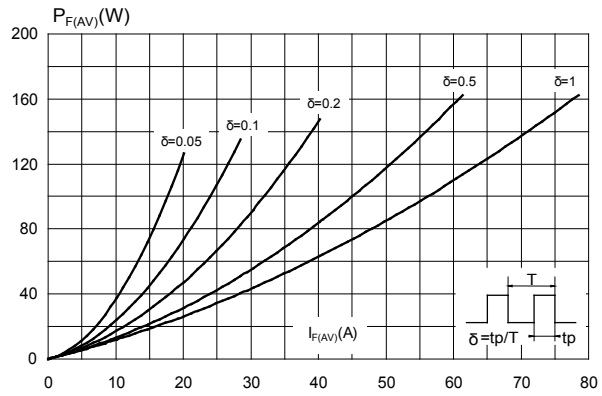


Figure 2. Average forward power dissipation versus average forward current (sinusoidal waveform)

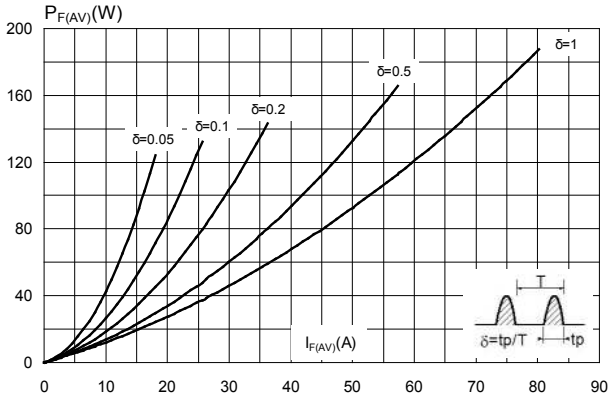


Figure 3. Forward voltage drop versus forward current (typical values)

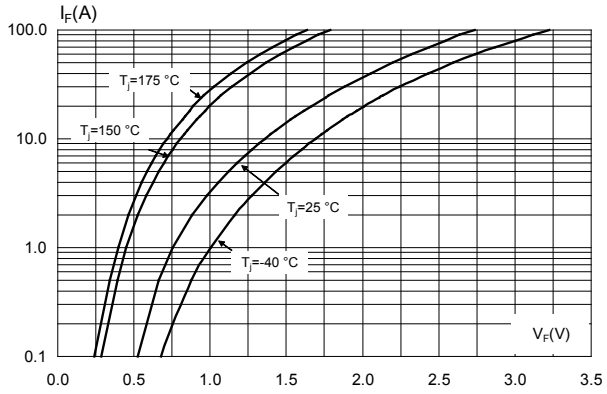


Figure 4. Forward voltage drop versus forward current (maximum values)

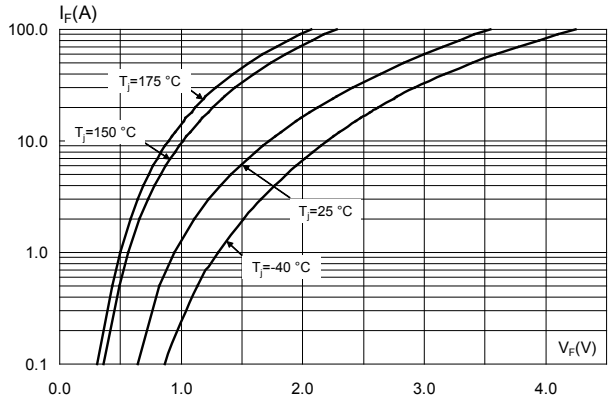


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

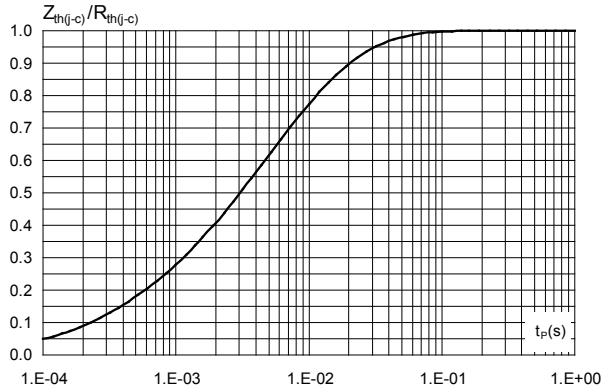


Figure 6. Peak reverse recovery current versus dI_F/dt (typical values)

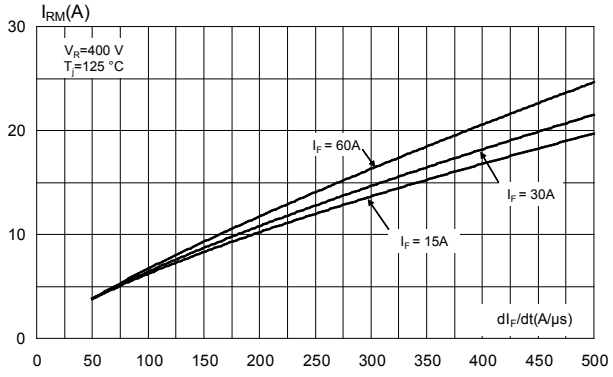


Figure 7. Reverse recovery time versus dI_F/dt (typical values)

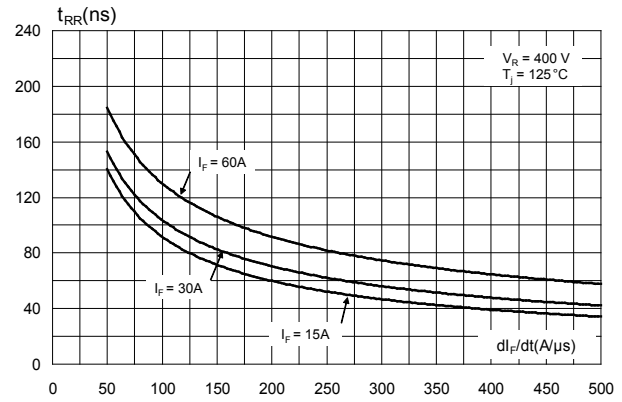


Figure 8. Reverse recovery charges versus dI_F/dt (typical values)

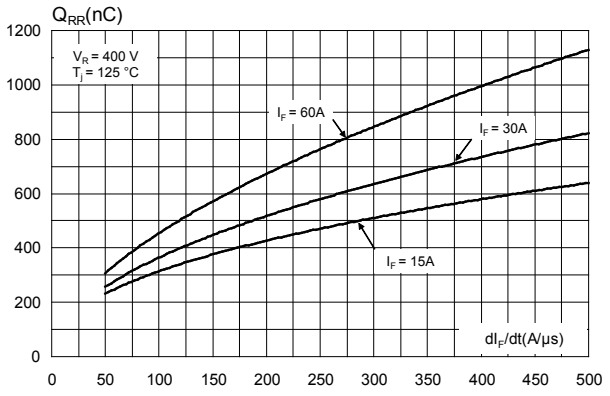


Figure 9. Reverse recovery softness factor versus dI_F/dt (typical values)

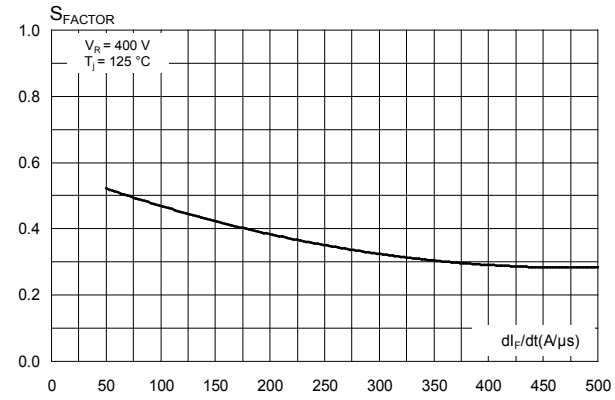


Figure 10. Relative variations of dynamic parameters versus junction temperature

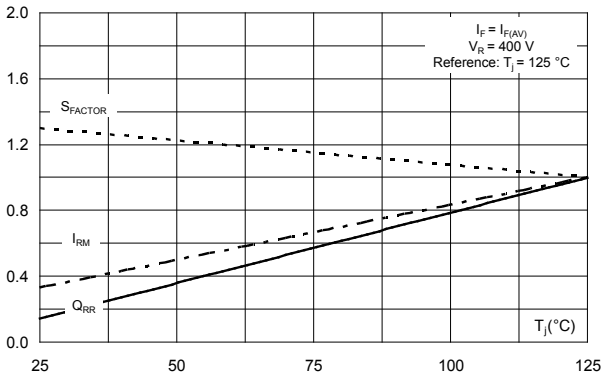


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

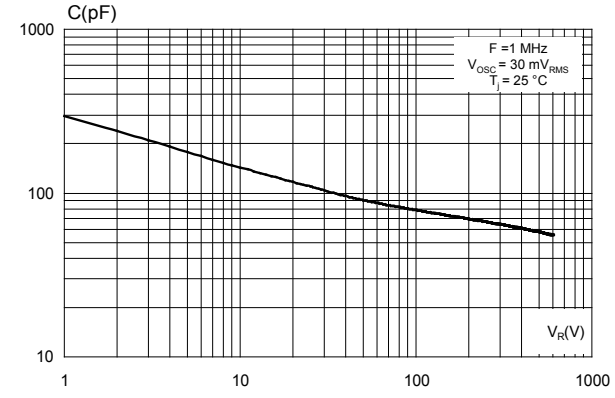


Figure 12. Relative variation of non-repetitive peak surge forward current versus pulse duration (sinusoidal waveform)

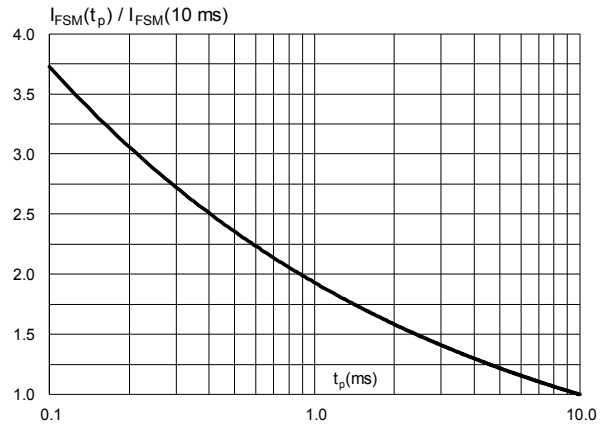
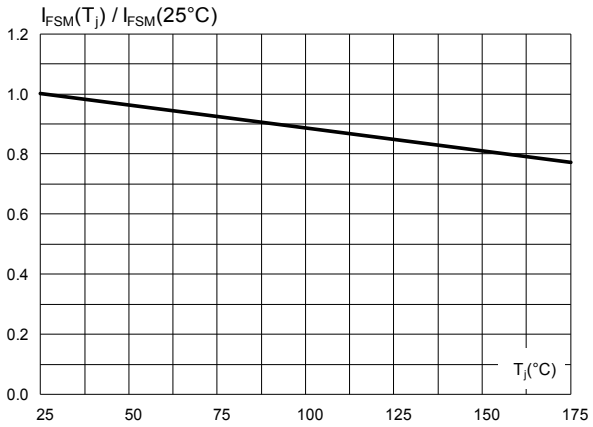


Figure 13. Relative variation of non-repetitive peak surge forward current versus initial junction temperature (sinusoidal waveform)



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 [Package name] package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m (DO-247)
- Maximum torque value: 1.0 N·m (DO-247)

Figure 14. DO-247 package outline

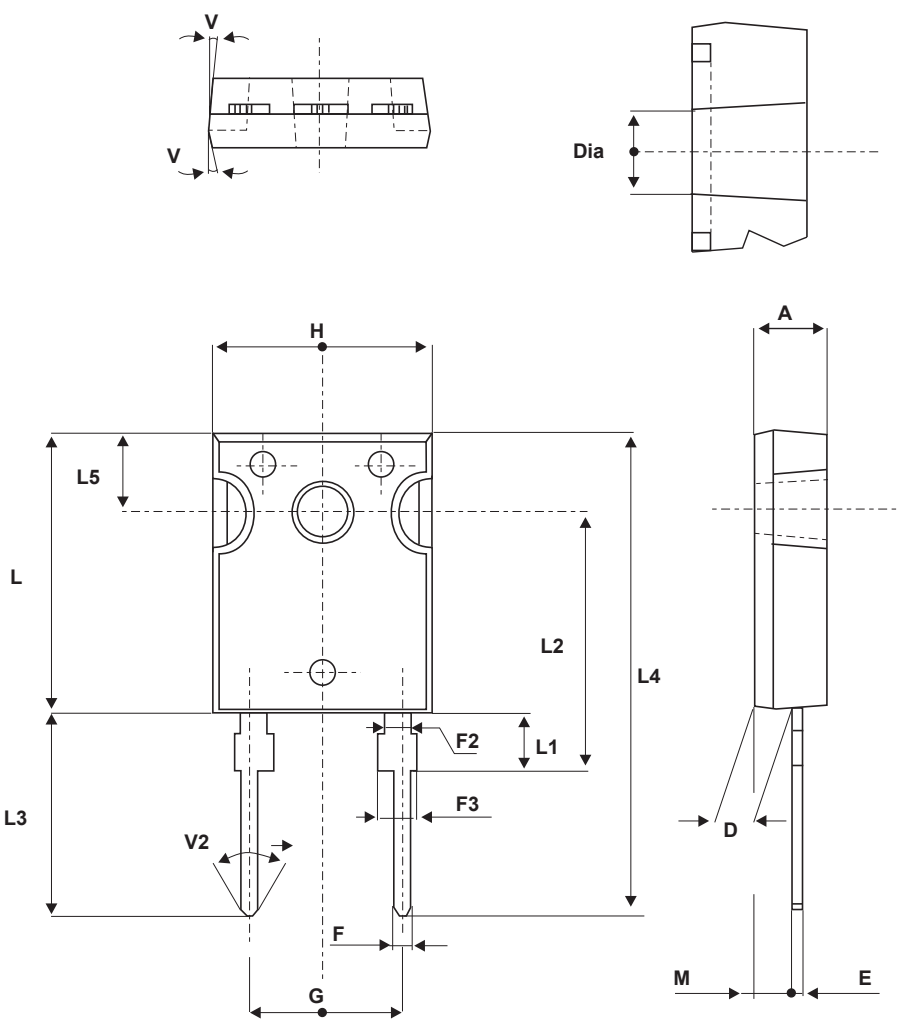


Table 5. DO-247 package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.85	5.15	0.191	0.203
D	2.20	2.60	0.086	0.102
E	0.40	0.80	0.015	0.031
F	1.00	1.40	0.039	0.055
F2	2.00 typ.		0.078 typ.	
F3	2.00	2.40	0.078	0.094
G	10.90 typ.		0.429 typ.	
H	15.45	15.75	0.608	0.620
L	19.85	20.15	0.781	0.793
L1	3.70	4.30	0.145	0.169
L2	18.50 typ.		0.728 typ.	
L3	14.20	14.80	0.559	0.582
L4	34.60 typ.		1.362 typ.	
L5	5.50 typ.		0.216 typ.	
M	2.00	3.00	0.078	0.118
V	5°		5°	
V2	60°		60°	
Dia.	3.55	3.65	0.139	0.143

3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH60RQ06WY	STTH60RQ06WY	DO-247	4.40 g	30	Tube

Revision history

Table 7. **Document revision history**

Date	Version	Changes
20-Mar-2018	1	Initial release.
05-Apr-2018	2	Updated Section ● Features. Minor text changes to improve readability.