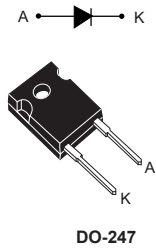


## Automotive turbo 2 ultrafast high voltage rectifier



### 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	
<a href="#">STTH60RQ06-Y</a>	
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 ( $T_j = -40\text{ °C}$ to $+175\text{ °C}$ )		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	$t_p = 10\text{ ms}$ 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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		80	$\mu\text{A}$
		$T_j = 150\text{ °C}$		-	160	1600	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$	-		2.45	V
		$T_j = 150\text{ °C}$		-	1.15	1.45	
		$T_j = 25\text{ °C}$	$I_F = 60\text{ A}$	-		2.95	
		$T_j = 150\text{ °C}$		-	1.45	1.85	

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

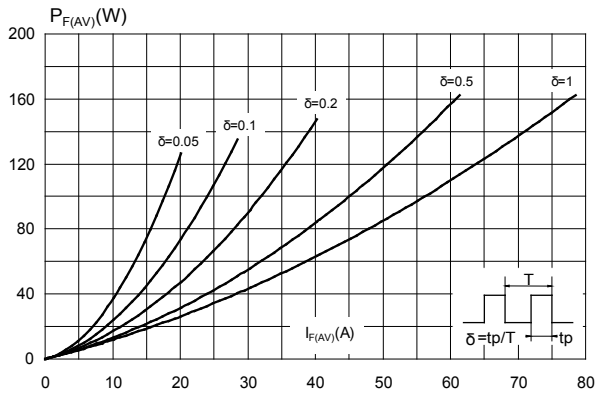
$$P = 1.05 \times I_{F(AV)} + 0.013 \times I_{F(RMS)}^2$$

**Table 4. Dynamic electrical characteristics**

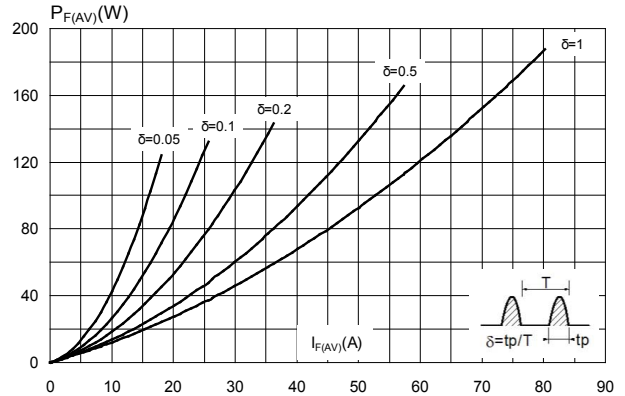
Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ , $I_R = 1\text{ A}$	-		35	ns
			$I_F = 1\text{ A}$ , $V_R = 30\text{ V}$ , $di_F/dt = -50\text{ A}/\mu\text{s}$	-	50	65	
$I_{RM}$	Reverse recovery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

### 1.1 Characteristics (curves)

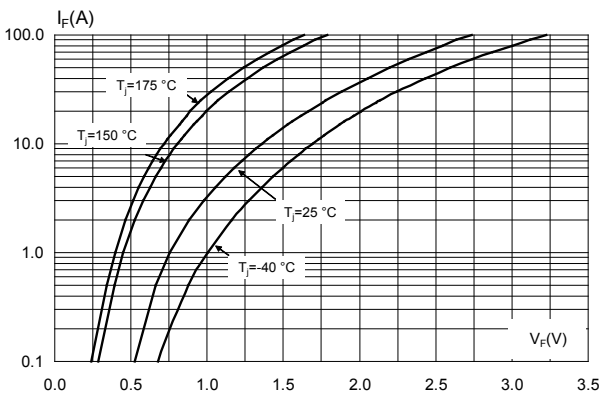
**Figure 1. Average forward power dissipation versus average forward current (square waveform)**



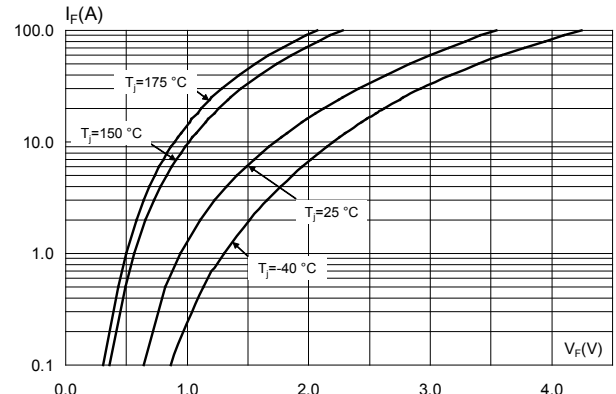
**Figure 2. Average forward power dissipation versus average forward current (sinusoidal waveform)**



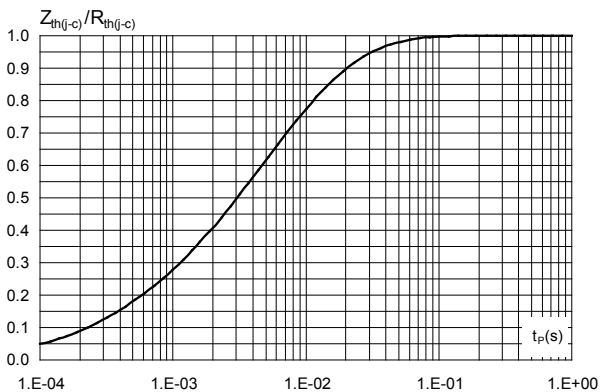
**Figure 3. Forward voltage drop versus forward current (typical values)**



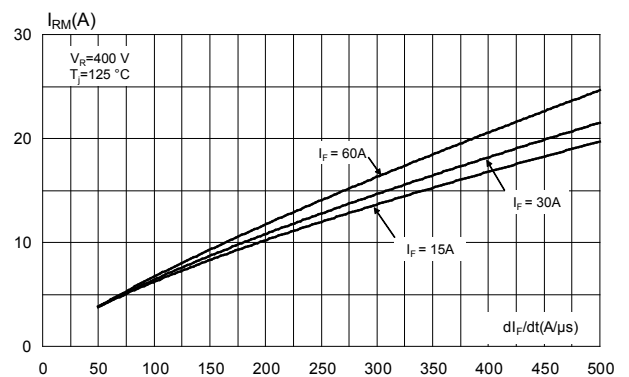
**Figure 4. Forward voltage drop versus forward current (maximum values)**



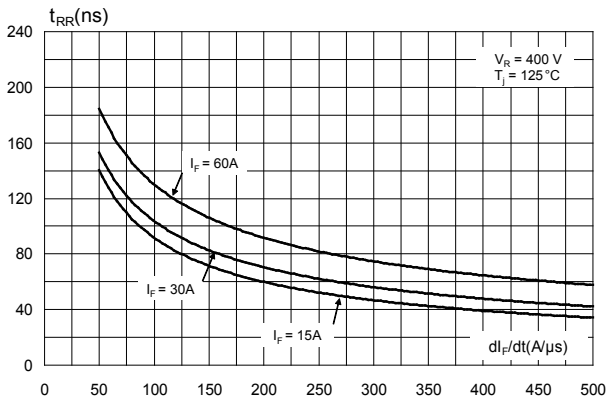
**Figure 5. Relative variation of thermal impedance junction to case versus pulse duration**



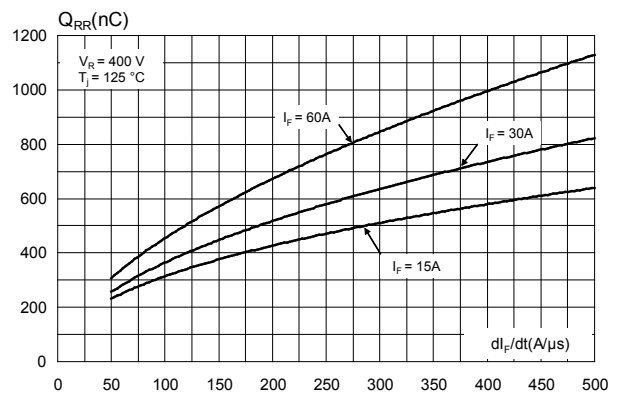
**Figure 6. Peak reverse recovery current versus di\_F/dt (typical values)**



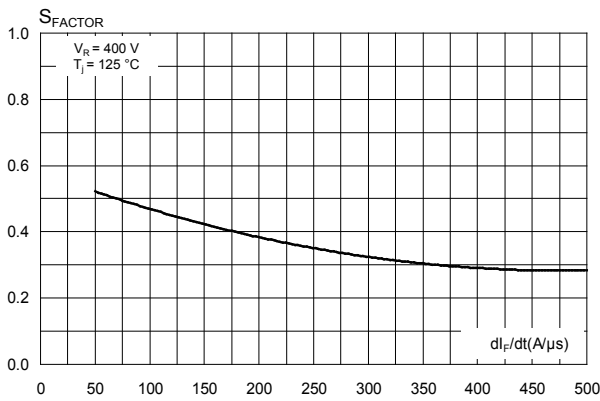
**Figure 7. Reverse recovery time versus  $di_F/dt$  (typical values)**



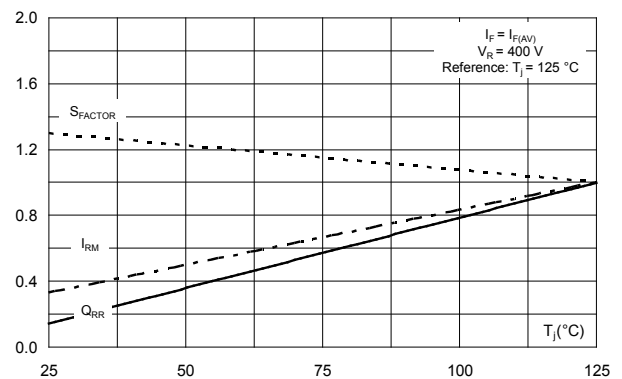
**Figure 8. Reverse recovery charges versus  $di_F/dt$  (typical values)**



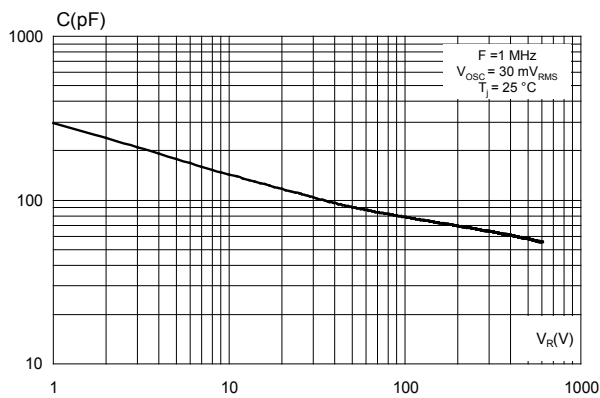
**Figure 9. Reverse recovery softness factor versus  $di_F/dt$  (typical values)**



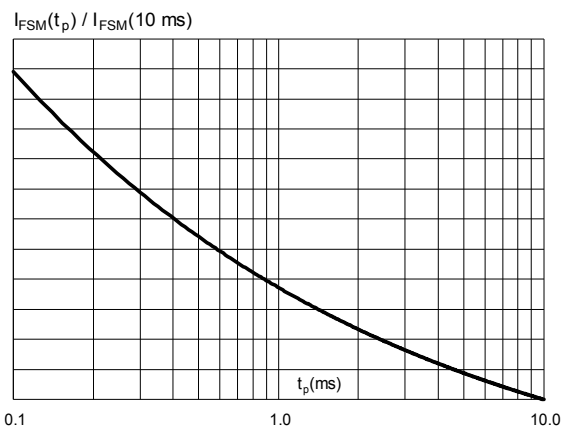
**Figure 10. Relative variations of dynamic parameters versus junction temperature**



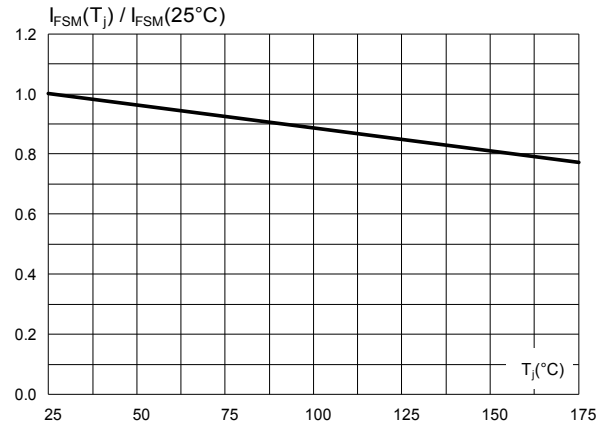
**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**



**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)**



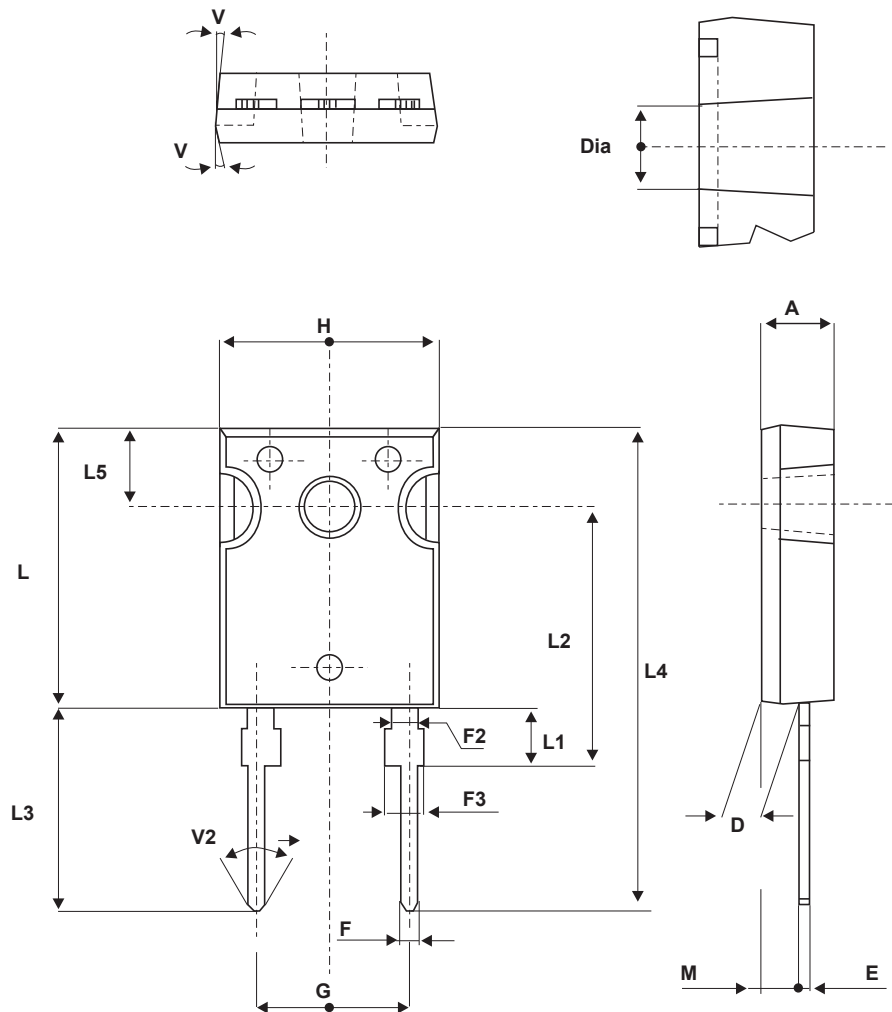
## 2 Package information

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](http://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 <a href="#">Section • Features</a> . Minor text changes to improve readability.

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