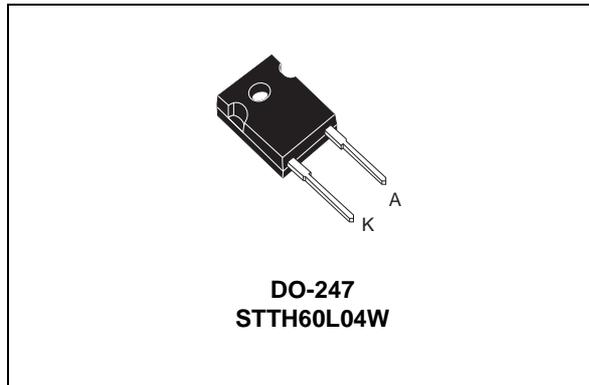


## Ultrafast high voltage rectifier

Datasheet - production data


**Features**

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses

**Description**

The STTH60L04W uses ST 400 V technology and is specially suited for use in switching power supplies, welding equipment, and industrial applications, as an output rectification diode.

**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	60 A
$V_{RRM}$	400 V
$T_j$ (max)	175 °C
$V_F$ (typ)	0.83 V
$t_{rr}$ (max)	50 ns

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, per diode)**

Symbol	Parameter			Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage			400	V
$I_{F(RMS)}$	Forward rms current			90	A
$I_{F(AV)}$	Average forward current	$T_c = 90\text{ °C}, \delta = 0.5$	Per diode	60	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$		600	A
$T_{stg}$	Storage temperature range			-55 to + 175	°C
$T_j$	Maximum operating junction temperature			175	°C

**Table 3. Thermal resistance**

Symbol	Parameter	Value (max)	Unit
$R_{th(j-c)}$	Junction to case	0.70	°C/W

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			50	$\mu\text{A}$
		$T_j = 150\text{ °C}$			100	1000	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 60\text{ A}$			1.2	V
		$T_j = 150\text{ °C}$			0.83	1.0	

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:

$$P = 0.8 \times I_{F(AV)} + 0.0033 I_{F(RMS)}^2$$

Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 1\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$		66	90	ns
			$I_F = 1\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 30\text{ V}$		36	50	
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ }^\circ\text{C}$	$I_F = 60\text{ A}$ , $V_R = 200\text{ V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			15	A
$S_{factor}$	Softness factor	$T_j = 125\text{ }^\circ\text{C}$	$I_F = 60\text{ A}$ , $V_R = 200\text{ V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		0.4		
$t_{fr}$	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 60\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$			600	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 60\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_{FR} = 1.1 \times V_{Fmax}$		3.2		V

Figure 1. Conduction losses versus average forward current (per diode)

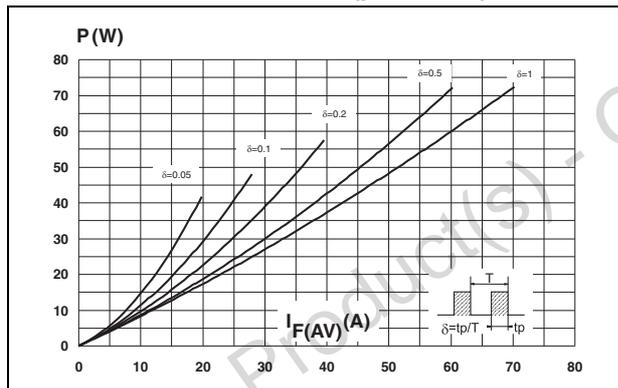


Figure 2. Forward voltage drop versus forward current (per diode)

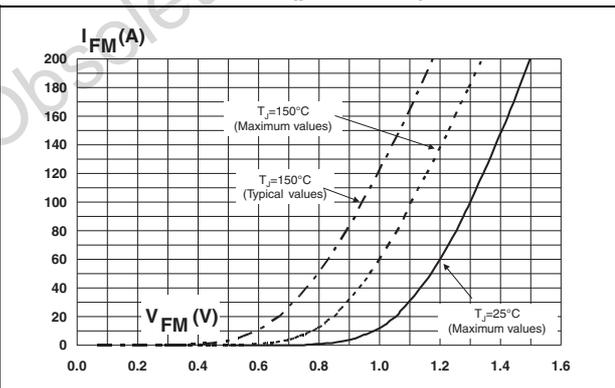


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

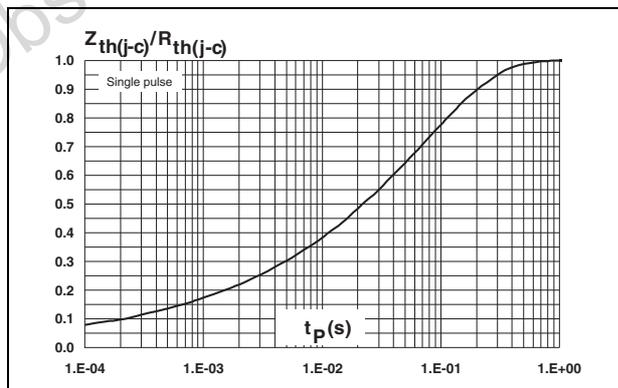


Figure 4. Peak reverse recovery current versus di\_F/dt (typical values, per diode)

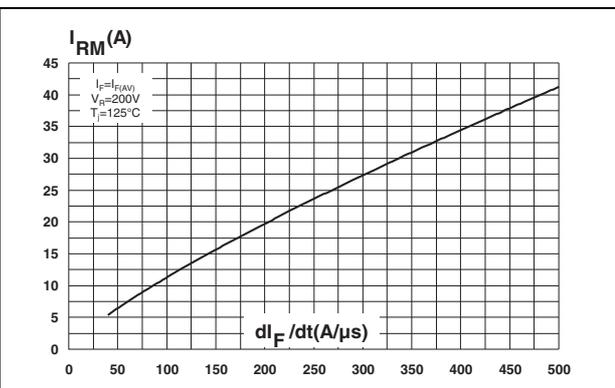


Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values, per diode)

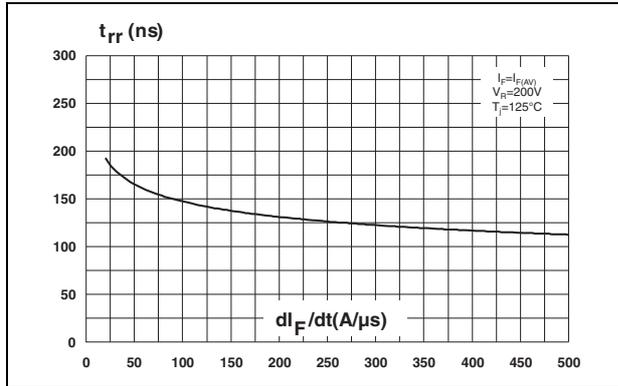


Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values, per diode)

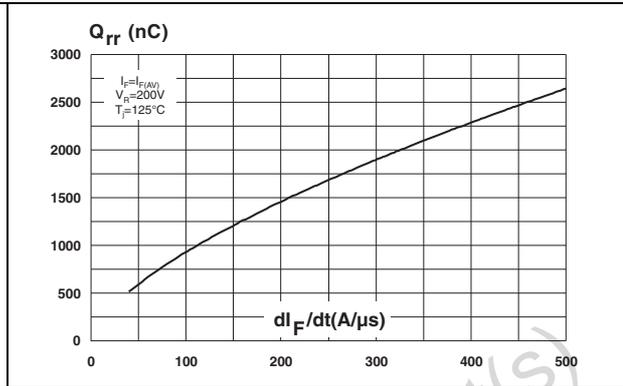


Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values, per diode)

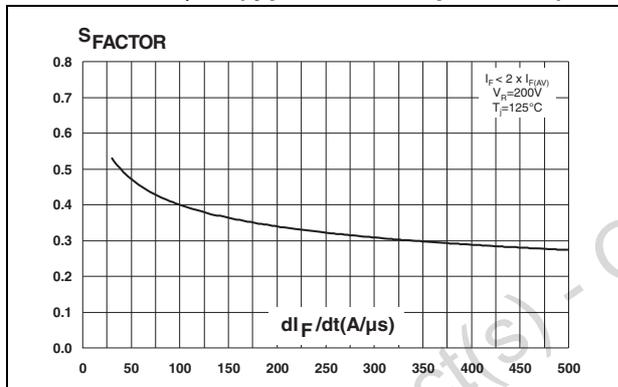


Figure 8. Relative variations of dynamic parameters versus junction temperature

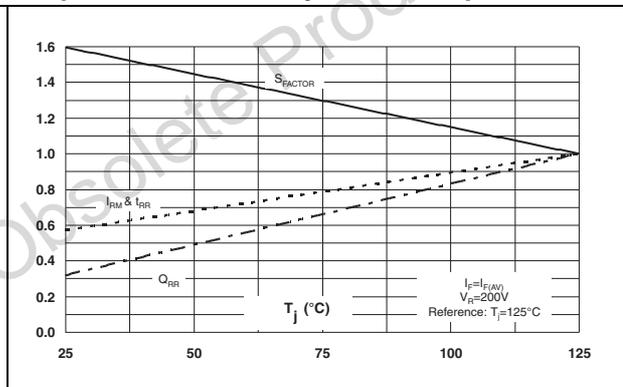


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values, per diode)

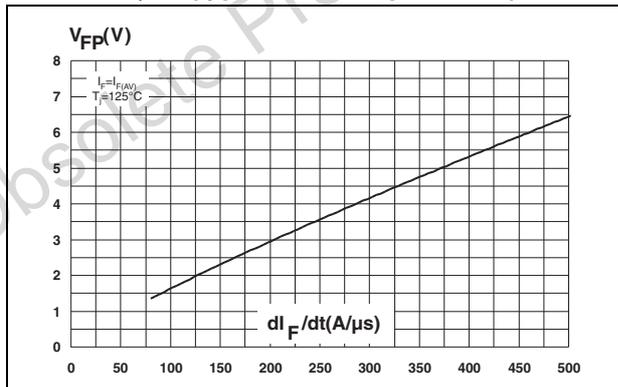


Figure 10. Forward recovery time versus  $di_F/dt$  (typical values, per diode)

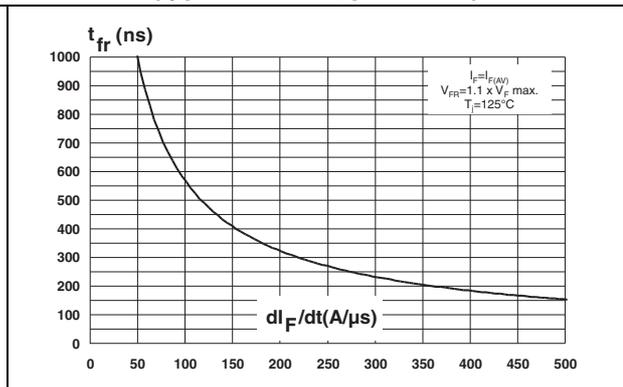
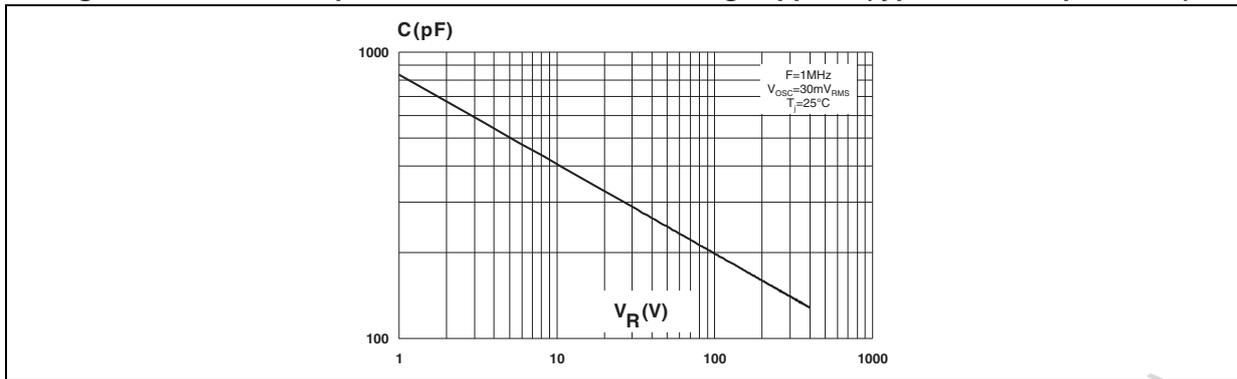


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



Obsolete Product(s) - Obsolete Product(s)

## 2 Package information

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

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 12. DO-247 dimension definitions

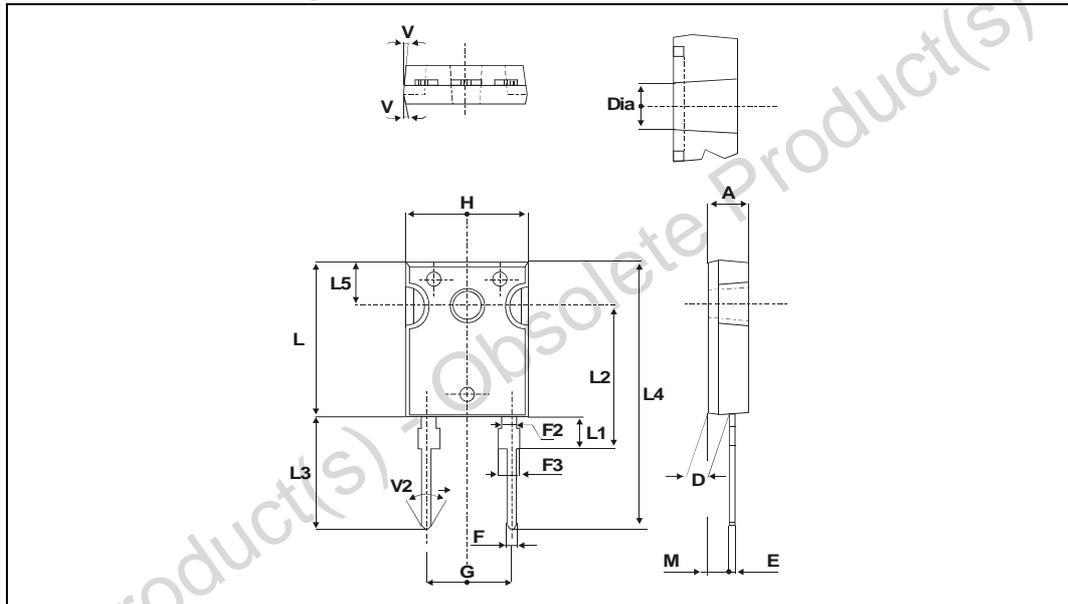


Table 6. DO-247 dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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			0.078	
F3	2.00		2.40	0.078		0.094
G		10.90			0.429	
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			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

Note: Leads and slug are pure tin plating finishing

### 3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH60L04W	STTH60L04W	DO-247	4.4 g	30	Tube

### 4 Revision history

Table 8. Document revision history

Date	Revision	Changes
26-Oct-2006	1	First issue
18-Mar-2013	2	Updated <a href="#">Package information on page 6</a> .

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