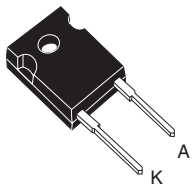
STTH60L04W

Ultrafast high voltage rectifier

Mian product characteristics

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



DO-247
STTH60L04W

Features and benefits

- 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.

Order codes

Part number	Marking
STTH60L04W	STTH60L04

Table 1. Absolute ratings (limiting values, per diode)

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

1 Characteristics

Table 2. Thermal resistance

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

Table 3. Static electrical characteristics (per diode)

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

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.8 \times I_{F(AV)} + 0.0033\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics (per diode)

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		66	90	ns
			I_F = 1 A dI_F/dt = 200 A/µs V_R = 30 V		36	50	
I_{RM}	Reverse recovery current	T_j = 125° C	I_F = 60 A V_R = 200 V dI_F/dt = 100 A/µs			15	A
S_{factor}	Softness factor	T_j = 125° C	I_F = 60 A V_R = 200 V dI_F/dt = 100 A/µs		0.4		
t_{fr}	Forward recovery time	T_j = 25° C	I_F = 60 A dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}			600	ns
V_{FP}	Forward recovery voltage	T_j = 25° C	I_F = 60 A dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}		3.2		V

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

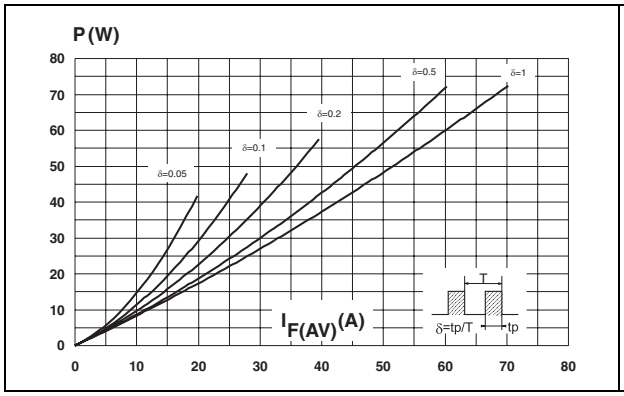


Figure 2. Forward voltage drop versus forward current (per diode)

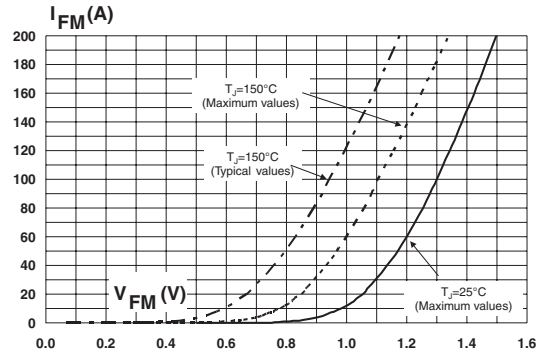


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

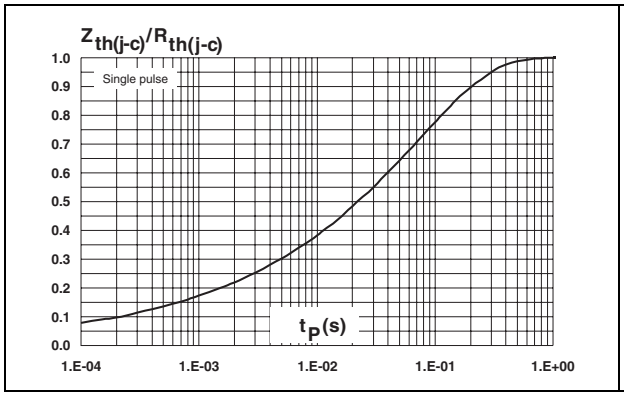


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values, per diode)

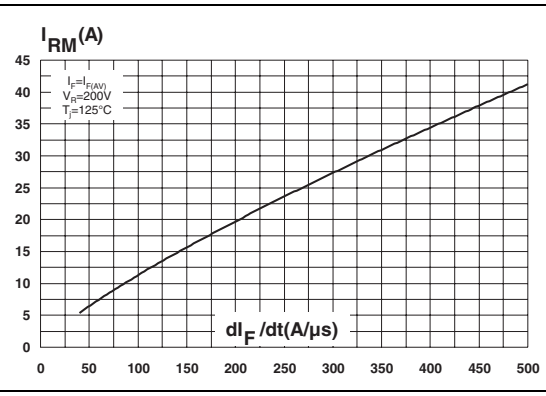


Figure 5. Reverse recovery time versus dI_F/dt (typical values, per diode)

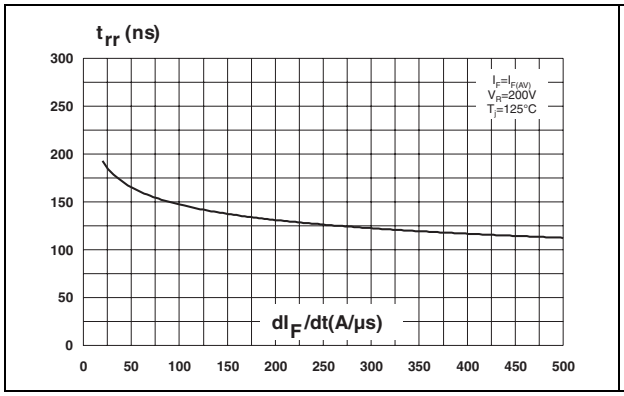


Figure 6. Reverse recovery charges versus dI_F/dt (typical values, per diode)

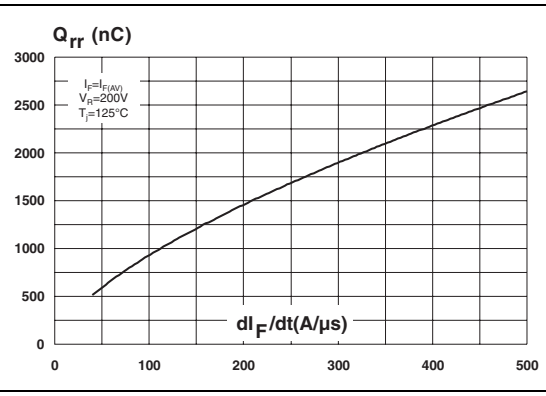


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

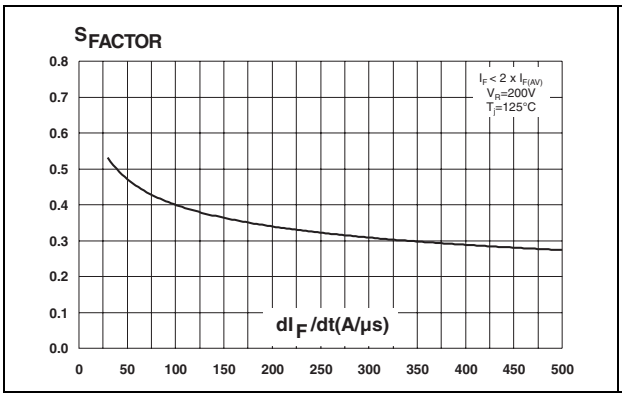


Figure 8. Relative variations of dynamic parameters versus junction temperature

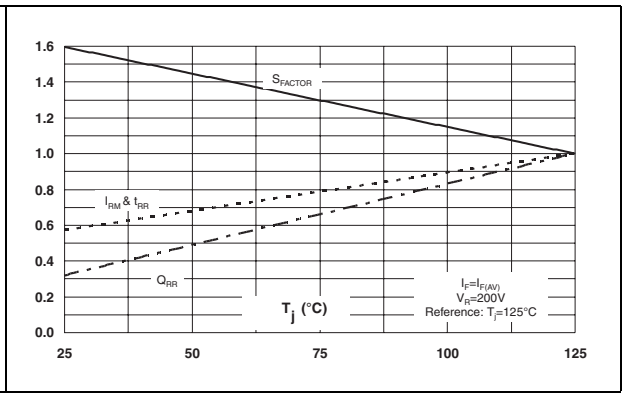


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

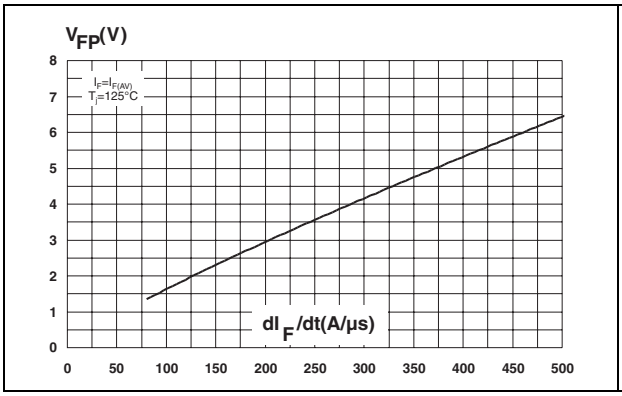


Figure 10. Forward recovery time versus dI_F/dt (typical values, per diode)

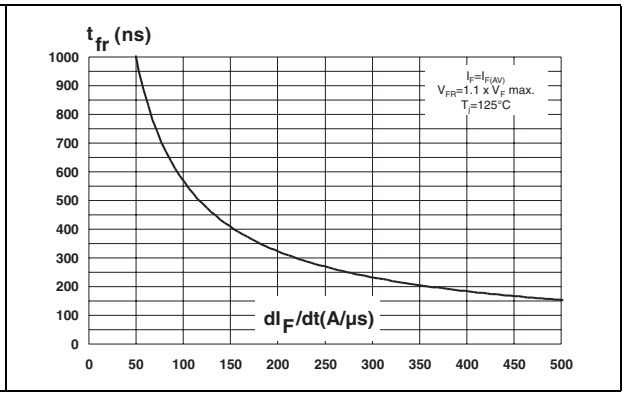
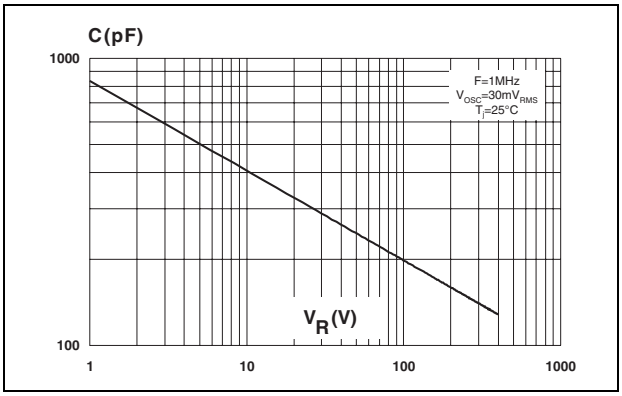


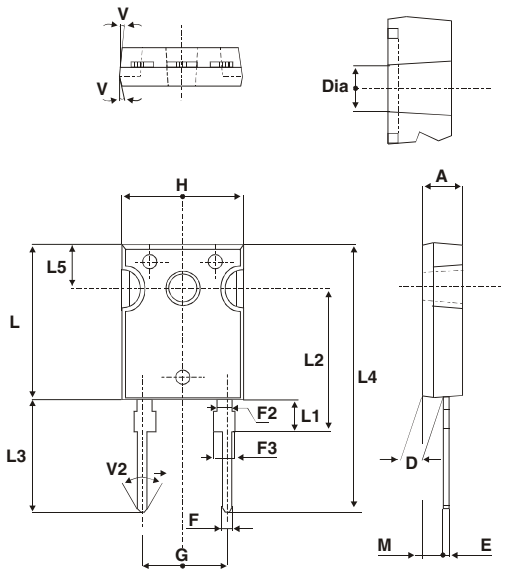
Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 Nm
- Maximum torque value: 1.0 Nm

Table 5. DO-247 Dimensions



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

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

3 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH60L04W	STTH60L04W	DO-247	4.4 g	30	Tube

4 Revision history

Date	Revision	Description of Changes
26-Oct-2006	1	First issue

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