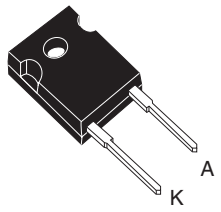
STTH6004W

Ultrafast high voltage rectifier

Table 1: Main 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
STTH6004W

Features and benefits

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

Description

The STTH6004W uses ST 400V technology and is specially suited for use in switching power supplies, welding equipment and industrial applications, as an output rectification diode.

Table 2: Order codes

Part number	Marking
STTH6004W	STTH6004W

Table 3: Absolute ratings (limiting values)

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 = 125 °C δ = 0.5	60	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	600	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature		175	°C

Table 4: Thermal Resistance

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

Table 5: Static electrical characteristics

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

Pulse test: * t_p = 5 ms, δ < 2%

** 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 6: Dynamic 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		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 $V_{FR} = 1.1 \times V_{Fmax}$			600	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C	I_F = 60 A dI_F/dt = 200 A/µs $V_{FR} = 1.1 \times V_{Fmax}$		3.2		V

Figure 1: Conduction losses versus average forward current

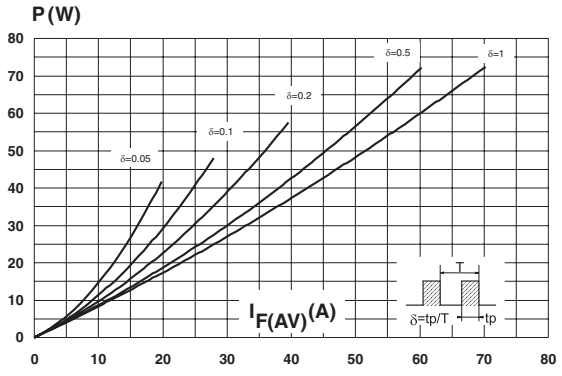


Figure 2: Forward voltage drop versus forward current

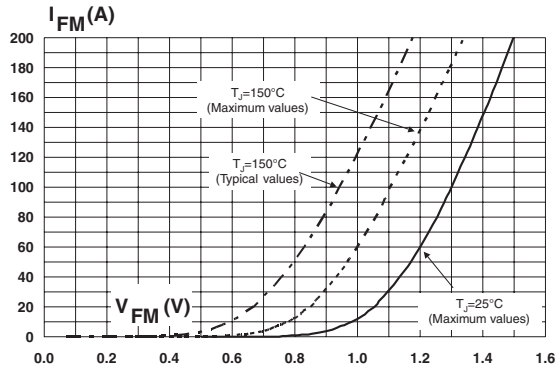


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

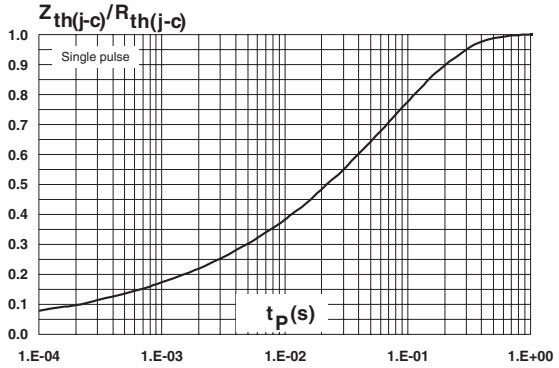


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values)

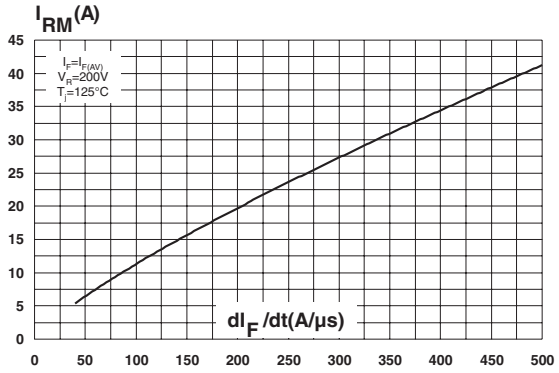


Figure 5: Reverse recovery time versus dI_F/dt (typical values)

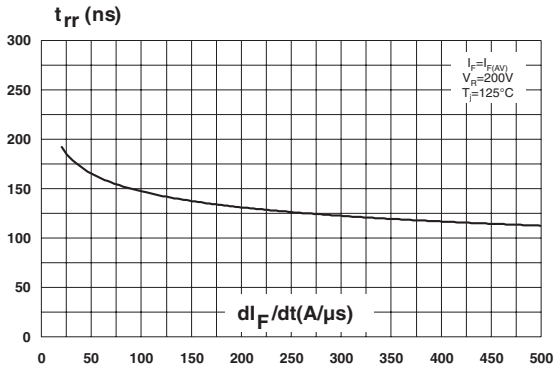


Figure 6: Reverse recovery charges versus dI_F/dt (typical values)

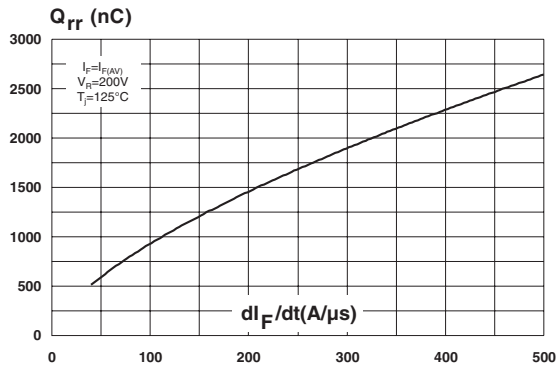


Figure 7: Reverse recovery softness factor versus dI_F/dt (typical values)

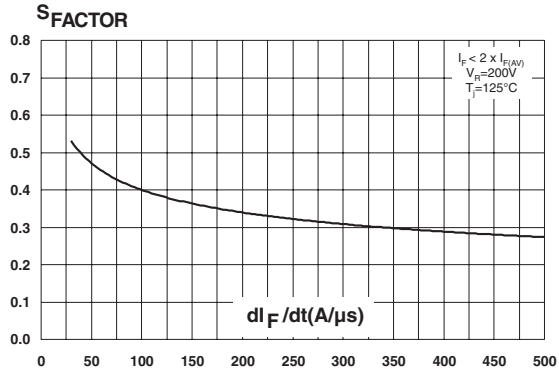


Figure 8: Relative variations of dynamic parameters versus junction temperature

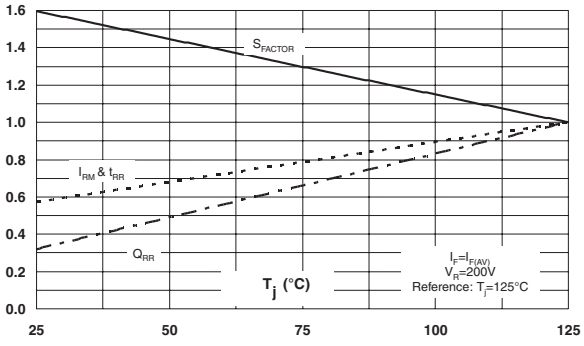


Figure 9: Transient peak forward voltage versus dI_F/dt (typical values)

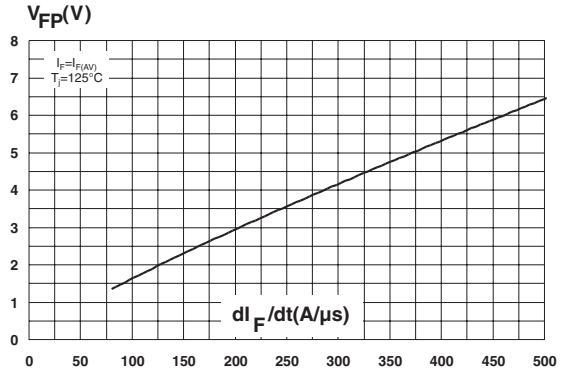


Figure 10: Forward recovery time versus dI_F/dt (typical values)

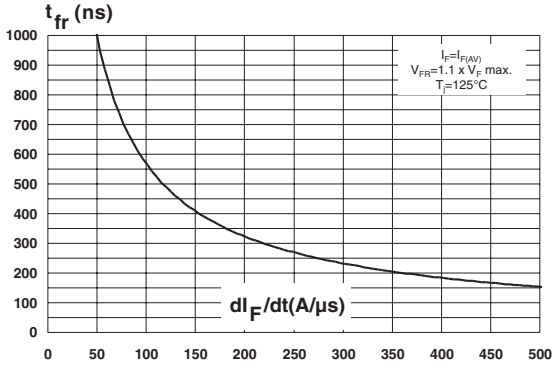


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

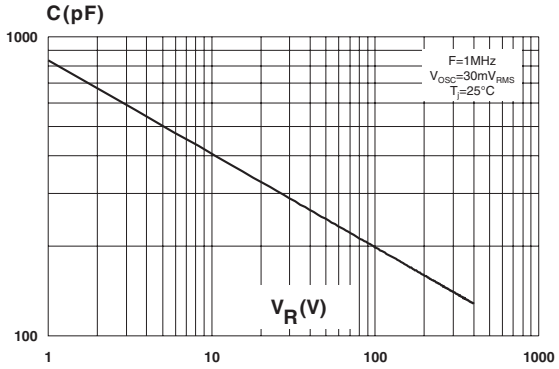
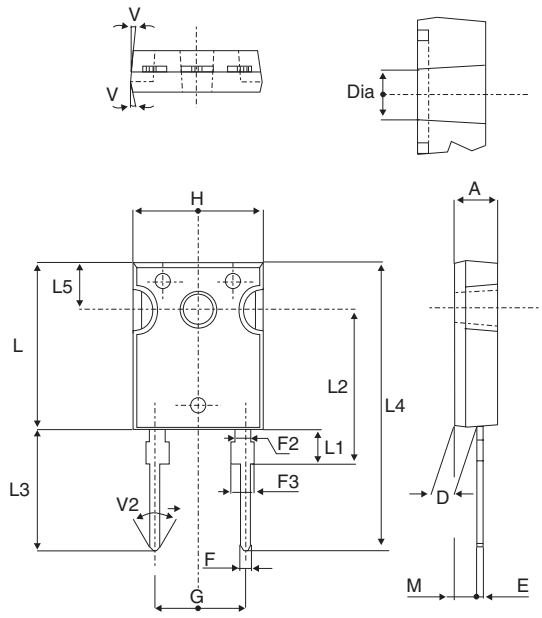


Figure 12: DO-247 Package mechanical data



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.

Table 7: Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH6004W	STTH6004W	DO-247	4.40 g	30	Tube

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

Table 8: Revision history

Date	Revision	Description of Changes
18-Oct-2005	1	First issue

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