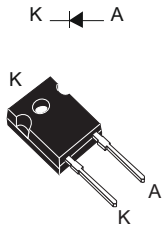
STTH6004W

Datasheet

400 V ultrafast high voltage rectifier



DO-247

Features

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- ECOPACK2 compliant

Applications

- UPS power supply
- Telecom / Server power equipment
- Datacenter

Product status link
STTH6004W

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

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.

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

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, δ = 0.5, square wave	T_C = 125 °C	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 2. Thermal resistance parameter

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	0.7	°C/W

For more information, you can refer to the following application note related to the thermal management:

- AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		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: tp = 5 ms, δ < 2%*
2. *Pulse test: tp = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

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

For more information, you can refer to the following application notes related to the power losses:

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

Table 4. Dynamic electrical 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			-	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				3.2		V

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

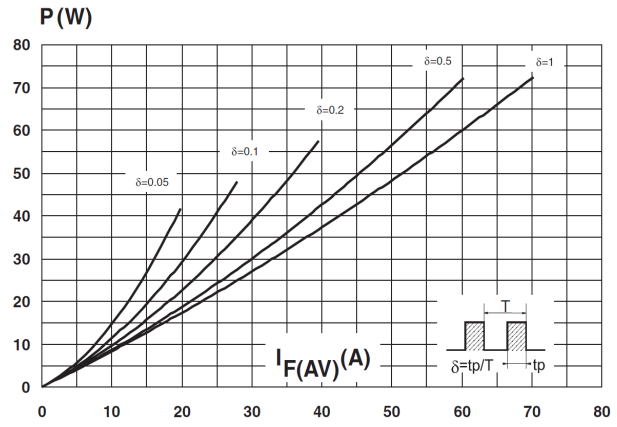


Figure 2. Forward voltage drop versus forward current

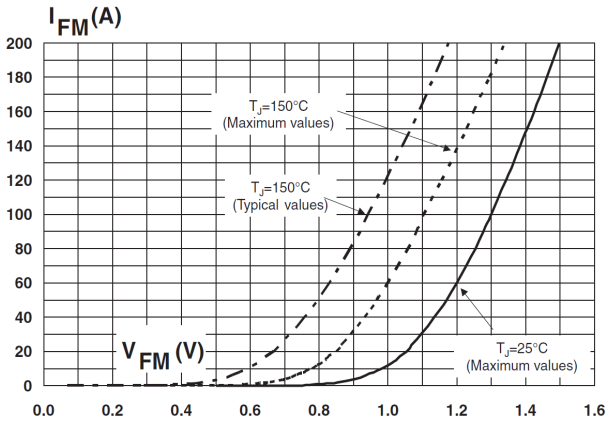


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

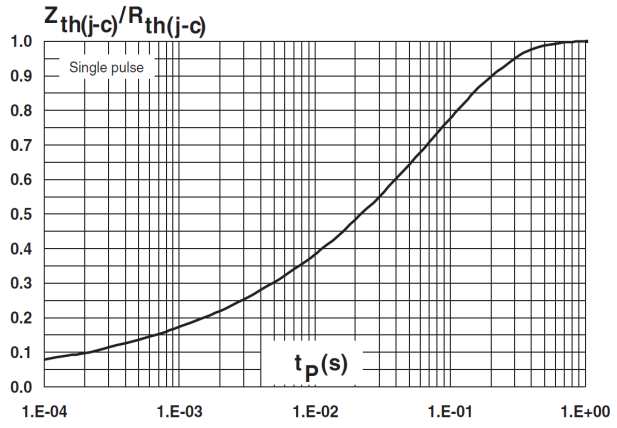


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

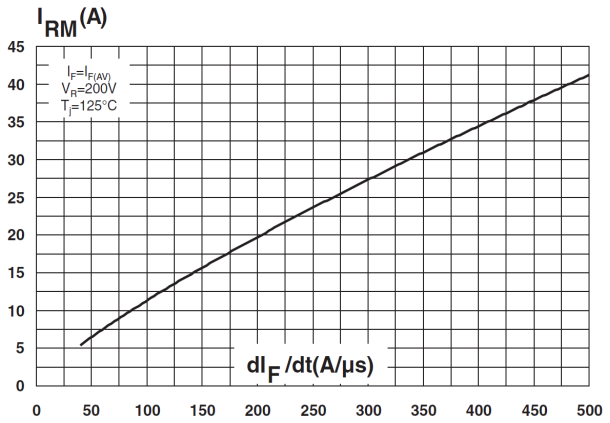


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

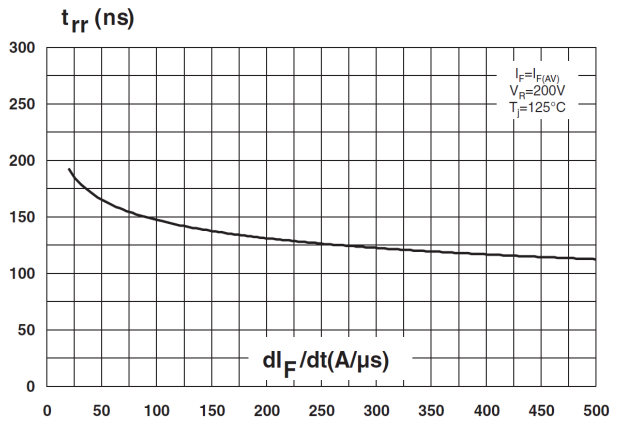


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

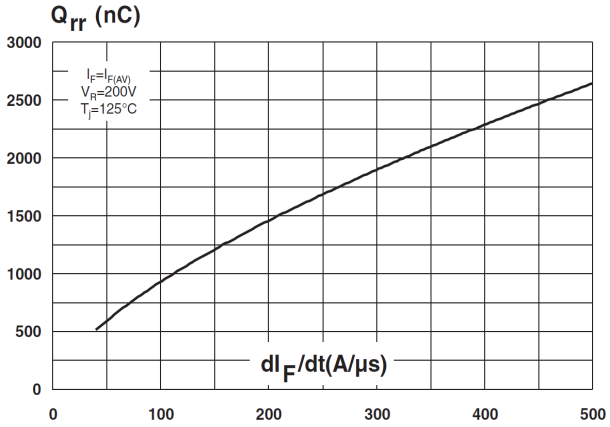


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values)

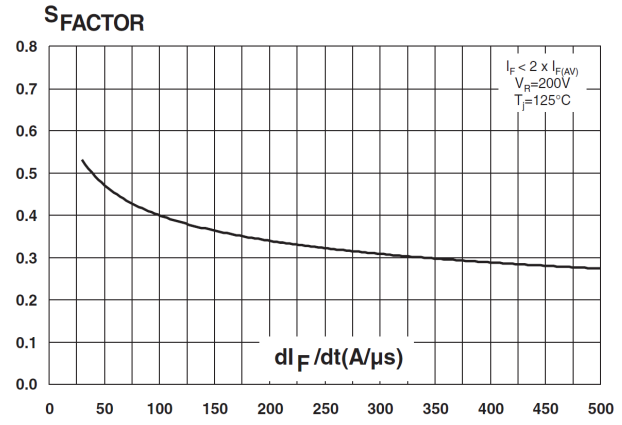


Figure 8. Relative variations of dynamic parameters versus junction temperature

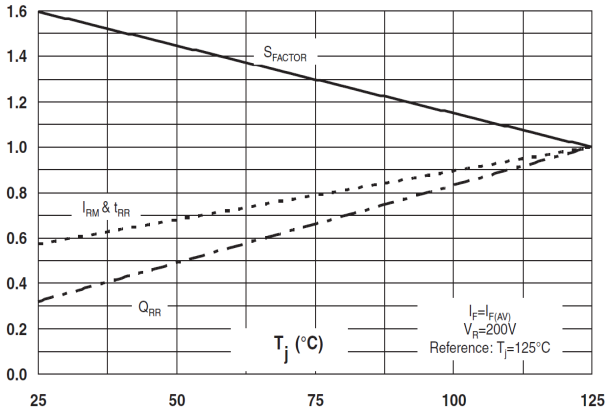


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

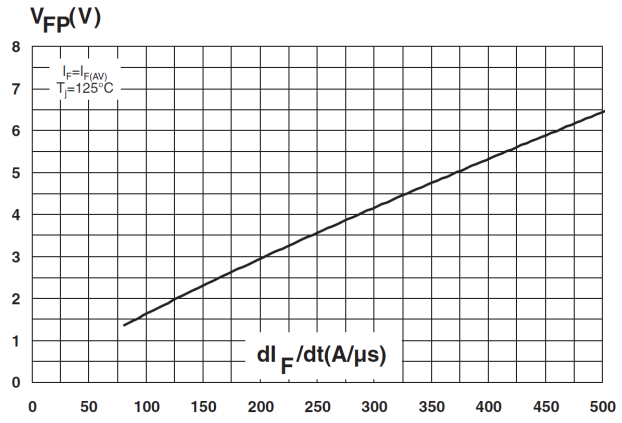


Figure 10. Forward recovery time versus dI_F/dt (typical values)

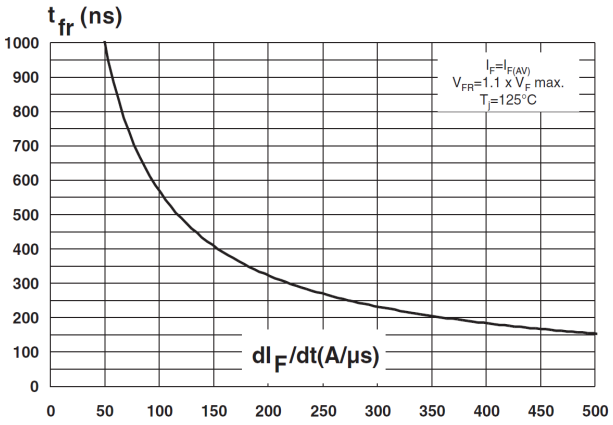
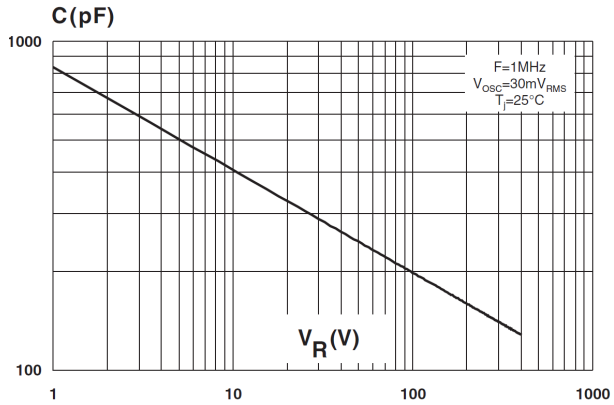


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



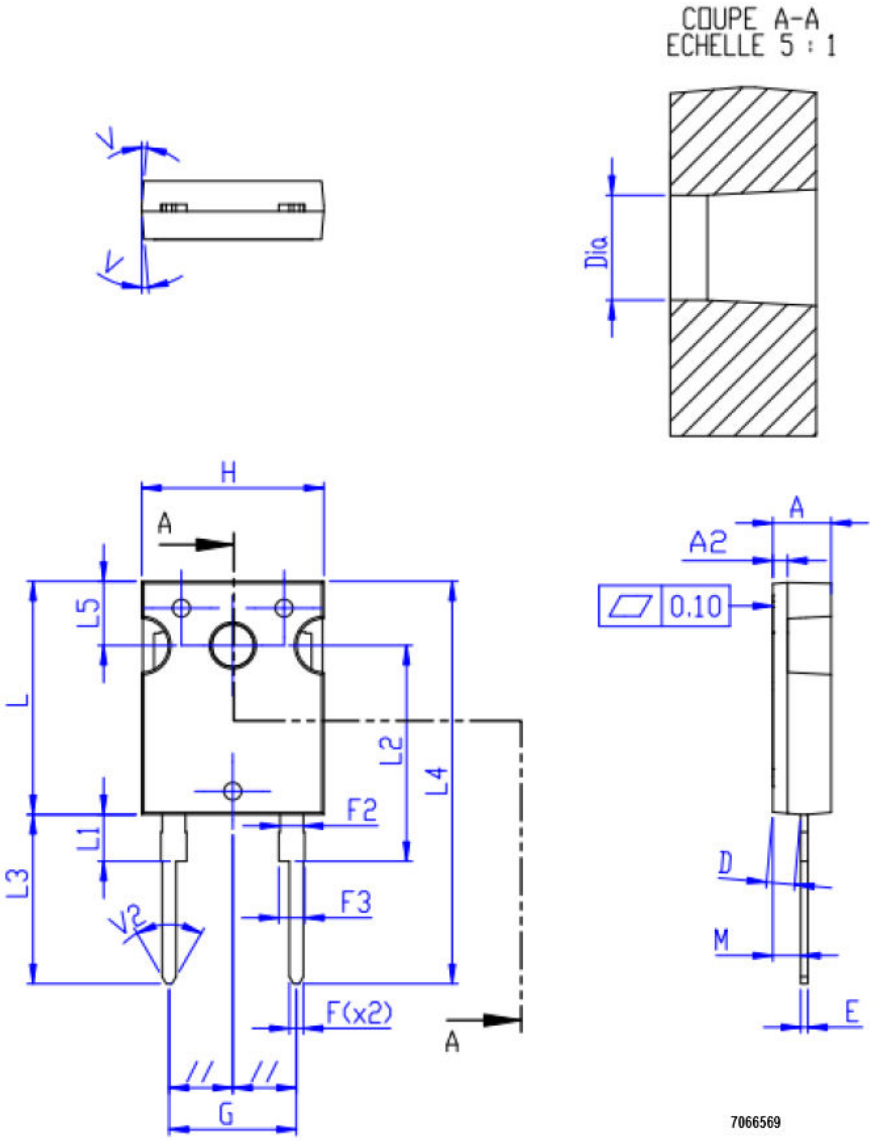
2 Package information

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 DO-247 package information

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

Figure 12. DO-247 package outline



Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. **DO-247 package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.90		5.10	0.1920		0.2010
A2	1.17		1.37	0.0460		0.0540
D	2.2		2.6	0.0866		0.1023
E	0.4		0.8	0.0157		0.0314
F	1		1.4	0.0393		0.0551
F2		2			0.0787	
F3	2		2.4	0.0787		0.0944
G		10.9			0.4291	
H	15.45		15.75	0.6082		0.6200
L	19.85		20.15	0.7814		0.7933
L1	3.7		4.3	0.1456		0.1692
L2		18.5			0.7283	
L3	14.2		14.8	0.5590		0.5826
L4		34.6			1.3622	
L5		5.5			0.2165	
M	2		3	0.0787		0.1181
V		5°			5°	
V2		60°			60°	
Diam.	3.55		3.65	0.1397		0.1437

3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH6004W	STTH6004W	DO-247	4.4 g	30	Tube

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
18-Oct-2025	1	Initial release.
05-Jun-2025	2	Inserted Section Applications. Updated Figure 12 Minor text changes.