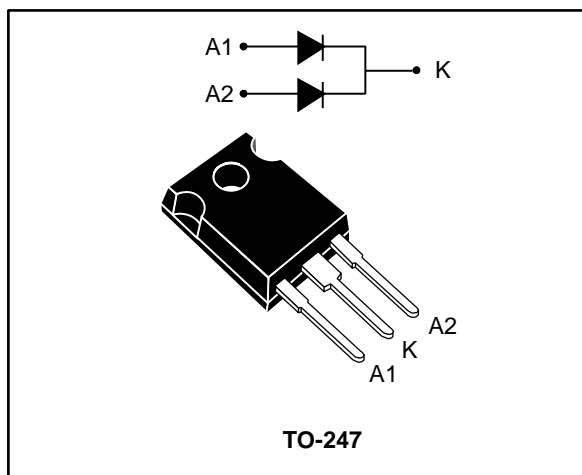


## High efficiency rectifier

Datasheet - production data



### Description

The STTH60W03C uses ST 300 V technology. It is especially suited to be used for DC/DC and DC/AC converters in secondary stage of MIG/MMA/TIG welding machine. Housed in ST's TO-247, this device offers high power integration for all welding machines and industrial applications.

**Table 1: Device summary**

Symbol	Value
$I_{F(AV)}$	2 x 30 A
$V_{RRM}$	300 V
$T_j$	175 °C
$V_F$ (typ.)	0.94 V
$t_{rr}$ (typ.)	25 ns

### Features

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduced switching losses
- ECOPACK<sup>®</sup>2 compliant component

# 1 Characteristics

**Table 2: Absolute ratings (limiting values, per diode, limiting values at 25°C, unless otherwise specified)**

Symbol	Parameter			Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage			300	V
I <sub>F(RMS)</sub>	Forward rms current			50	A
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$ , square wave	T <sub>c</sub> = 110 °C	Per diode	30	A
		T <sub>c</sub> = 95 °C	Per device	60	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal		280	A
T <sub>stg</sub>	Storage temperature range			-65 to +175	°C
T <sub>j</sub>	Maximum operating junction temperature range			+175	°C

**Table 3: Thermal parameters**

Symbol	Parameter		Max. value	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	1.5	°C/W
		Total	0.9	°C/W
R <sub>th(c)</sub>	Coupling		0.3	°C/W

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P_{(\text{diode1})} \times R_{th(j-c)} (\text{per diode}) + P_{(\text{diode2})} \times R_{th(c)}$$

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

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		20	μA
		T <sub>j</sub> = 125 °C		-	20	200	
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 30 A	-		1.45	V
		T <sub>j</sub> = 150 °C		-	0.94	1.15	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 60 A	-		1.7	
		T <sub>j</sub> = 150 °C		-	1.18	1.45	

**Notes:**

(1)Pulse test: t<sub>p</sub> = 5 ms,  $\delta < 2\%$

(2)Pulse test: t<sub>p</sub> = 380 μs,  $\delta < 2\%$

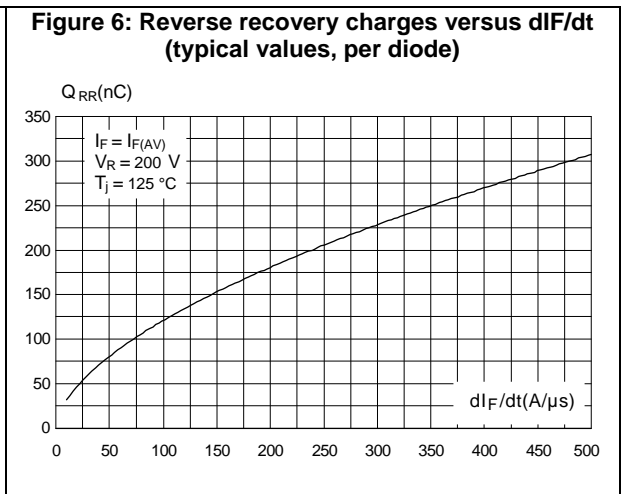
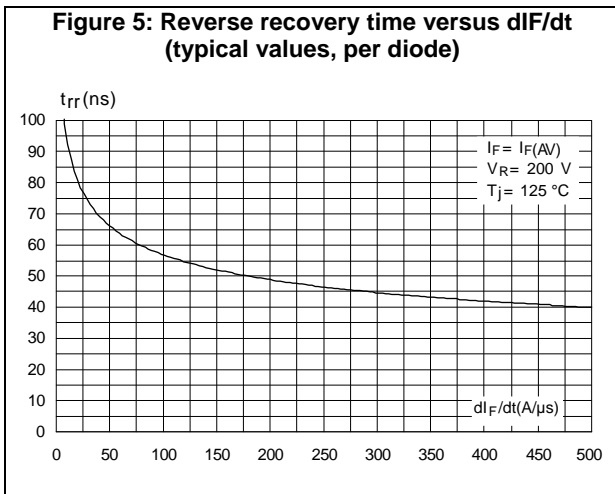
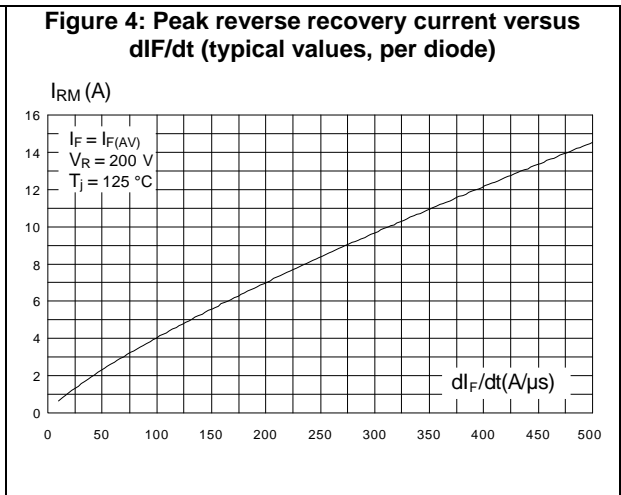
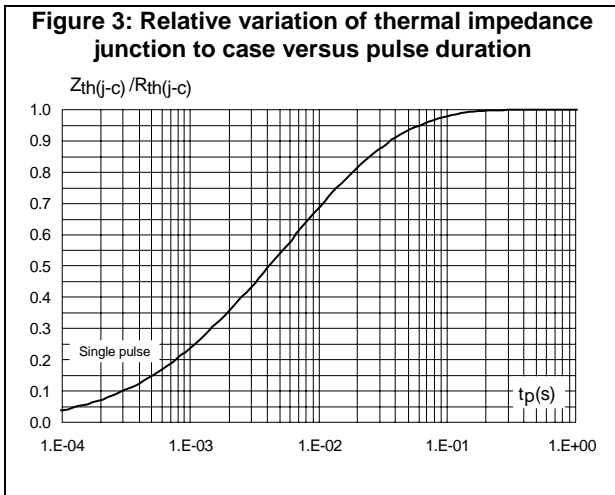
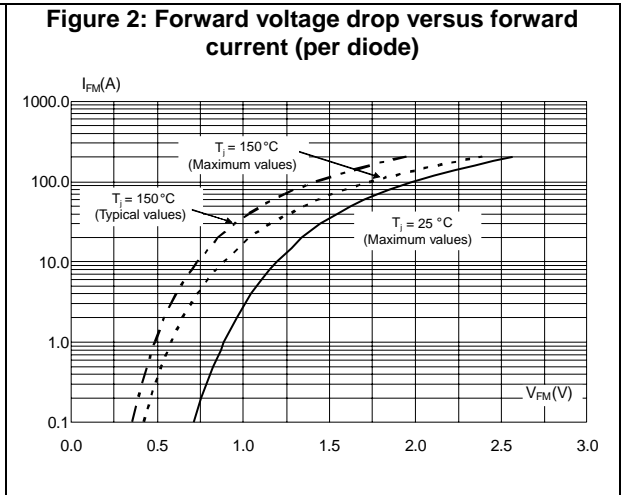
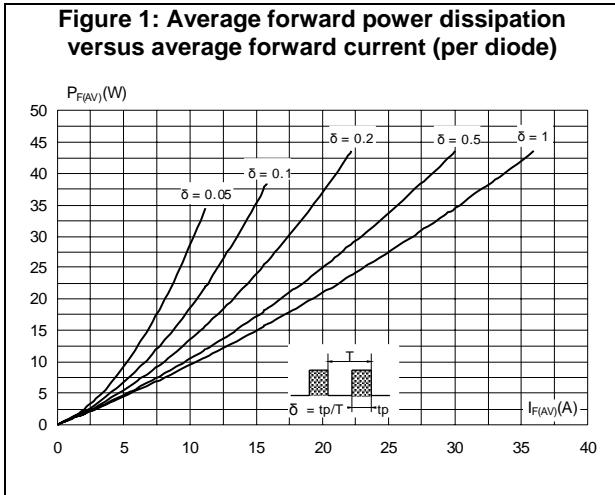
To evaluate the conduction losses, use the following equation:

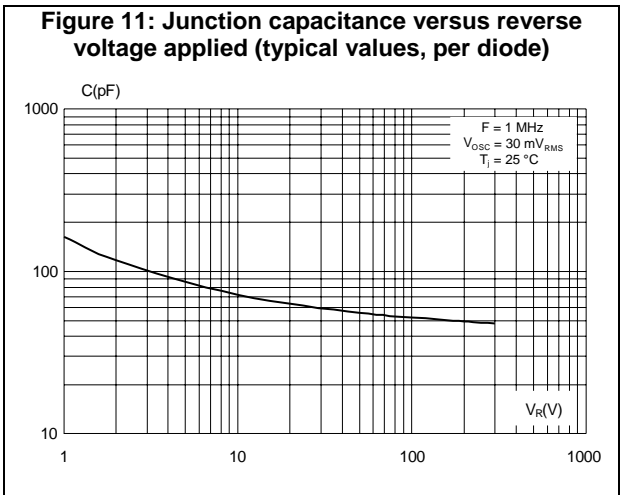
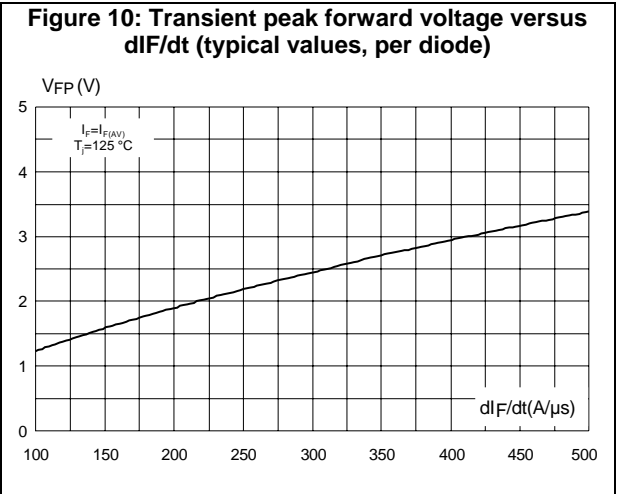
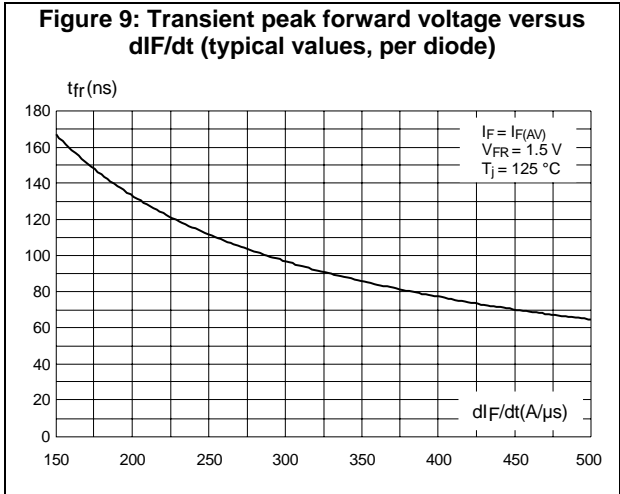
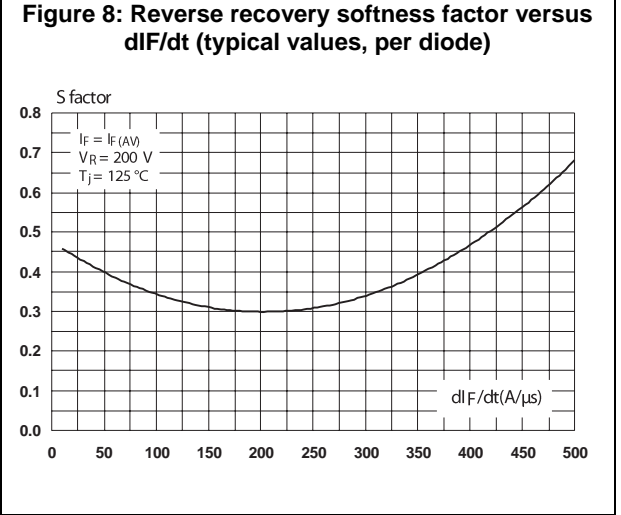
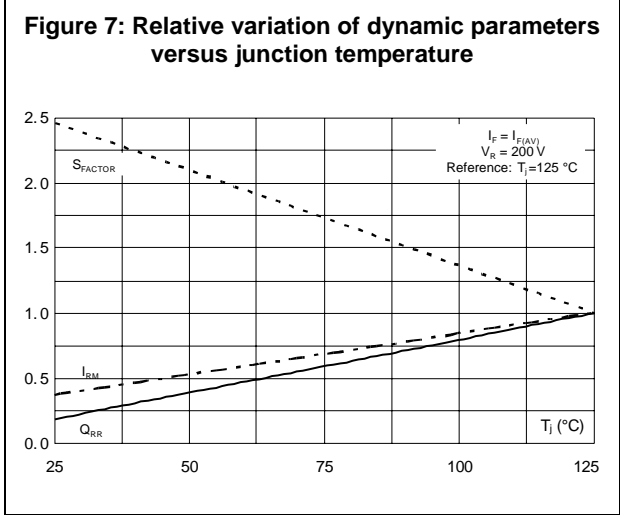
$$P = 0.85 \times I_{F(AV)} + 0.010 \times I_{F(RMS)}^2$$

Table 5: Dynamic electrical characteristics (per diode)

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ °C}$	$I_F = 30\text{ A}$ , $V_R = 200\text{ V}$ , $di_F/dt = -200\text{ A}/\mu\text{s}$	-	7	9	A
$Q_{RR}$	Reverse recovery charge	$T_j = 125\text{ °C}$	$I_F = 30\text{ A}$ , $V_R = 200\text{ V}$ , $di_F/dt = -200\text{ A}/\mu\text{s}$	-	180		nC
$S_{factor}$	Softness factor	$T_j = 125\text{ °C}$	$I_F = 30\text{ A}$ , $V_R = 200\text{ V}$ , $di_F/dt = -200\text{ A}/\mu\text{s}$	-	0.3		
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 1\text{ A}$ , $di_F/dt = -100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	25	35	ns
$t_{fr}$	Forward recovery time	$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_{FR} = 1.5\text{ V}$	-		180	ns
$V_{FP}$	Forward recovery voltage			-	2.0	3.0	V

# 1.1 Characteristics (curves)





## 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.

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.8 N·m (TO-247)
- Maximum torque value: 1.0 N·m (TO-247)

### 2.1 TO-247 with Inches package information

Figure 12: TO-247 package outline

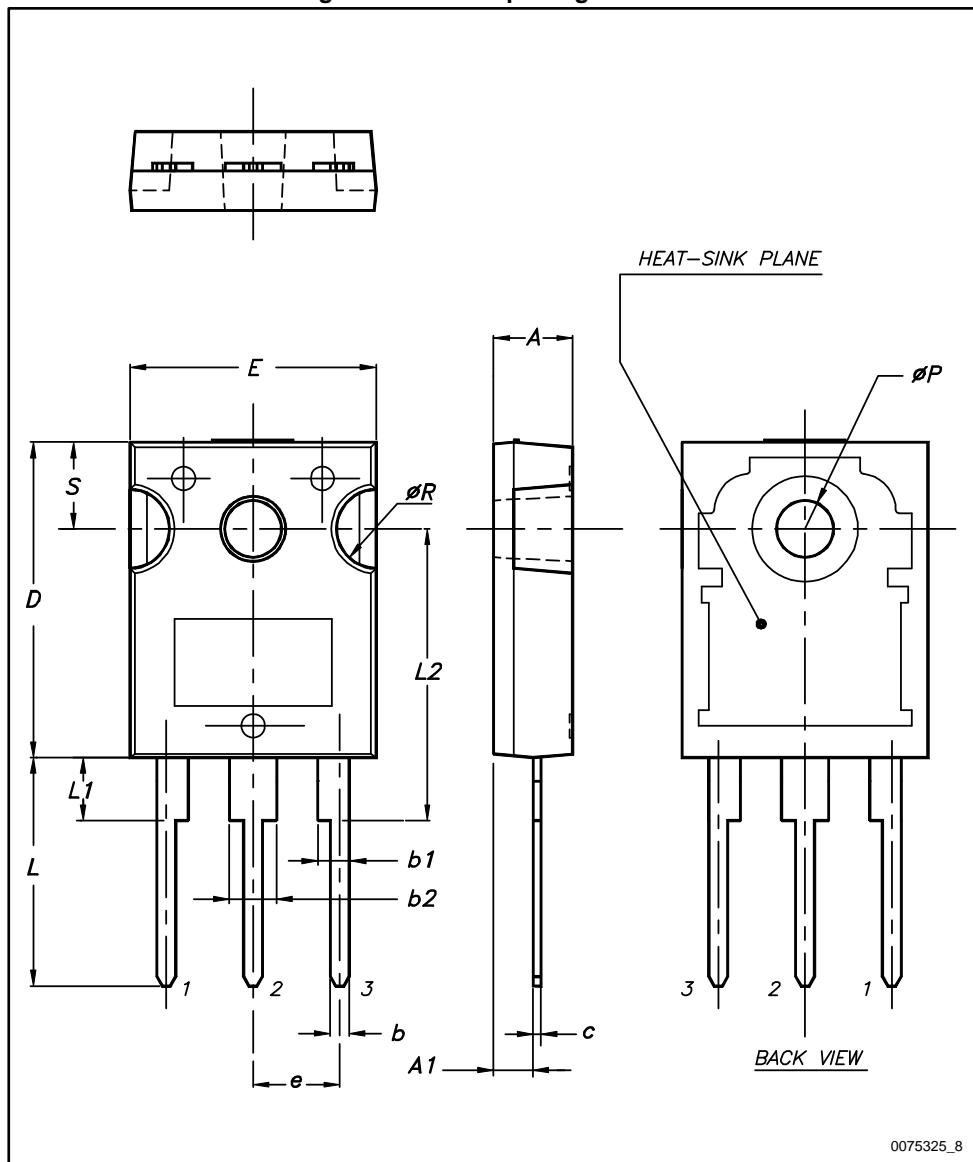


Table 6: TO-247 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D <sup>(1)</sup>	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
ØP <sup>(2)</sup>	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

**Notes:**

<sup>(1)</sup>Dimension D plus gate protusion does not exceed 20.5 mm

<sup>(2)</sup>Resin thickness around the mounting hole is not less than 0.9 mm.

### 3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH60W03CW	STTH60W03CW	TO-247	4.43 g	50	Tube

### 4 Revision history

Table 8: Document revision history

Date	Revision	Changes
07-Sep-2004	1	First issue.
08-Feb-2018	2	Updated Description and package information.



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