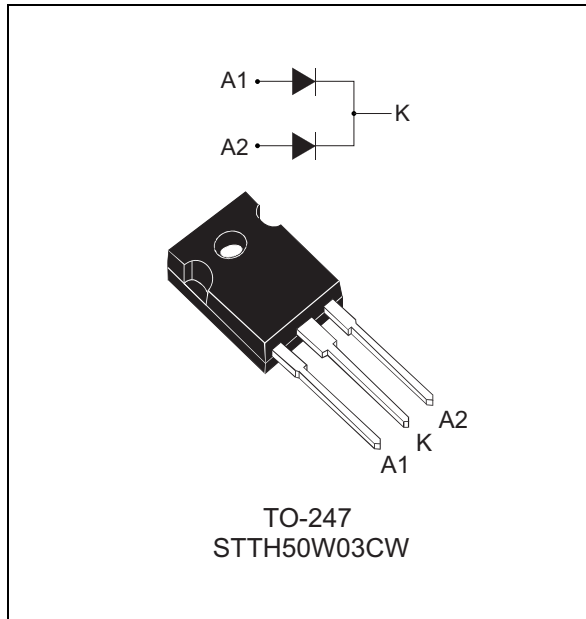




Description

The STTH50W03C uses ST Turbo 2 300 V technology. It is especially suited to be used for DC/DC and DC/AC converters in the secondary stage of MIG/MMA/TIG welding machines. 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 25 A
V_{RRM}	300 V
t_{rr} (typ)	20 ns
T_j	175 °C
V_F (typ)	1 V

Features

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses
- ECOPACK®2 compliant component

1 Characteristics

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

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			300	V
I _{F(RMS)}	Forward rms current			40	A
I _{F(AV)}	Average forward current, δ = 0.5	T _c = 105 °C	Per diode	25	A
		T _c = 100°C	Per device	50	
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal		200	A
T _{stg}	Storage temperature range			-65 to + 175	° C
T _j	Maximum operating junction temperature			+ 175	° C

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	1.8	°C / W
		Total	1	
$R_{th(c)}$	Coupling		0.2	

When diodes 1 and 2 are used simultaneously:

$$T_{j(\text{diode } 1)} = P_{(\text{diode } 1)} \times R_{th(j-c)}(\text{Per diode}) + P_{(\text{diode } 2)} \times R_{th(c)}$$

Table 4. Static electrical characteristics per diode

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			15	μA
		$T_j = 125\text{ °C}$			15	150	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 25\text{ A}$			1.5	V
		$T_j = 150\text{ °C}$			1.0	1.2	
		$T_j = 25\text{ °C}$	$I_F = 50\text{ A}$			1.8	
		$T_j = 150\text{ °C}$			1.25	1.5	

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:

$$P = 0.9 \times I_{F(AV)} + 0.012 I_{F(RMS)}^2$$

Table 5. Dynamic electrical characteristics per diode

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_{RM}	Reverse recovery current	$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 25\text{ A}$, $V_R = 200\text{ V}$ $di_F/dt = -200\text{ A}/\mu\text{s}$		7	9	A
Q_{RR}	Reverse recovery charge				170		nC
S_{factor}	Softness factor				0.3		
t_{rr}	Reverse recovery time	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$, $V_R = 30\text{ V}$ $di_F/dt = -100\text{ A}/\mu\text{s}$		20	27	ns
t_{fr}	Forward recovery time	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 25\text{ A}$, $V_{FR} = 1.2\text{ V}$ $di_F/dt = 400\text{ A}/\mu\text{s}$			120	ns
V_{FP}	Forward recovery voltage				2.5	3.6	V

Figure 1. Average forward power dissipation versus average forward current (per diode)

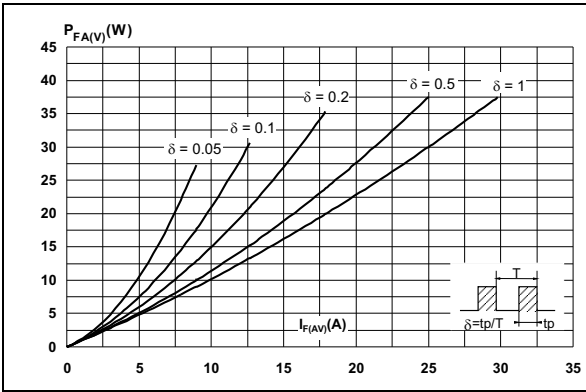


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

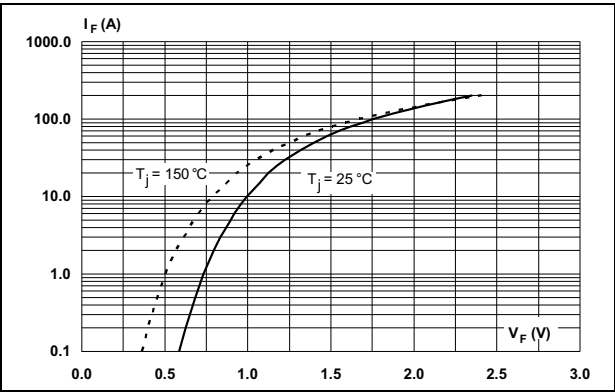


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

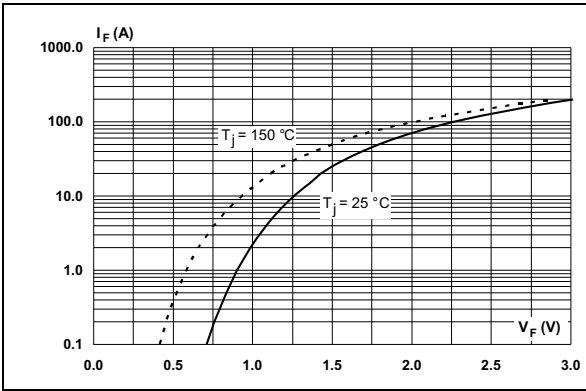
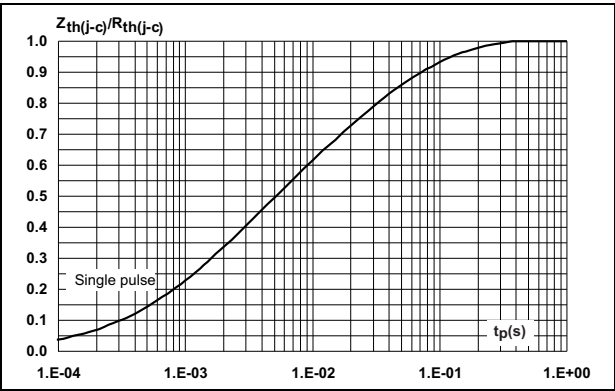


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration



3 **Ordering information**

Table 7. Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH50W03CW	STTH50W03CW	TO-247	4.46 g	50	Tube