

Features

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

Description

The STTH30W02CW, uses ST Turbo 2, 200 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.

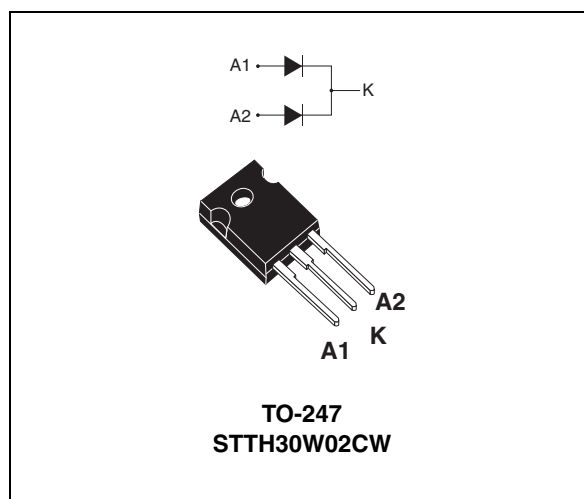


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 15 A
V_{RRM}	200 V
t_{rr} (typ)	20 ns
T_j (max)	175 °C
V_F (typ)	0.90 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			200	V
I _{F(RMS)}	Forward rms current			30	A
I _{F(AV)}	Average forward current, δ = 0.5	T _c = 125 °C	Per diode	15	A
		T _c = 115°C	Per device	30	
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal		140	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	2.5	°C / W
		Total	1.5	
$R_{th(c)}$	Coupling		0.5	

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

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			10	μA
		$T_j = 125\text{ °C}$			5	50	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 15\text{ A}$			1.20	V
		$T_j = 150\text{ °C}$			0.90	1.05	
		$T_j = 25\text{ °C}$	$I_F = 30\text{ A}$			1.4	
		$T_j = 150\text{ °C}$			1.1	1.3	

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:

$$P = 0.8 \times I_{F(AV)} + 0.0167 I_{F(RMS)}^2$$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_{RM}	Reverse recovery current	$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 15\text{ A}$, $V_R = 160\text{ V}$ $di_F/dt = -200\text{ A}/\mu\text{s}$		7	9	A
Q_{RR}	Reverse recovery charge				160		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	25	ns
t_{fr}	Forward recovery time	$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 15\text{ A}$, $V_{FR} = 1.1\text{ V}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			200	ns
V_{FP}	Forward recovery voltage	$T_j = 25\text{ }^{\circ}\text{C}$			1.6	2.4	V

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

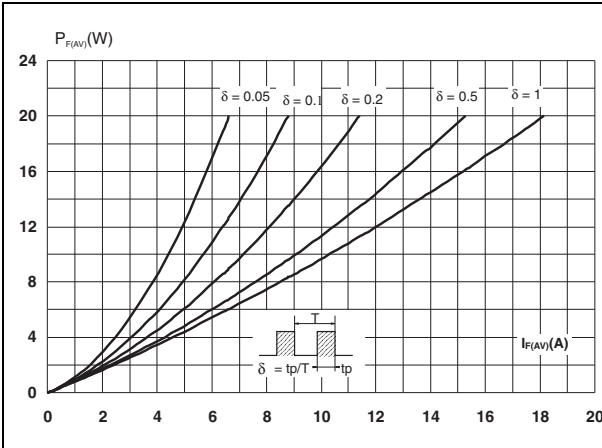


Figure 2. Forward voltage drop versus forward current (per diode)

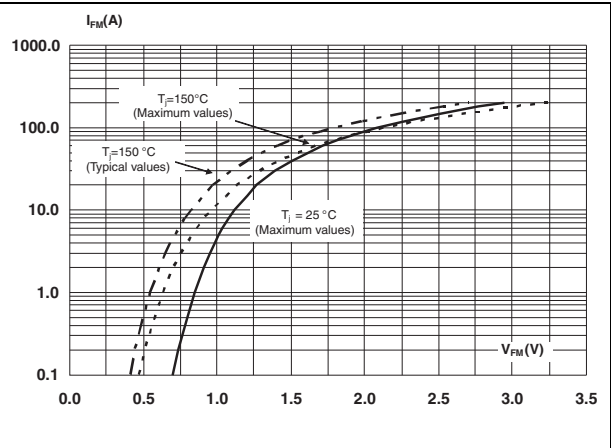


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

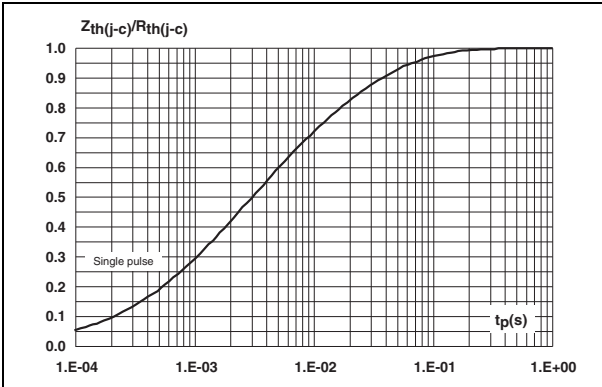


Figure 4. Peak reverse recovery current versus di_F/dt (typical values, per diode)

