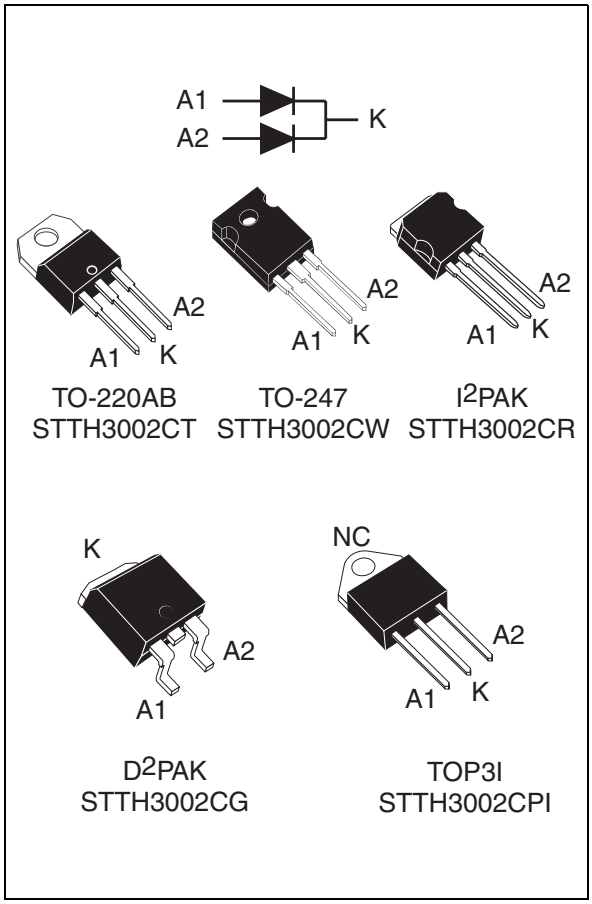
STTH3002C

High efficiency ultrafast diode

Main product characteristics

$I_{F(AV)}$	2 x 15A
V_{RRM}	200 V
T_j(max)	175° C
V_F (typ)	0.75 V
t_{rr} (typ)	17 ns



Features and benefits

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- High junction temperature
- Insulated version TOP3I:
  - Insulated voltage: 2500 V_{rms}
  - Capacitance 12 pF

Description

Dual center tab rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-220AB, TO-247, I²PAK, D²PAK, and TOP3I, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection

Order codes

Part Number	Marking
STTH3002CT	STTH3002C
STTH3002CW	STTH3002C
STTH3002CR	STTH3002C
STTH3002CG	STTH3002C
STTH3002CG-TR	STTH3002C
STTH3002CPI	STTH3002C

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			200	V
$I_{F(RMS)}$	RMS forward current			50	A
$I_{F(AV)}$	Average forward current, δ = 0.5	TO-220AB, TO-247, I^2PAK, D^2PAK	Per diode T_c = 150° C	15	A
			Per device T_c = 145° C	30	
		TOP3I	Per diode T_c = 125° C	15	
			Per device T_c = 105° C	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		180	A
T_{stg}	Storage temperature range			-65 to +175	° C
T_j	Maximum operating junction temperature			175	° C

Table 2. Thermal parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, TO-247, I^2PAK, D^2PAK	Per diode	1.5	° C/W
			Total	1.0	
		TOP3I	Per diode	3.5	
			Total	2.3	
$R_{th(c)}$	Coupling	TO-220AB, TO-247, I^2PAK, D^2PAK		0.5	
		TOP3I		1.1	

When the two diodes 1 and 2 are used simultaneously:

ΔTj(diode 1) = P (diode 1) X $R_{th(j-c)}$ (Per diode) + P (diode 2) x $R_{th(c)}$

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			20	µA
		T_j = 125° C			10	125	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 15 A			1.05	V
			I_F = 30 A			1.18	
		T_j = 150° C	I_F = 15 A		0.75	0.84	
			I_F = 30 A			0.99	

1. Pulse test: t_p = 5 ms, δ < 2 %
2. Pulse test: t_p = 380 µs, δ < 2 %

To evaluate the conduction losses use the following equation:
$P = 0.69 \times I_{F(AV)} + 0.01\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = 200 A/µs, V_R = 30 V, T_j = 25 °C		17	22	ns
I_{RM}	Reverse recovery current	I_F = 15 A, dI_F/dt = 200 A/µs, V_R = 160 V, T_j = 125 °C		6	7.8	A
t_{fr}	Forward recovery time	I_F = 15 A, dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}, T_j = 25 °C			110	ns
V_{FP}	Forward recovery voltage	I_F = 15 A, dI_F/dt = 200 A/µs, T_j = 25 °C		2.5		V

Figure 1. Peak current versus duty cycle (per diode)

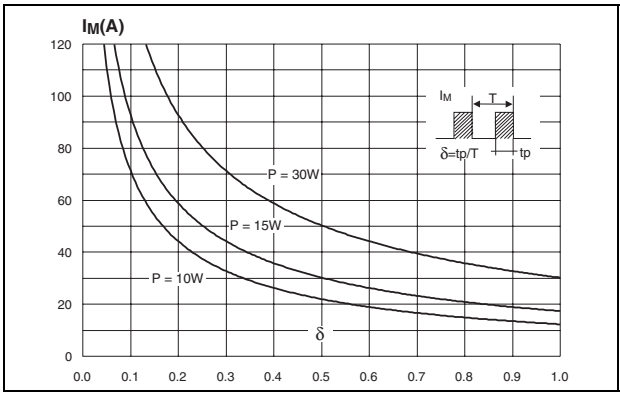


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

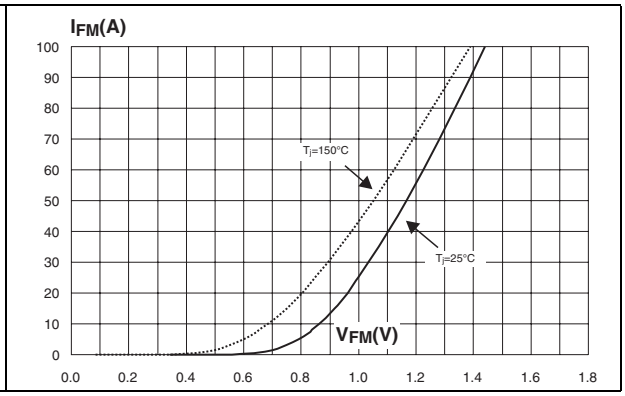


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

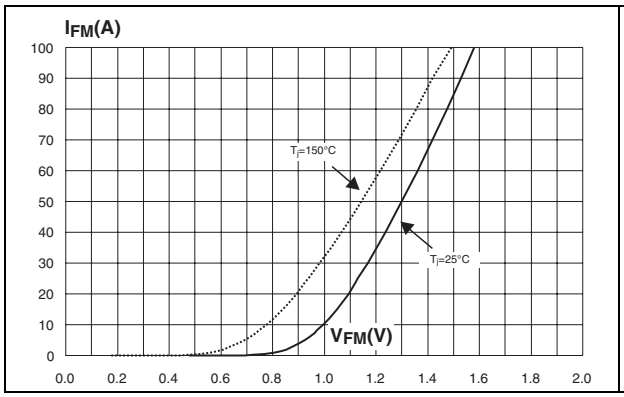


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

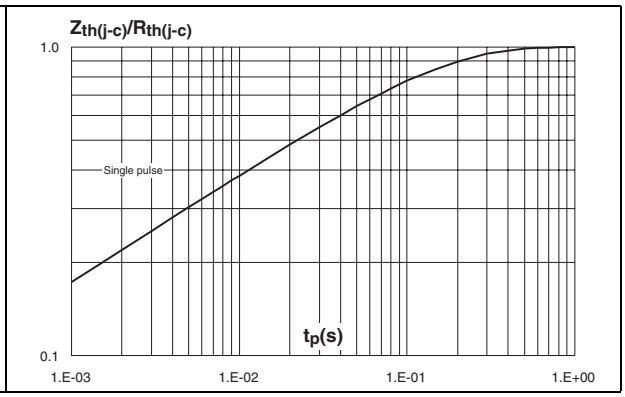


Figure 5. Junction capacitance versus reverse applied voltage (typical values, per diode)

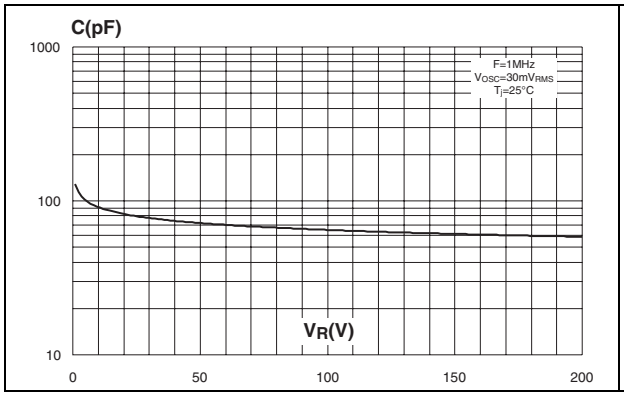


Figure 6. Reverse recovery charges versus dI_F/dt (typical values, per diode)

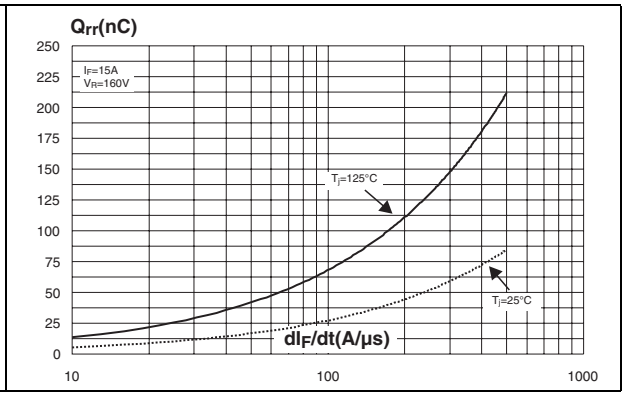


Figure 7. Reverse recovery time versus dI_F/dt (typical values, per diode)

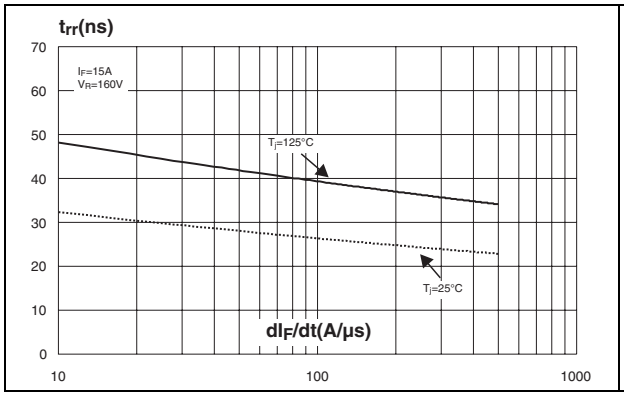
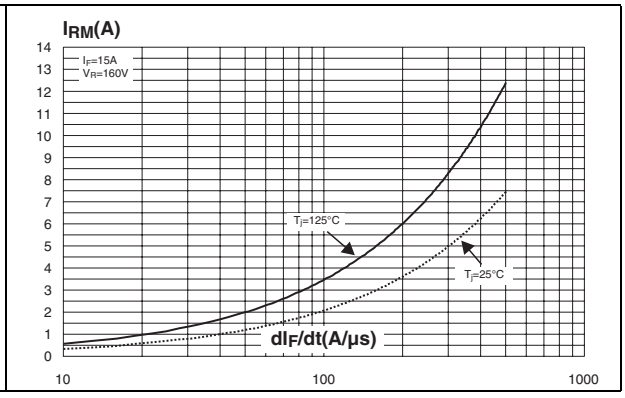


Figure 8. Peak reverse recovery current versus dI_F/dt (typical values, per diode)



4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH3002CT	STTH3002C	TO-220AB	2.23 g	50	Tube
STTH3002CW	STTH3002C	TO-247	4.46 g	30	Tube
STTH3002CR	STTH3002C	I^2PAK	1.49 g	50	Tube
STTH3002CG	STTH3002C	D^2PAK	1.48 g	50	Tube
STTH3002CG-TR	STTH3002C	D^2PAK	1.48 g	1000	Tape and reel
STTH3002CPI	STTH3002C	TOP3I	4.7 g	30	Tube