

Ultrafast recovery - 1200 V diode

Main product characteristics

$I_{F(AV)}$	5 A
V_{RRM}	1200 V
T_j	175° C
V_F (typ)	1.25 V
t_{rr} (typ)	48 ns

Features and benefits

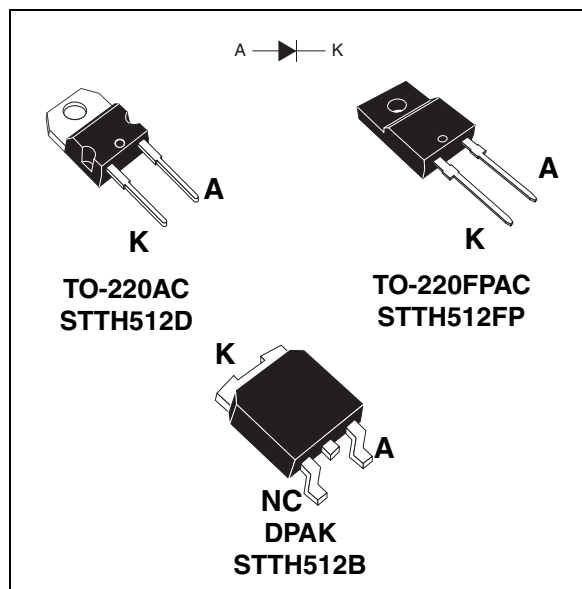
- Ultrafast, soft recovery
- Very low conduction and switching losses
- High frequency and/or high pulsed current operation
- High reverse voltage capability
- High junction temperature
- Insulated package: TO-220FPAC
Electrical insulation = 2000 V_{RMS}
Capacitance = 12 pF

Description

The high quality design of this diode has produced a device with low leakage current, regularly reproducible characteristics and intrinsic ruggedness. These characteristics make it ideal for heavy duty applications that demand long term reliability.

Such demanding applications include industrial power supplies, motor control, and similar mission-critical systems that require rectification and freewheeling. These diodes also fit into auxiliary functions such as snubber, bootstrap, and demagnetization applications.

The improved performance in low leakage current, and therefore thermal runaway guard band, is an immediate competitive advantage for this device.



Order codes

Part Number	Marking
STTH512D	STTH512D
STTH512B	STTH512B
STTH512B-TR	STTH512B
STTH512FP	STTH512FP

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		1200	V
$I_{F(RMS)}$	RMS forward current	TO-220AC / TO-220FPAC	30	A
		DPAC	10	
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	TO-220AC / DPAK	5	A
		TO-220FPAC		
I_{FRM}	Repetitive peak forward current	$t_p = 5 \mu s$, $F = 5$ kHz square	60	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal	55	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-220AC / DPAK	2.5	°C/W
		TO-220FPAC	5.8	

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ C$	$V_R = V_{RRM}$			5	μA
		$T_j = 125^\circ C$			3	30	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25^\circ C$	$I_F = 5$ A			2.2	V
		$T_j = 125^\circ C$			1.30	2.0	
		$T_j = 150^\circ C$			1.25	1.9	

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$

2. Pulse test: $t_p = 380 \mu s$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.5 \times I_{F(AV)} + 0.08 I_{F(RMS)}^2$$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	$I_F = 1$ A, $dI_F/dt = -50$ A/ μs , $V_R = 30$ V, $T_j = 25^\circ C$			95	ns
		$I_F = 1$ A, $dI_F/dt = -100$ A/ μs , $V_R = 30$ V, $T_j = 25^\circ C$		48	70	
I_{RM}	Reverse recovery current	$I_F = 5$ A, $dI_F/dt = -200$ A/ μs , $V_R = 600$ V, $T_j = 125^\circ C$		11	16	A

Table 4. Dynamic characteristics

S	Softness factor	$I_F = 5\text{ A}$, $dI_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 600\text{ V}$, $T_j = 125^\circ\text{ C}$		2		
t_{fr}	Forward recovery time	$I_F = 5\text{ A}$ $dI_F/dt = 50\text{ A}/\mu\text{s}$ $V_{FR} = 1.5 \times V_{Fmax}$, $T_j = 25^\circ\text{ C}$			400	ns
V_{FP}	Forward recovery voltage	$I_F = 5\text{ A}$, $dI_F/dt = 50\text{ A}/\mu\text{s}$, $T_j = 25^\circ\text{ C}$		9.5		V

Figure 1. Conduction losses versus average current

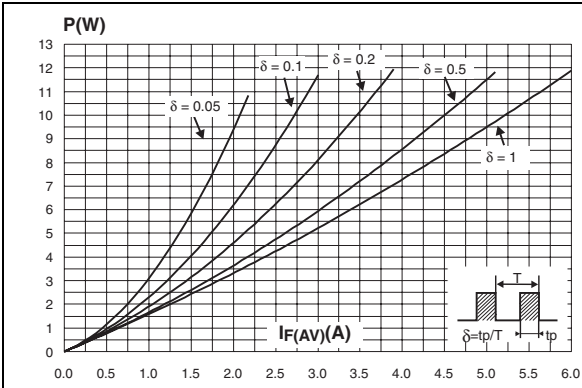


Figure 2. Forward voltage drop versus forward current

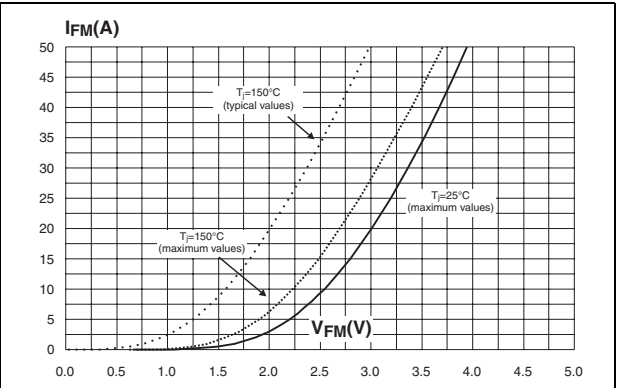


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

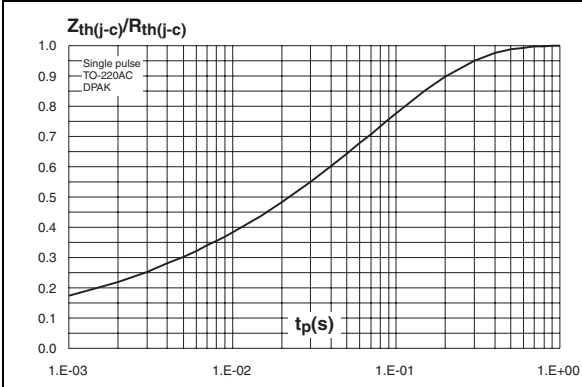


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

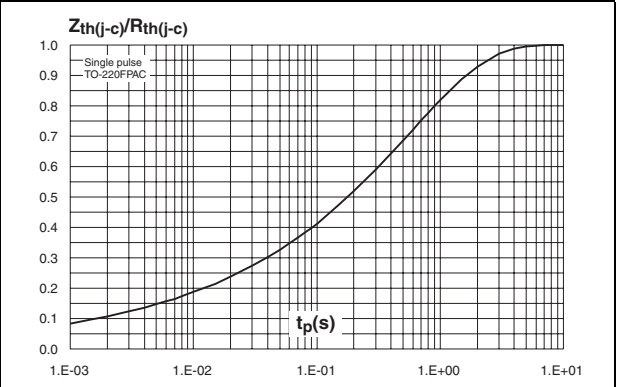


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

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

3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH512D	STTH512D	TO-220AC	1.86g	50	Tube
STTH512FP	STTH512FP	TO-220FPAC	2.2	50	Tube
STTH512B	STTH512B	DPAK	0.30	75	Tube
STTH512B-TR	STTH512B	DPAK	0.30	2500	Tape & reel