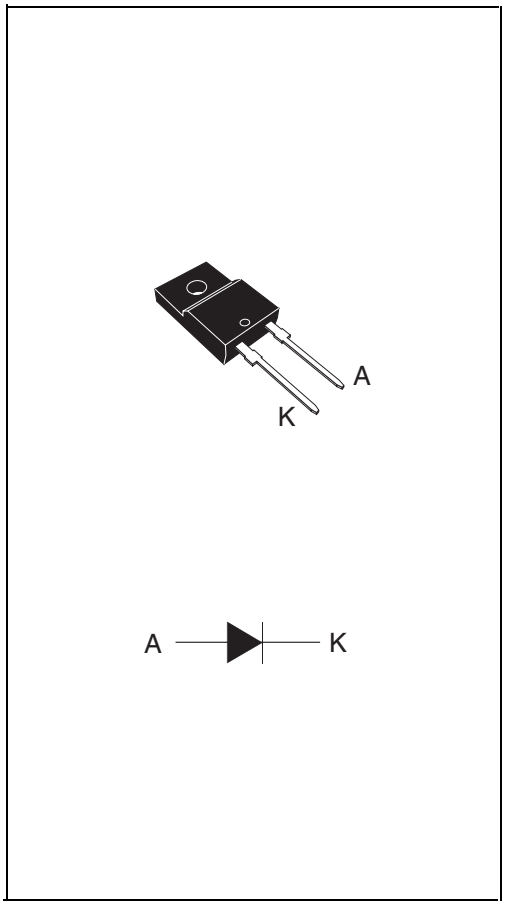
SHEN ZHEN LONG JING MICRO- ELECTRONICS CO. LTD

TO-220FUltrafast recovery diode

STTH802FP

Main product characteristics

$I_{F(AV)}$	8 A
V_{RRM}	200 V
$T_{j\ (max)}$	175° C
V_F (typ)	0.8 V
t_{rr} (typ)	17 ns



Features and benefits

- Very low conduction losses
- Negligible switching losses
- Low forward and reverse recovery time
- High junction temperature

Description

The STTH802 uses ST's new 200 V planar Pt doping technology, and is specially suited for switching mode base drive and transistor circuits.

Packaged in TO-220AC, TO-220FPAC, DPAK, and D^2PAK this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection.

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			16	A
$I_{F(AV)}$	Average forward current, δ = 0.5	TO-220A, DPAK, D^2PAK	T_c = 145° C	8	A
		TO-220FPAC	T_c = 125° C		
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal		100	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-220FPAC	5.5	° C/W

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$			6	µA
		T_j = 125° C			6	60	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 8 A		0.95	1.05	V
		T_j = 150° C			0.8	0.90	

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:
$P = 0.73 \times I_{F(AV)} + 0.021\ I_F{}^2{}_{(RMS)}$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V, T_j = 25 °C		25	30	ns
		I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V, T_j = 25 °C		17	22	
I_{RM}	Reverse recovery current	I_F = 8 A, dI_F/dt = -200 A/µs, V_R = 160 V, T_j = 125 °C		5.5	7	A
t_{fr}	Forward recovery time	I_F = 8 A, dI_F/dt = 50 A/µs $V_{FR} = 1.1 \times V_{Fmax}$, T_j = 25 °C		150		ns
V_{FP}	Forward recovery voltage	I_F = 8 A, dI_F/dt = 50 A/µs, T_j = 25 °C		1.5		V

Figure 1. Peak current versus duty cycle

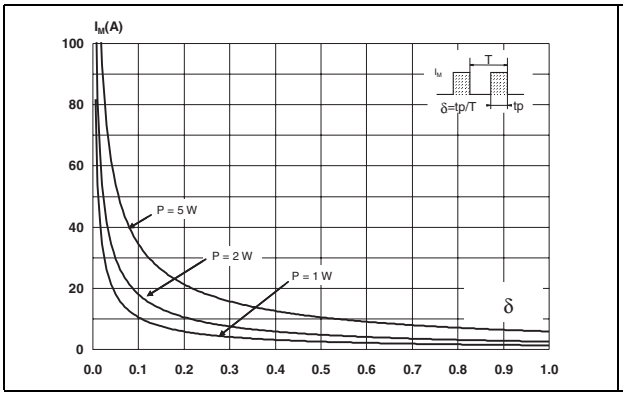


Figure 2. Forward voltage drop versus forward current (typical values)

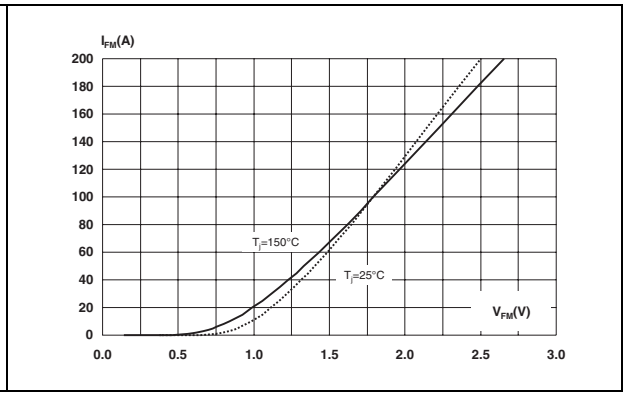


Figure 3. Forward voltage drop versus forward current (maximum values)

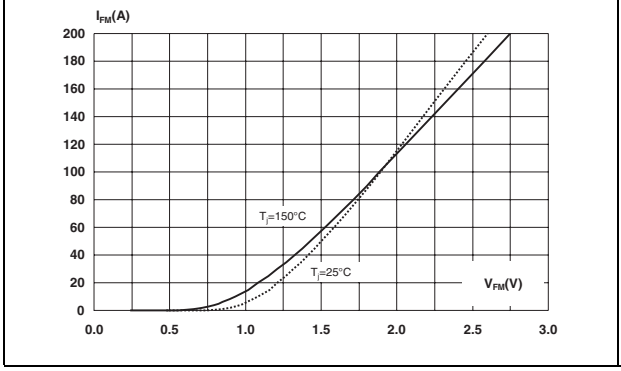


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220AC, DPAK, D^2PAK)

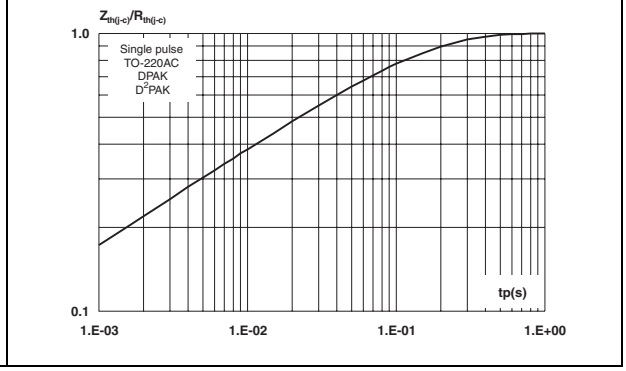


Figure 5. Relative variation of thermal impedance, junction to case, versus pulse duration (TO-220FPAC)

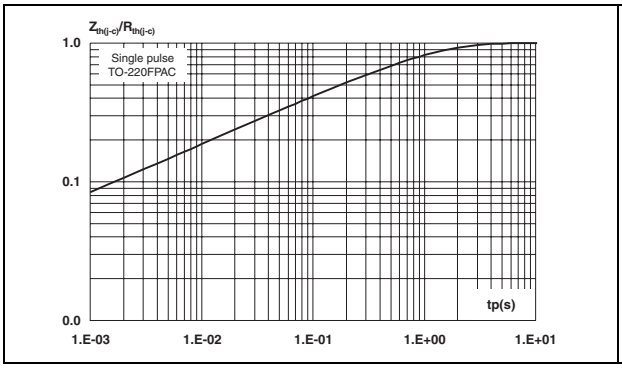


Figure 6. Junction capacitanceversus reverse applied voltage (typical values)

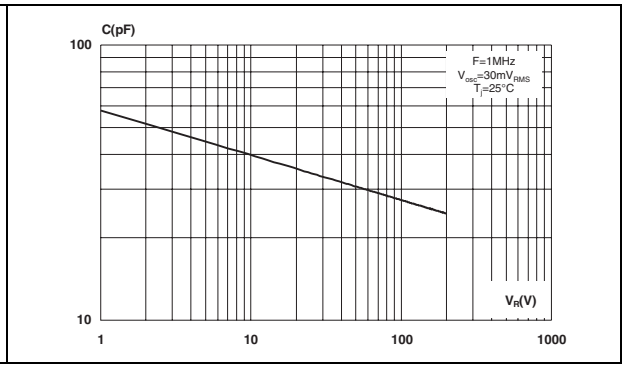


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

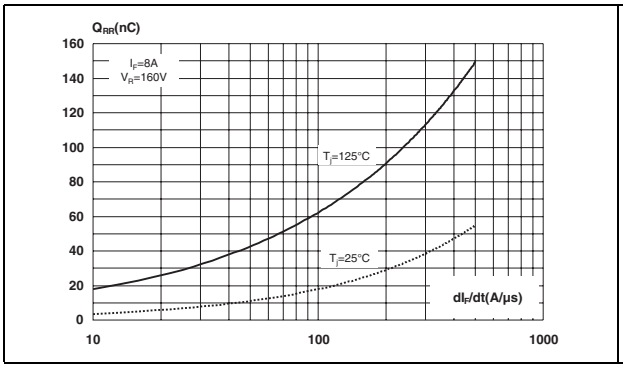


Figure 8. Reverse recovery time versus dI_F/dt (typical values)

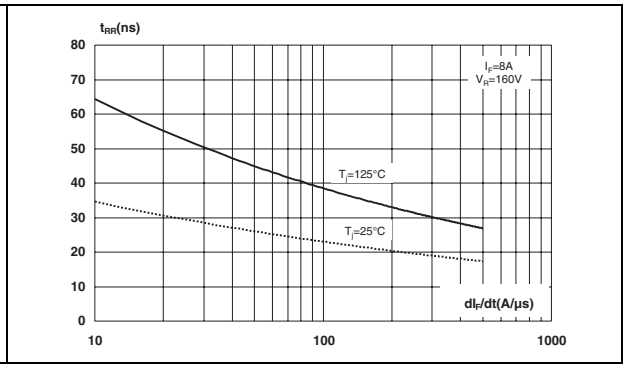


Figure 9. Peak reverse recovery current versus dI_F/dt (typical values)

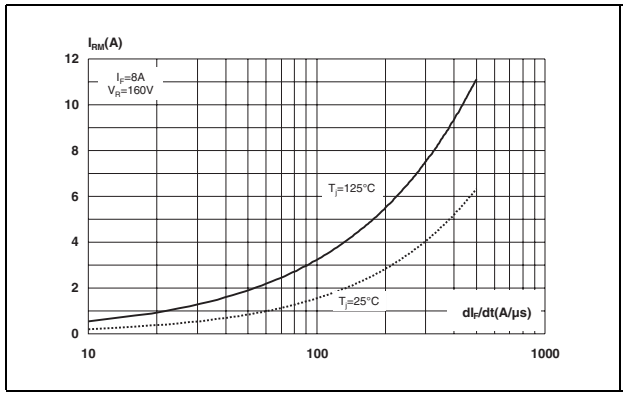


Figure 10. Dynamic parameters versus junction temperature

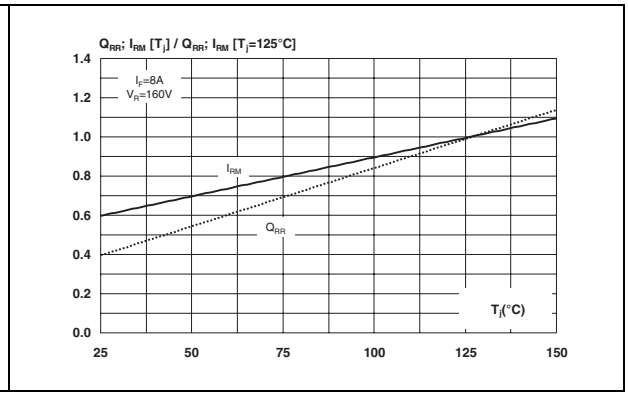


Figure 11. Thermal resistance, junction to ambient, versus copper surface under tab - Epoxy printed circuit board FR4, e_{CU} = 35 µm (D^2PAK)

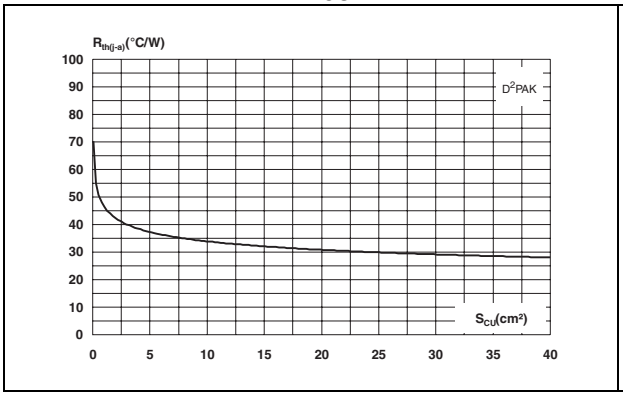


Figure 12. Thermal resistance, junction to ambient, versus copper surface under tab - Epoxy printed circuit board FR4, e_{CU} = 35 µm (DPAK)