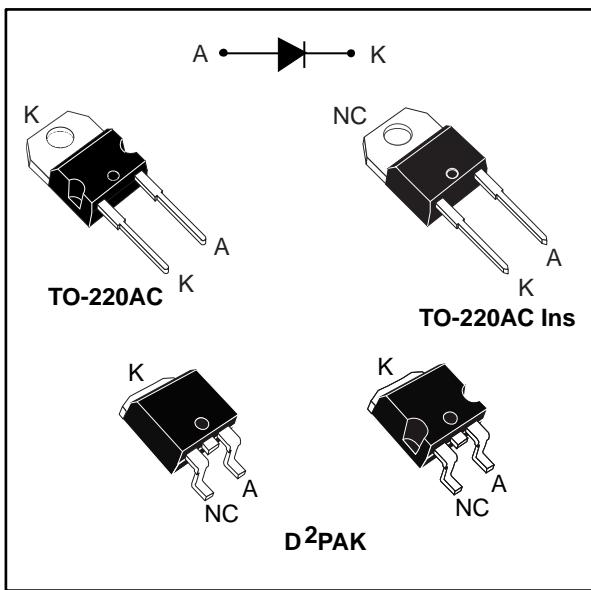




STTH8R04

Ultrafast recovery diode

Datasheet - production data



Description

This device uses ST's new 400 V planar Pt doping technology. It is specially suited for switching mode base drive and transistor circuits.

Packaged in through-the-hole and surface mount packages, this device is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	8 A
V_{RRM}	400 V
T_j (max)	175 °C
V_F (typ)	0.9 V
t_{rr} (typ)	25 ns

Features

- Very low switching losses
- High frequency and high pulsed current operation
- High junction temperature
- Insulated package: TO-220AC Ins
 - Insulating voltage = 2500 V_{RMS} sine
- ECOPACK®2 compliant component for D²PAK on demand

1 Characteristics

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

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			400	V
I _{F(RMS)}	Forward rms current	TO-220AC, D ² PAK			30
		TO-220AC Ins			20
I _{F(AV)}	Average forward current $\delta = 0.5$, square wave	TO-220AC, D ² PAK	T _C = 145 °C	8	A
		TO-220AC Ins	T _C = 115 °C		
I _{FRM}	Repetitive peak forward current	t _p = 10 µs, F = 1 kHz		165	A
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal		120	A
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Operating junction temperature range			-40 to +175	°C

Table 3: Thermal parameter

Symbol	Parameter			Max. value	Unit
R _{th(j-c)}	Junction to case	TO-220AC, D ² PAK		2.5	°C/W
		TO-220AC Ins		5.5	

Table 4: 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}	-		10	µA
		T _j = 125 °C		-	10	100	
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 8 A	-		1.50	V
		T _j = 100 °C		-	1.05	1.30	
		T _j = 150 °C		-	0.90	1.10	

Notes:(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:

$$P = 0.83 \times I_{F(AV)} + 0.034 \times I_{F(RMS)}^2$$

Table 5: Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25 \text{ }^\circ\text{C}$	$I_F = 1 \text{ A},$ $dI_F/dt = -50 \text{ A}/\mu\text{s},$ $V_R = 30 \text{ V}$	-	35	50	ns
			$I_F = 1 \text{ A},$ $dI_F/dt = -100 \text{ A}/\mu\text{s},$ $V_R = 30 \text{ V}$	-	25	35	
I_{RM}	Reverse recovery current	$T_j = 125 \text{ }^\circ\text{C}$	$I_F = 8 \text{ A},$ $dI_F/dt = -200 \text{ A}/\mu\text{s},$ $V_R = 320 \text{ V}$	-	5.5	8.0	A
S_{factor}	Softness factor			-	0.4		-
t_{fr}	Forward recovery time	$T_j = 25 \text{ }^\circ\text{C}$	$I_F = 8 \text{ A},$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{F\max}$	-		150	ns
V_{FP}	Peak forward voltage		$I_F = 8 \text{ A},$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$	-	2.9		V

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average current

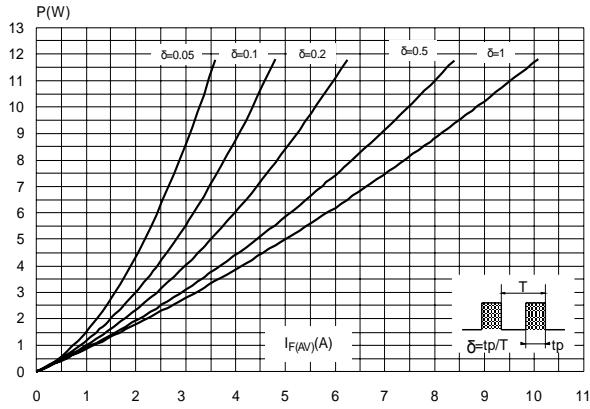


Figure 2: Forward voltage drop versus forward current

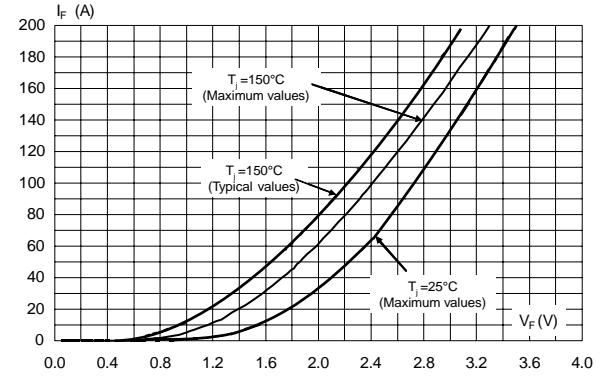


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

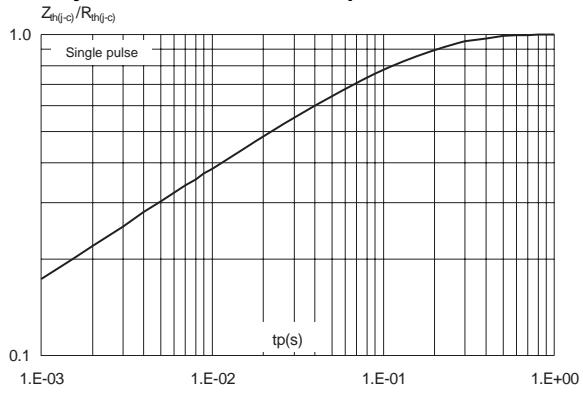


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values)

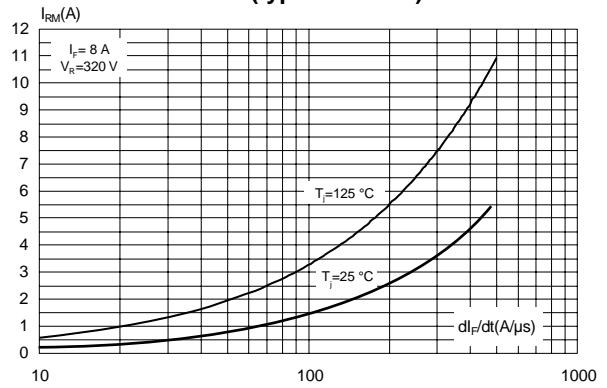


Figure 5: Reverse recovery time versus dI_F/dt (typical values)

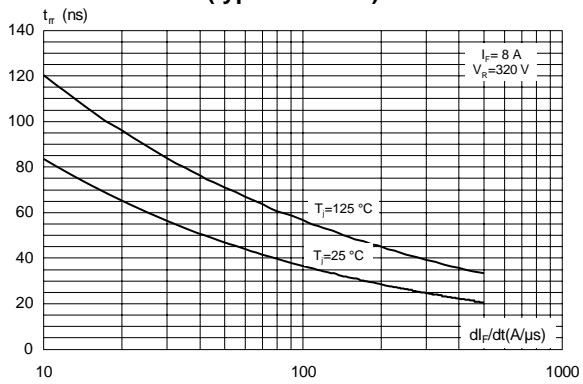


Figure 6: Reverse recovery charges versus dI_F/dt (typical values)

