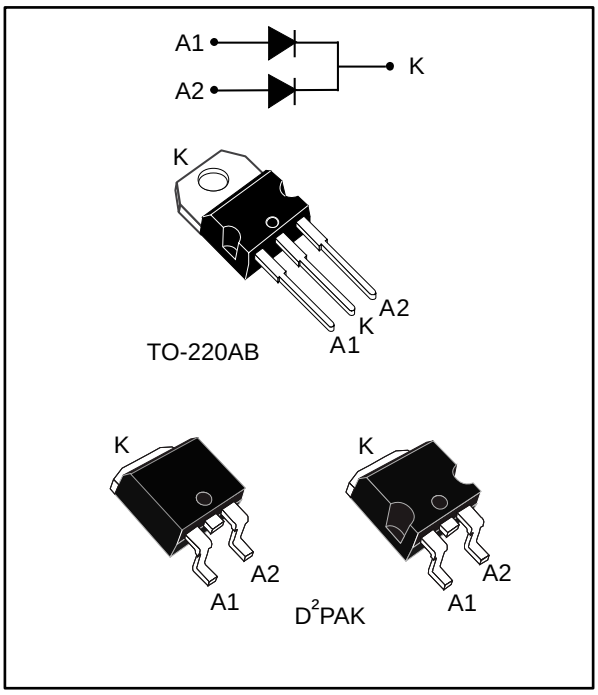
STTH16R04C

Ultrafast recovery diode

Datasheet - production data



Description

This series uses ST's new 400 V planar Pt doping technology. This device 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
$I_{F(AV)}$	2 x 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/or high pulsed current operation
- High junction temperature
- ECOPACK®2 compliant component for D²PAK on demand

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			400	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 150 °C	Per diode	8	A
		T_C = 145 °C	Per device	16	
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	Maximum operating junction temperature range			-40 to +175	°C

Table 3: Thermal parameter

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2	°C/W
		Per device	1.15	
$R_{th(c)}$	Coupling		0.3	°C/W

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j(diode1)} = P_{(diode1)} \times R_{th(j-c)\ (per\ diode)} + P_{(diode2)} \times R_{th(c)}$

Table 4: Static electrical characteristics (per diode)

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	-		1.5	V
		T_j = 100 °C		-	1.05	1.3	
		T_j = 150 °C		-	0.9	1.1	
		T_j = 25 °C	I_F = 16 A	-		1.75	
		T_j = 100 °C		-	1.25	1.55	
		T_j = 150 °C		-	1.12	1.37	

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:

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

Table 5: Dynamic electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A V_R = 30 V dI_F/dt = -50 A/µs	-	35	50	ns
			I_F = 1 A V_R = 30 V dI_F/dt = -100 A/µs	-	25	35	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 8 A V_R = 320 V dI_F/dt = -200 A/µs	-	5.5	8	A
S_{factor}	Softness factor			-	0.4		-
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 8 A V_{FR} = 1.1 x V_F(max) dI_F/dt = 100 A/µs	-		150	ns
V_{FP}	Forward recovery voltage		I_F = 8 A dI_F/dt = 100 A/µs	-	2.9		V

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average current (per diode)

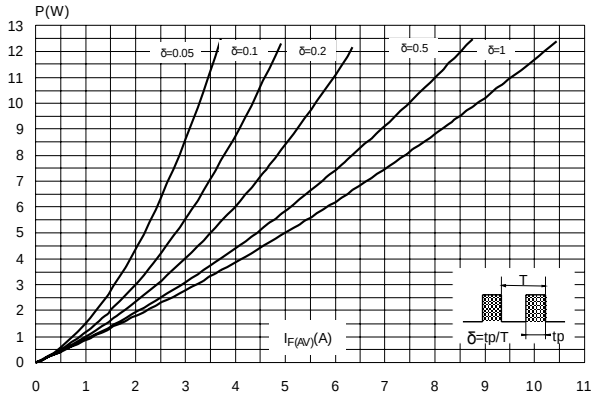


Figure 2: Forward voltage drop versus forward current (per diode)

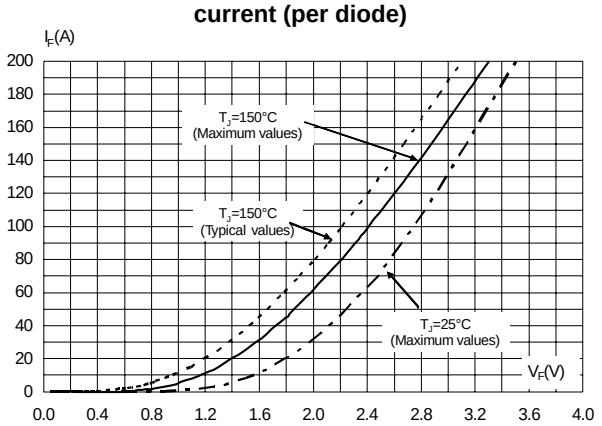


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

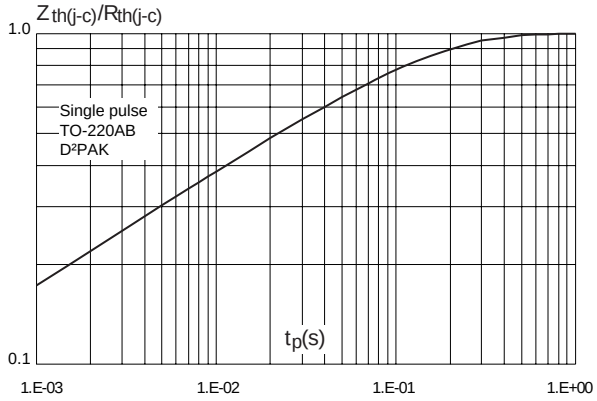


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values, per diode)

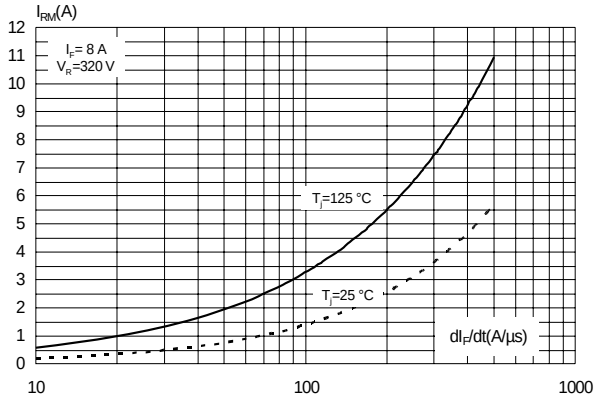


Figure 5: Reverse recovery time versus dI_F/dt (typical values, per diode)

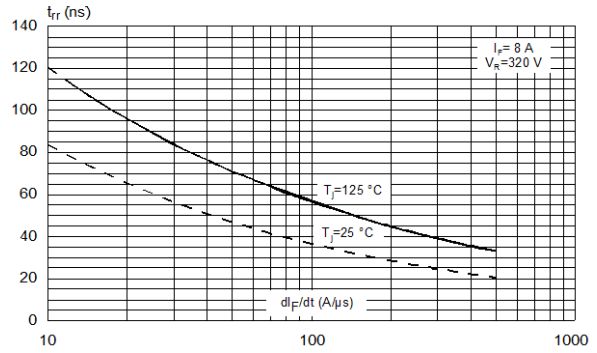


Figure 6: Reverse recovery charges versus dI_F/dt (typical values, per diode)