STTA406

TURBOSWITCH ™ ULTRA-FAST HIGH VOLTAGE DIODE

MAJOR PRODUCT CHARACTERISTICS

I_P	4 A
V_{RRM}	600 V
t_{rr} (typ.)	25 ns
V_F (max)	1.5 V

DO-201AD

FEATURES AND BENEFITS

- SPECIFIC TO "FREEWHEEL MODE" OPERATIONS: FREEWHEEL OR BOOSTER DIODE
- ULTRA-FAST, AND SOFT RECOVERY
- VERY LOW OVERALL POWER LOSSES IN BOTH THE DIODE AND THE COMPANION TRANSISTOR
- HIGH FREQUENCY OPERATIONS

DESCRIPTION

The TURBOSWITCH is a very high performance series of ultra-fast high voltage power diodes from 600V to 1200V.

TURBOSWITCH family, drastically cuts losses in both the diode and the associated switching IGBT or MOSFET in all "freewheel mode" operations and is particularly suitable and efficient in motor control freewheel applications and in booster diode applications in power factor control circuitries.
Packaged in DO-201AD this 600V device is particularly intended for use on 240V domestic mains.

ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		VALUE	Unit
V_{RRM}	Repetitive peak reverse voltage		600	V
V_{RWM}	Reverse working voltage		600	V
I_P	Peak forward current (1)	Tamb = 65°C δ = 0.5	4	A
I_{FRM}	Repetitive peak forward current	tp = 5µs F = 5kHz square	30	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal	80	A
T_j	Maximum operating junction temperature		125	°C
T_{stg}	Storage temperature range		- 40 to 150	°C

(1) square waveform and on infinite heatsink

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THERMAL DATA

Symbol	Parameter	Max.	Unit
$R_{th(j-l)}$	Junction to lead L lead = 10mm	20	°C/W
$R_{th(j-a)}$	Junction to ambient on printed circuit L lead = 10mm	75	°C/W

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions		Typ.	Max.	Unit
V_F **	Forward voltage drop	IF = 4 A	Tj = 25°C Tj = 125°C	 1.25	1.75 1.5	V V
I_R *	Reverse leakage current	$V_R = 0.8\ V_{RWM}$	Tj = 25°C Tj = 125°C	 0.75	50 2	µA mA
V_{to}	Threshold voltage	$Ip < 3.I_{AV}$	Tj = 125°C		1.15	V
rd	Dynamic resistance				85	mΩ

Test pulse : * tp = 380 µs, δ cycle < 2%
** tp = 5 ms, δ cycle < 2%

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

DYNAMIC ELECTRICAL CHARACTERISTICS

TURN-OFF SWITCHING

Symbol	Parameter	Test conditions	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 0.5A I_R = 1A Irr = 0.25A	25		ns
		I_F = 1A di/dt = -50A/µs V_R = 30V		55	ns

TURN-ON SWITCHING

Symbol	Parameter	Test conditions	Typ.	Max.	Unit
t_{fr}	Forward recovery time	I_F = 4 A dI_F/dt = 100 A/µs Measured at 1.1 x V_F max. Tj = 25°C		200	ns
V_{FP}	Peak forward voltage			20	V

Fig. 1: Power dissipation versus average forward current.

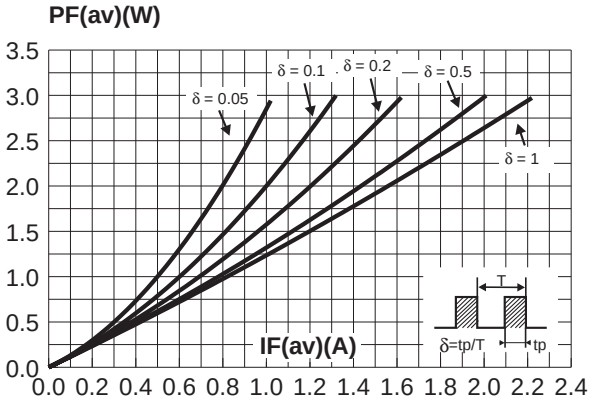


Fig. 2: Average forward current versus ambient temperature (δ=0.5).

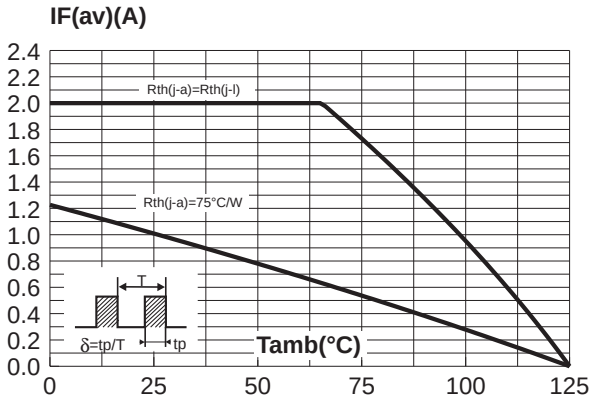


Fig. 3: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout).

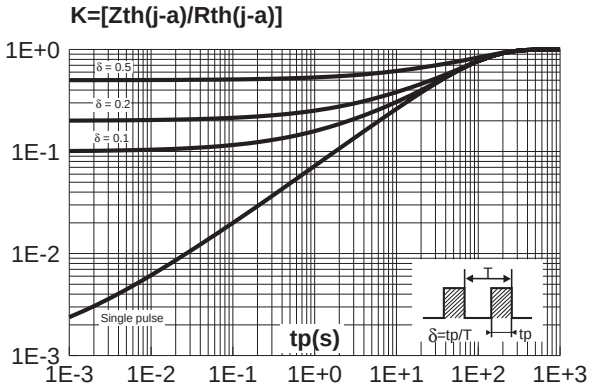


Fig 4-2 : Forward voltage drop versus forward current (high level).

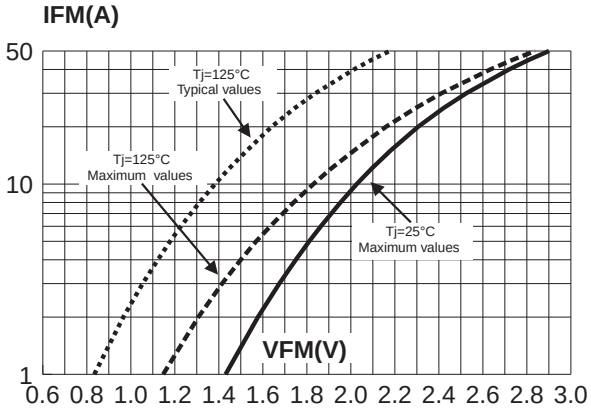


Fig. 4-1: Forward voltage drop versus forward current (low level).

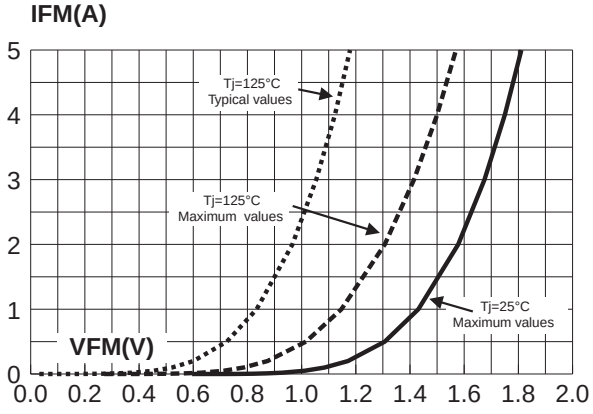


Fig 5 : Reverse recovery time versus dI_F/dt.

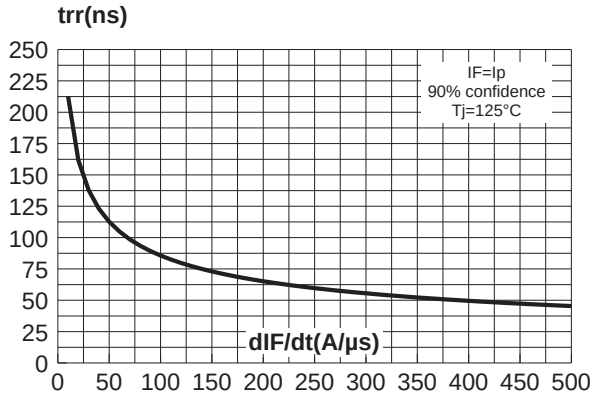


Fig. 6: Reverse recovery current versus dI_F/dt.

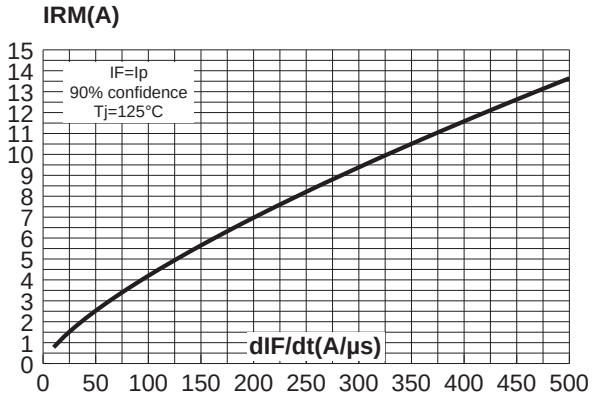


Fig. 7: Transient peak forward voltage versus dI_F/dt.

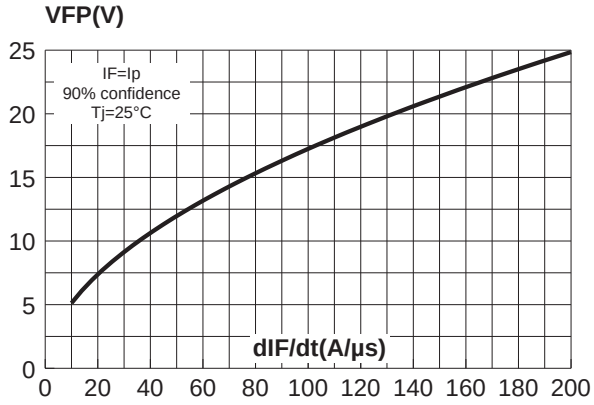


Fig. 9: Junction capacitance versus reverse voltage applied (typical values).

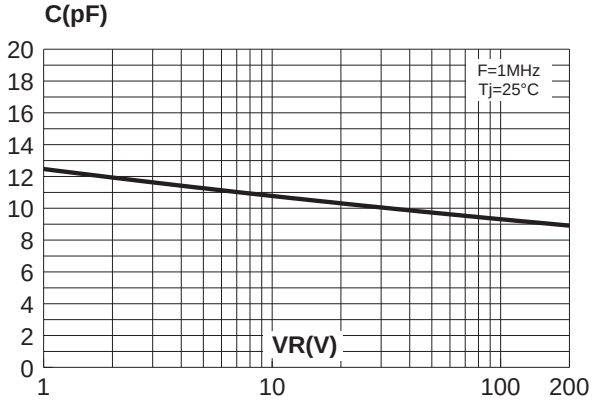
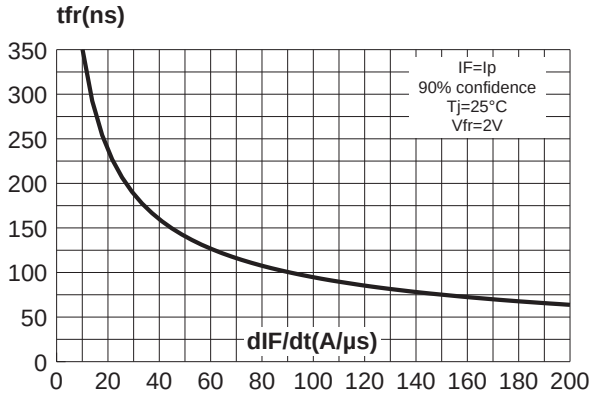
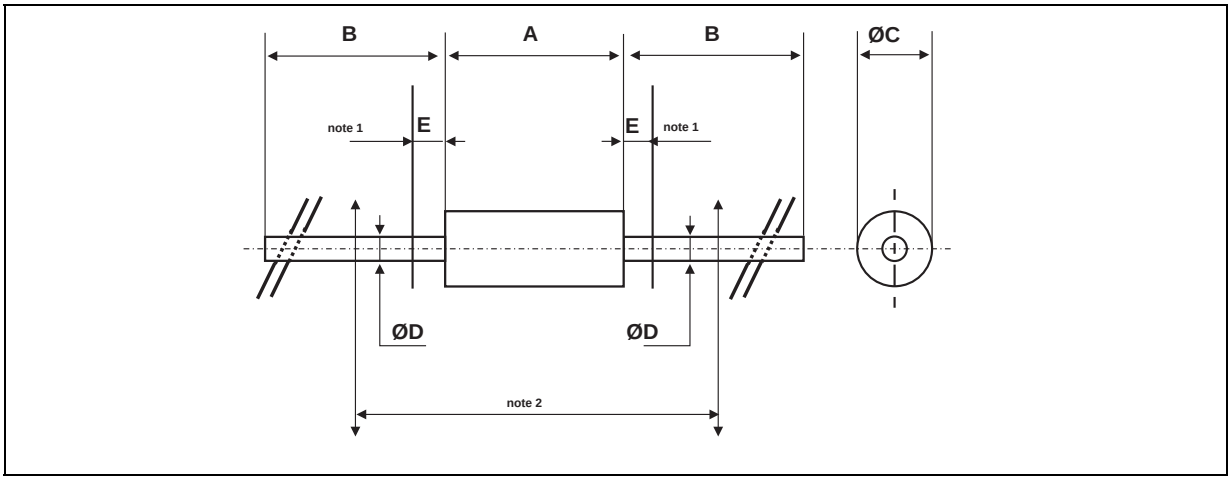


Fig. 8: Forward recovery time versus dI_F/dt.



PACKAGE MECHANICAL DATA

DO-201AD



REF.	DIMENSIONS				NOTES
	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
A		9.50		0.374	1 - The lead diameter ∅ D is not controlled over zone E 2 - The minimum axial lengh within which the device may be placed with its leads bent at right angles is 0.59"(15 mm)
B	25.40		1.000		
∅ C		5.30		0.209	
∅ D		1.30		0.051	
E		1.25		0.049	

- Cooling method: by convertion (method A)

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTA406	STTA406	DO-201AD	1.166g	600	Ammopack
STTA406RL	STTA406	DO-201AD	1.166g	1900	Tape & reel

- Band indicated cathode
- Epoxy meets UL94,V0