STTH3R06

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

Table 1: Main Product Characteristics

$I_{F(AV)}$	3 A
V_{RRM}	600 V
I_R (max)	100 µA
T_j	175°C
V_F (typ)	1.0 V
t_{rr} (typ)	35 ns

DO-201AD
STTH3R06

SMB
STTH3R06U

SMC
STTH3R06S

FEATURES AND BENEFITS

- Ultrafast switching
- Low forward voltage drop
- Low thermal resistance
- Low leakage current (platinium doping)

DESCRIPTION

The STTH3R06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, inverters and as a free wheeling diode.

Table 2: Order Codes

Part Number	Marking
STTH3R06	STTH3R06
STTH3R06RL	STTH3R06
STTH3R06U	R06U
STTH3R06S	R6S

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward voltage			10	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-201AD	Tl = 80°C	3	A
		SMB	Tl = 55°C		
		SMC	Tl = 80°C		
I_{FSM}	Surge non repetitive forward current	DO-201AD	tp = 10ms sinusoidal	55	A
		SMB / SMC		45	
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature			175	°C

Table 4: Thermal Parameters

Symbol	Parameter		Maximum	Unit
$R_{th(j-l)}$	Junction to lead	DO-201AD L = 10 mm	20	°C/W
		SMB	25	
		SMC	20	
$R_{th(j-a)}$	Junction to ambient (see fig. 13)	DO-201AD L = 10 mm	75	°C/W

Table 5: Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	T_j = 25°C	$V_R = V_{RRM}$			3	µA
		T_j = 150°C			15	100	
V_F	Forward voltage drop	T_j = 25°C	I_F = 3A			1.7	V
		T_j = 150°C			1.0	1.25	

To evaluate the conduction losses use the following equation: $P = 1.03 \times I_{F(AV)} + 0.09\ I_F{}^2{}_{(RMS)}$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25°C	I_F = 0.5A I_{RR} = 0.25A I_R = 1A			30	ns
			I_F = 1A dI_F/dt = -50 A/µs V_R =30V		35		
t_{fr}	Forward recovery time	T_j = 25°C	I_F = 3A dI_F/dt = 100 A/µs $V_{FR} = 1.1 \times V_{Fmax}$			100	ns
V_{FP}	Forward recovery voltage		I_F = 3A dI_F/dt = 100 A/µs			10	V

Figure 1: Conduction losses versus average current

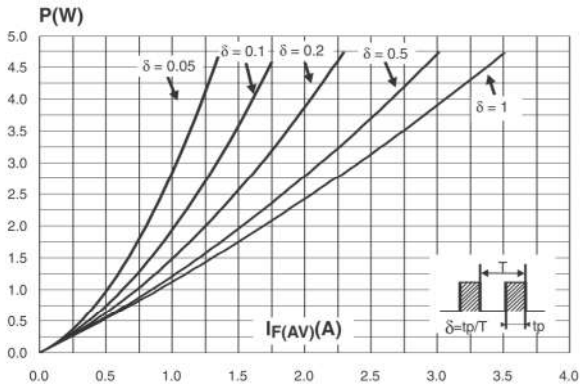


Figure 2: Forward voltage drop versus forward current

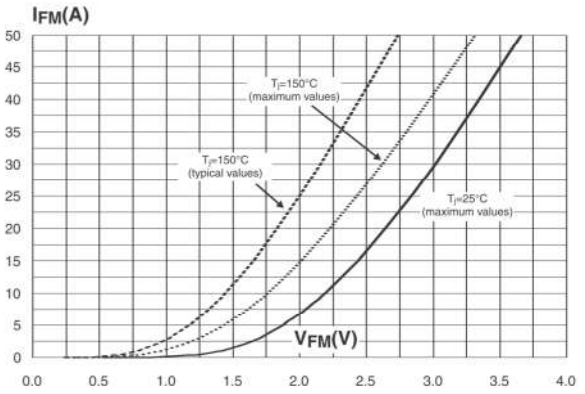


Figure 3: Relative variation of thermal impedance junction ambient versus pulse duration (epoxy printed circuit FR4, L_{leads} = 10mm, S_{CU}=1cm²)

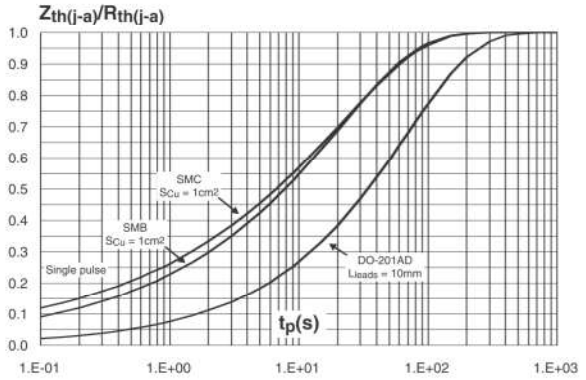


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values)

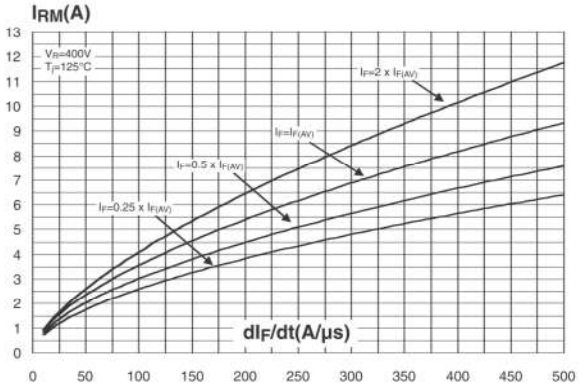


Figure 5: Reverse recovery time versus dI_F/dt (typical values)

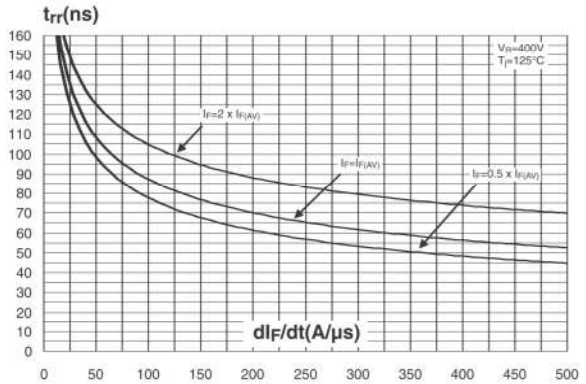


Figure 6: Reverse recovery charges versus dI_F/dt (typical values)

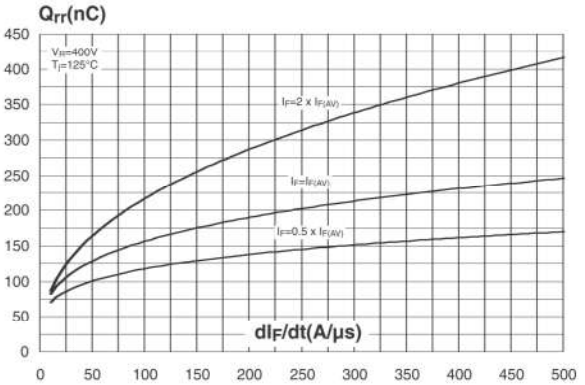


Figure 7: Softness factor versus d_{IF}/dt (typical values)

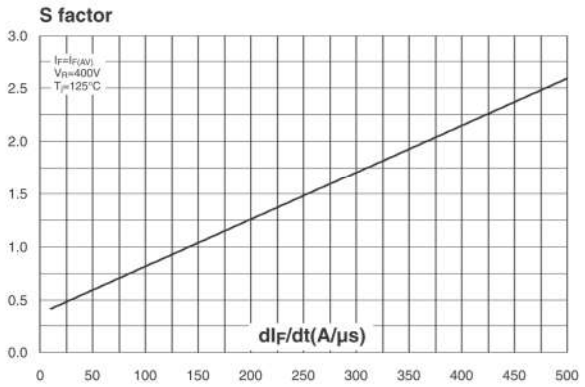


Figure 8: Relative variations of dynamic parameters versus junction temperature

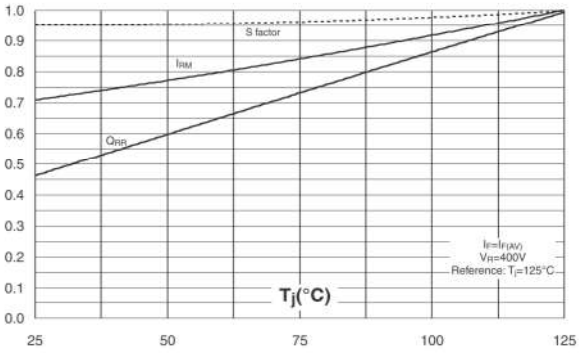


Figure 9: Transient peak forward voltage versus dI_F/dt (typical values)

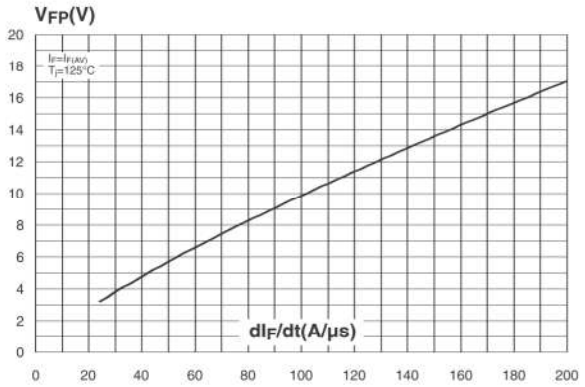


Figure 10: Forward recovery time versus dI_F/dt (typical values)

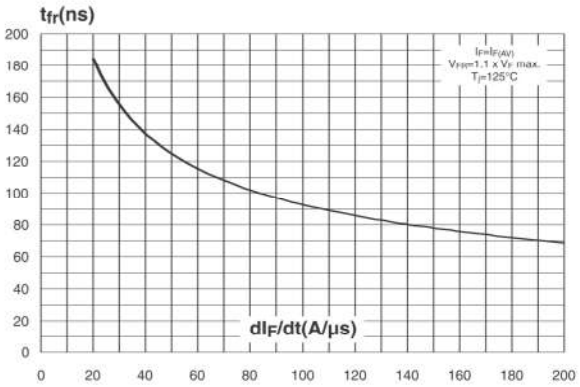


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

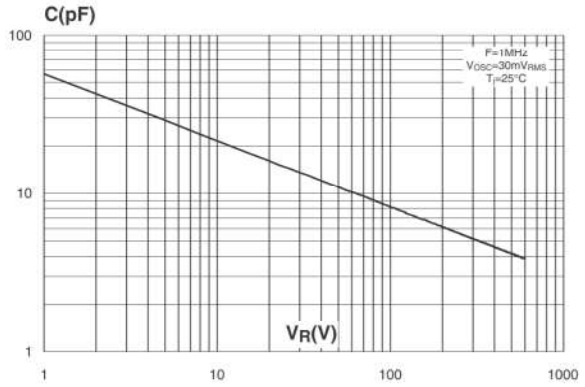


Figure 12: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, e_{CU}=35µm) (DO-201AD)

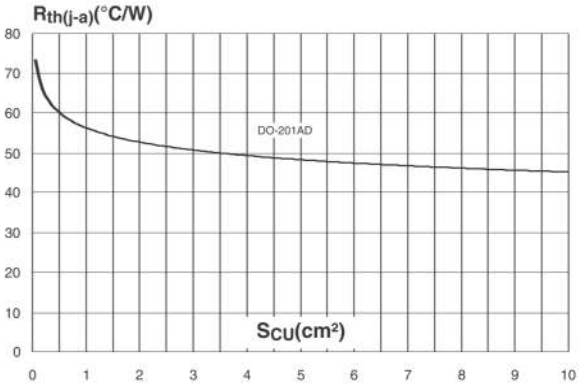


Figure 13: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, e_{CU}=35µm) (SMB / SMC)

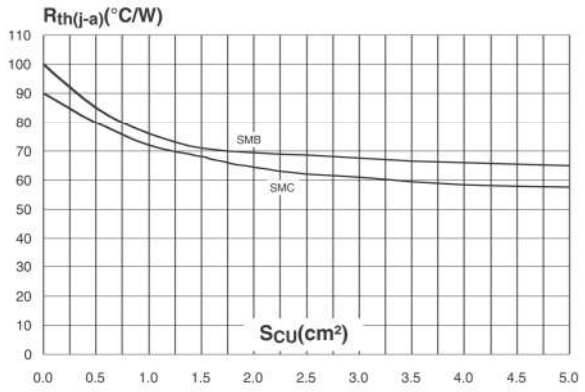


Figure 14: Thermal resistance versus lead length

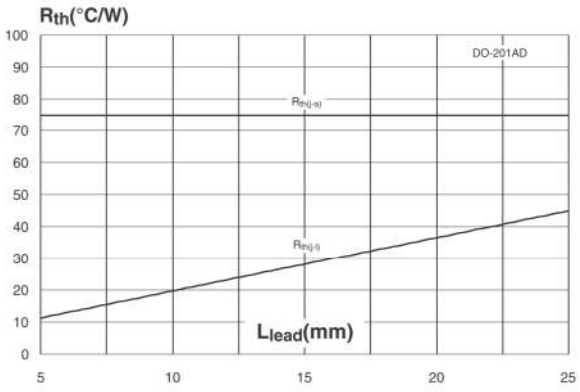
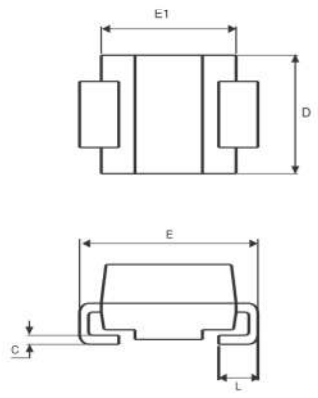


Figure 15: SMB Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.41	0.006	0.016
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
D	3.30	3.95	0.130	0.156
L	0.75	1.60	0.030	0.063

Figure 16: SMB Foot Print Dimensions
(in millimeters)

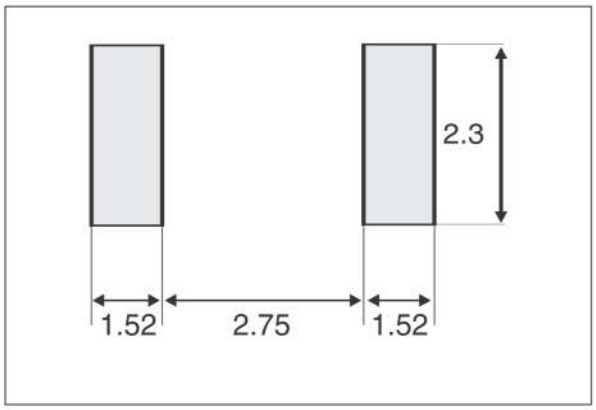
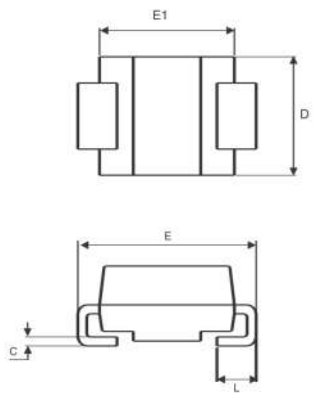


Figure 17: SMC Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	2.90	3.2	0.114	0.126
c	0.15	0.41	0.006	0.016
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
D	5.55	6.25	0.218	0.246
L	0.75	1.60	0.030	0.063

Figure 18: SMC Foot Print Dimensions
(in millimeters)

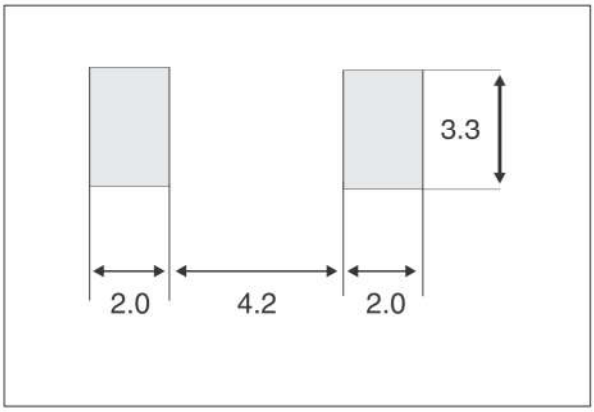
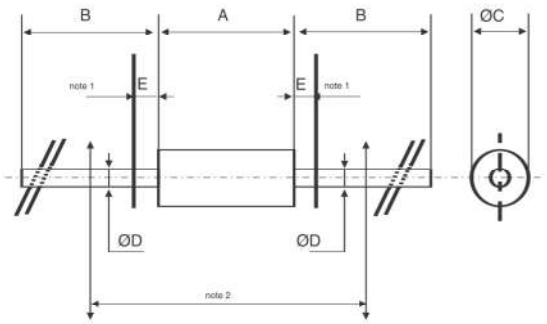


Figure 19: DO-201AD Package Mechanical Data



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

Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH3R06	STTH3R06	DO-201AD	1.12 g	600	Ammopack
STTH3R06-RL	STTH3R06	DO-201AD	1.12 g	1900	Tape & reel
STTH3R06U	3R6U	SMB	0.11 g	2500	Tape & reel
STTH3R06S	R6S	SMC	0.243 g	2500	Tape & reel

- Epoxy meets UL94, V0
- Band indicated cathode (DO-201AD)
- Bending method: see application note **AN1471** (DO-201AD)

Table 8: Revision History

Date	Revision	Description of Changes
March-2003	1	First issue
07-Sep-2004	2	SMB and SMC packages added