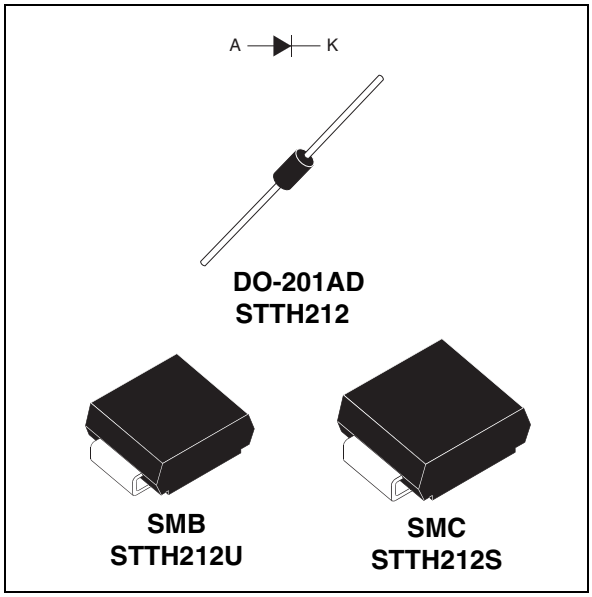
STTH212

High voltage ultrafast diode

Main product characteristics

$I_{F(AV)}$	2 A
V_{RRM}	1200 V
T_j	175°C
V_F (typ)	1.0 V
t_{rr} (max)	75 ns



Features and benefits

- Low forward voltage drop
- High reliability
- High surge current capability
- Soft switching for reduced EMI disturbances
- Planar technology

Description

The STTH212, which is using ST ultrafast high voltage planar technology, is specially suited for free-wheeling, clamping, snubbering, demagnetization in power supplies and other power switching applications.

Housed in axial, SMB, and SMC packages, this diode will reduce the losses in high switching freqency operations.

Order codes

Part Number	Marking
STTH212	STTH212
STTH212RL	STTH212
STTH212U	U22
STTH212S	S12

1 Electrical characteristics

Table 1. Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			1200	V
$V_{(RMS)}$	RMS voltage			850	V
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-201AD	T_l = 105°C	2	A
		SMB	T_l = 90°C		
		SMC	T_l = 105°C		
$I_{F(RMS)}$	RMS forward current	DO-201AD, SMB, SMC		10	A
I_{FSM}	Forward surge current t_p = 8.3ms	DO-201AD, SMB, SMC		40	A
T_{stg}	Storage temperature range			-50 to + 175	°C
T_j	Maximum operating junction temperature			175	°C

Table 2. Thermal parameters

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

Table 3. Static Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R	Reverse leakage current	T_j = 25°C	$V_R = V_{RRM}$			10	µA
		T_j = 125°C				100	
V_F	Forward voltage drop	T_j = 25°C	I_F = 2A			1.75	V
		T_j = 125°C			1.07	1.50	
		T_j = 150°C			1.0	-	

To evaluate the conduction losses use the following equation: $P = 1.26 \times I_{F(AV)} + 0.12\ I_{F^2(RMS)}$

Table 4. Dynamic Electrical Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25°C	I_F = 1A dI$_F$/dt = -100 A/µs V_R =30V			75	ns
t_{fr}	Forward recovery time	T_j = 25°C	I_F = 2A dI$_F$/dt = 50 A/µs V_{FR} = 1.1 x V_{Fmax}			500	ns
V_{FP}	Forward recovery voltage					30	V

Figure 1. Conduction losses versus average forward current

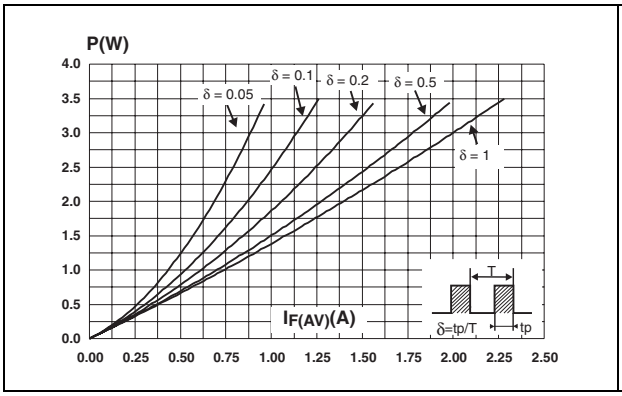


Figure 2. Forward voltage drop versus forward current

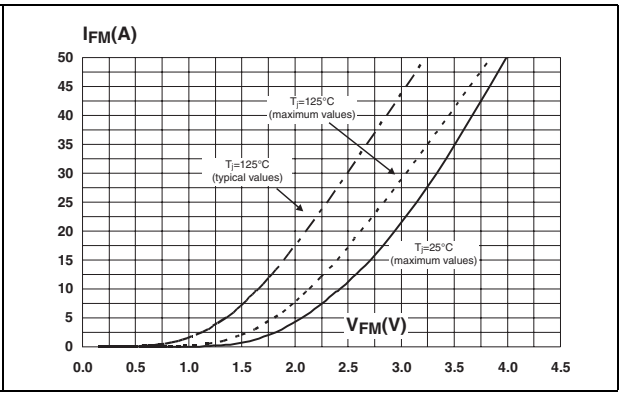


Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration (Epoxy printed circuit board FR4, L_{Leads} = 10mm)

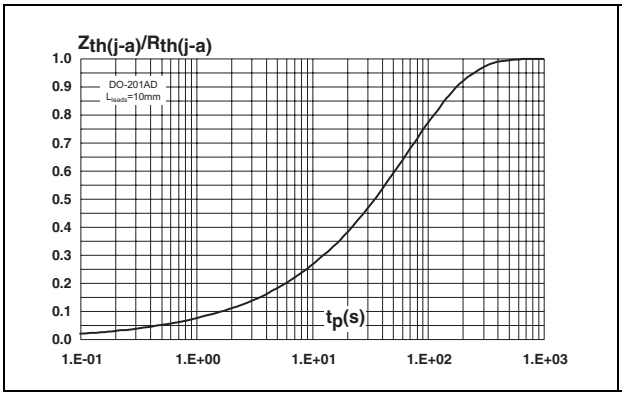


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (Epoxy printed circuit board FR4, S_{CU} = 1cm²)

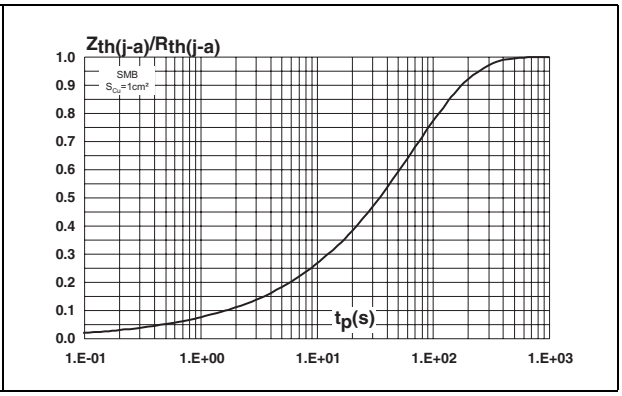


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (Epoxy printed circuit board FR4, S_{CU} = 1cm²)

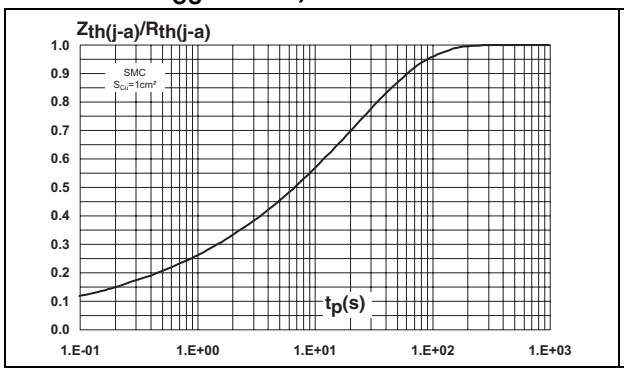


Figure 6. Reverse recovery current versus dI_F/dt (typical values)

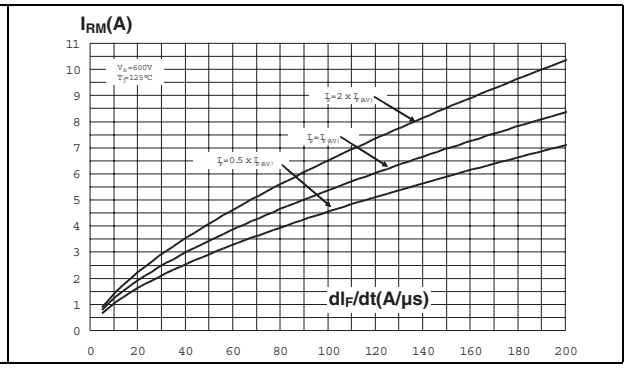


Figure 7. Reverse recovery time versus dI_F/dt (typical values)

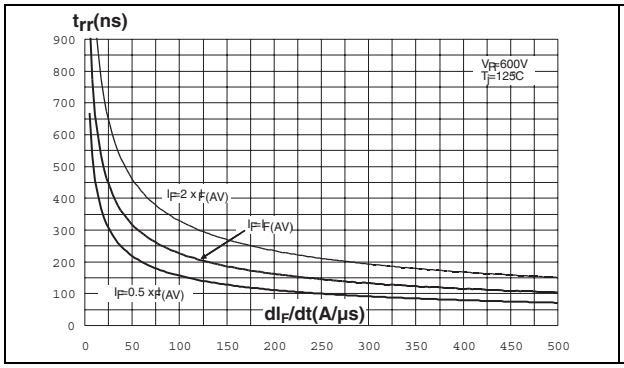


Figure 8. Reverse recovery charges versus dI_F/dt (typical values)

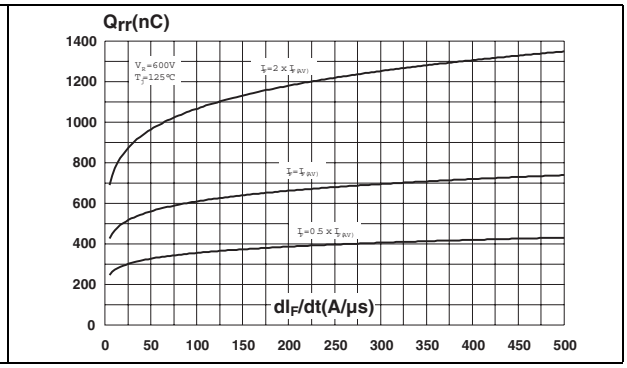


Figure 9. Softness factor versus dI_F/dt (typical values)

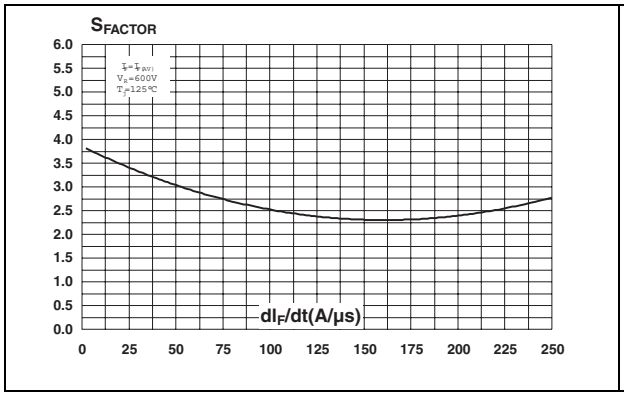


Figure 10. Relative variations of dynamic parameters versus junction temperature

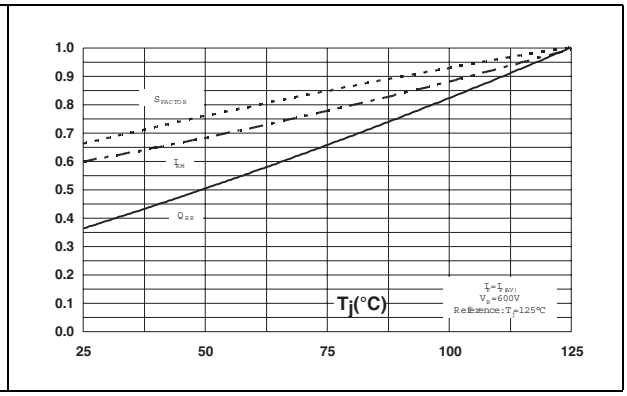


Figure 11. Transient peak forward voltage versus dI_F/dt (typical values)

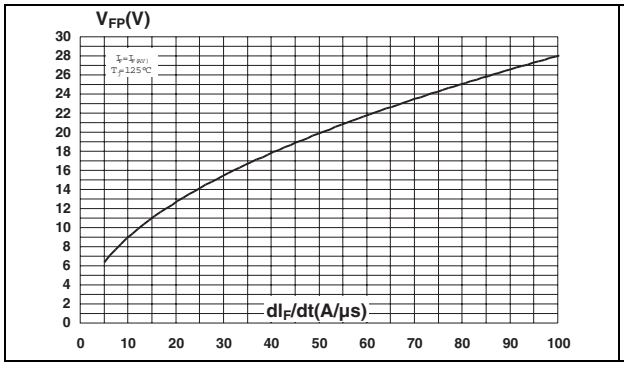


Figure 12. Forward recovery time versus dI_F/dt (typical values)

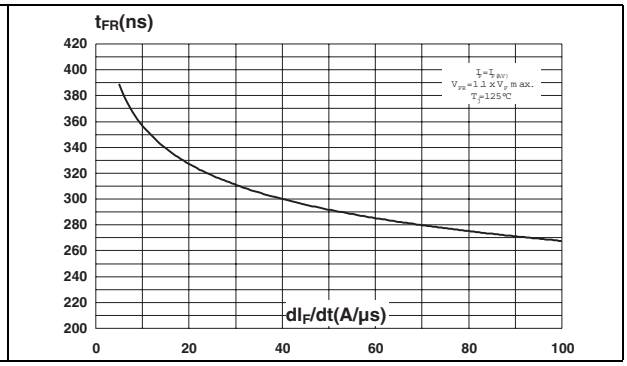


Figure 13. Junction capacitance versus reverse voltage applied (typical values)

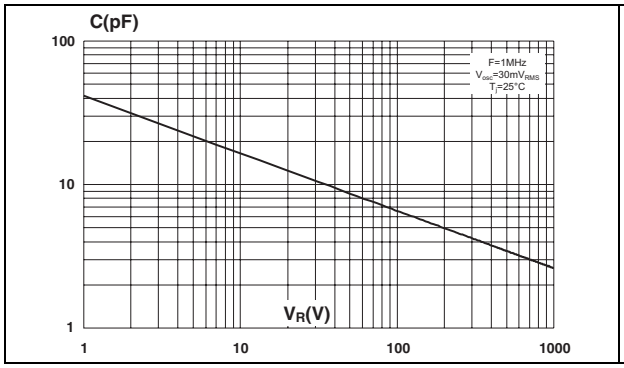


Figure 14. Thermal resistance versus lead length

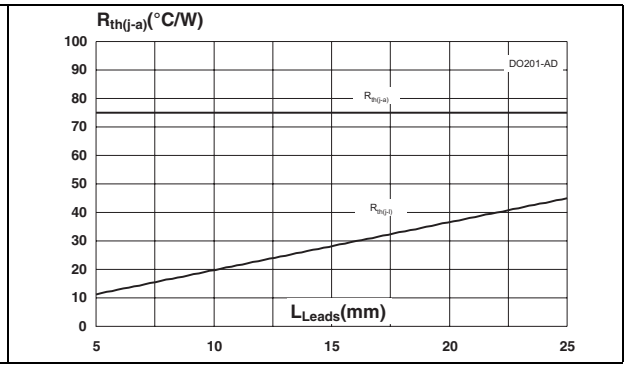


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, e_{CU} = 35µm)

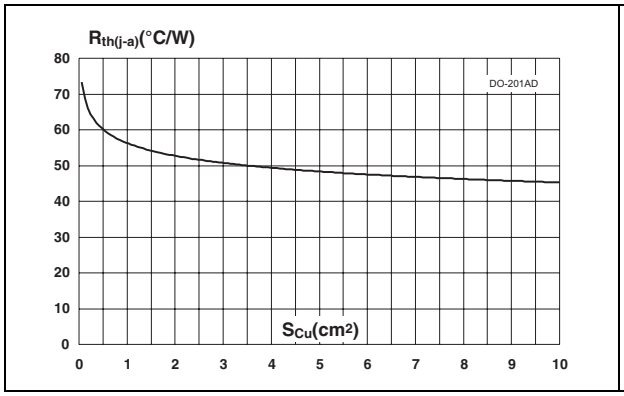
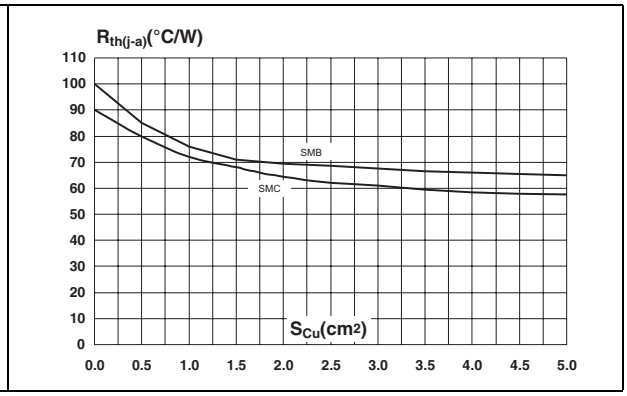


Figure 16. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, e_{cu} = 35 µm)



2 Package mechanical data

Table 5. SMB dimensions

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 17. SMB references to dimensions table

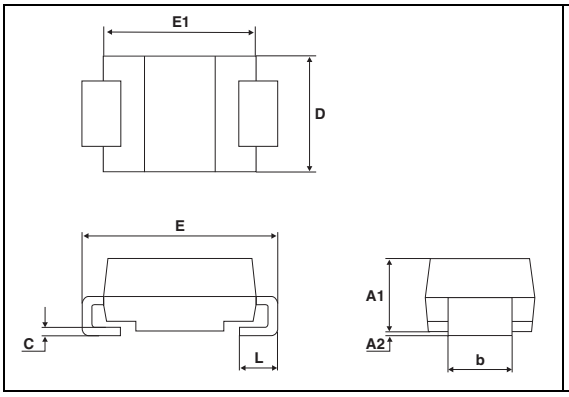


Figure 18. SMB footprint dimensions (in millimetres)

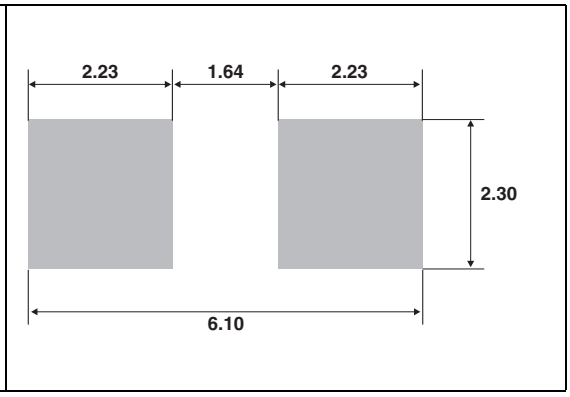


Table 6. SMC dimensions

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 19. SMC references to dimensions table

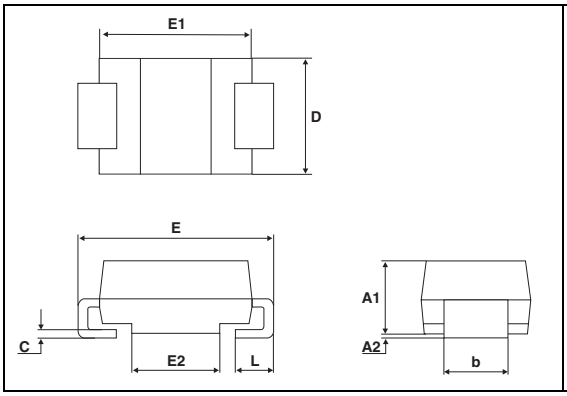


Figure 20. SMC footprint dimensions (in millimetres)

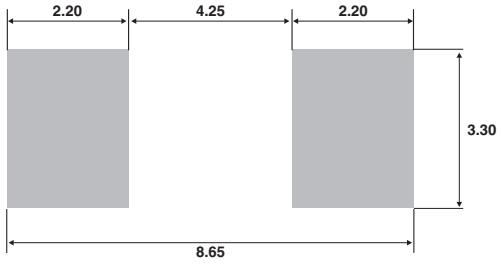
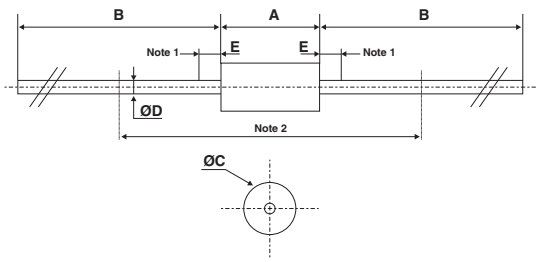


Table 7. DO-201AD dimensions



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	-	9.5	-	0.37
B	25.4	-	1.00	-
C	-	5.3	-	0.21
D	-	1.3	-	0.051
E	-	1.25	-	0.048

Note: 1 The lead diameter D is not controlled over zone E.

2 The minimum length which must stay straight between the right angles after bending is 15 mm (0.59 inch).

3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH212	STTH212	DO-201AD	1.12 g	600	Ammopack
STTH212RL	STTH212			1900	Tape & reel
STTH212U	U22	SMB	0.11 g	2500	Tape & reel
STTH212S	S12	SMC	0.243 g	2500	Tape & reel

4 Revision history

Date	Revision	Description of Changes
28-Jun-2005	1	First issue.