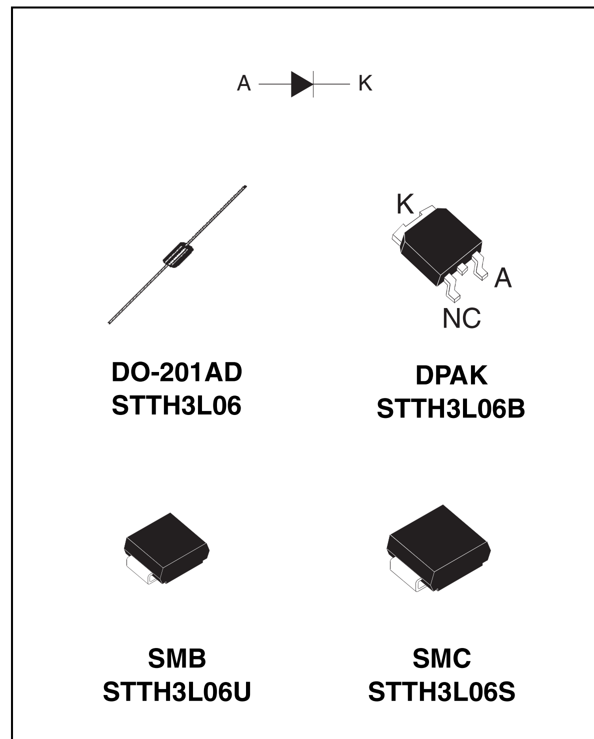
STTH3L06

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)	0.85 V
t_{rr} (typ)	60 ns



FEATURES AND BENEFITS

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

DESCRIPTION

The STTH3L06, which is using ST Turbo 2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.
This device is intended for use as a free wheeling diode in power supplies and other power switching applications.

Table 2: Order Codes

Part Number	Marking
STTH3L06	STTH3L06
STTH3L06RL	STTH3L06
STTH3L06B	STTH3L06B
STTH3L06B-TR	STTH3L06B
STTH3L06U	3L6U
STTH3L06S	S06

Table 3: Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current	DO-201AD / SMB / SMC		10	A
		DPAK		6	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	DO-201AD	Tl = 100°C	3	A
		DPAK	Tl = 155°C		
		SMB	Tl = 80°C		
		SMC	Tl = 100°C		
I_{FSM}	Surge non repetitive forward current	DO-201AD	tp = 10ms sinusoidal	70	A
		SMB / SMC		60	
		DPAK		40	
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
		DPAK	5.5	
		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			1.3	V
		T_j = 150°C			0.85	1.05	

To evaluate the conduction losses use the following equation: $P = 0.89 \times I_{F(AV)} + 0.055\, I_F{}^2{}_{(RMS)}$

Table 6: Dynamic Characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25°C	I_F = 1A dI_F/dt = -50 A/µs V_R =30V		60	85	ns
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			7.5	V

Figure 1: Conduction losses versus average current

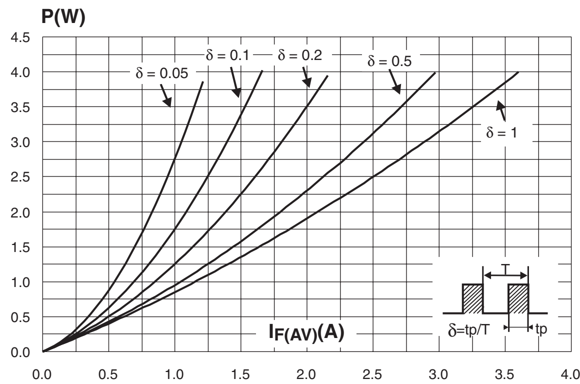


Figure 2: Forward voltage drop versus forward current

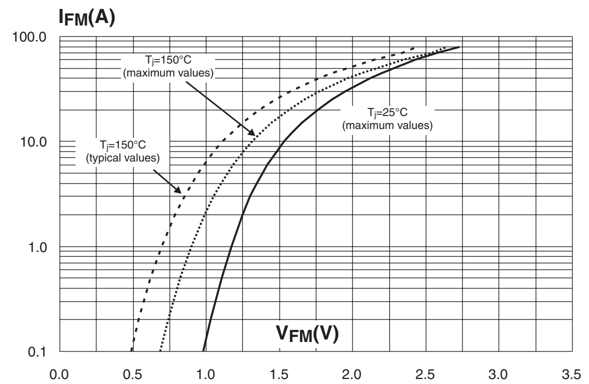


Figure 3: Relative variation of thermal impedance junction ambient versus pulse duration (epoxy printed circuit FR4, L_{leads} = 10mm, S_{CU}=1cm^2)

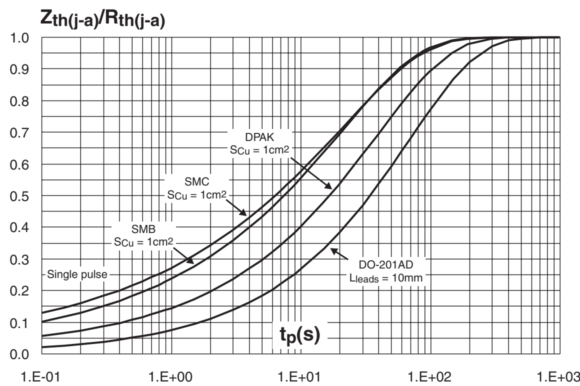


Figure 4: Peak reverse recovery current versus dI_F/dt (typical values)

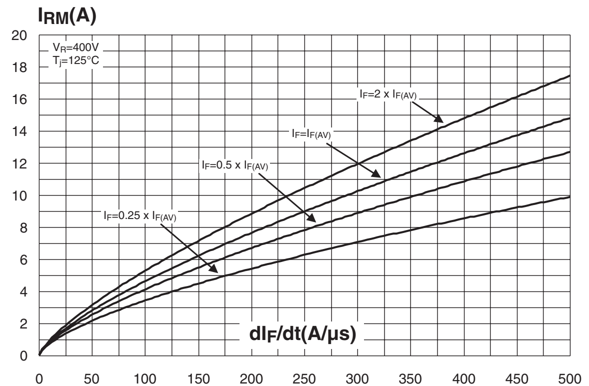


Figure 5: Reverse recovery time versus dI_F/dt (typical values)

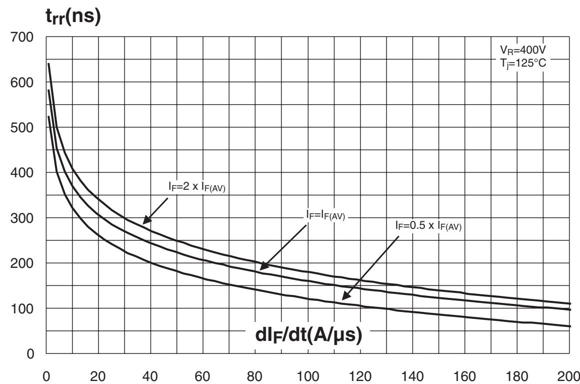


Figure 6: Reverse recovery charges versus dI_F/dt (typical values)

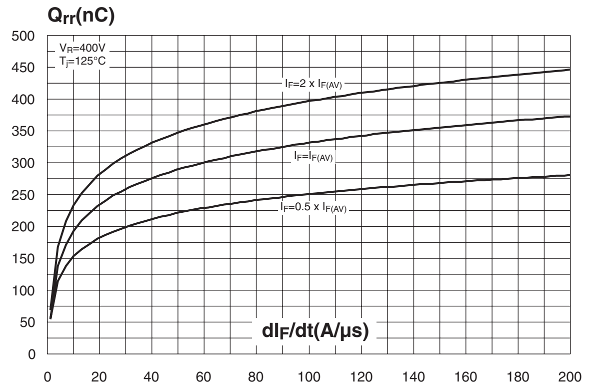


Figure 7: Softness factor versus dI_F/dt (typical values)

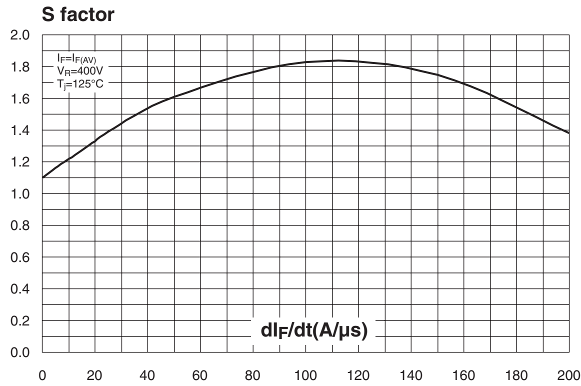


Figure 8: Relative variations of dynamic parameters versus junction temperature

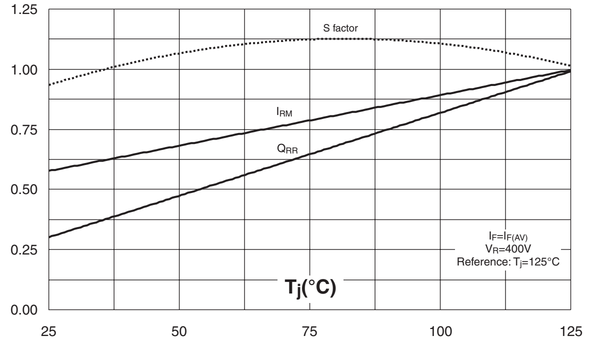


Figure 9: Transient peak forward voltage versus dI_F/dt (typical values)

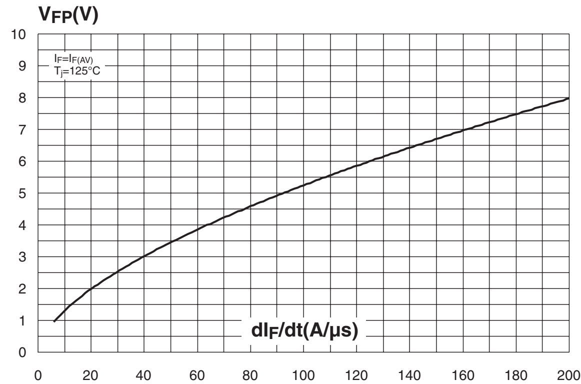


Figure 10: Forward recovery time versus dI_F/dt (typical values)

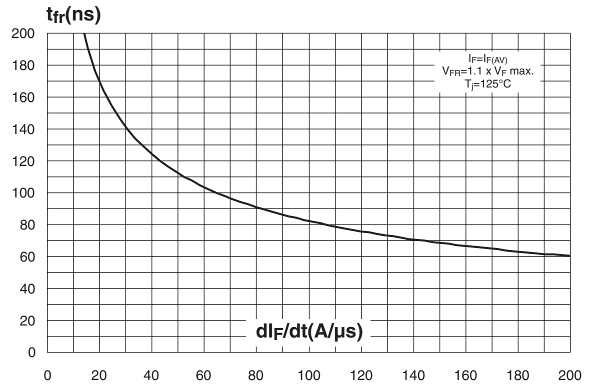


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

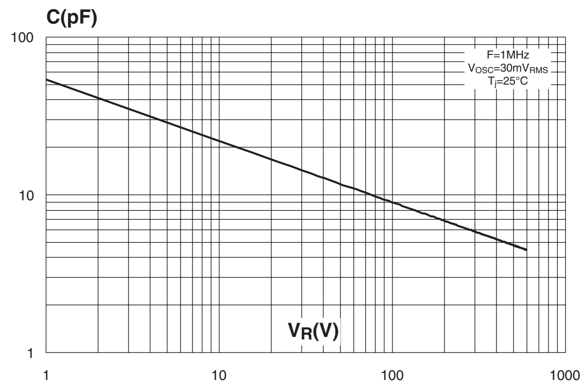


Figure 12: Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, e_{CU}=35µm) (DO-201AD)

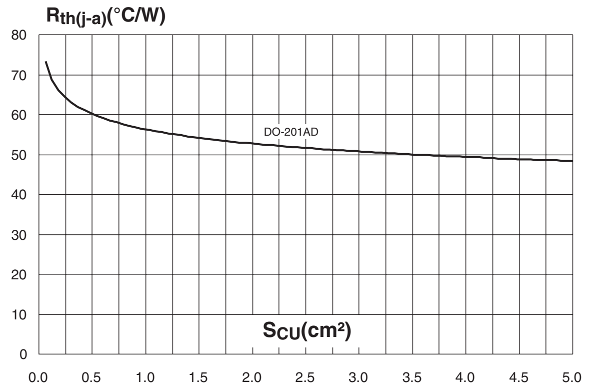


Figure 13: **Thermal resistance junction to ambient versus copper surface under lead (epoxy FR4, e_{CU}=35µm) (SMB / SMC)**

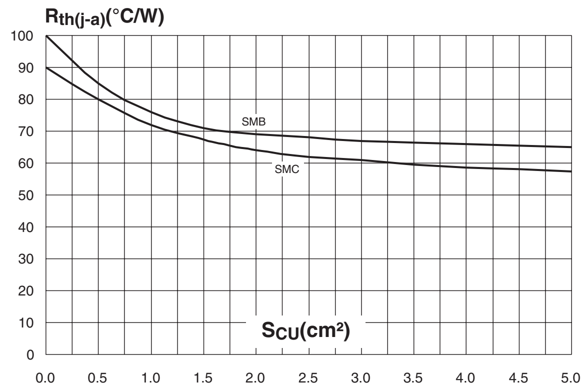


Figure 14: **Thermal resistance junction to ambient versus copper surface under tab (epoxy FR4, e_{CU}=35µm) (DPAK)**

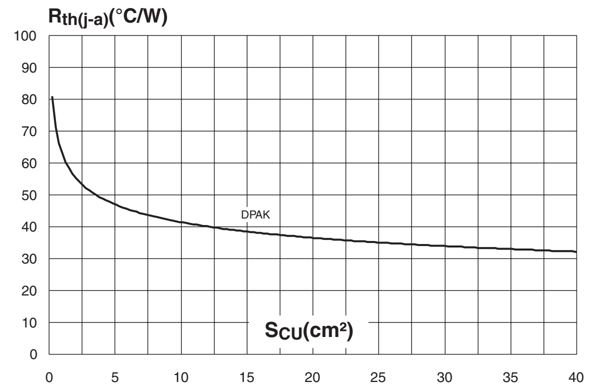


Figure 15: **Thermal resistance versus lead length**

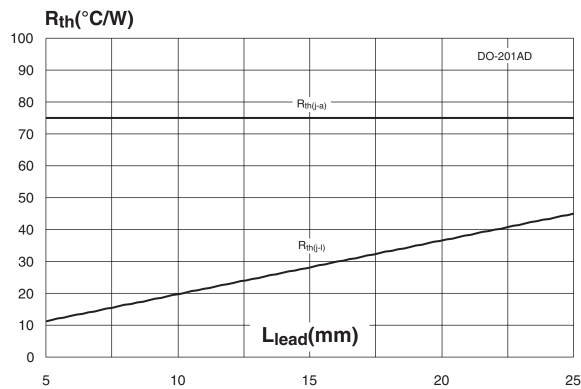
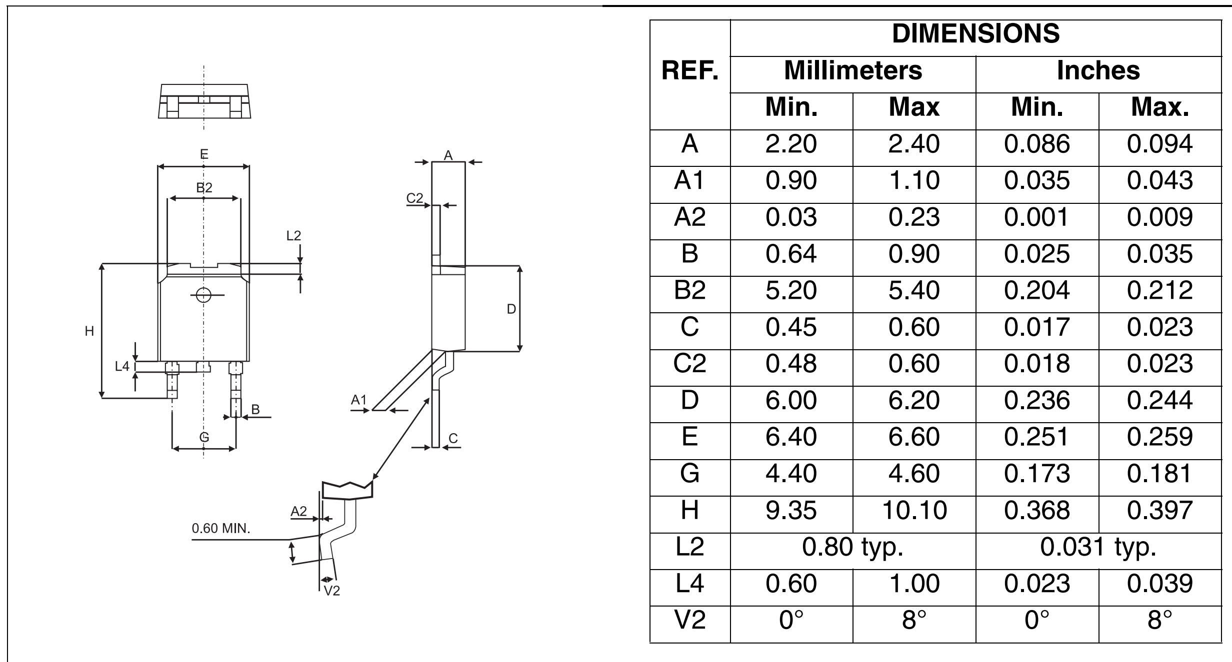


Figure 16: DPAK Package Mechanical Data



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

Figure 17: DPAK Foot Print Dimensions
(in millimeters)

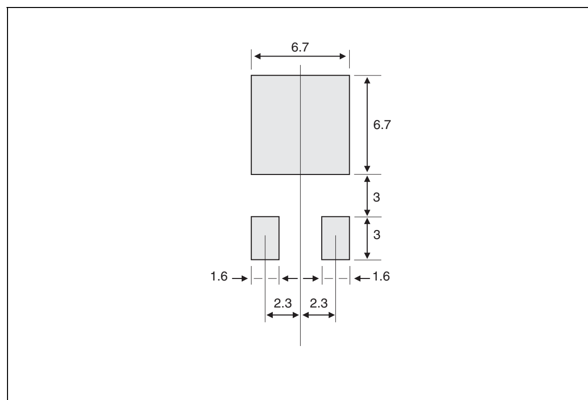
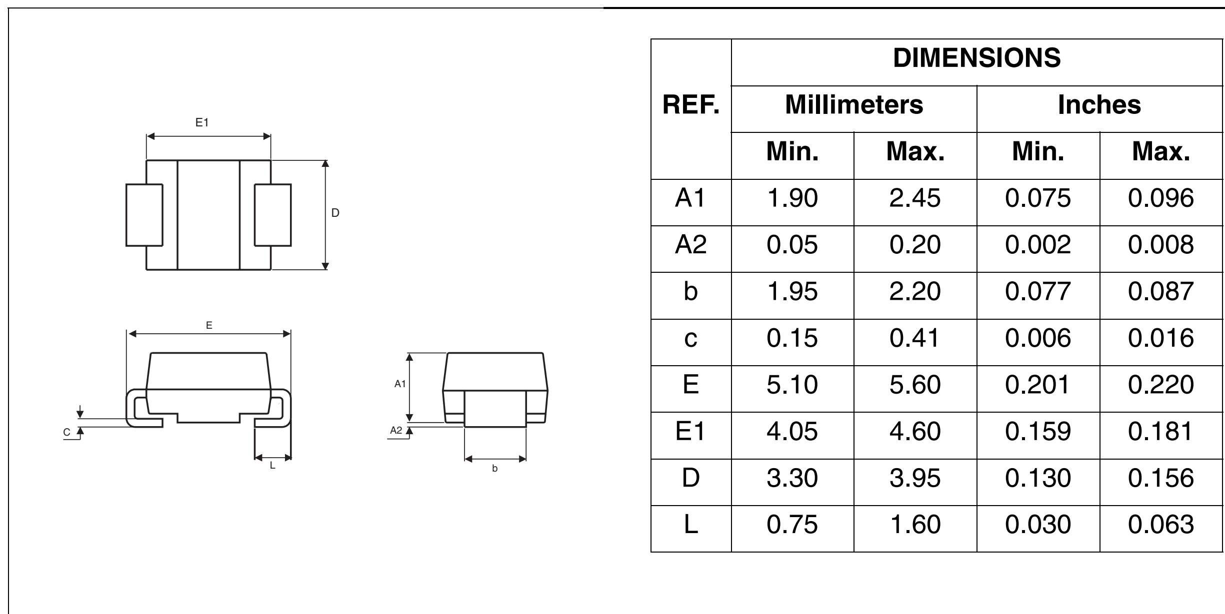


Figure 18: SMB Package Mechanical Data



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 19: SMB Foot Print Dimensions
(in millimeters)

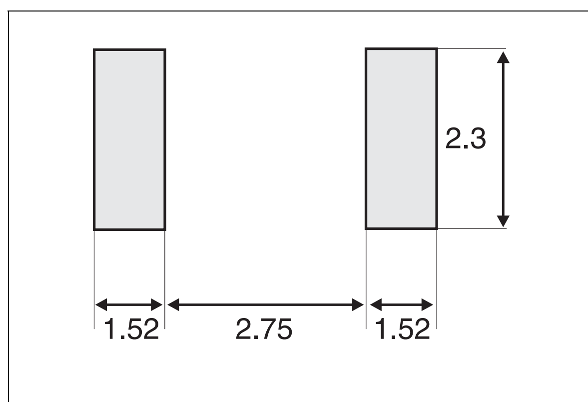
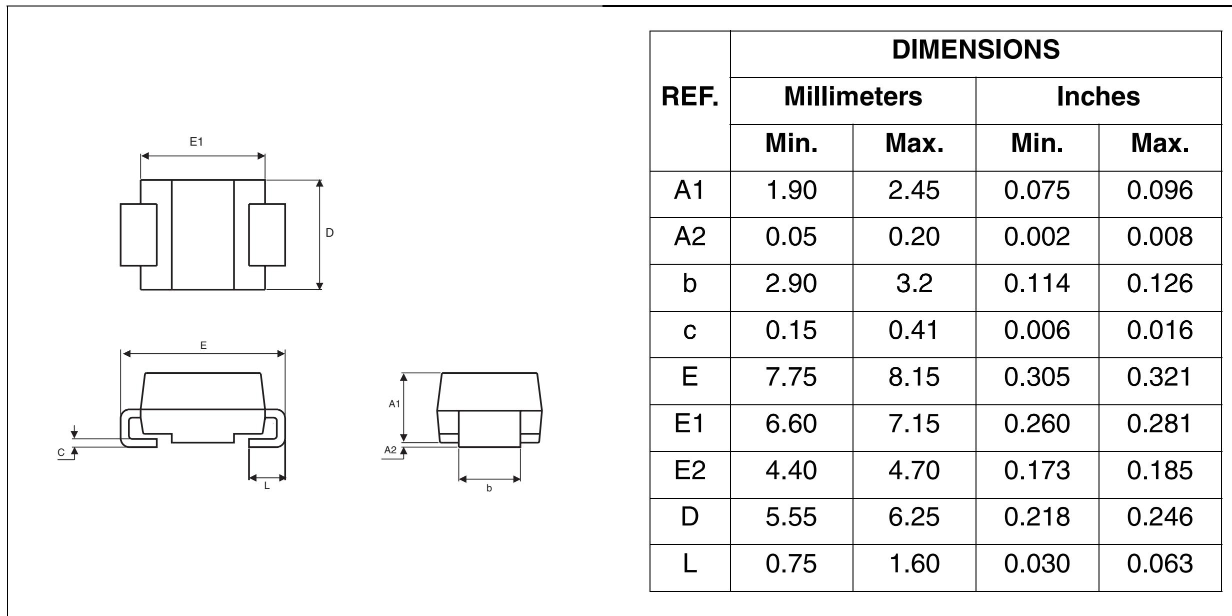


Figure 20: SMC Package Mechanical Data



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 21: SMC Foot Print Dimensions
(in millimeters)

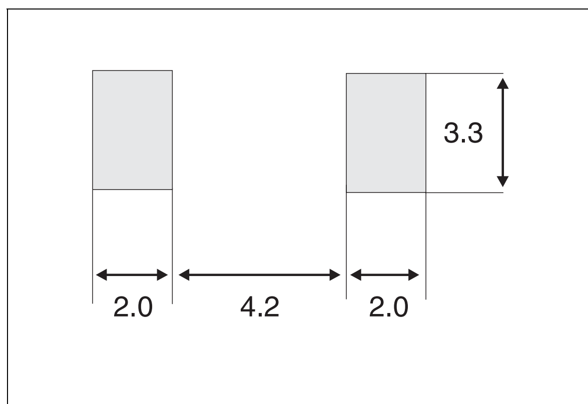
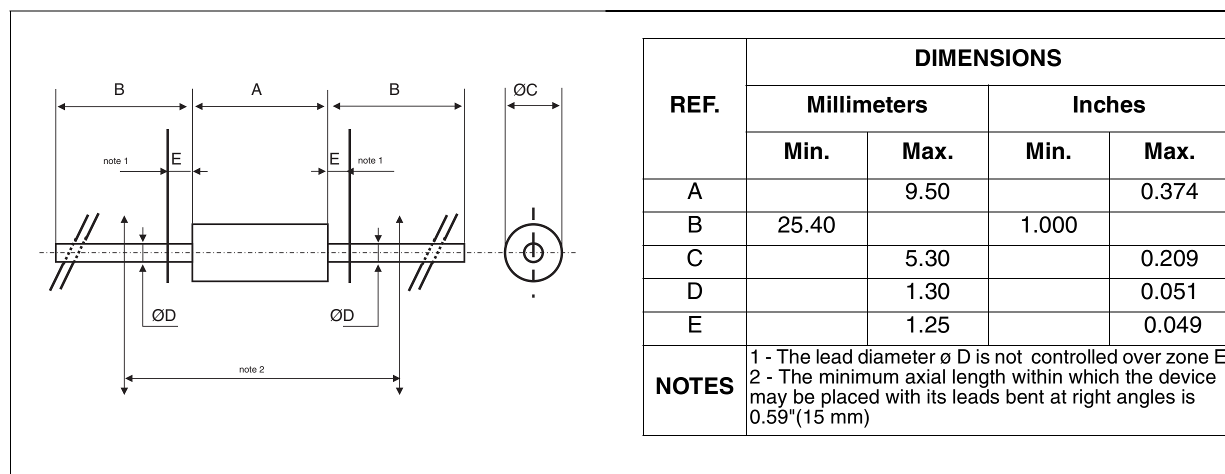


Figure 22: DO-201AD Package Mechanical Data



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)			

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH3L06	STTH3L06	DO-201AD	1.12 g	600	Ammopack
STTH3L06-RL	STTH3L06	DO-201AD	1.12 g	1900	Tape & reel
STTH3L06B	STTH3L06B	DPAK	0.3 g	75	Tubel
STTH3L06B-TR	STTH3L06B	DPAK	0.3 g	2500	Tape & reel
STTH3L06U	3L6U	SMB	0.11 g	2500	Tape & reel
STTH3L06S	S06	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
October-2001	1	First issue
07-Sep-2004	2	SMB, SMC and DPAK packages added
14-Oct-2005	3	Changed marking of STTH3L06U from 3L06U to 3L6U. Added ECOPACK statement

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