DB-55008L-175

RF POWER AMPLIFIER USING 1 x PD55008L

PRELIMINARY DATA

N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

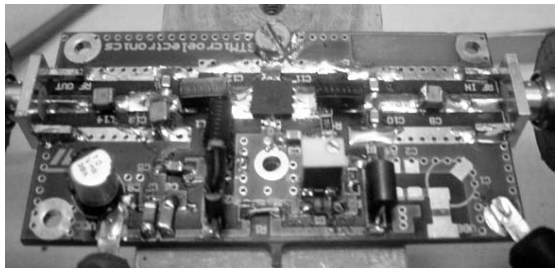
GENERAL FEATURES

- EXCELLENT THERMAL STABILITY
- FREQUENCY 135 - 175 MHz
- SUPPLY VOLTAGE 12.5 V
- OUTPUT POWER 6 W
- POWER GAIN 17.4 +/- 0.4 dB
- EFFICIENCY 61% - 67%
- LOAD MISMATCH 20:1
- BeO FREE AMPLIFIER

DESCRIPTION

The DB-55008L-175 is a common source N-Channel Enhancement-Mode Lateral Field Effect RF power amplifer designed for VHF analog and digital mobile radio.

Figure 1. Demo Board (Picture)



Mechanical dimensions
L = 60 mm W = 30 mm

Table 1. Order Codes

Package	Order Code
PowerFLAT™ (5x5)	DB-55008L-175

Table 2. Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	16	V
I_D	Drain current	1.3	A
P_{DISS}	Power Dissipation	8	W
T_{CASE}	Operate Case Temperature	-20 to +85	^oC
T_{amb}	Max. Ambient Temperature	55	^oC

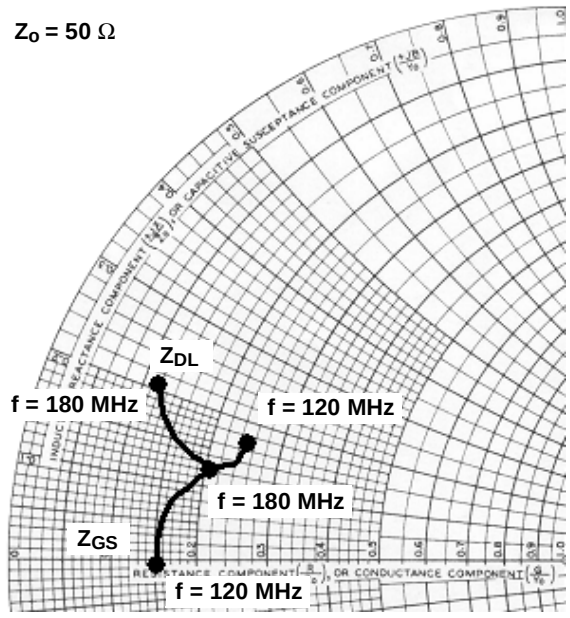
ELECTRICAL CHARACTERISTICS

(T_{amb} = +25 °C, V_{DD} = 12.5 V, I_{DQ} = 150mA, unless otherwise specified)

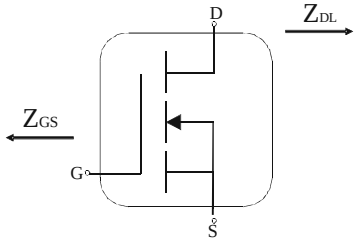
Table 3. RF Data

Symbol	Parameters	Test Conditions	Min.	Typ.	Max.	Unit
f	Frequency range		135		175	MHz
P_{out}	Output Power		6	7		W
G_p	Power Gain	P_{OUT} = 6 W		17		dB
N_D	Efficiency	P_{OUT} = 6 W	60			%
	Gain Flatness	P_{OUT} = 6 W			+/- 0.5	dB
H2	2nd Harmonic	P_{OUT} = 6 W		-21	-15	dBc
H3	3rd Harmonic	P_{OUT} = 6 W		-30	-25	dBc
VSWR	Load Mismatch	P_{OUT} = 6 W, all phases		20:1		

Figure 2. Impedance data



f (MHz)	Z_{GS} (Ω)	Z_{DL} (Ω)
120	7.3 + j 0.2	12.2 + j 8.6
130	7.3 + j 1.3	11.6 + j 6.9
140	7.5 + j 2.7	10.1 + j 6.4
150	8.0 + j 3.9	8.6 + j 6.8
160	8.7 + j 4.7	7.3 + j 7.7
170	9.5 + j 5.7	6.3 + j 8.9
180	10.1 + j 6.2	5.5 + j 10.3



Note: Optimum board impedances for which the DUT operates, at given DC bias and frequency band, to meet application requirements.

TYPICAL PERFORMANCE

Figure 3. Output Power Vs Input Power

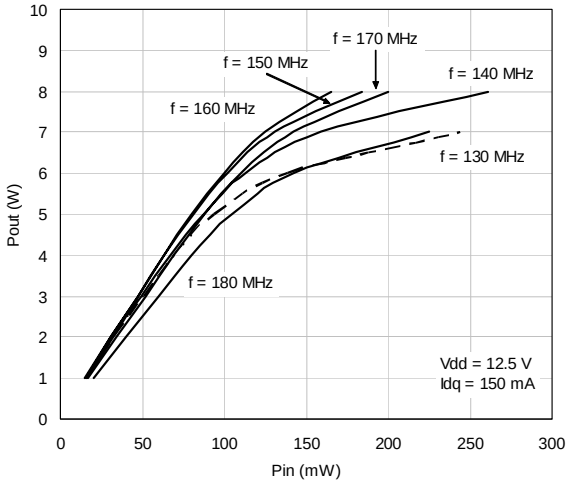


Figure 4. Power Gain & Efficiency Vs Freq.

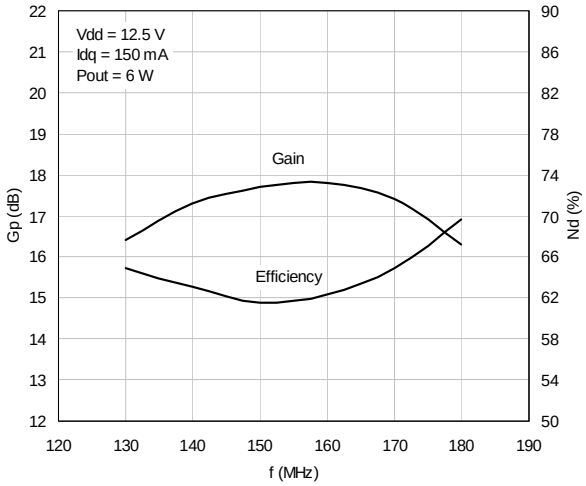


Figure 5. Harmonics Vs Frequency

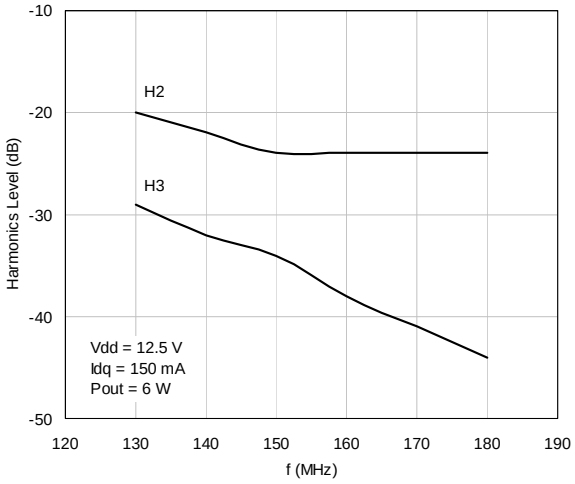


Figure 6. Efficiency Vs Output Power

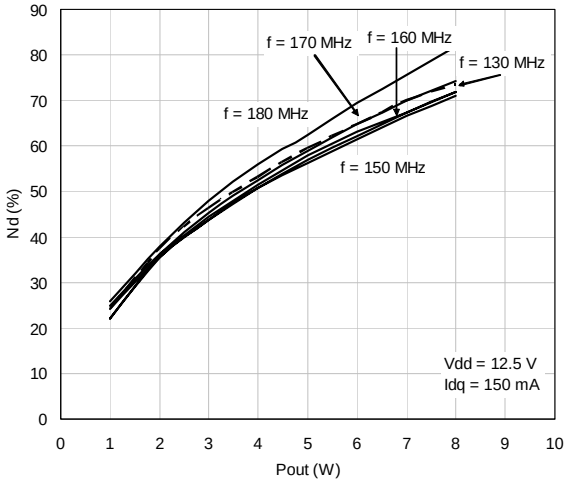


Figure 7. Input Return Loss Vs Frequency

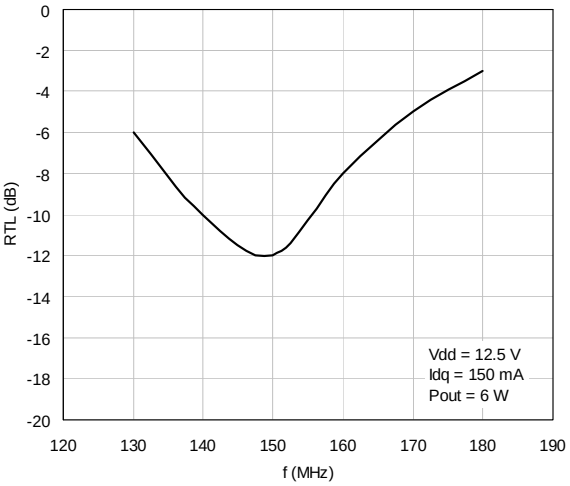


Figure 8. Output Power Vs Freq. & Drain Volt.

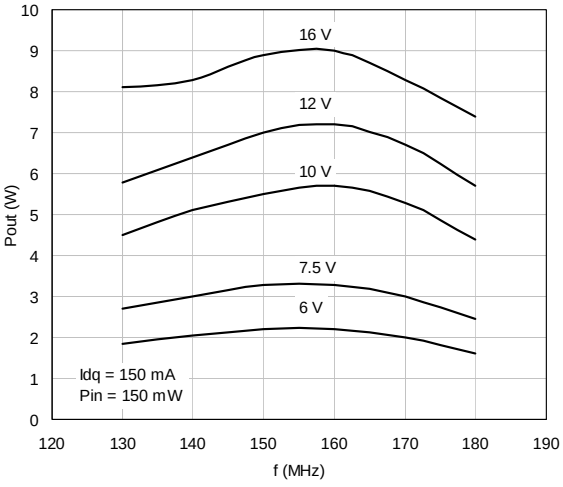


Figure 9. Test Circuit

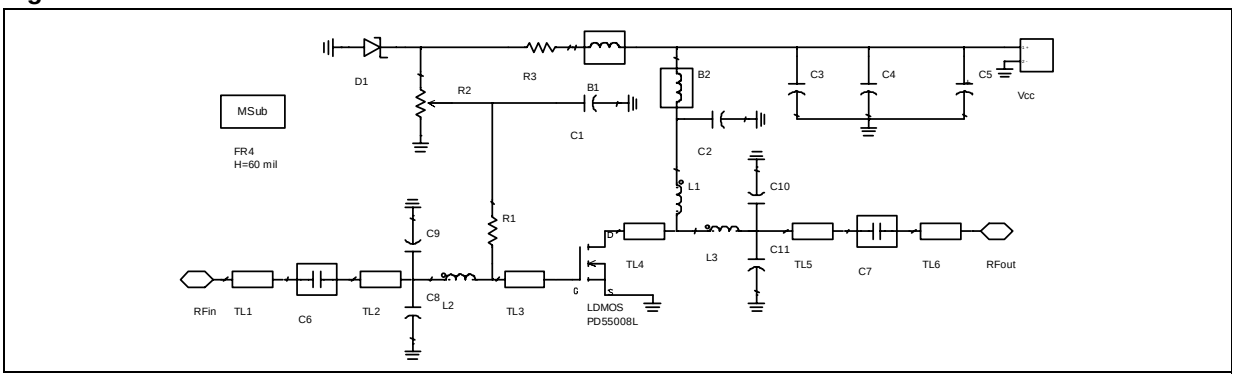


Table 4. Component Part List

Component ID	Description	Value	Case size	Manufacturer	Part Code
B1	Ferrite Bead			PANASONIC	EXCELDRC35C
B2	Ferrite Bead			PANASONIC	EXCELDRC35C
C1, C2	Capacitor	120 pF	1206	MURATA	GRM42-6C0G121J50
C3	Capacitor	1 nF	1206	MURATA	GRM42-6C0G102J50
C4	Capacitor	10 nF	1206	Murata	GRM42-6X7R104K50
C5	Capacitor	10 uF	SMT	PANASONIC	EEVHB1V100P
C6, C7	Capacitor	620 pF	C17AH	DLI	621J-1UXL
C8	Capacitor	33 pF	VJ0805Q	VITRAMON	330JXB
C9	Capacitor	12 pF	VJ0805Q	VITRAMON	120JXB
C10	Capacitor	10 pF	VJ0805Q	VITRAMON	100JXB
C11	Capacitor	27 pF	VJ0805Q	VITRAMON	270JXB
D1	Zener Diode	5.1 V	SOD110	PHILIPS	BZX284C5V1
L1	Inductor	35.5 nH		COILCRAFT	B09T
L2	Inductor	28 nH		COILCRAFT	B08T
L3	Inductor	22 nH		COILCRAFT	B07T
R1	Resistor	15 Ω	1206	TYCO ELECTRONICS	01623440-1
R2	Potentiometer	10 KΩ		BOURNS ELECTRONICS	3214W-1-103E
R3	Resistor	1 K	1206	TYCO ELECTRONICS	01623440-1

TL1	Transmission Line	-	W = 2.87 mm, L = 8.6 mm		
TL2	Transmission Line	-	W = 2.87 mm, L = 9.2 mm		
TL3	Transmission Line	-	W = 4.9 mm, L = 5.4 mm		
TL4	Transmission Line	-	W = 4.9 mm, L = 5.9 mm		
TL5	Transmission Line	-	W = 2.87 mm, L = 8.4 mm		
TL6	Transmission Line	-	W = 2.87 mm, L = 7.5 mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	JOHNSON	142-0701-801
PD55008L	LDMOS			STMicroelectronics	PD55008L
Board	FR-4 THk=0.060" 2OZ Cu Both Sides				

Figure 10. Photomaster

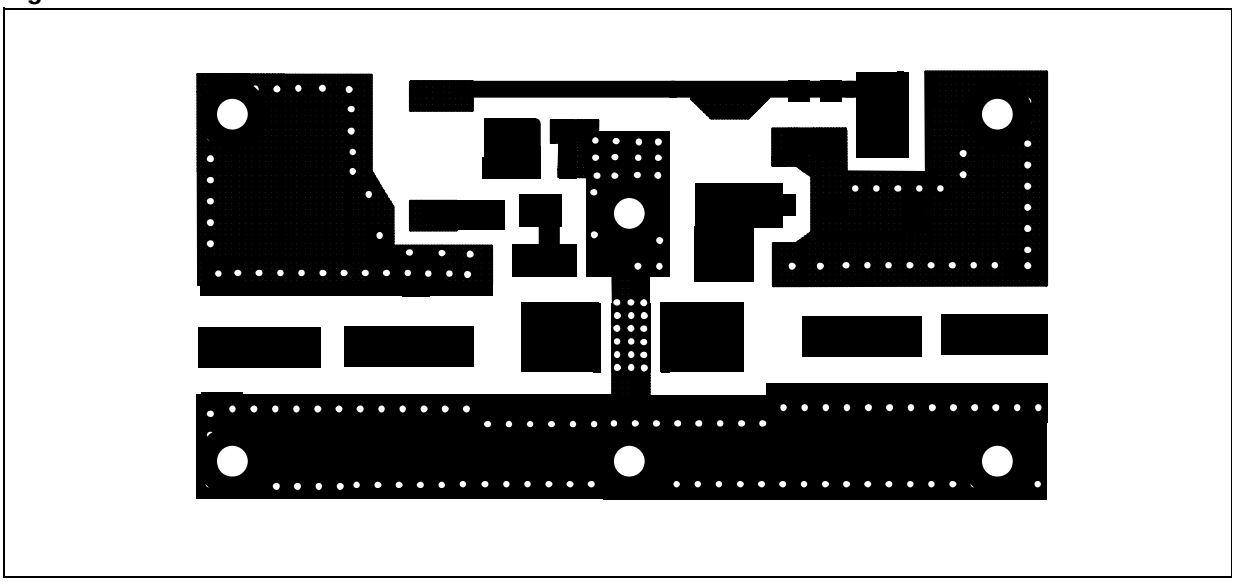
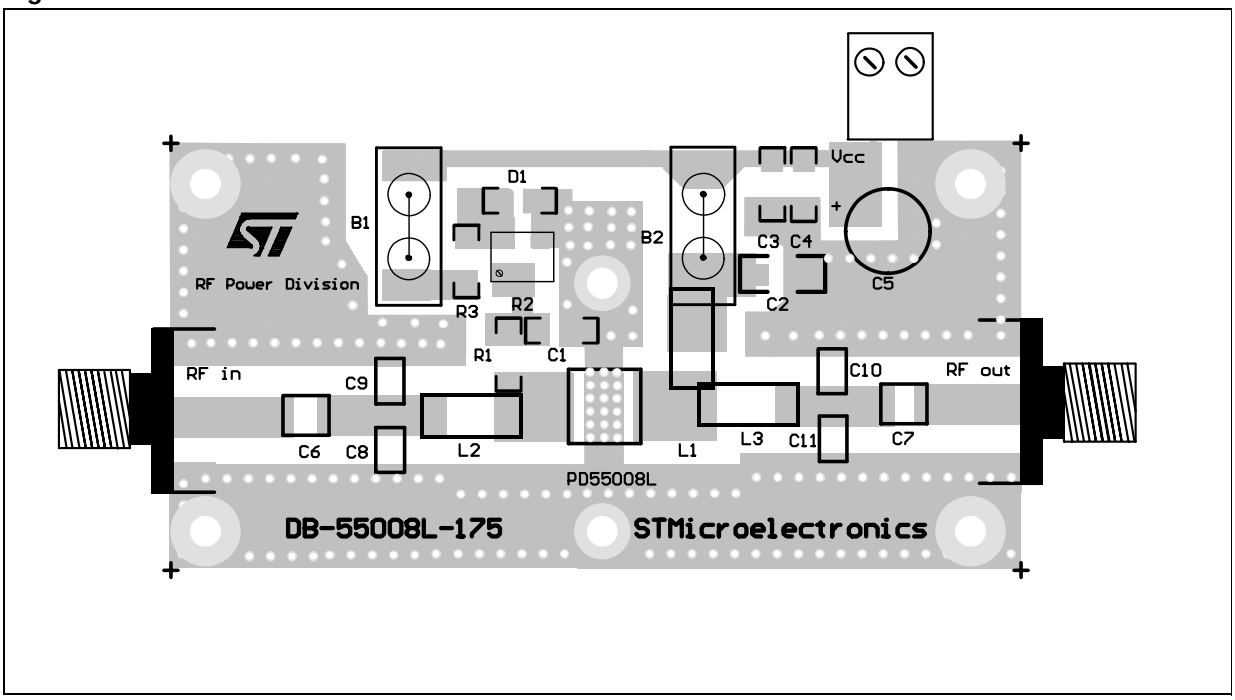


Figure 11. Circuit

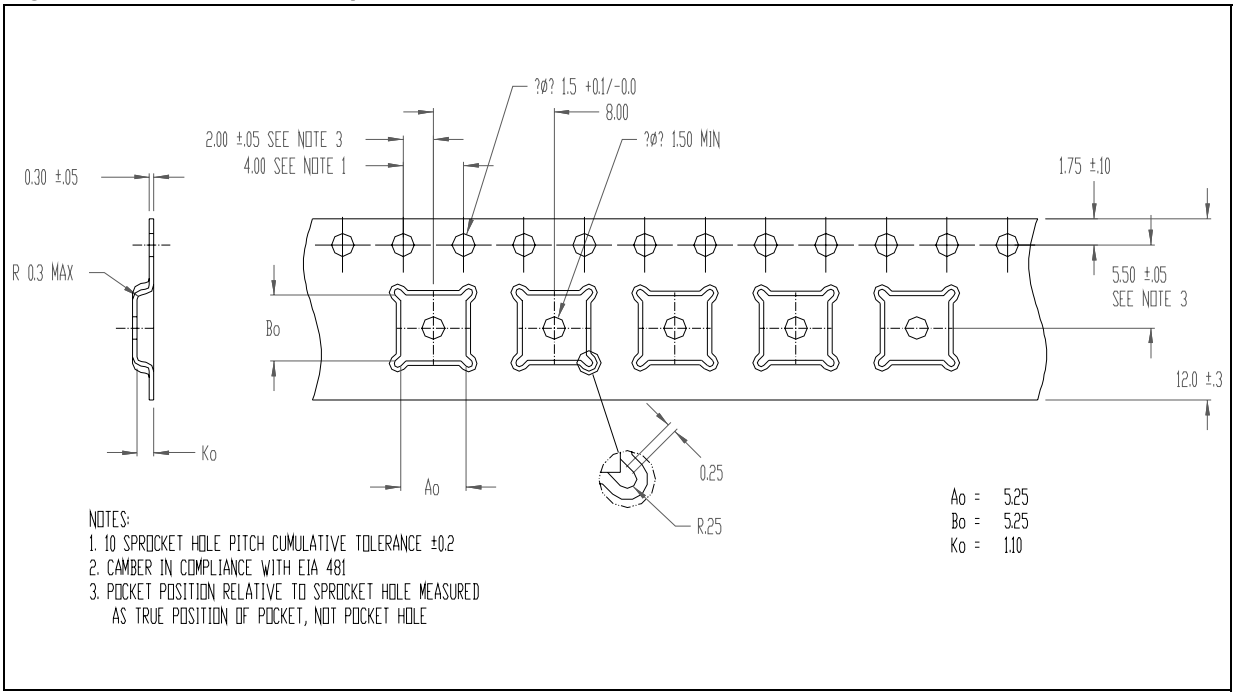


TAPE & REEL

Table 5. PowerFLAT™ Tape & Reel Dimensions

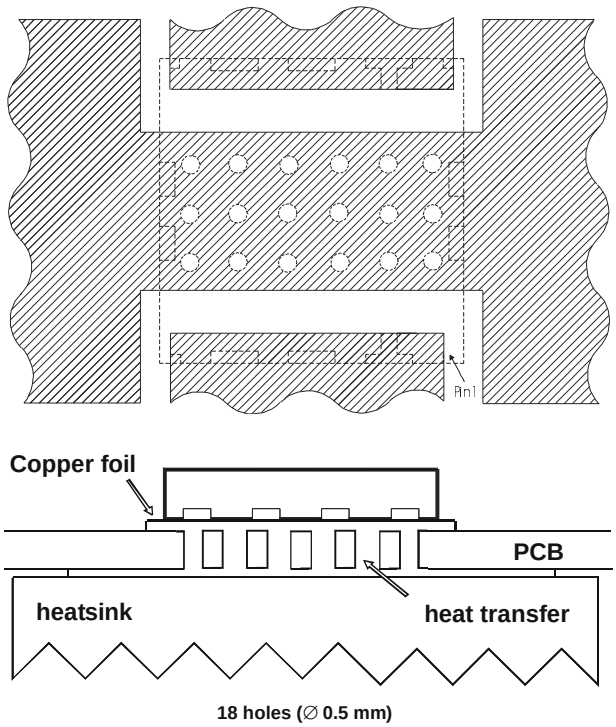
DIM.	mm.		
	MIN.	TYP	MAX.
Ao	5.15	5.25	5.35
Bo	5.15	5.25	5.35
Ko	1.0	1.1	1.2

Figure 12. PowerFLAT™ Tape & Reel



MOUNTING INDICATIONS

Figure 13. Standard SMD Mounting

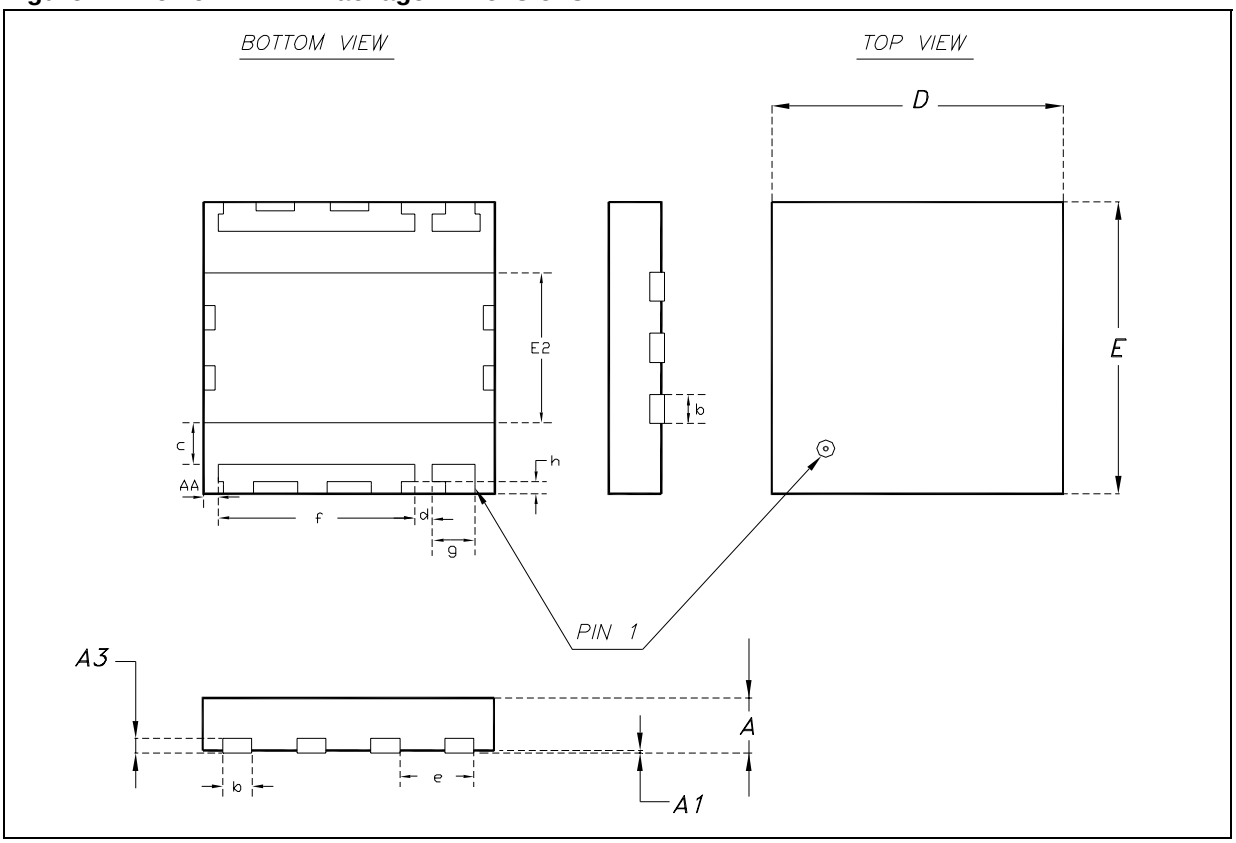


PACKAGE MECHANICAL

Table 6. PowerFLAT™ Mechanical Data

DIM.	mm			inch		
	MIN.	TYP	MAX.	MIN.	TYP	MAX.
A		0.90	1.00		0.035	0.039
A1		0.02	0.05		0.001	0.002
A3		0.24			0.009	
AA	0.15	0.25	0.35	0.006	0.01	0.014
b	0.43	0.51	0.58	0.017	0.020	0.023
c	0.64	0.71	0.79	0.025	0.028	0.031
D		5.00			0.197	
d		0.30			0.011	
E		5.00			0.197	
E2	2.49	2.57	2.64	0.098	0.101	0.104
e		1.27			0.050	
f		3.37			0.132	
g		0.74			0.03	
h		0.21			0.008	

Figure 14. PowerFLAT™ Package Dimensions



REVISION HISTORY

Table 7. Revision History

Date	Revision	Description of Changes
11-Nov-2005	1	First Issue.