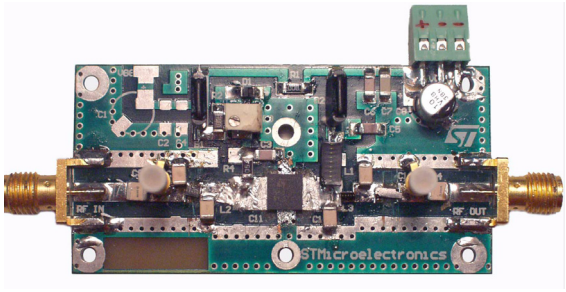
DB-55003L-512

RF POWER AMPLIFIER using 1x PD55003L-512
The LdmoST FAMILY

General Features

- EXCELLENT THERMAL STABILITY
- FREQUENCY: 410 -512 MHz
- SUPPLY VOLTAGE: 12.5V
- OUTPUT POWER: > 3W
- POWER GAIN: 15.8 +/-1.2dB
- EFFICIENCY: 50% - 57%
- LOAD MISMATCH: 20:1
- BeO FREE AMPLIFIER



Mechanical Specification:
L=60 mm, W=30 mm, H=10mm

Description

The DB-55003L-512 is a common source N-Channel Enhancement-Mode Lateral Field Effect RF power amplifer designed for UHF applications such as Wireless Remote & Data Modem.

Order Code

- DB-55003L-512

Contents

1 Electrical Data

1.1 Maximum Ratings

Table 1. Absolute Maximum Ratings

(T_{CASE} = 25°C)

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	16	V
I_D	Drain Current	1	A
T_{CASE}	Operating Case Temperature	-20 to +85	^oC
P_{amb}	Max. Ambient Temperature	+55	^oC

2 Electrical Characteristics

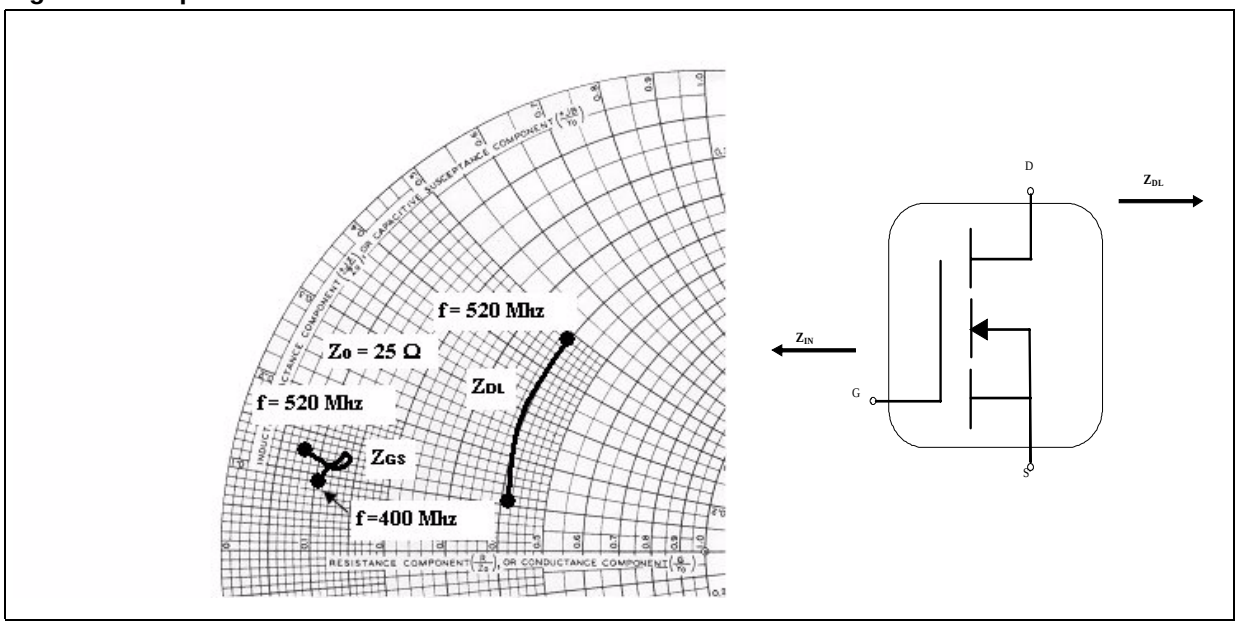
(T_{amb} = +25 ^{o}C, Vdd = 12.5 V, Idq = 80 mA)

Table 2. Electrical Specification

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
FREQ.	Frequency Range	410		512	MHz
P_{OUT}		3	3.5		W
Gain	P_{OUT} = 3 W		15.8 ± 1.2		dB
ND	P_{OUT} = 3 W		50 ÷ 57		%
H2	2ND Harmonic @ P_{OUT} = 3W		-32 ÷- 46		dBc
H3	3ND Harmonic @ P_{OUT} = 3W		-28 ÷ -54		dBc
VSWR	Load Mismatch all phases @ P_{OUT} = 3W			20:1	

2.1 Impedance

Figure 1. Impedance Data(1)



1. Optimum board impedances into which the DUT operates, at a given DC bias and frequency band, to fulfill application requirements.

Table 3. Impedance Data

F(MHz)	Z_{source}	Z_{DL}
400	2.4 + j 2.3	10.2 +j 2.8
420	2.6 + j 2.8	10.0 + j 4.2
440	3.0 + j 3.1	9.8 + j 5.5
460	3.2 + j 3.4	9.6 + j 7.2
480	3.3 + j 3.1	9.6 + j 8.7
500	2.8 + j 2.8	9.6 + j 10.3
520	1.8 + j 3.2	9.6 + j 12.1

3 Typical Perfomance

Figure 2. Output Power vs. Input Power

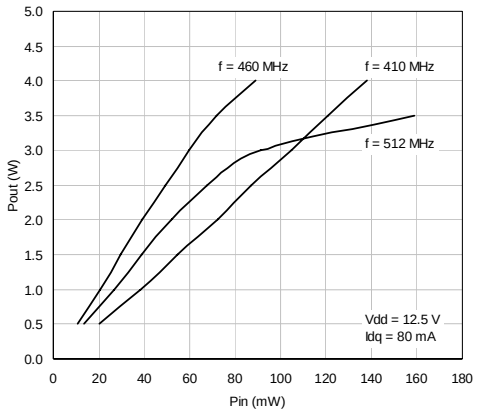


Figure 3. Efficiency vs. Output Power

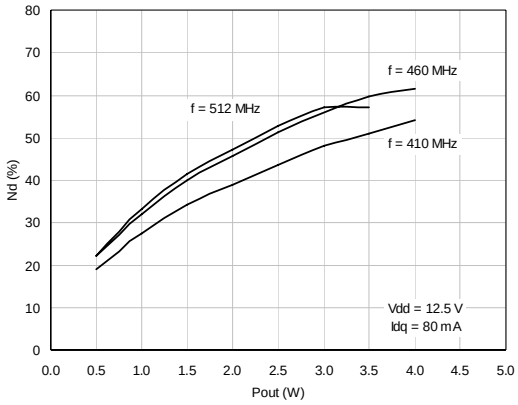


Figure 4. Power Gain vs. Frequency

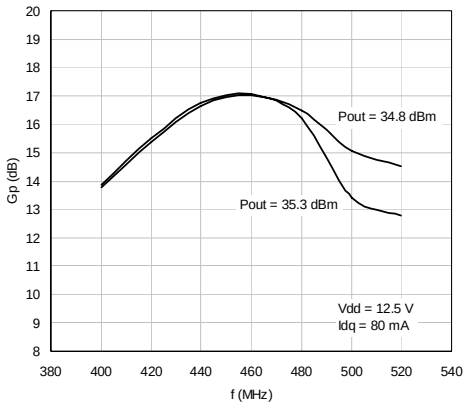


Figure 5. Efficiency vs. Frecuency

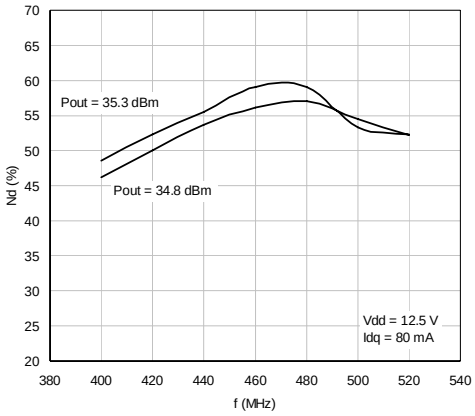


Figure 6. Input Return Loss vs. Frecuency

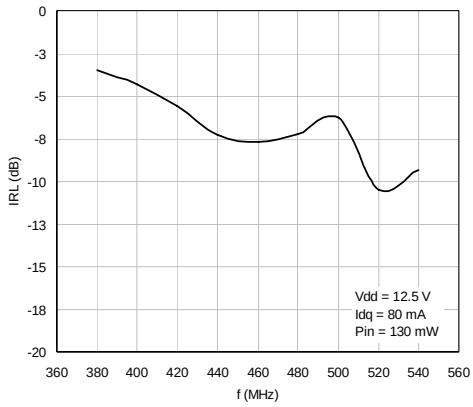


Figure 7. Harmonics vs. Frequency

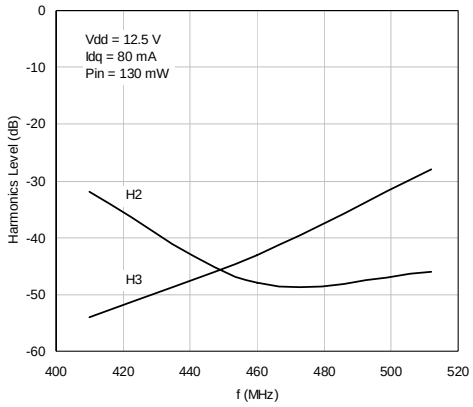
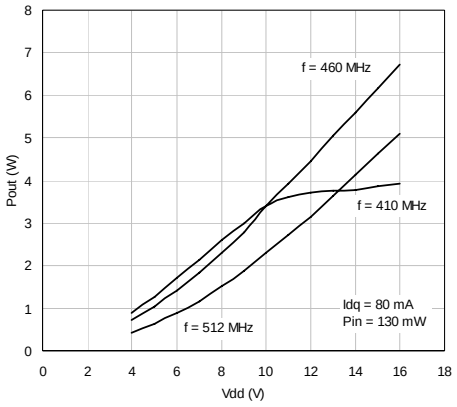
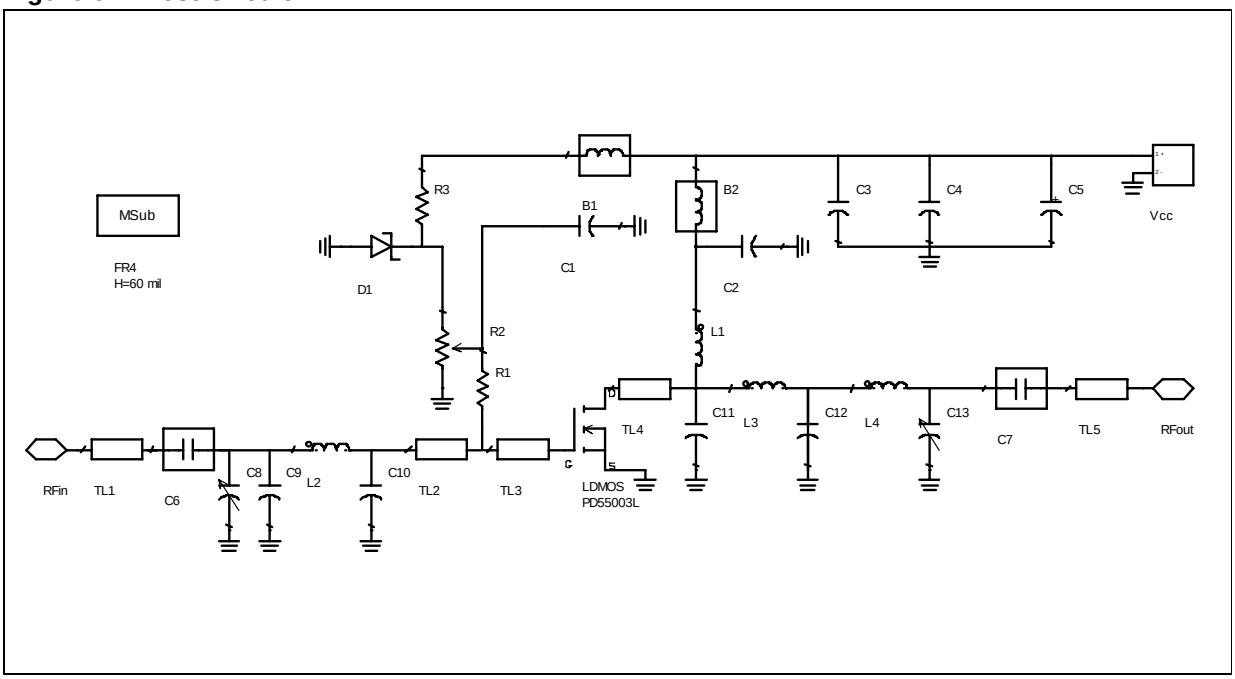


Figure 8. Output Power vs. Drain Voltage



4 Test Circuit

Figure 9. Test Circuit(1)



1. This electrical schematic MUST be intended only as an equivalent lumped circuit representation and it is NOT suitable for simulation.

Table 4. Test Circuit 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	30 pF	100B	ATC	3R0
C8,C13	Variable Capacitor	0.8 -:- 8 pF		Johnson	27293
C9	Capacitor	11 pF	100B	ATC	110
C10	Capacitor	39 pF	100B	ATC	390
C11	Capacitor	4.3 pF	100B	ATC	4R3

Component ID	Description	Value	Case size	Manufacturer	Part Code
C12	Capacitor	15 pF	100B	ATC	150
D1	Zener Diode	5.1 V	SOD110	PHILIPS	BZX284C5V1
L1	Inductor	35.5 nH		COILCRAFT	B09T
L2, L3	Inductor	5.4 nH		COILCRAFT	0906-5
L4	Inductor	7.15 nH		COILCRAFT	1606-7
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=4.33 mm		
TL3, TL4	Transmission Line	-	W=4.9 mm, L=5.7 mm		
TL5	Transmission Line	-	W=2.87 mm, L=8.6 mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	JOHNSON	142-0701-801
PD55003L	LDMOS			STMicroelectronics	PD55003L
Board	FR-4 THk=0.060" 2OZ Cu Both Sides				

Figure 10. Test Fixture Component Layout

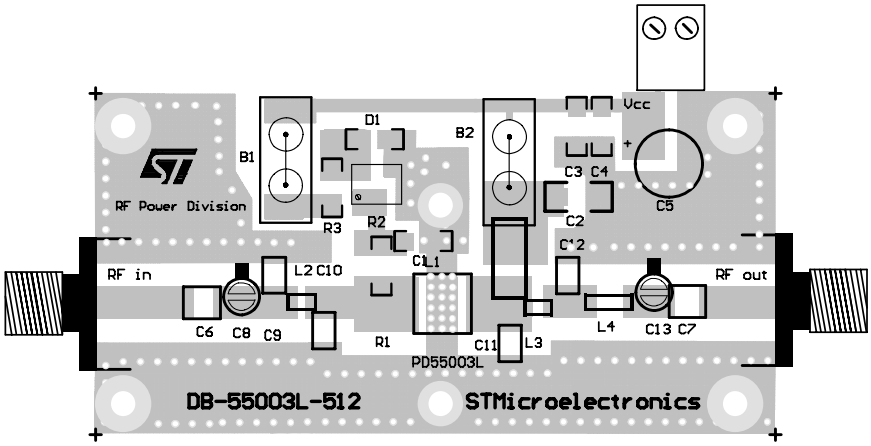
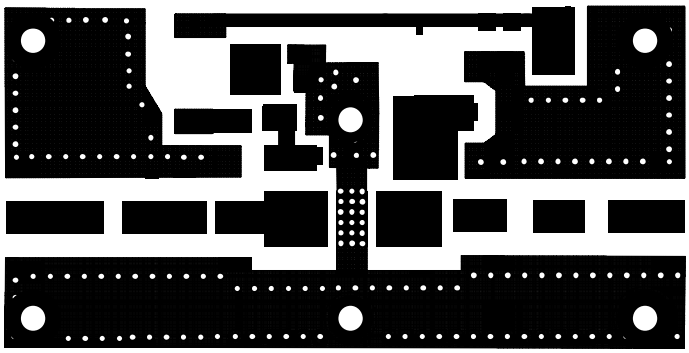
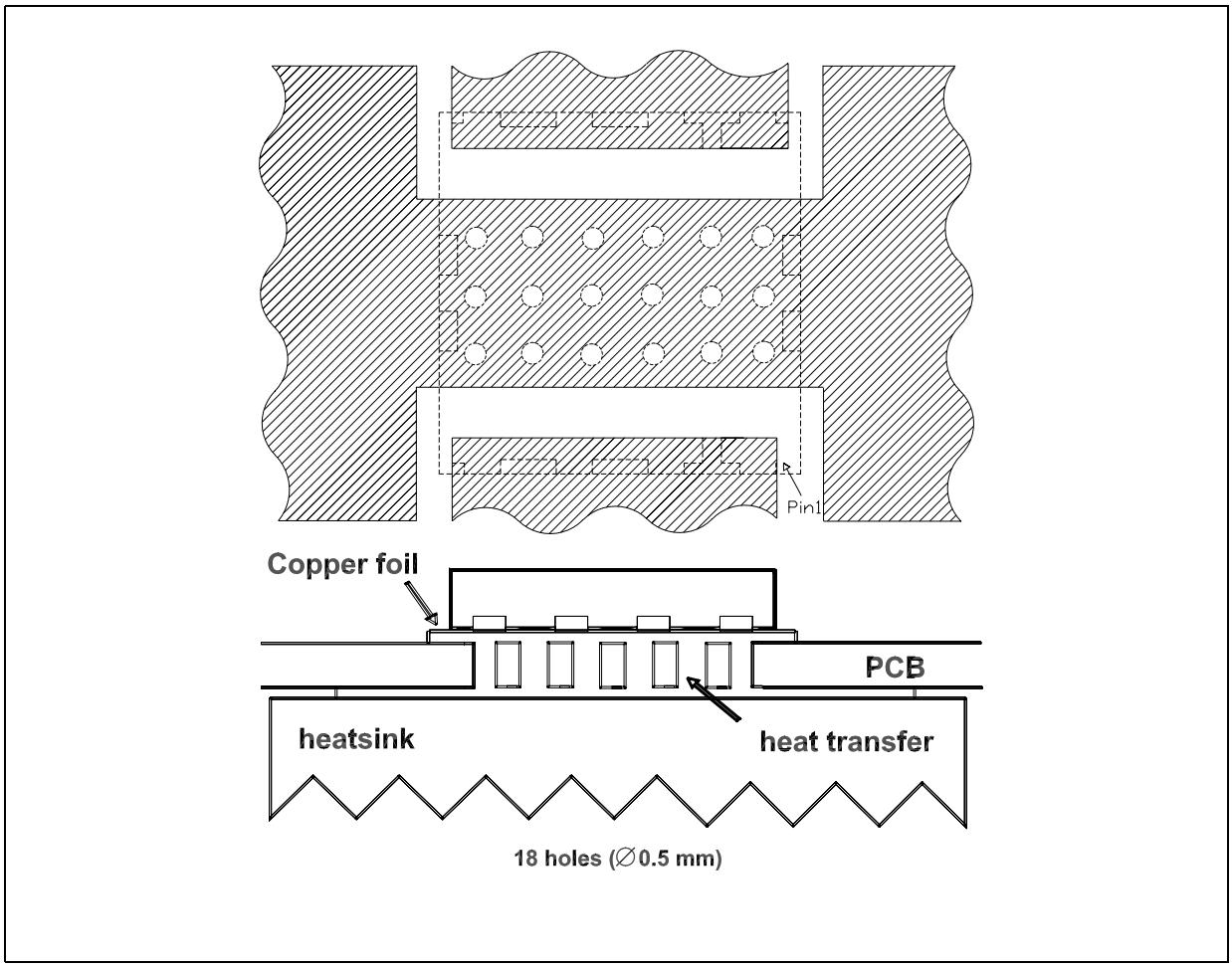


Figure 11. Test Circuit Photomaster



5 Mounting Indications

Figure 12. Standard SMD Mounting



6 Mechanical Data

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 5. 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 13. PowerFLAT™ Package Dimensions

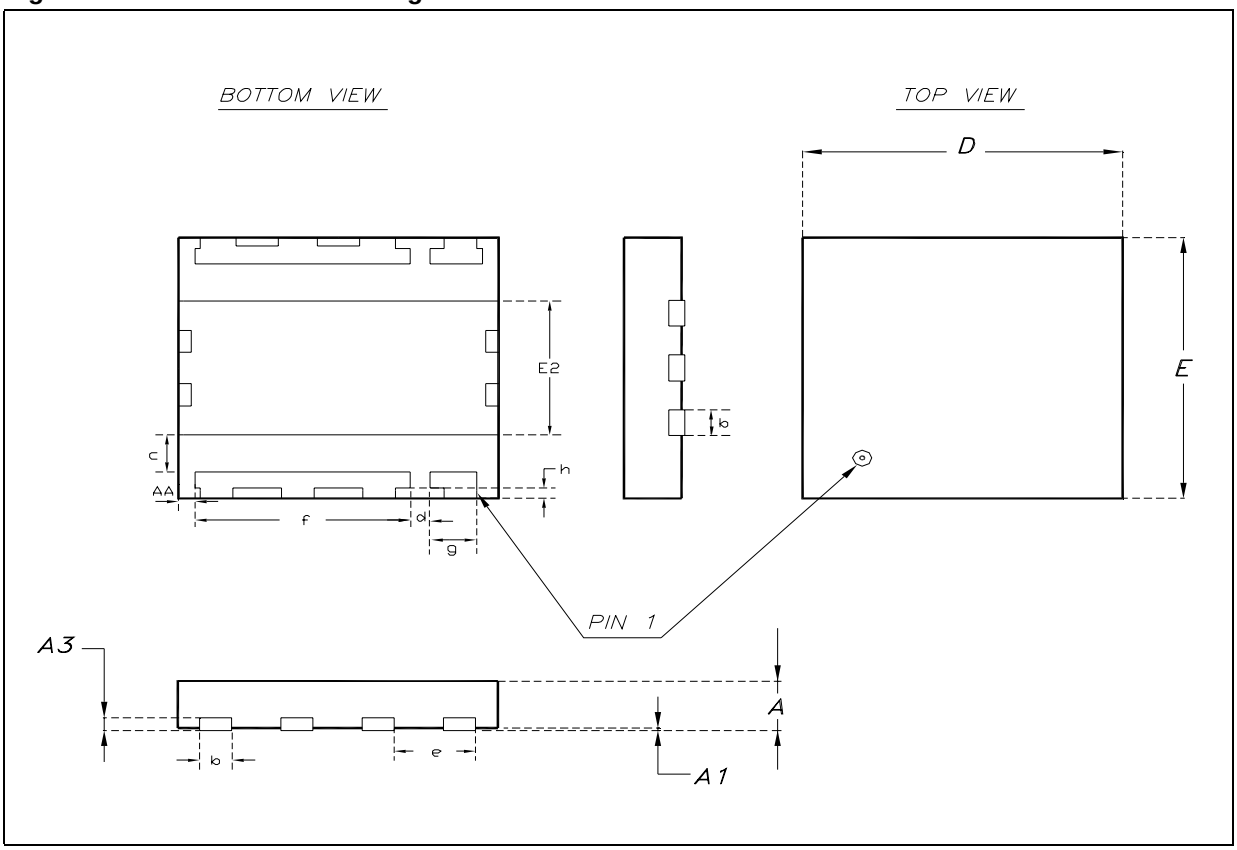
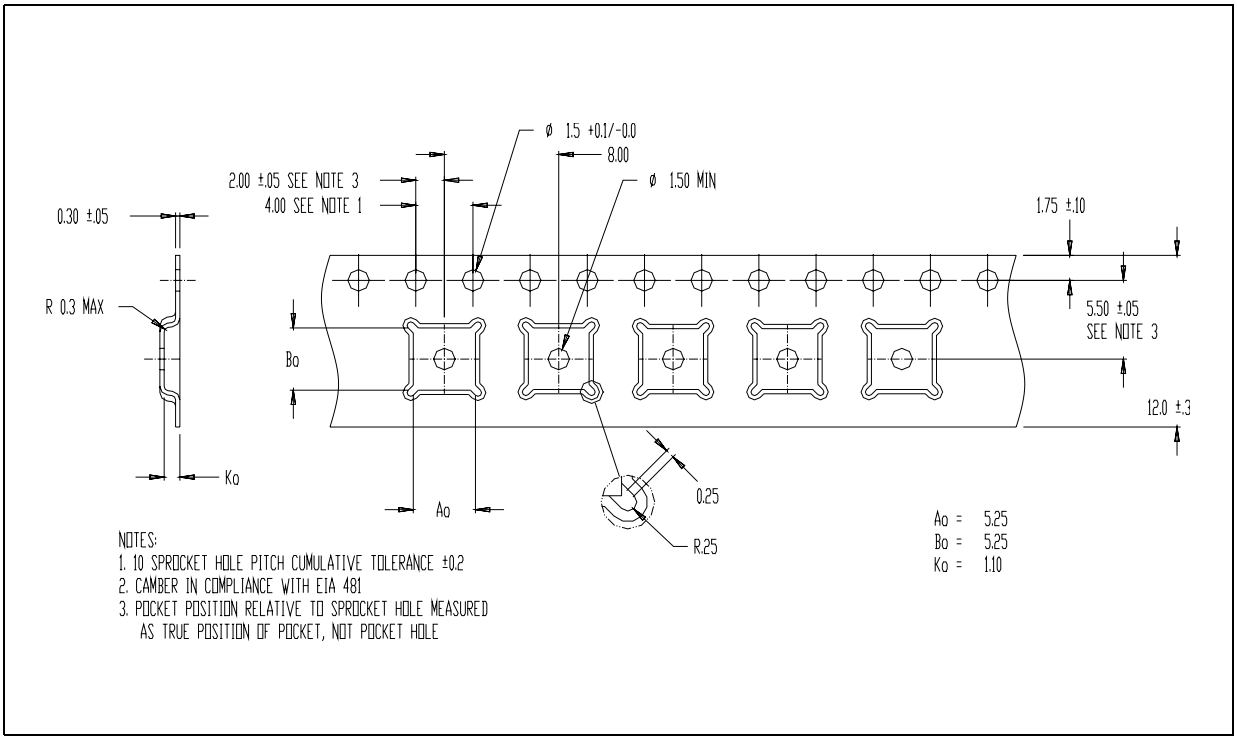


Table 6. PowerFLAT™ Tape & Reel Dimensions

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 14. PowerFLAT™ Tape & Reel



7 Revision History

Date	Revision	Description of Changes
11-Jan-2006	1	First Issue.