



# DB-55008L-450

## RF power amplifier using 1 x PD55008L-E N-channel enhancement-mode lateral MOSFETs

Preliminary Data

### Features

- Excellent thermal stability
- Frequency: 318 - 450 MHz
- Supply voltage: 13.6 V
- Output power: 8 W
- Power gain:  $14.6 \pm 0.6$  dB
- Efficiency: 52 % - 73 %
- BeO free amplifier

### Description

The DB-55008L-450 is a common source N-channel enhancement-mode lateral field effect RF power amplifier designed for UHF mobile applications.

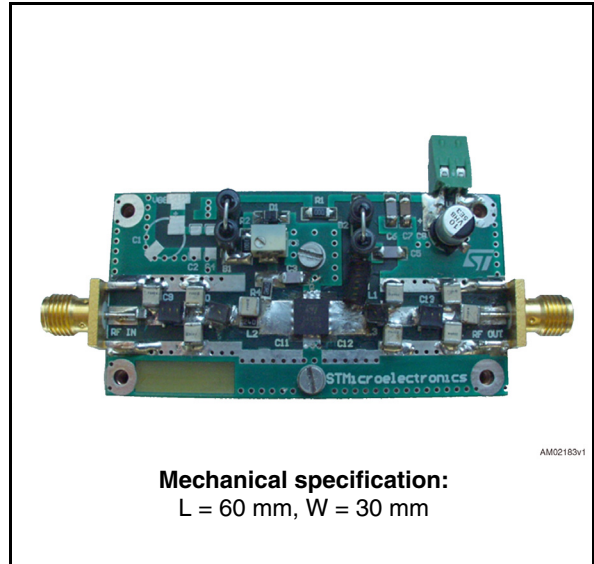


Table 1. Device summary

Order codes
DB-55008L-450

# Contents

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<b>1</b>	<b>Electrical data</b> .....	<b>3</b>
1.1	Maximum ratings .....	3
<b>2</b>	<b>Electrical characteristics</b> .....	<b>3</b>
<b>3</b>	<b>Impedance</b> .....	<b>4</b>
<b>4</b>	<b>Typical performance</b> .....	<b>5</b>
4.1	$V_{DD} = 13.6\text{ V}$ , $I_{DQ} = 200\text{ mA}$ , $P_{IN} = 25\text{ dBm}$ .....	5
<b>5</b>	<b>Test circuit</b> .....	<b>6</b>
<b>6</b>	<b>Circuit layout</b> .....	<b>8</b>
<b>7</b>	<b>Mounting indications</b> .....	<b>9</b>
<b>8</b>	<b>Package mechanical data</b> .....	<b>10</b>
<b>9</b>	<b>Revision history</b> .....	<b>12</b>

# 1 Electrical data

## 1.1 Maximum ratings

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**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DD}$	Supply voltage	13.6	V
$I_D$	Drain current	1.5	A
$T_{CASE}$	Operating case temperature	+20 to +85	°C
$T_A$	Max. ambient temperature	+55	°C

# 2 Electrical characteristics

$T_A = +25\text{ °C}$ ,  $V_{DD} = 13.6\text{ V}$ ,  $I_{dq} = 200\text{ mA}$ , unless otherwise specified

**Table 3. RF data**

Symbol	Parameters	Test conditions	Min	Typ	Max	Unit
f	Frequency range		318		450	MHz
$P_{out}$	Output power		7	8		W
$G_p$	Power gain	$P_{IN} = 25\text{ dBm}$		$14.6 \pm 0.6$		dB
$N_D$	Efficiency	$P_{IN} = 25\text{ dBm}$		52 - 73		%
H2	2nd harmonic	$P_{IN} = 25\text{ dBm}$			-30	dBc
H3	3rd harmonic	$P_{IN} = 25\text{ dBm}$			-55	dBc

### 3 Impedance

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Figure 1. Impedance graphic

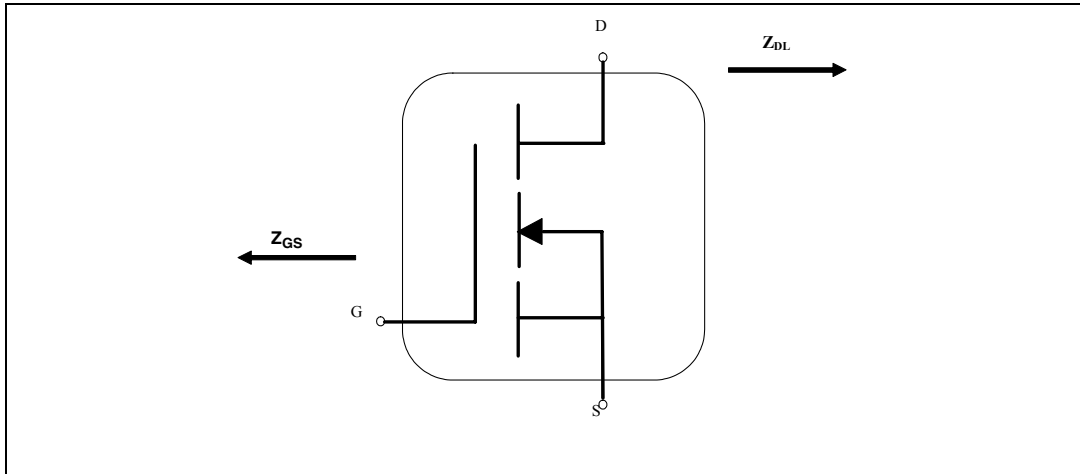


Table 4. Impedance data

f(MHz)	$Z_{GS} (\Omega)$	$Z_{DL} (\Omega)$
310	$5.33 + j1.67$	$3.79 + j4.78$
330	$5.26 + j2.74$	$3.87 + j5.75$
350	$5.54 + j3.39$	$4.29 + j6.45$
370	$6.18 + j3.81$	$5.06 + j7.10$
390	$6.29 + j3.42$	$5.57 + j7.07$
410	$5.26 + j3.00$	$5.57 + j6.63$
430	$3.82 + j3.53$	$4.90 + j6.11$
450	$2.45 + j4.87$	$3.30 + j3.39$
470	$1.75 + j6.52$	$2.21 + j7.40$

# 4 Typical performance

## 4.1 $V_{DD} = 13.6\text{ V}$ , $I_{DQ} = 200\text{ mA}$ , $P_{IN} = 25\text{ dBm}$

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Figure 2. Gain vs frequency

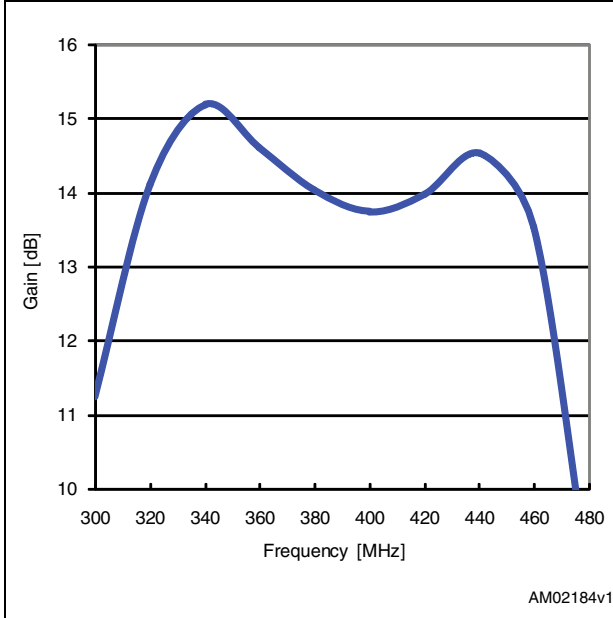


Figure 3. Pout and efficiency vs frequency

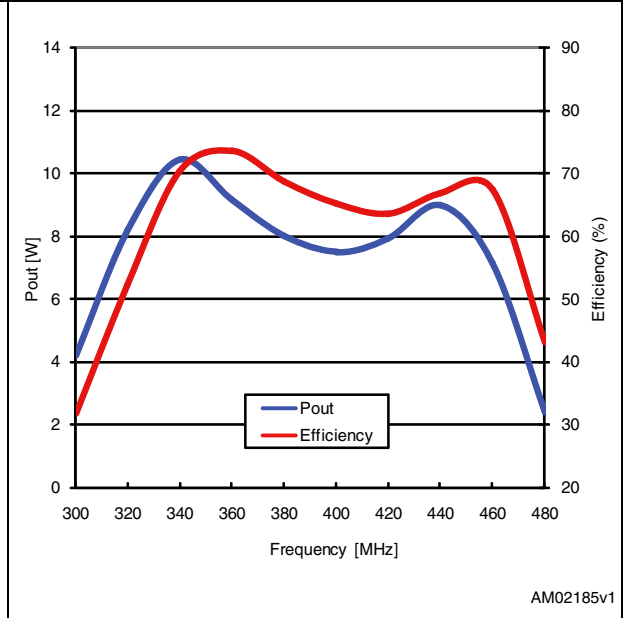


Figure 4. Input return loss vs frequency

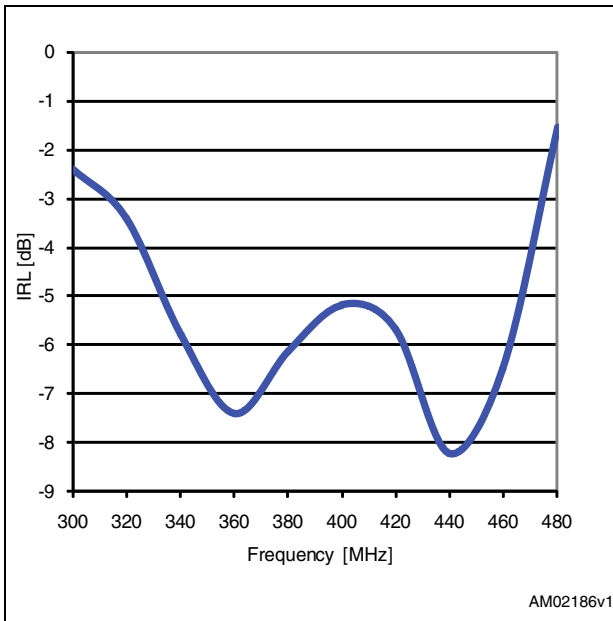


Figure 5. Harmonics vs frequency, Pout = 8 W

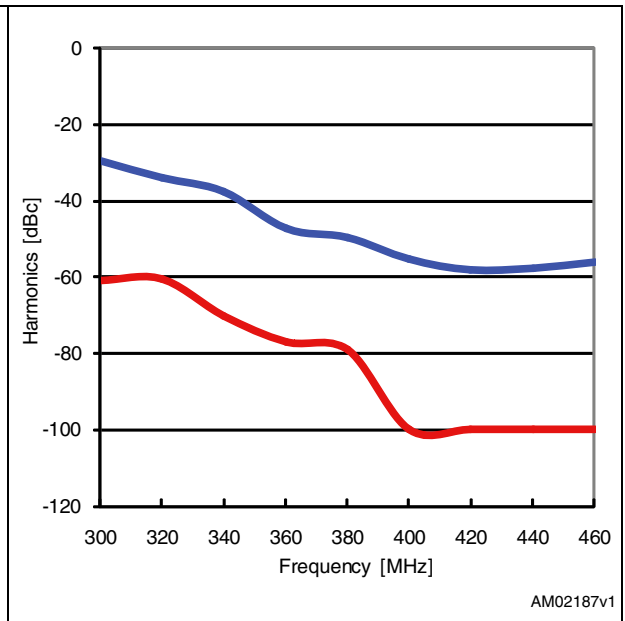
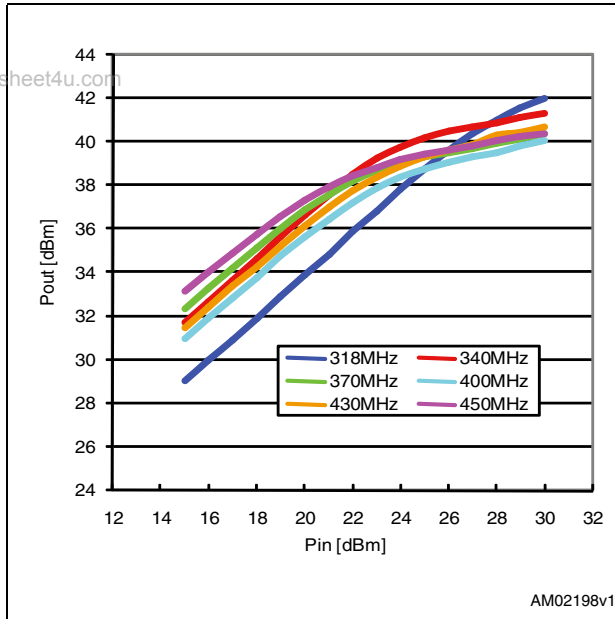


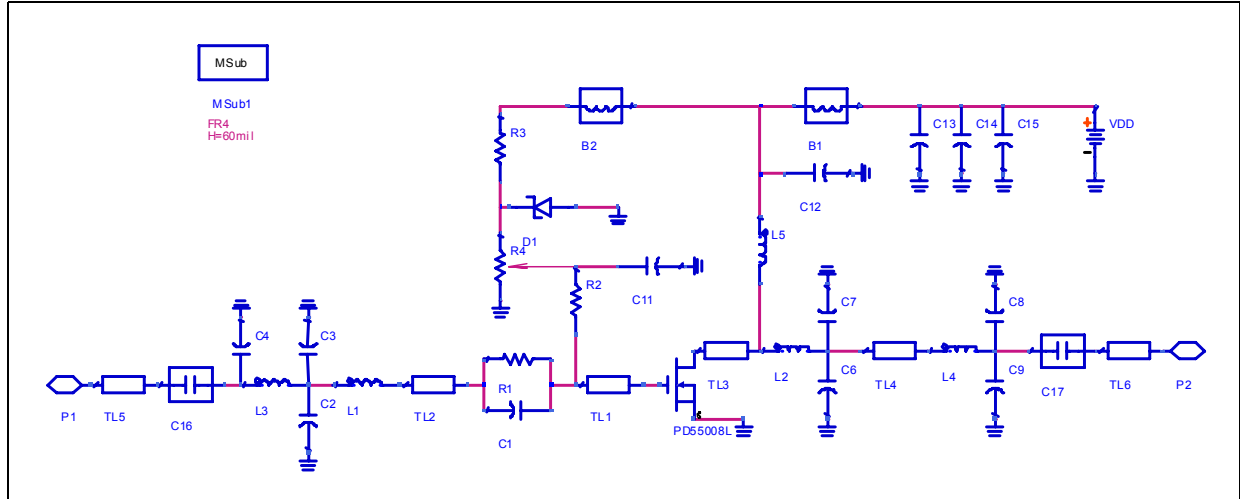
Figure 6. Output power vs input power\_Vdd = 13.6 V, Idq = 200 mA



# 5 Test circuit

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**Table 5. Test circuit schematic**



**Table 6. Components part list for DB-55008L-450**

Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite Bead			Panasonic	EXCELDRC35C
B2	Ferrite Bead			Panasonic	EXCELDRC35C
C1	Capacitor	56 pF	100B	ATC	ATC 100B 560JW
C2,C3	Capacitor	30 pF	100B	ATC	ATC 100B 330JW
C4	Capacitor	20 pF	100B	Murata	ATC 100B 200JW
C6, C7	Capacitor	27 pF	100B	ATC	ATC 100B 270JW
C8	Capacitor	6.8 pF	100B	ATC	ATC 100B 6R8CW
C9	Capacitor	10 pF	100B	ATC	ATC 100B 100JW
C11,C12	Capacitor	120 pF	1206	Murata	GRM42-6C0G121J50
C13	Capacitor	1 nF	1206	Murata	GRM42-6C0G102J50
C14	Capacitor	10 nF	1206	Murata	GRM42-6X7R103K50
C15	Capacitor	10 μF	SMT	Panasonic	EEVHB1V100P
C16	Capacitor	270 pF	100A	ATC	700A271KW150X
C17	Capacitor	220 pF	100B	ATC	ATC 100B 221FW
L1,L2	Inductor	2.5 nH		Coilcraft	A01TJ
L3,L4	Inductor	8 nH		Coilcraft	A03TJ
L5	Inductor	22 nH		Coilcraft	B07TJ
R1	Resistor	24 Ω	1206	Tyco electronics	01623440-1
R2	Resistor	20 Ω	1206	Tyco electronics	01623440-1
R3	Resistor	1kΩ	1206	Tyco electronics	01623440-1

Table 6. Components part list for DB-55008L-450 (continued)

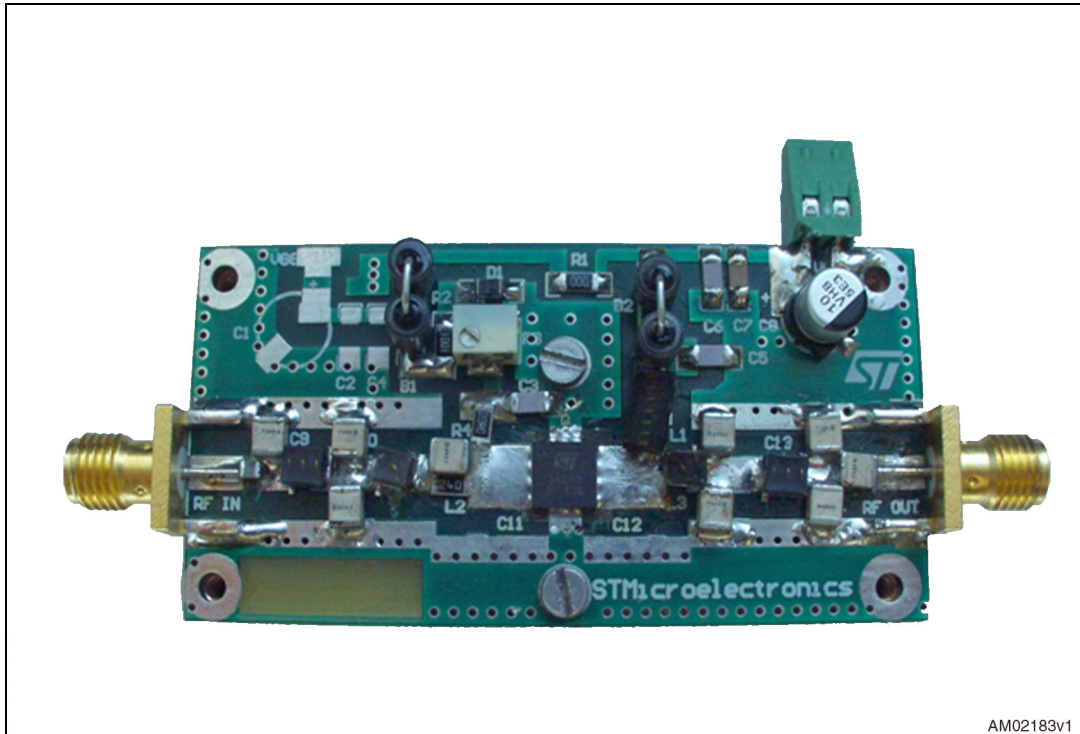
Component ID	Description	Value	Case size	Manufacturer	Part code
R4	Potentiometer	10 k $\Omega$		BOURNS ELECTRONICS	3214W-1-103E
D1	Zener diode	5.1 V		PHILIPS	BZX284C5V1
TL1	Transmission line		W=4.98 mm,L=5.6 mm		
TL2			W=2.8 mm,L=1.3 mm		
TL3			W=4.98 mm,L=5.5 mm		
TL4			W=2.8 mm,L=1.7 mm		
TL5			W=2.8 mm,L=4.6 mm		
TL6			W=2.8 mm,L=4.6 mm		
PD55008L	LDMOS			STMicroelectronics	PD55008L-E
Board	FR-4 THk=0.060" 2OZ Cu both sides				



## 6 Circuit layout

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Figure 7. Test fixture component layout

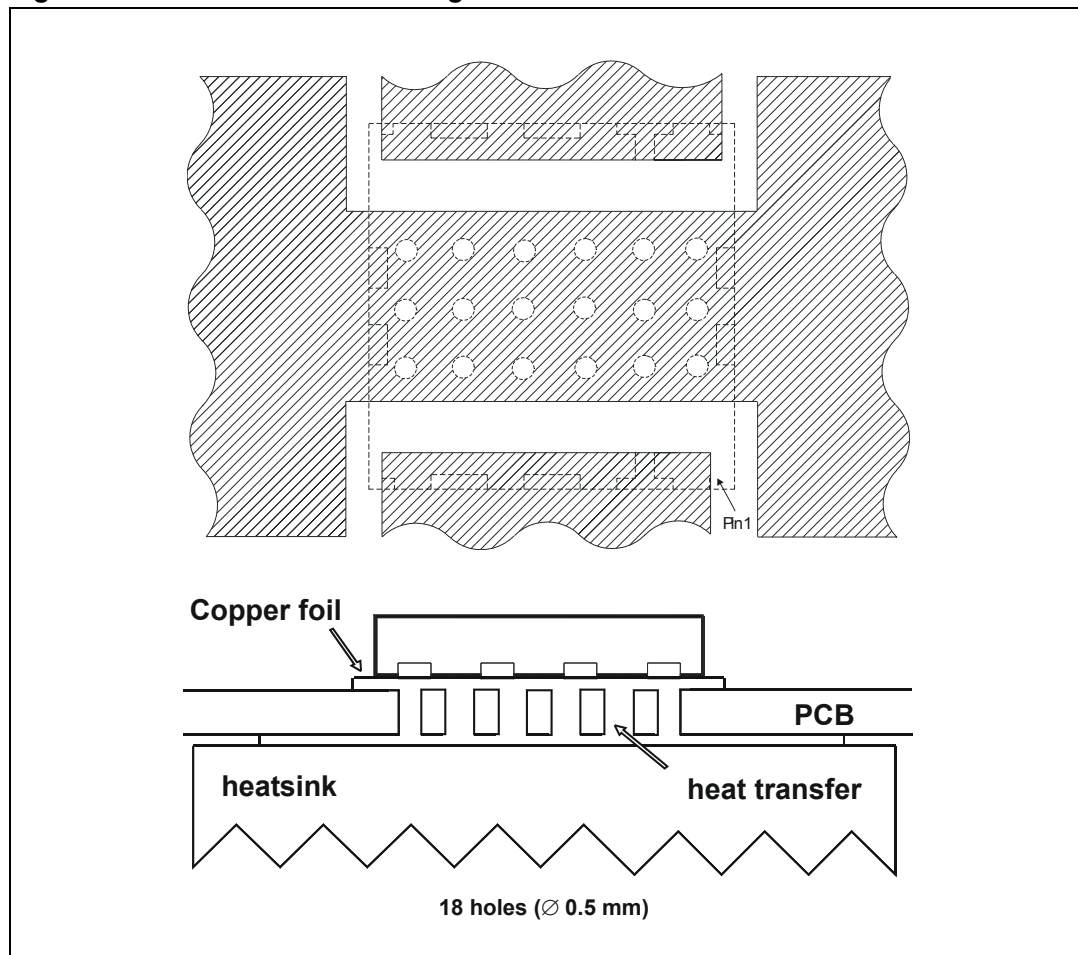


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# 7 Mounting indications

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Figure 8. Standard SMD mounting



## 8 Package mechanical data

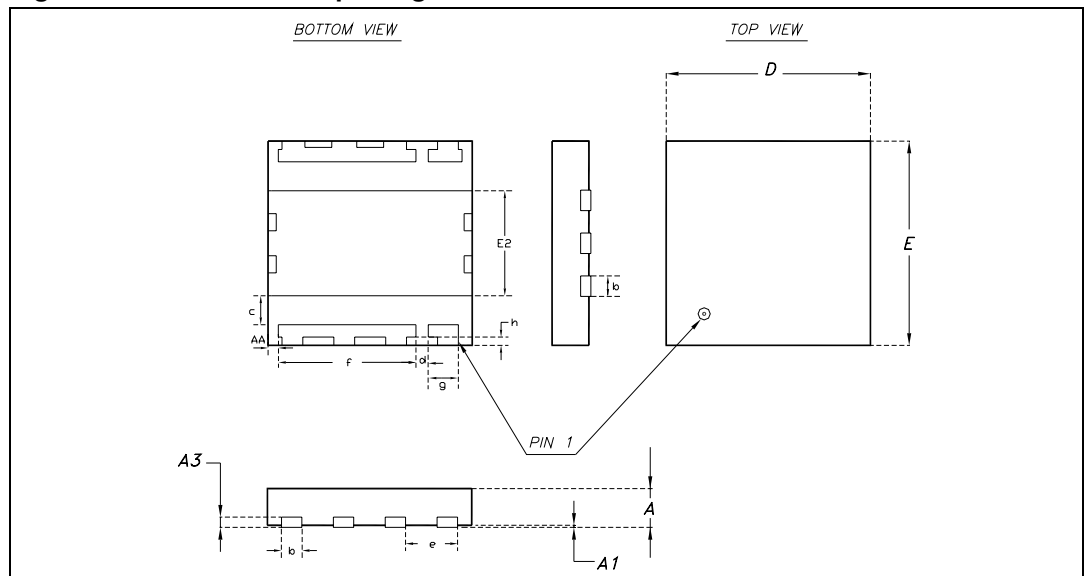
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**Table 7. PowerFLAT™ mechanical data**

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 9. PowerFLAT™ package dimensions**

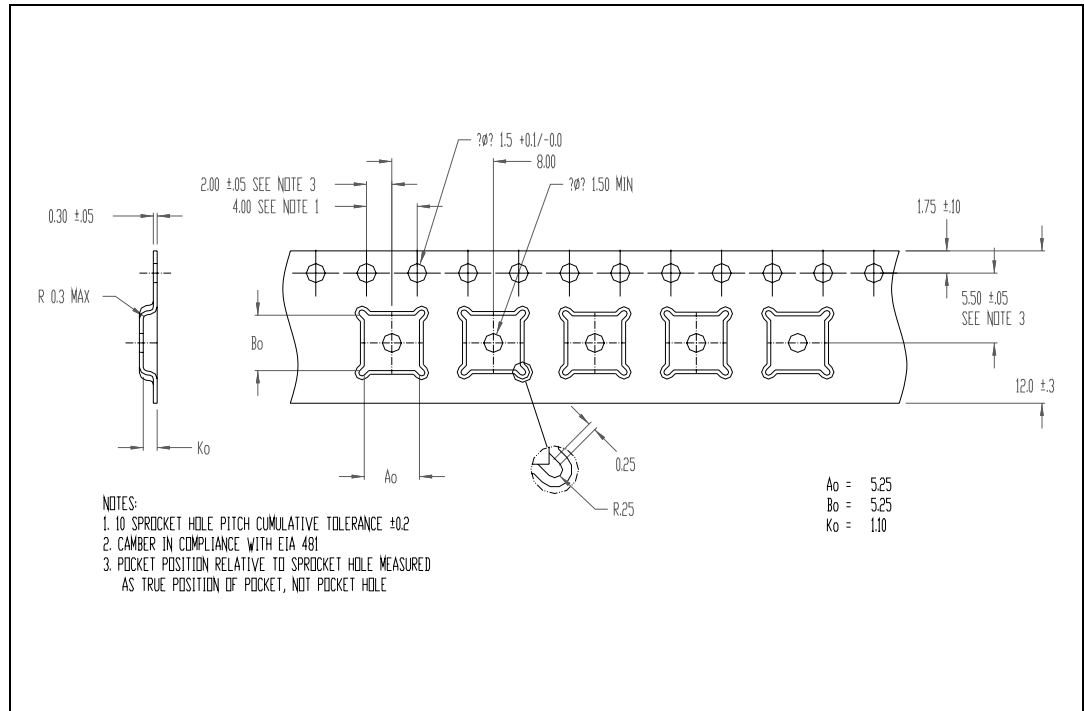


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**Table 8. PowerFLAT™ tape and reel dimensions**

Dim.	mm.			inch		
	Min	Typ	Max	Min	Typ	Max
Ao	5.15	5.25	5.35	0.12	0.13	0.13
Bo	5.15	5.25	5.35	0.12	0.13	0.13
Ko	1.0	1.1	1.2	0.02	0.02	0.02

**Figure 10. PowerFLAT™ tape and reel**



## 9 Revision history

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**Table 9. Document revision history**

Date	Revision	Changes
18-Mar-2009	1	First release

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