



DB-55008L-235

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

Preliminary Data

Features

- Excellent thermal stability
- Frequency: 215 - 235 MHz
- Supply voltage: 13.6 V
- Output power: 12 W
- Power gain: 15.2 ± 0.8 dB
- Efficiency: 57 %
- Load mismatch: 20:1
- BeO free amplifier

Description

The DB-55008L-235 is a common source N-channel enhancement-mode lateral field effect RF power amplifier designed for VHF SEISMIC applications.

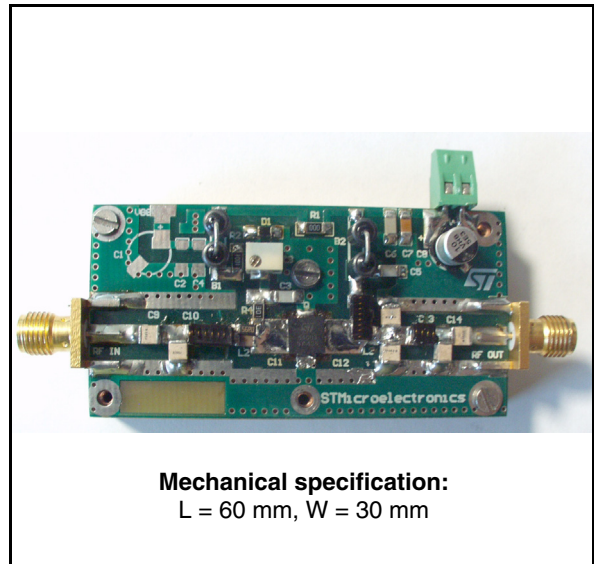


Table 1. Device summary

Order codes
DB-55008L-235

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1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	13.6	V
I_D	Drain current	2.5	A
T_{CASE}	Operating case temperature	+20 to +85	°C
T_A	Max. ambient temperature	+55	°C

2 Electrical characteristics

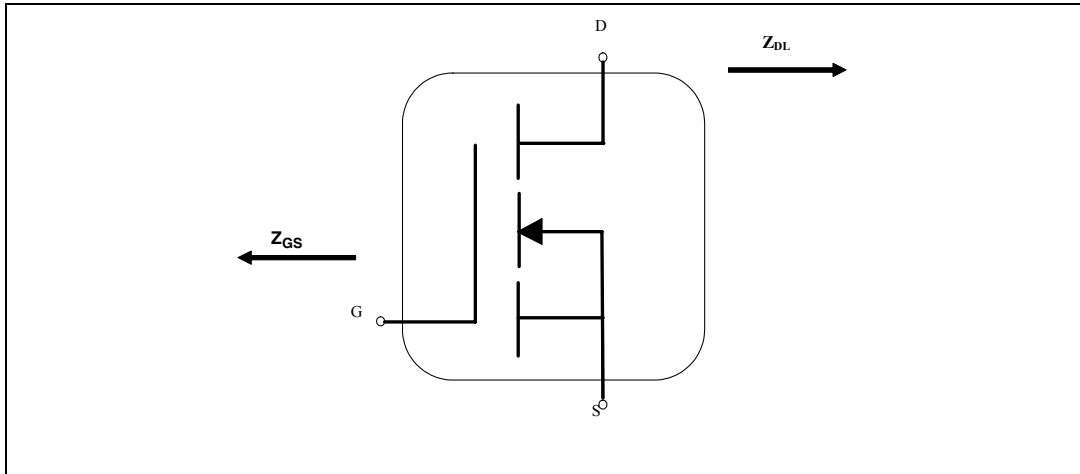
$T_A = +25\text{ °C}$, $V_{DD} = 13.6\text{ V}$, $I_{dq} = 100\text{ mA}$, unless otherwise specified

Table 3. RF data

Symbol	Parameters	Test conditions	Min	Typ	Max	Unit
f	Frequency range		215		235	MHz
P_{out}	Output power		9	12		W
G_p	Power gain	$P_{OUT} = 12\text{ W}$		15.2 ± 0.8		dB
N_D	Efficiency	$P_{OUT} = 12\text{ W}$		53 - 57		%
H2	2nd harmonic	$P_{OUT} = 12\text{ W}$			-20	dBc
H3	3rd harmonic	$P_{OUT} = 12\text{ W}$			-30	dBc
VSWR	Load mismatch	$P_{IN} = 25\text{ dBm}$, all phases		10:1		

3 Impedance

Figure 1. Impedance graphic



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

Table 4. Impedance data

f(MHz)	$Z_{GS} (\Omega)$	$Z_{DL} (\Omega)$
215	$9.9 + j3.8$	$4.9 - j2.3$
220	$9.6 + j5.2$	$5.0 - j1.9$
225	$9.3 + j6.5$	$5.0 - j1.5$
230	$9.1 + j7.9$	$5.0 - j1.2$
235	$8.9 + j9.4$	$5.2 - j0.9$

4 Typical performance

4.1 $V_{DD} = 13.6\text{ V}$, $I_{DQ} = 100\text{ mA}$

Figure 2. Output power vs input power

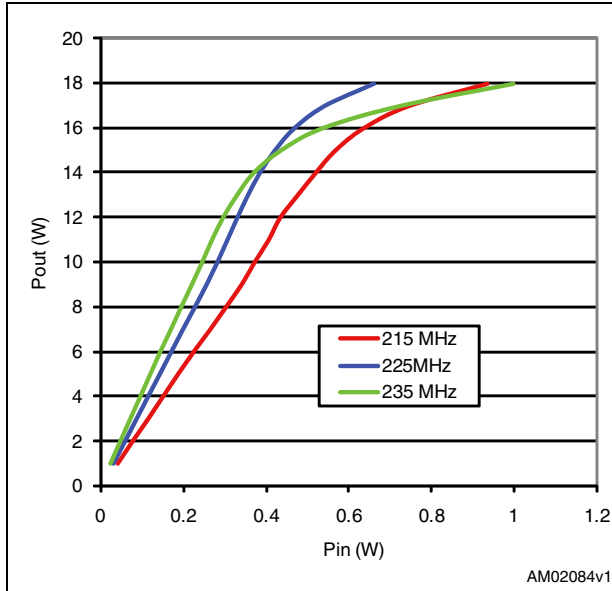


Figure 3. Efficiency vs output power

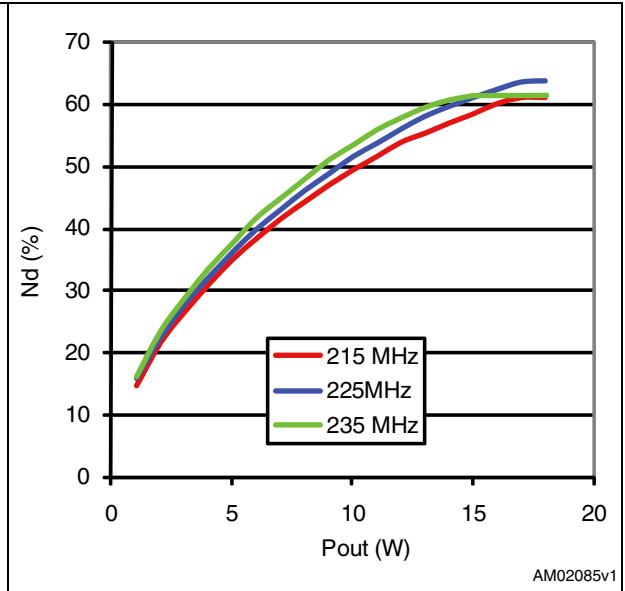


Figure 4. Gain vs output power

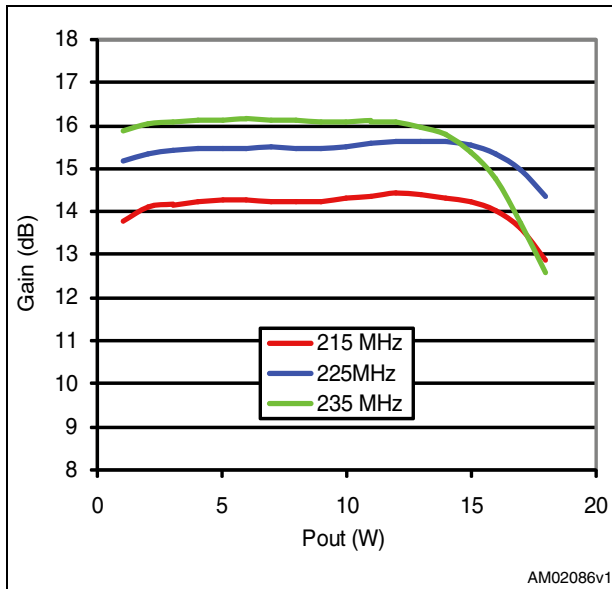
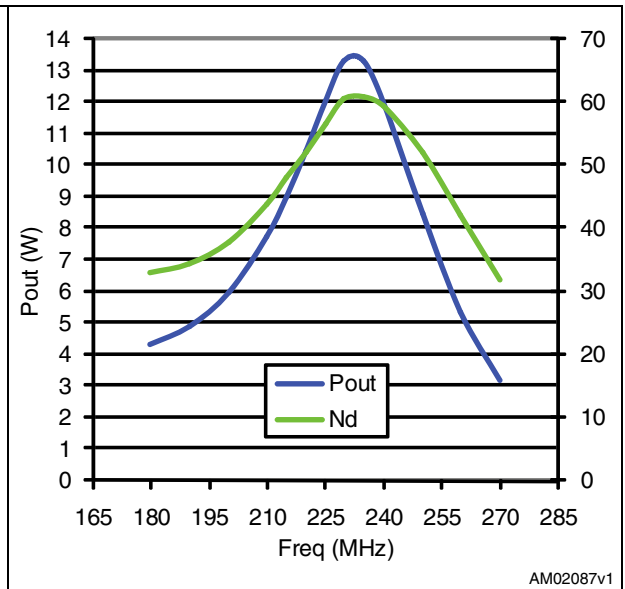


Figure 5. Output power and efficiency vs frequency (Pin = 25 dBm)



5 Test circuit

Table 5. Test circuit schematic

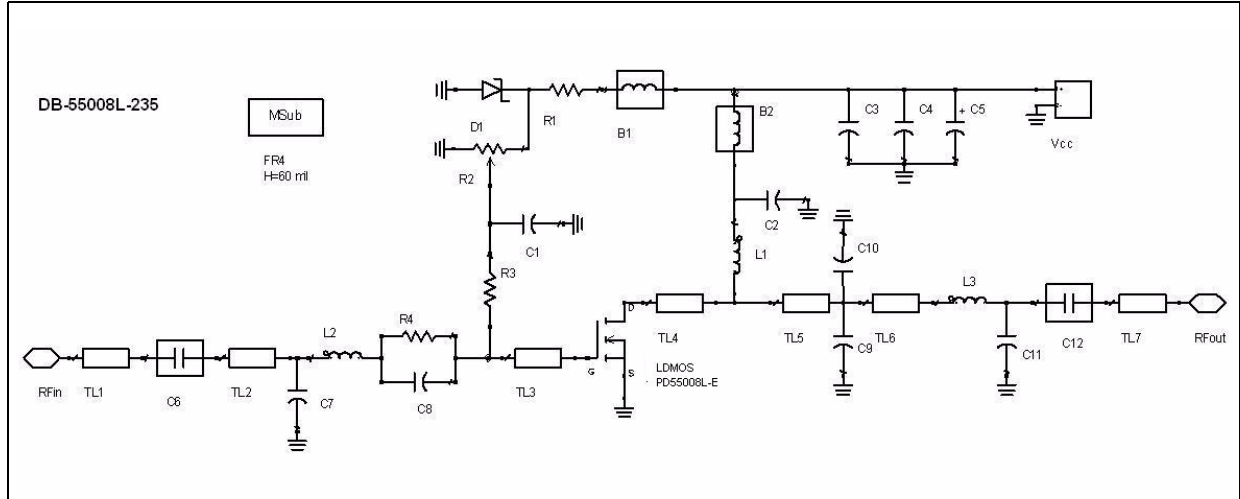


Table 6. Components part list for DB-55008L-235

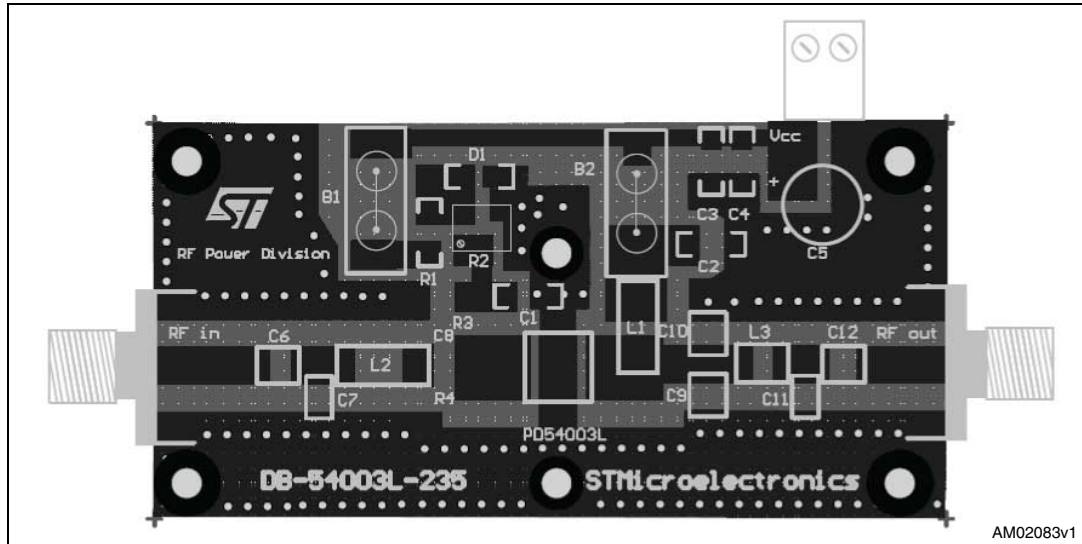
Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite Bead			Panasonic	EXCELDRC35C
B2	Ferrite Bead			Panasonic	EXCELDRC35C
C1, C2	Capacitor	120 pF	1206	Murata	GRM42-6 COG 151J 50_
C3	Capacitor	1 nF	1206	Murata	GRM42-6 COG 102J 50
C4	Capacitor	100 nF	1206	Murata	GRM42-6_X7R 104K 50_
C5	Capacitor	10 uF	SMT	Panasonic	EEVHB1V100P
C6, C12	Capacitor	220 pF	100B	ATC	ATC 100B 221JW
C7	Capacitor	39 pF	100B	ATC	ATC 100B 390 JW
C8	Capacitor	47 pF	100B	Murata	GRM42-6 COG
C9, C10	Capacitor	33 pF	100B	ATC	ATC 100B 330JW
C11	Capacitor	24 pF	100B	ATC	ATC 100B 240 JW
D1	Zener diode	5.1 V	SOD110	Philips	BZX284C5V1
L1	Inductor	28 nH		Coilcraft	B08T
L2	Inductor	12,5 nH		Coilcraft	A04T
L3	Inductor	22 nH		Coilcraft	B07T
R1	Resistor	1 kΩ	1206	Tyco electronics	01623440-1
R2	Potentiometer	10 kΩ		Bourns electronics	3214W-1-103E
R3	Resistor	300 Ω	1206	Bourns electronics	
R4	Resistor	56 Ω	1206	Bourns electronics	
TL1	Transmission Line	W =2.87 mm	L=7.4 mm		

Table 6. Components part list for DB-55008L-235 (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
TL2	Transmission line	W=2,87 mm	L=1,0 mm		
TL3		W=4.98 mm	L=3,8 mm		
TL4		W=4.98 mm	L=5.0 mm		
TL5		W=2,87 mm	L=2,0 mm		
TL6		W=2.87 mm	L=1,6 mm		
TL7		W=2.87 mm	L=6,1 mm		
PD55008L-E		LDMOS			STMicroelectronics
Board	FR-4 THk = 0.060" 2 OZ Cu both sides				

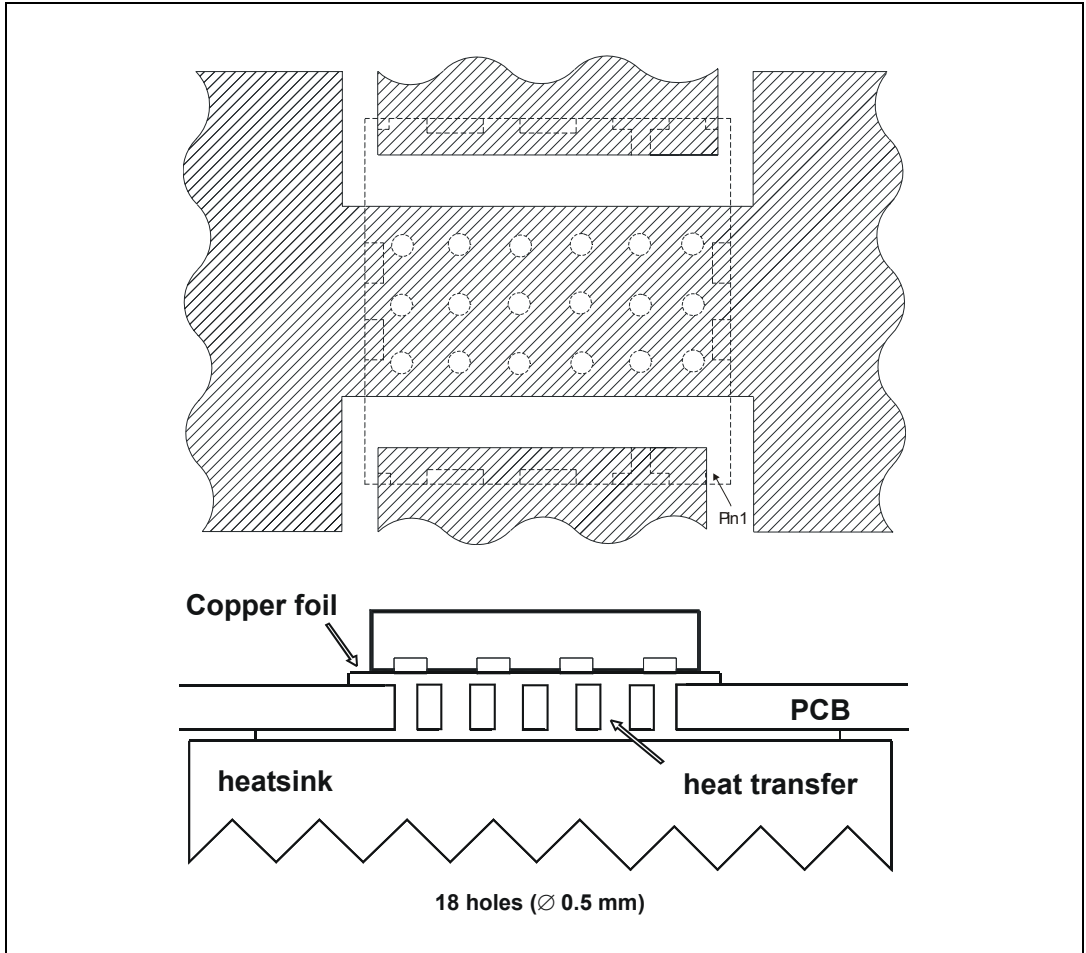
6 Circuit layout

Figure 6. Test fixture component layout



7 Mounting indications

Figure 7. Standard SMD mounting



8 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

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 8. PowerFLAT™ package dimensions

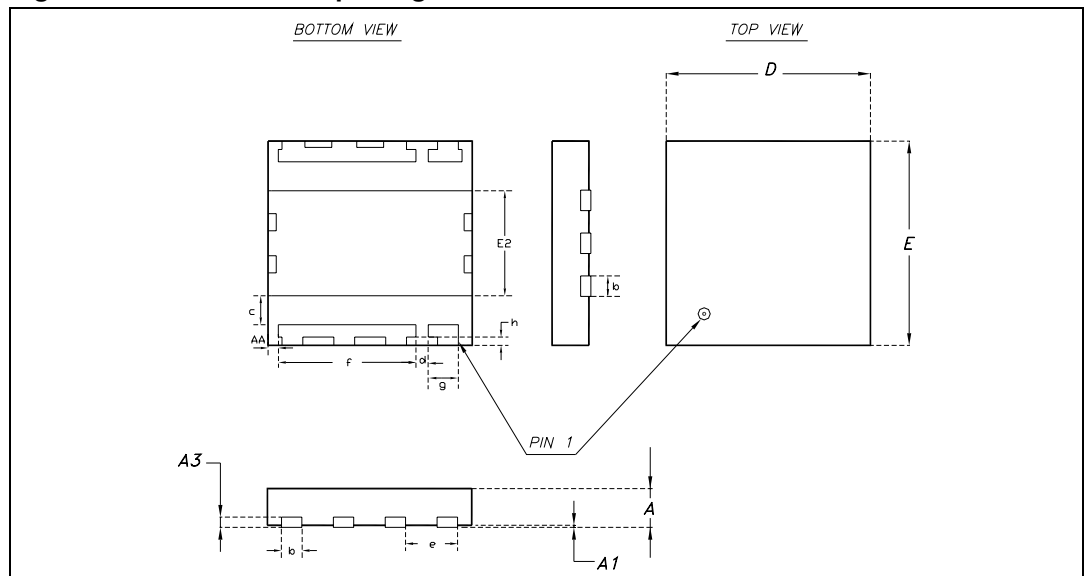
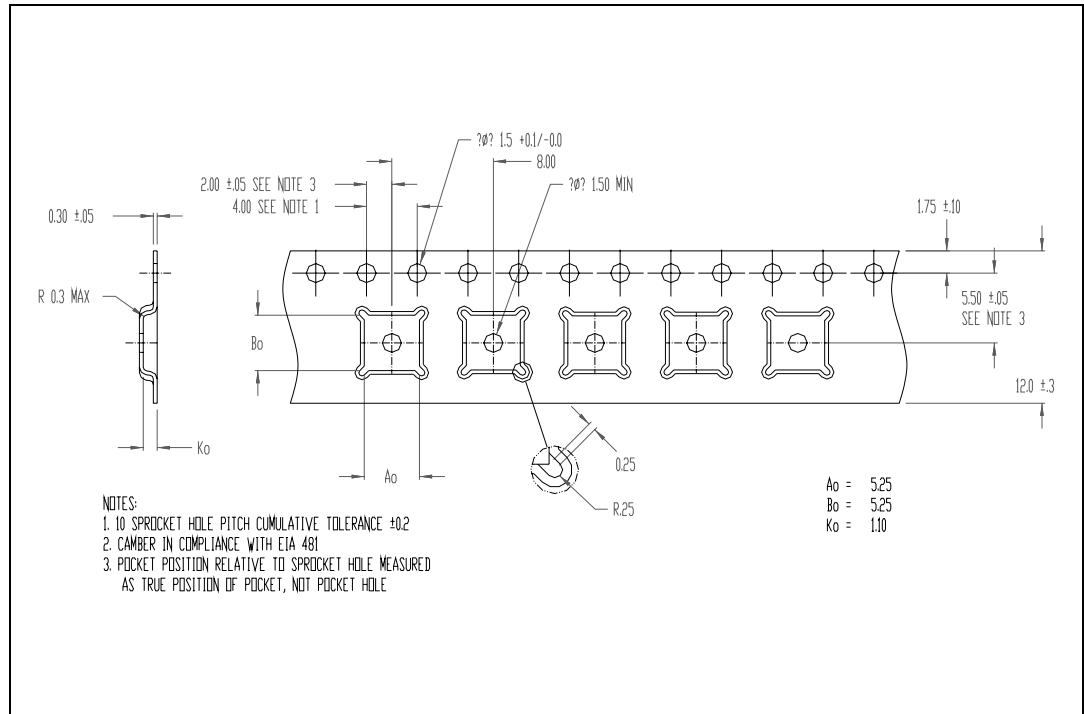


Table 8. PowerFLAT™ tape and reel dimensions

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 9. PowerFLAT™ tape and reel



9 Revision history

Table 9. Document revision history

Date	Revision	Changes
09-Dec-2008	1	First release

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