DB-55008L-470

Evaluation board using PD55008L-E for UHF mobile radio

Features

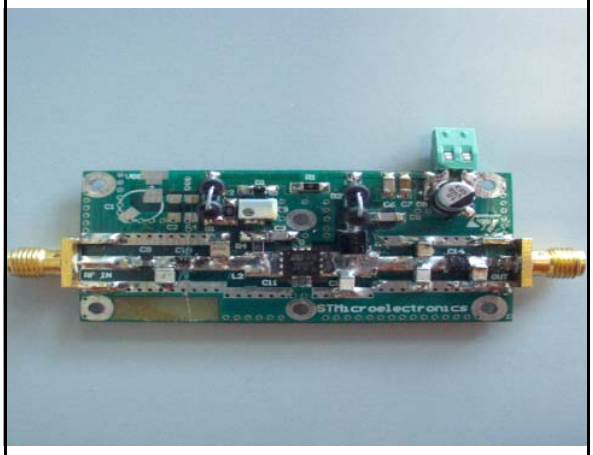
- Excellent thermal stability
- Frequency: 400 - 470 MHz
- Supply voltage: 12.5 V
- Output power: 8 W
- Power gain: 16.7 ± 2.0 dB
- Efficiency: 49 % - 61 %
- Load mismatch: 20:1
- Beo free amplifier

Description

The DB-55008L-470 is an evaluation board using PD55008L-E LDMOS transistor and designed for UHF analog and digital mobile radios.

For additional informations on PD55008L-E,

please refer to its datasheet



Mechanical specification:
L = 60 mm, W = 30 mm

Table 1. Device summary

Part number
DB-55008L-470

Contents

1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply voltage	16	V
I_D	Drain current	1.6	A
T_{CASE}	Operating case temperature	-20 to +85	°C
T_A	Max. ambient temperature	+55	°C

2 Electrical characteristics

T_A = +25 °C, V_{DD} = 12.5 V, I_{dq} = 100 mA

Table 3. Electrical specification

Symbol	Test conditions	Min	Typ	Max	Unit
Freq	Frequency range	400		470	MHz
P_{OUT}		7	8		W
Gain	@ P_{OUT} = 8 W		16.7 ± 2.0		dB
ND	@ P_{OUT} = 8 W		49 - 61		%
H2	2^{ND} Harmonic @ P_{OUT} = 8 W		-43 / -70		dBc
H3	3^{RD} Harmonic @ P_{OUT} = 8 W		-49 / -72		dBc
VSWR	Load mismatch all phases @P_{OUT} = 8 W		20:1		

3 Impedance

Table 4. Impedance data

F(MHz)	Z_{GS}	Z_{DL}
380	2.6 + J1.4	2.9 + J2.1
400	2.5 + J2.1	3.3 + J2.5
420	2.5 + J2.8	3.8 + J2.9
440	2.6 + J3.5	4.3 + J3.0
460	2.8 + J4.1	4.8 + J3.1
480	3.1 + J4.6	5.3 + J3.0

4 Typical performances

Figure 1. Pout vs pin and frequency

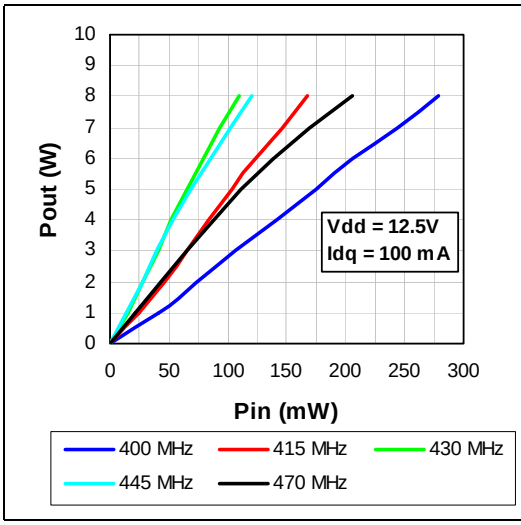


Figure 2. Efficiency vs pout and frequency

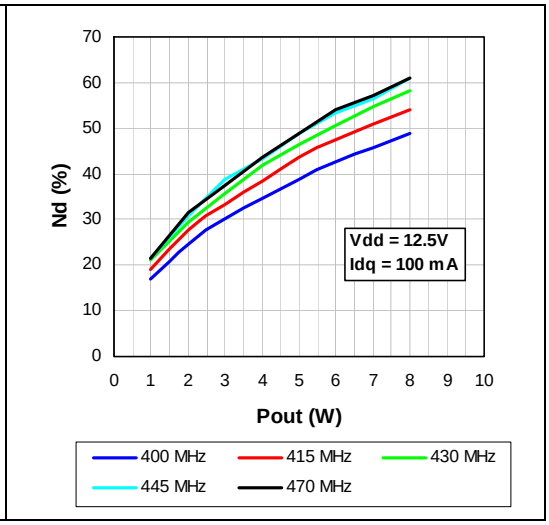


Figure 3. Gain and efficiency vs frequency

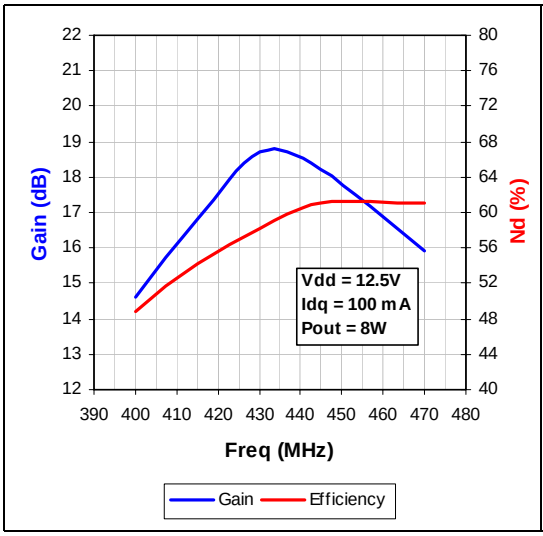


Figure 4. Input return loss vs frequency

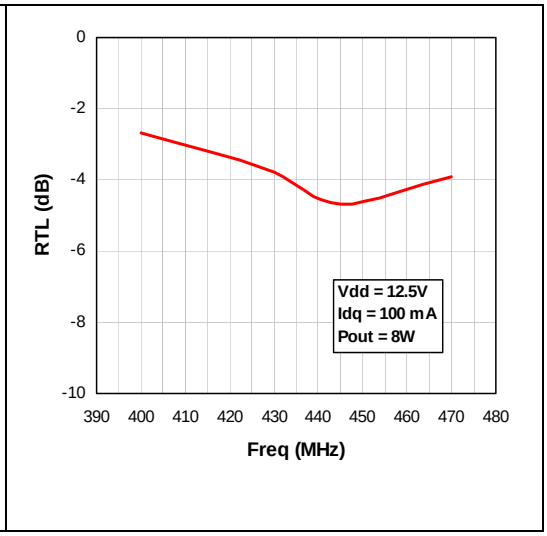


Figure 5. Harmonics vs frequency

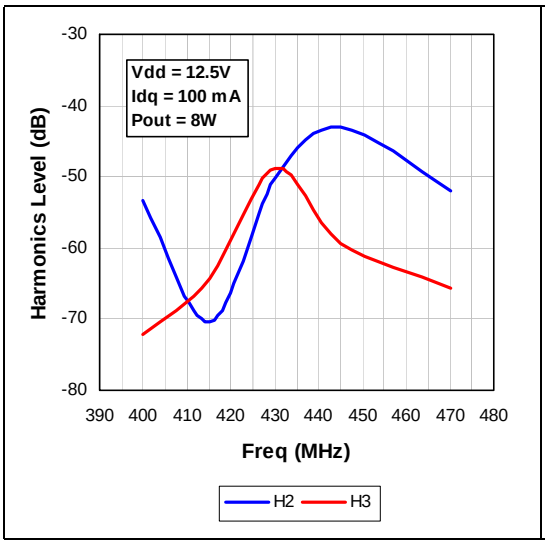
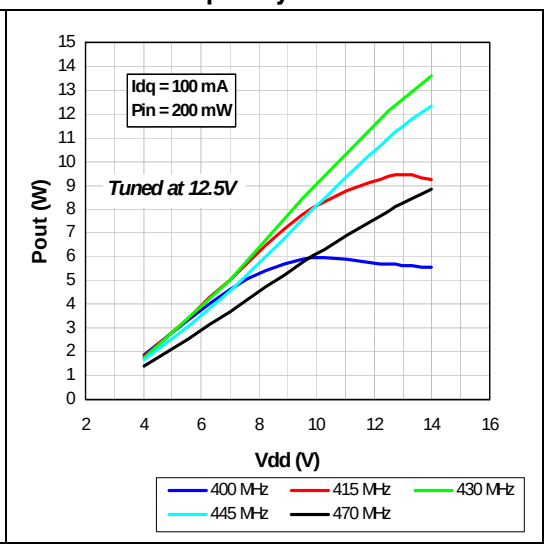


Figure 6. Pout vs drain voltage and frequency



5 Circuit layout and parts list

Figure 7. Circuit layout

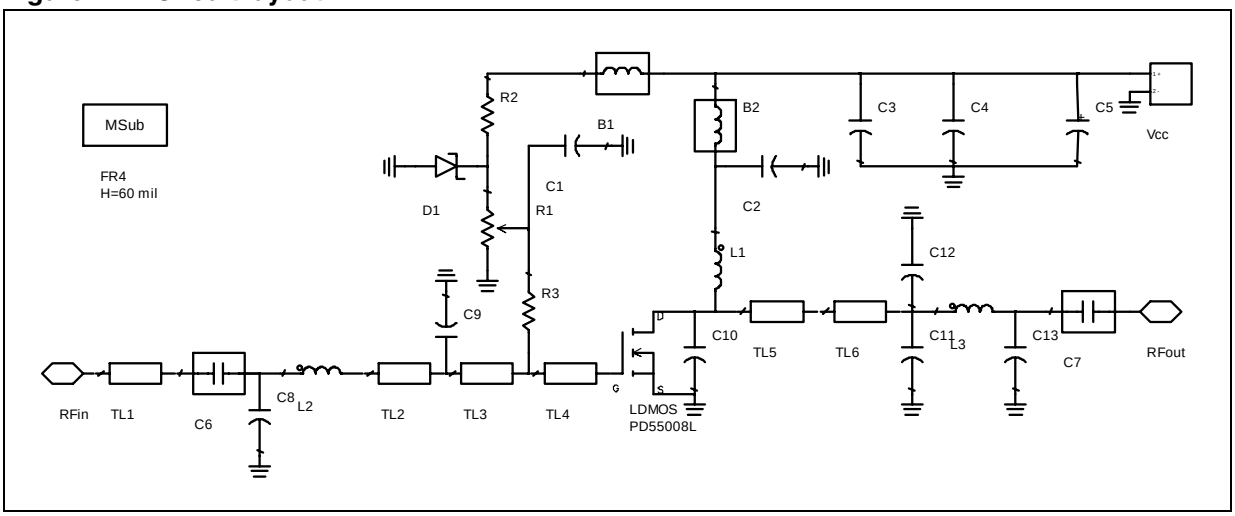


Table 5. Circuit parts list

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	ATC	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	300 pF	100B	Murata	GRM42-6C0G301J50
C8	Capacitor	18 pF	100B	ATC	180
C9	Capacitor	33 pF	100B	ATC	330
C10	Capacitor	39 pF	100B	ATC	390
C11	Capacitor	15 pF	100B	ATC	150
C12	Capacitor	33 pF	100B	ATC	330
C13	Capacitor	11 pF	100B	ATC	110
D1	Zener diode	NC			
L1	Inductor	35.5 nH		Coilcraft	B09T
L2	Inductor	8 nH		Coilcraft	A03T
R1	Potentiometer	10 KΩ		Bourns electronics	103
R2	Resistor	1 KΩ	1206	Tyco electronics	01623440-1
R3	Resistor	15 Ω	1206	Tyco electronics	150
TL1	Transmission line	W=2.87mm	L=8.6 mm		

Table 5. Circuit parts list (continued)

Component ID	Description	Value	Case size	Manufacturer	Part code
TL2	Transmission line	W=2.87mm	L=3.1 mm		
TL3	Transmission line	W=2.87mm	L=2.8 mm		
TL4	Transmission line	W=4.9mm	L=5.4 mm		
TL5	Transmission line	W=4.9mm	L=5.4 mm		
TL6	Transmission line	W=2.87mm	L=8.6 mm		
PD55008L-E	LDMOS			STMicroelectronics	PD55008L-E
Board	FR4 THk = 0.060" 2OZ Cu both sides				

Figure 8. Test circuit photomaster

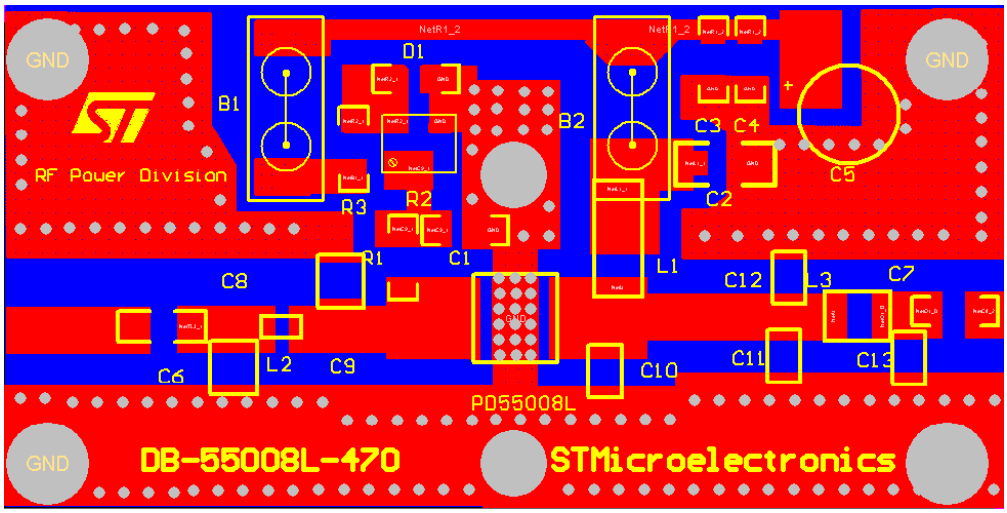
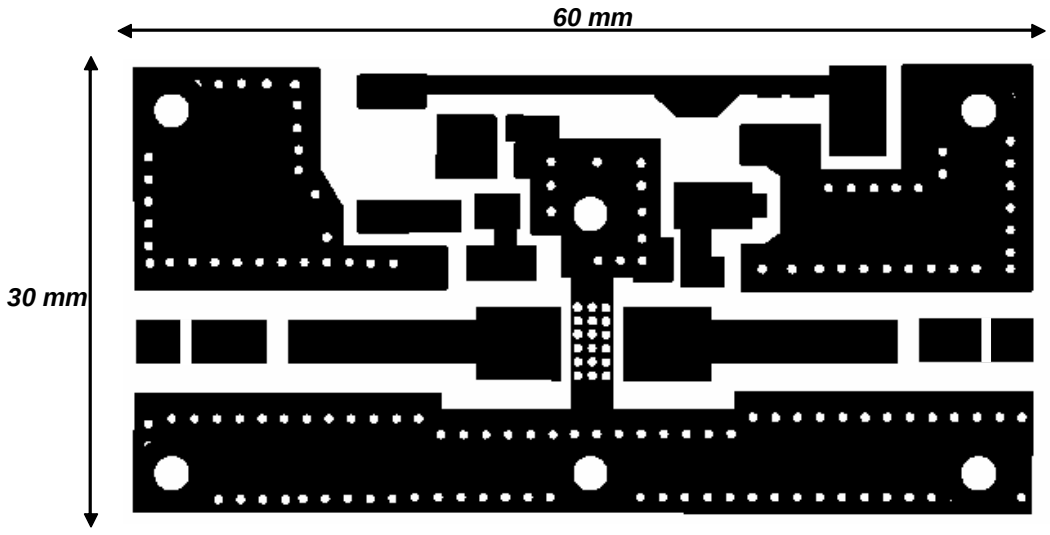
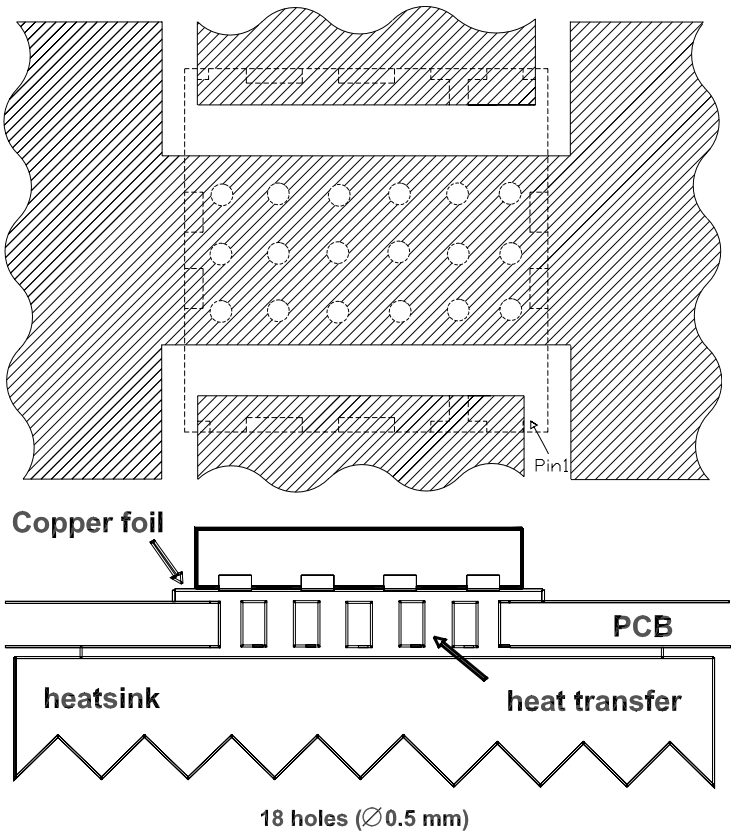


Figure 9. Test circuit photomaster



6 Mounting indications - PD55008L-E

Figure 10. Standard SMD mounting



7 Package mechanical data - PD55008L-E

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 6. PD55008L-E 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 11. PowerFLAT™ package dimensions

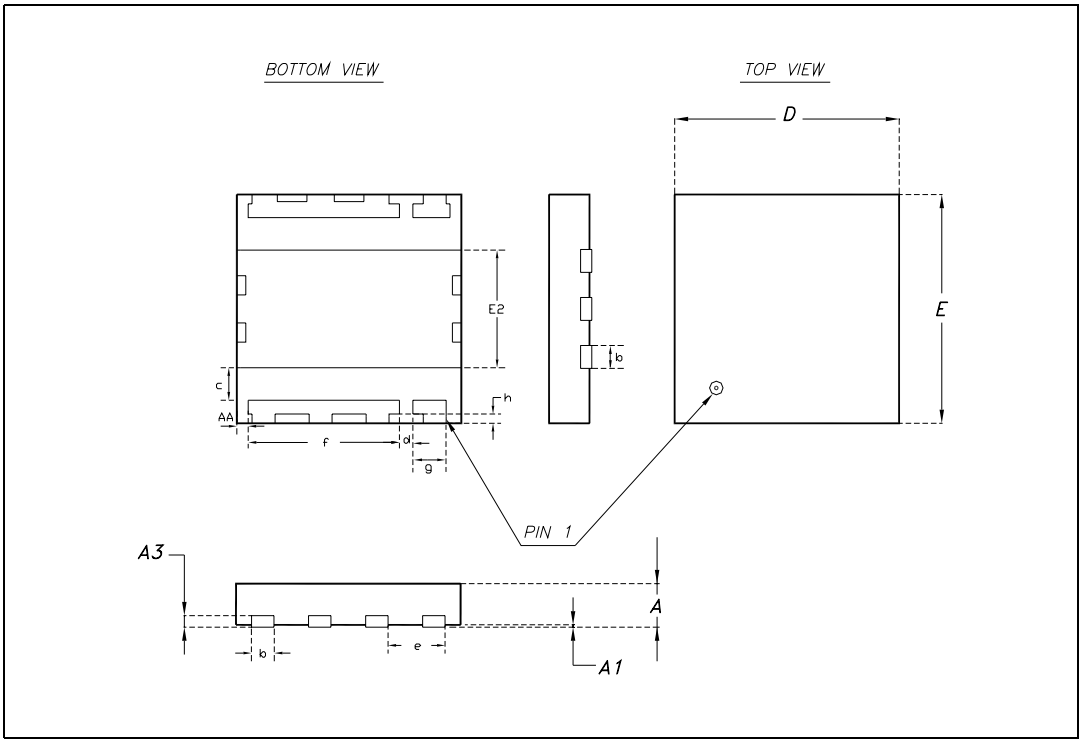
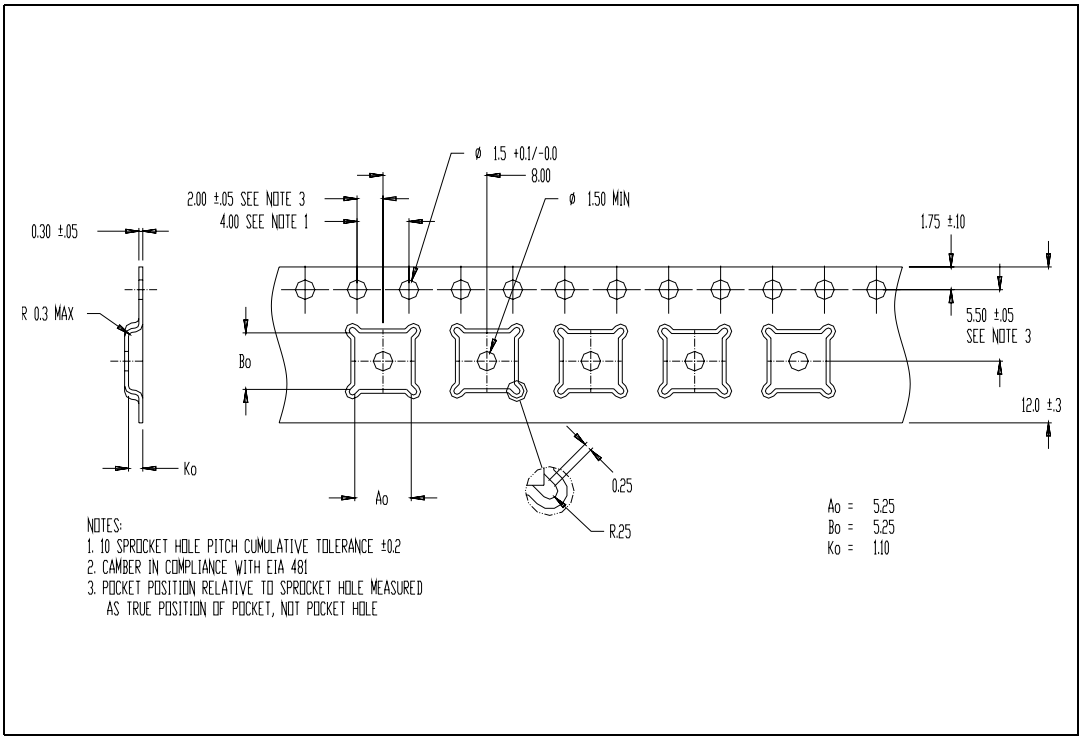


Table 7. PD55008L-E PowerFLAT™ tape and reel dimensions

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 12. PowerFLAT™ tape and reel



8 Revision history

Table 8. Document revision history

Date	Revision	Changes
07-Dec-2006	1	Initial release
18-Dec-2007	2	Updated: *Table 5 on page 7*

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com