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**Evaluation board using PD55008L-E for UHF RFID reader**

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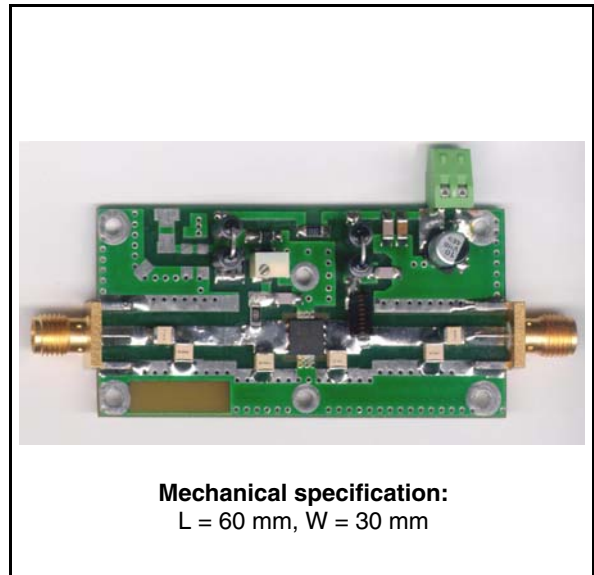
**Features**

- Excellent thermal stability
- Frequency: 860 - 960 MHz
- Supply voltage: 12 V
- Output power: 7 W
- Efficiency: 46 % - 55 %
- Load mismatch: 20:1
- Beo free amplifier

**Description**

The DB-55008L-960 is an evaluation board using PD55008L-E LDMOS transistor and designed for UHF portable RFID reader covering Europe, USA/Canada and Japan frequency bands.

For additional informations on PD55008L-E, please refer to its datasheet.

**Table 1. Device summary**

Part number
DB-55008L-960

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# 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
$P_{DISS}$	Drain current	10	W
$T_{CASE}$	Operating case temperature	-20 to +85	°C
$T_A$	Max. ambient temperature	+55	°C

## 2 Electrical characteristics

$T_A = +25\text{ °C}$ ,  $V_{DD} = 12\text{ V}$ ,  $I_{dq} = 100\text{ mA}$

**Table 3. Electrical specification**

Symbol	Test conditions	Min	Typ	Max	Unit
Freq	Frequency range	860		960	MHz
$P_{OUT}$			7		W
Gain	@ $P_{OUT} = 7\text{ W}$		9.5		dB
ND	@ $P_{OUT} = 7\text{ W}$	45		55	%
GAIN Flatness	@ $P_{OUT} = 7\text{ W}$			±0.8	dB
H2	2 <sup>ND</sup> Harmonic @ $P_{OUT} = 7\text{ W}$		-54	-50	dBc
H3	3 <sup>RD</sup> Harmonic @ $P_{OUT} = 7\text{ W}$		-44	-40	dBc
VSWR	Load mismatch all phases @ $P_{OUT} = 7\text{ W}$			20:1	

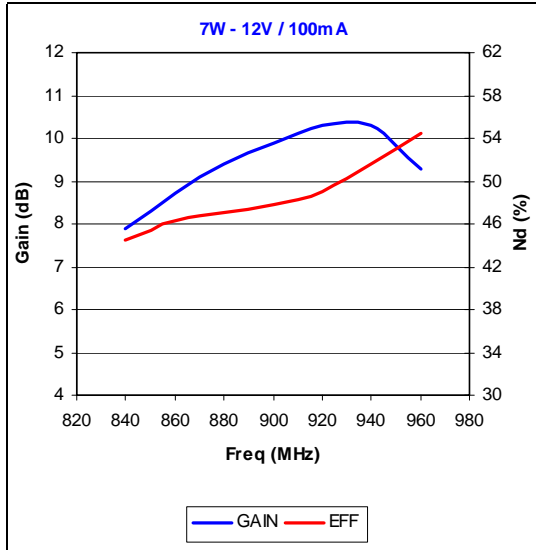
### 3 Impedance

Table 4. Impedance data

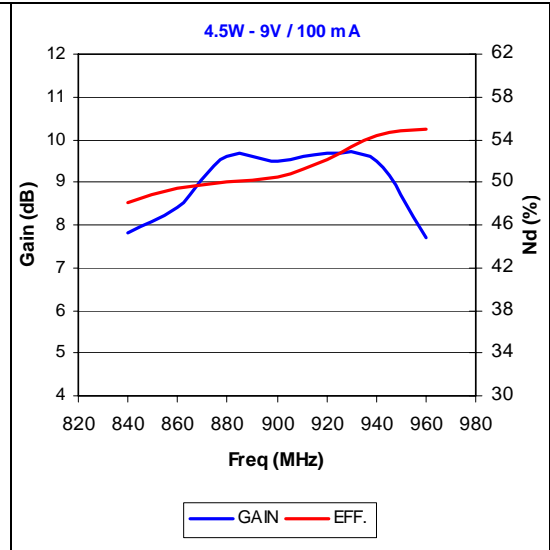
F(MHz)	$Z_{GS}$	$Z_{DL}$
840	$2.20 + j0.2$	$2.95 + j2.4$
860	$2.05 + j0.8$	$2.95 + j2.7$
880	$1.87 + j1.4$	$2.93 + j2.9$
900	$1.70 + j2.0$	$2.86 + j3.1$
920	$1.54 + j2.6$	$2.73 + j3.15$
940	$1.40 + j3.2$	$2.50 + j3.2$
960	$1.26 + j3.7$	$2.14 + j3.3$

# 4 Typical performances

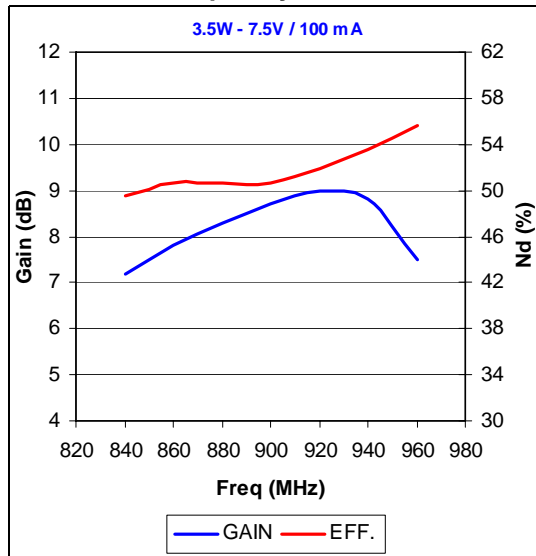
**Figure 1. Gain and efficiency vs frequency**



**Figure 2. Gain and efficiency vs frequency**



**Figure 3. Gain and efficiency vs frequency**



**Figure 4. Gain and efficiency vs frequency**

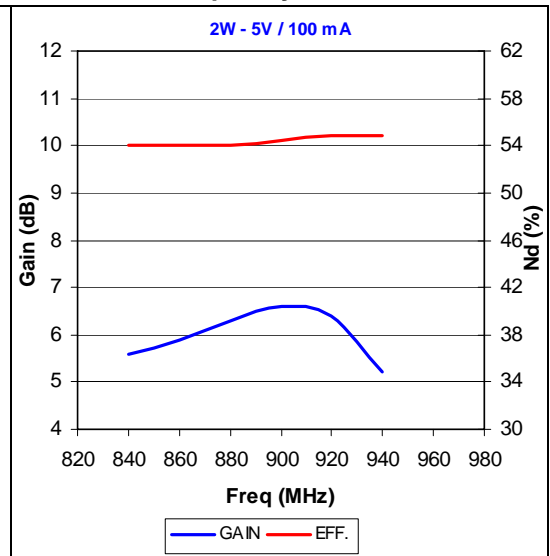


Figure 5. Input return loss vs frequency

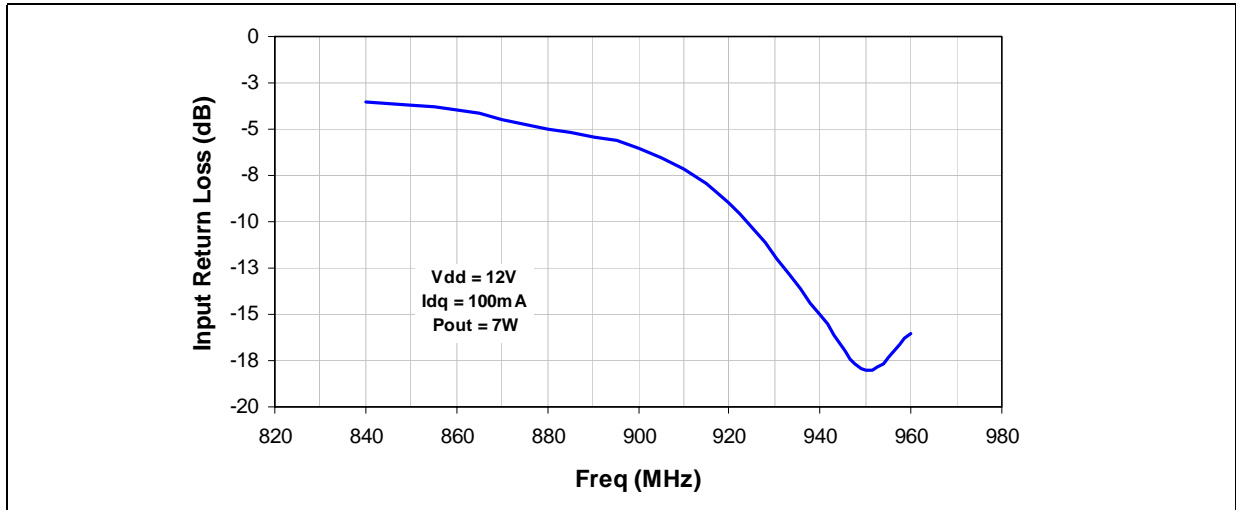


Figure 6. Output power vs input power

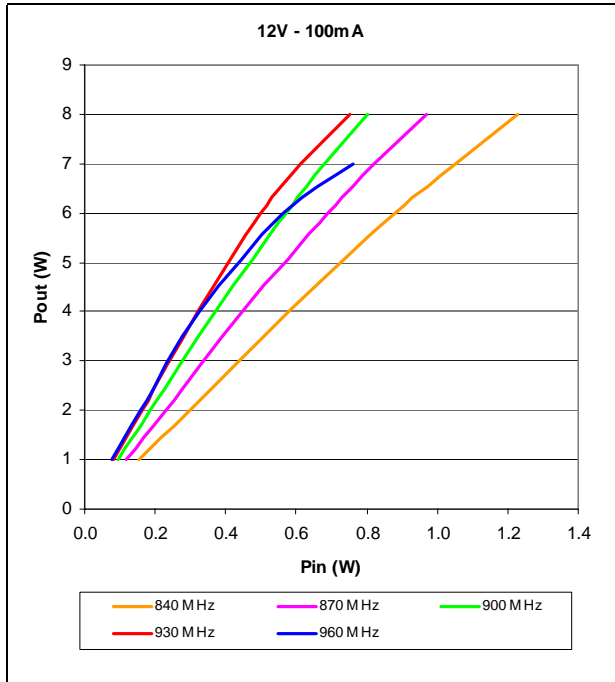


Figure 7. Drain efficiency vs output power

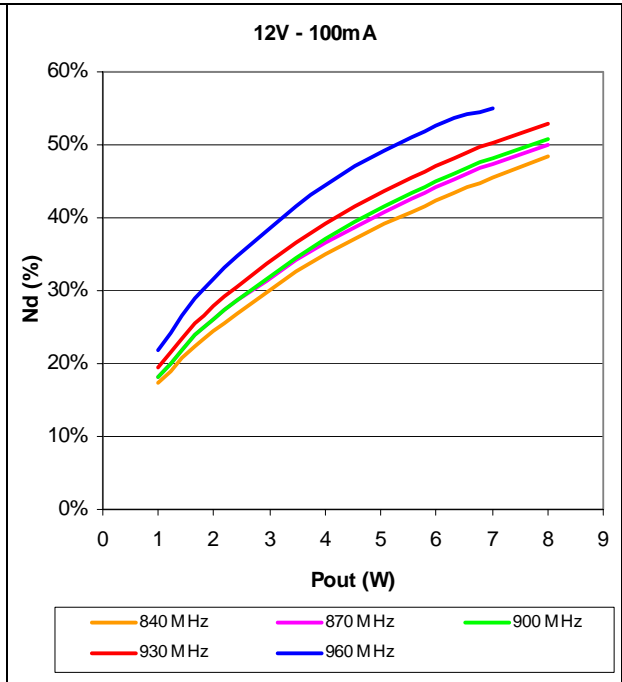


Figure 8. Power gain vs output power

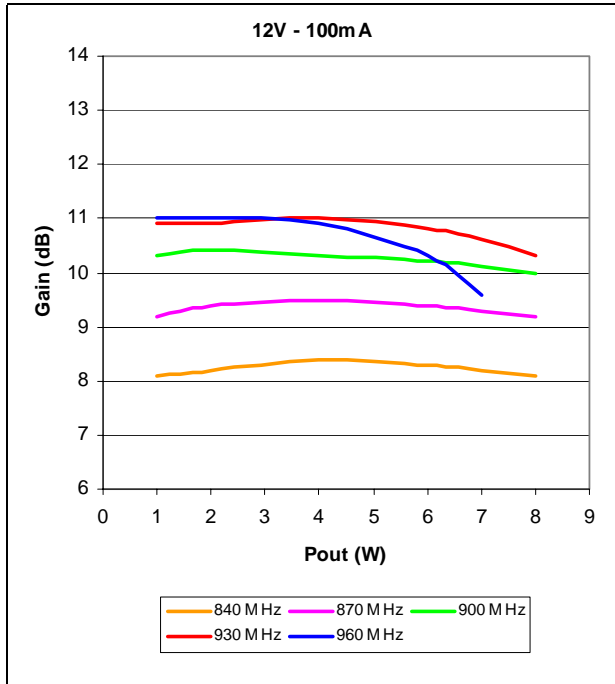
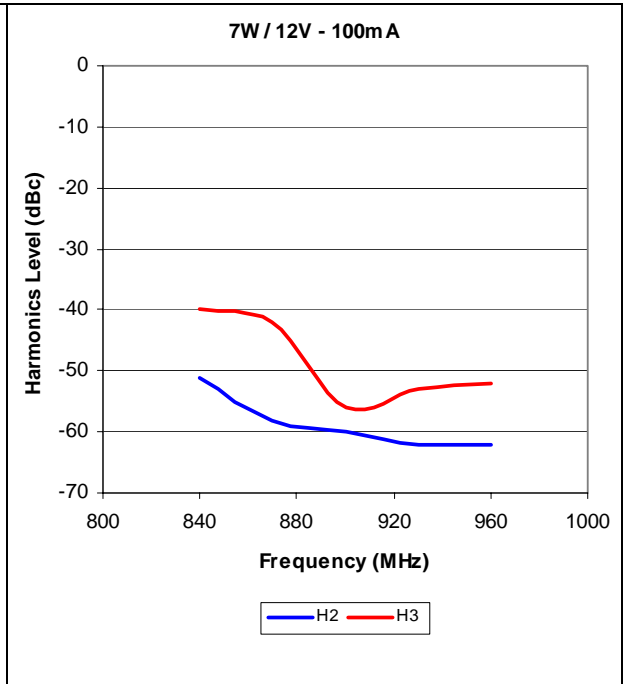


Figure 9. Harmonics vs frequency



# 5 Circuit layout

Figure 10. Circuit layout

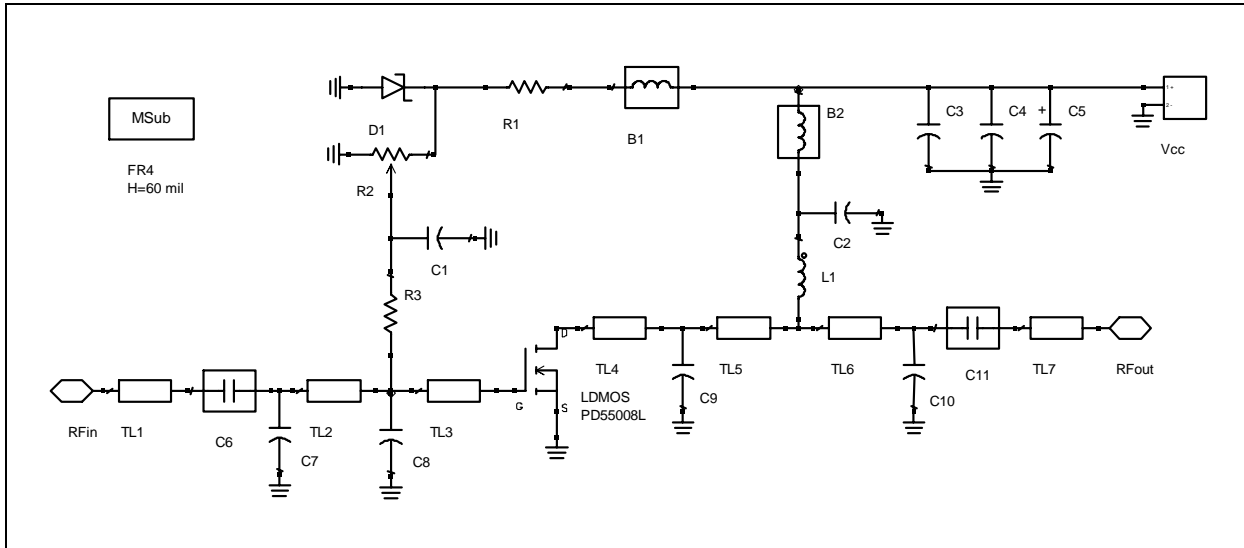


Table 5. Component part list

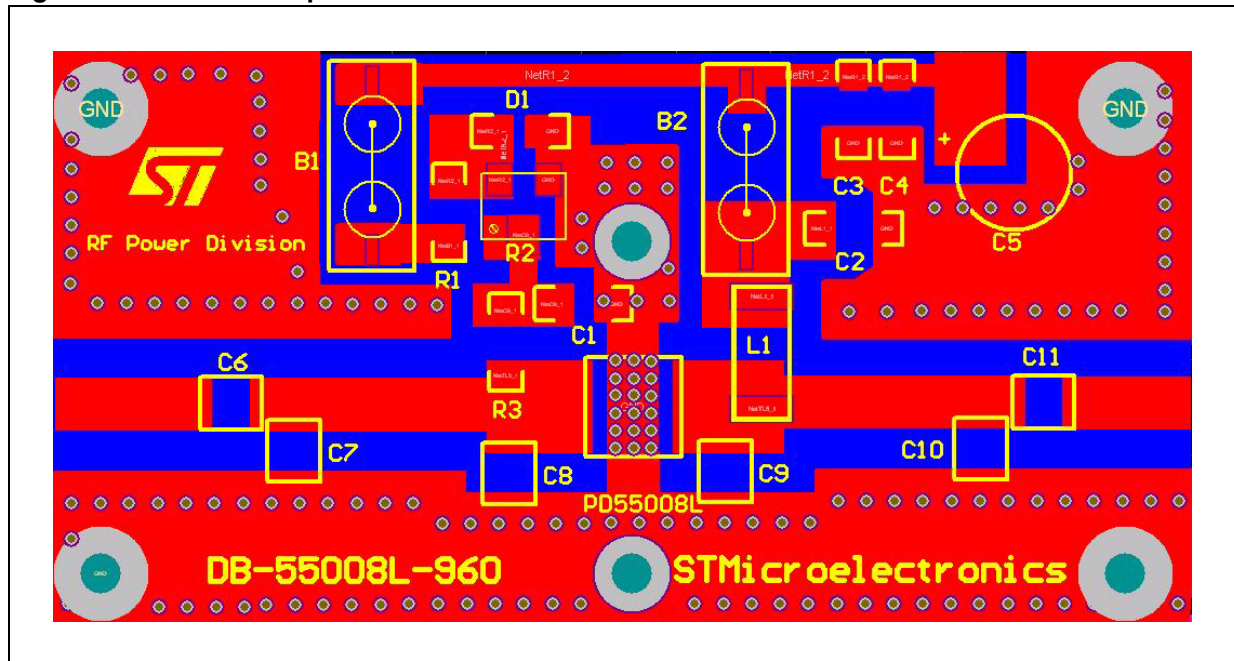
Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite Bead			Panasonic	EXCELDRC35C
B2	Ferrite Bead			Panasonic	EXCELDRC35C
C1, C2	Capacitor	120 pF	1206	Murata	GRM42-6 COG 121J 50_
C3	Capacitor	1 nF	1206	Murata	GRM42-6 COG 102J 50
C4	Capacitor	10 nF	1206	Murata	GRM42-6_X7R 103K 50_
C5	Capacitor	10 uF	SMT	Panasonic	EEVHB1V100P
C6, C11	Capacitor	100 pF	100B	ATC	ATC 100B 101JW
C7	Capacitor	1,8 pF	100B	ATC	ATC 100B 1R8BW
C8	Capacitor	10 pF	100B	ATC	ATC 100B 100JW
C9	Capacitor	15 pF	100B	ATC	ATC 100B 150JW
C10	Capacitor	5,6 pF	100B	ATC	ATC 100B 5R6BW
D1	Zener Diode	5.1 V	SOD110	Philips	BZX284C5V1
L1	Inductor	35,5 nH		Coilcraft	B09T
R1	Resistor	1 kΩ	1206	Tyco electronics	01623440-1
R2	Potentiometer	10 kΩ		Bourns electronics	3214W-1-103E
R3	Resistor	1 kΩ	1206	Bourns electronics	01623440-1
TL1	Transmission line	W=2.87 mm	L= 7,4 mm		
TL2	Transmission line	W=2.87 mm	L= 11,2 mm		
TL3	Transmission line	W=4.98 mm	L= 4,15 mm		



Table 5. Component part list (continued)

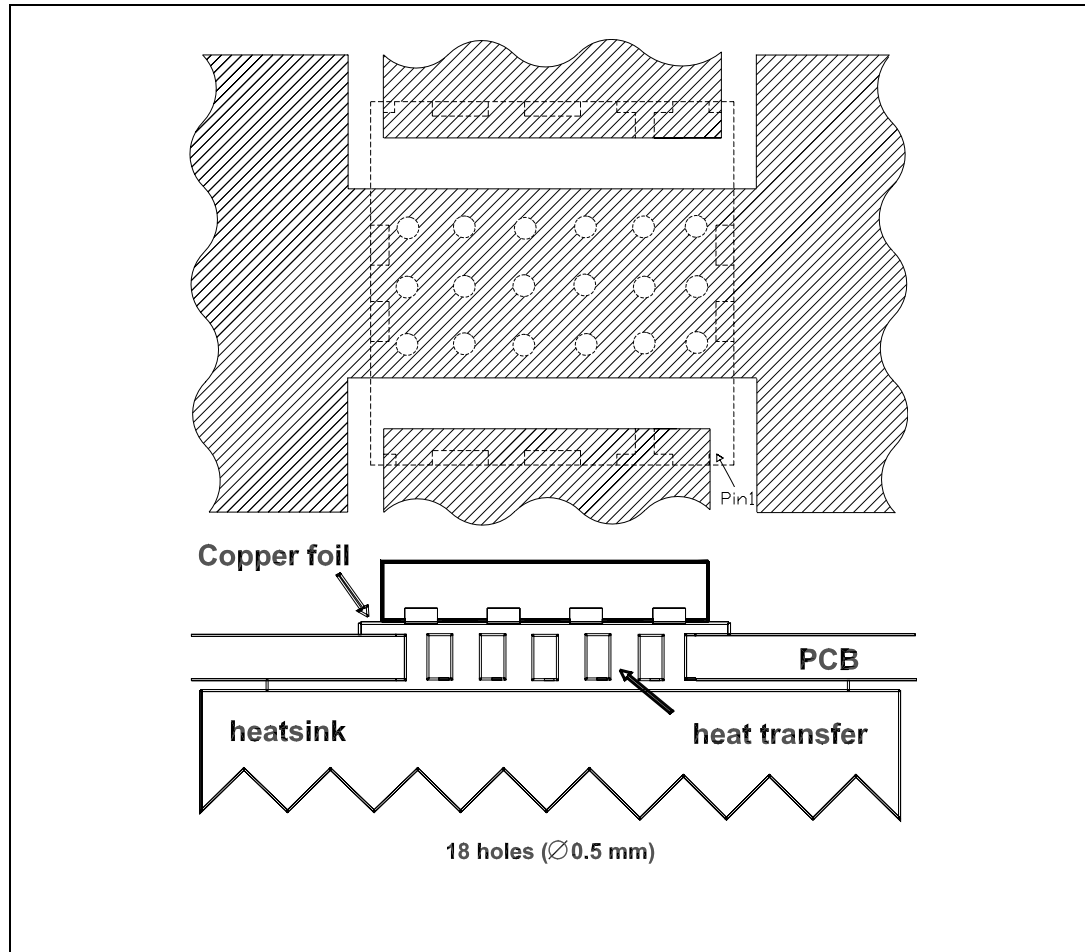
Component ID	Description	Value	Case size	Manufacturer	Part code
TL4	Transmission line	W=4.98 mm	L= 2,5 mm		
TL5	Transmission line	W=4.98 mm	L= 2,0 mm		
TL6	Transmission line	W=2.87 mm	L= 11,6 mm		
TL7	Transmission line	W=2.87 mm	L=6,5 mm		
PD55008L-E	LDMOS			STMicroelectronics	PD55008L-E
Board	FR-4 THk=0.060" 2OZ Cu both sides				

Figure 11. Test circuit photomaster



## 6 Mounting indications - PD55008L-E

Figure 12. Standard SMD mounting



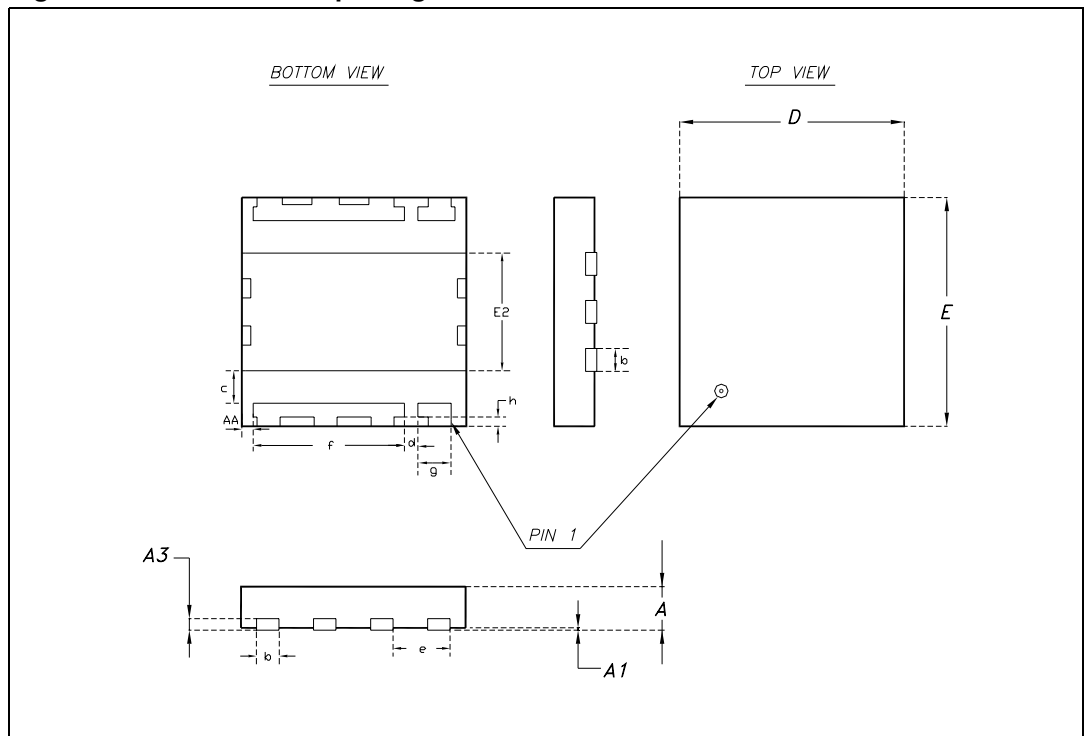
## 7 Package mechanical data - PD55008L-E

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](http://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	

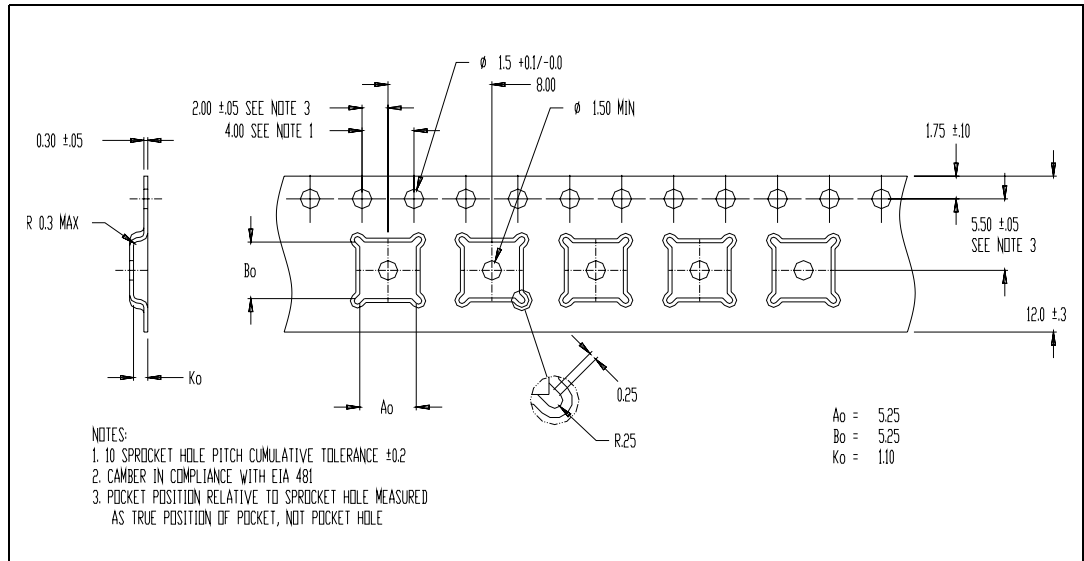
**Figure 13. PowerFLAT™ package dimensions**



**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 14. PowerFLAT™ tape and reel**



## 8 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
12-Dec-2006	1	Initial release
18-Dec-2007	2	Updated: <i>Table 5 on page 8, Figure 10, Figure 11 on page 9.</i>

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