



## DB-54008L-830

RF POWER amplifier using 1 x PD54008L  
N-channel enhancement-mode lateral MOSFETs

### General Feature

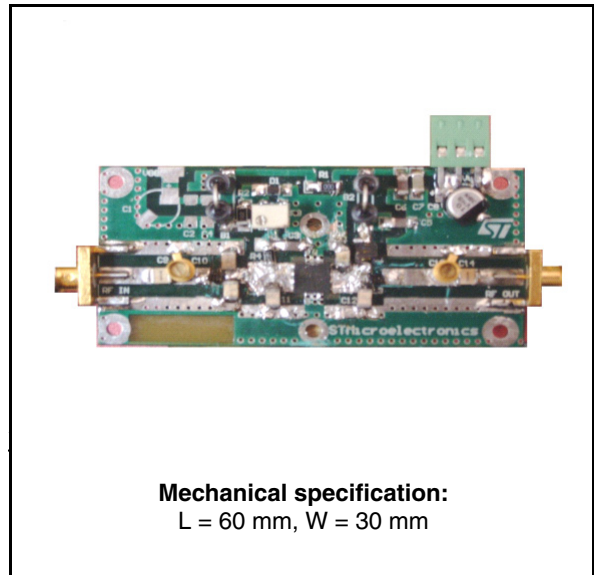
- Excellent thermal stability
- Frequency: 800 - 830MHz
- Supply voltage: 7.2V
- Output power: 7W
- Power gain:  $7.9 \pm 0.3\text{dB}$
- Efficiency: 56% - 59%
- Load mismatch: 20:1
- Beo free amplifier

### Description

The DB-54008L-830 is a common source N-channel Enhancement-Mode Lateral Field Effect RF power amplifier designed for Wireless Data Modem applications.

### Order code

- DB-54008L-830



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# 1 Electrical data

## 1.1 Maximum ratings

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{DD}$	Supply Voltage	16	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

$T_A = +25\text{ °C}$ ,  $V_{DD} = 7.2\text{ V}$ ,  $I_{dq} = 50\text{mA}$

**Table 2. Electrical specification**

Symbol	Test conditions	Min	Typ	Max	Unit
FREQ	Frequency Range	800		830	MHz
$P_{OUT}$			7		W
Gain	@ $P_{OUT} = 8\text{W}$		$7.9 \pm 0.3$		dB
ND	@ $P_{OUT} = 8\text{W}$		56 - 59		%
H2	2 <sup>ND</sup> Harmonic @ $P_{OUT} = 8\text{W}$		-51 / -54		dBc
H3	3 <sup>RD</sup> Harmonic @ $P_{OUT} = 8\text{W}$		-46 / -48		dBc
VSWR	Load Mismatch all phases @ $P_{OUT} = 8\text{W}$			20:1	

### 3 Impedance

Figure 1. Impedance graphic

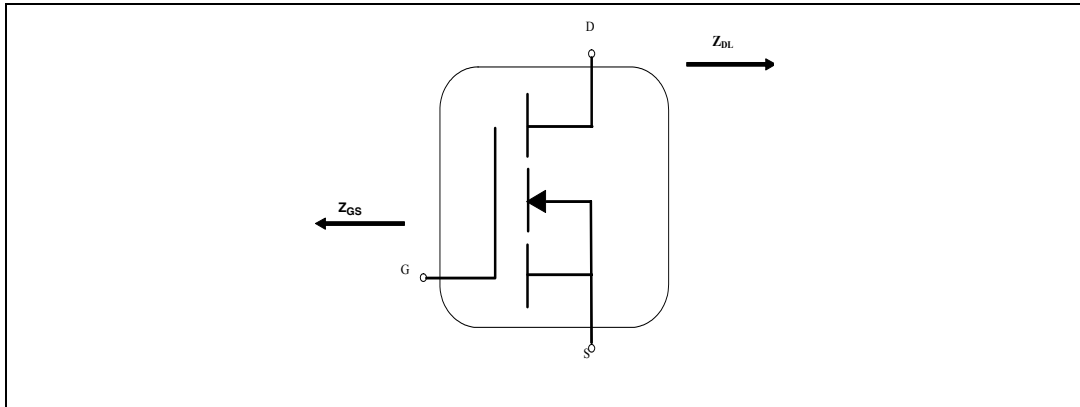
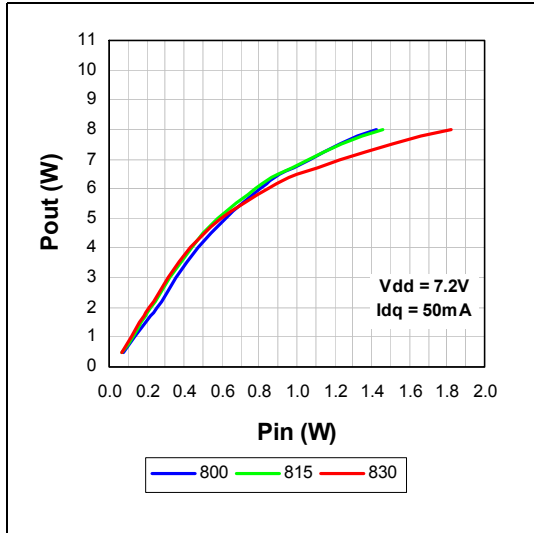


Table 3. Impedance data

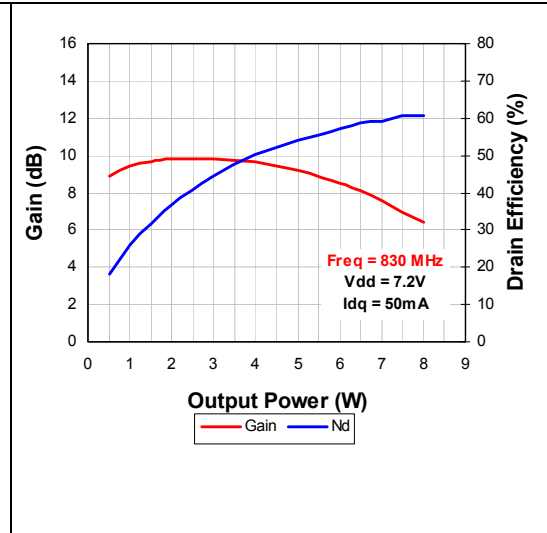
F(MHz)	$Z_{GS}$	$Z_{DL}$
800	$1.6 - j 1.5$	$1.9 + j 0.2$
810	$1.6 - j 1.2$	$1.9 + j 0.5$
820	$1.6 - j 1.1$	$1.7 + j 0.5$
830	$1.5 - j 0.8$	$1.96 + j 0.7$

# 4 Typical performance

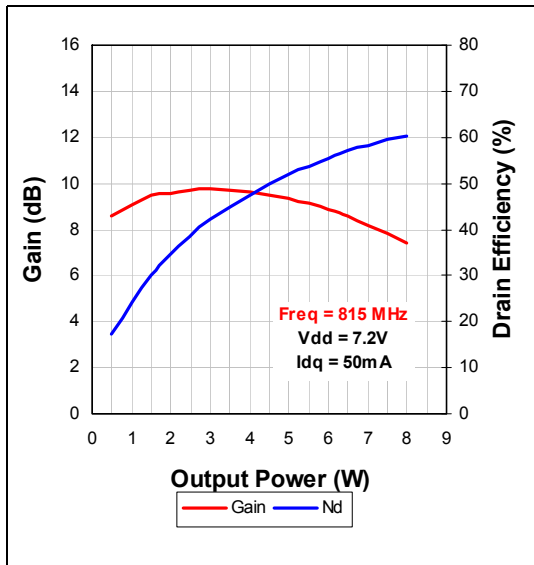
**Figure 2. Output power vs input power**



**Figure 3. Gain & efficiency vs output power**



**Figure 4. Gain & efficiency vs output power**



**Figure 5. Gain & efficiency vs output power**

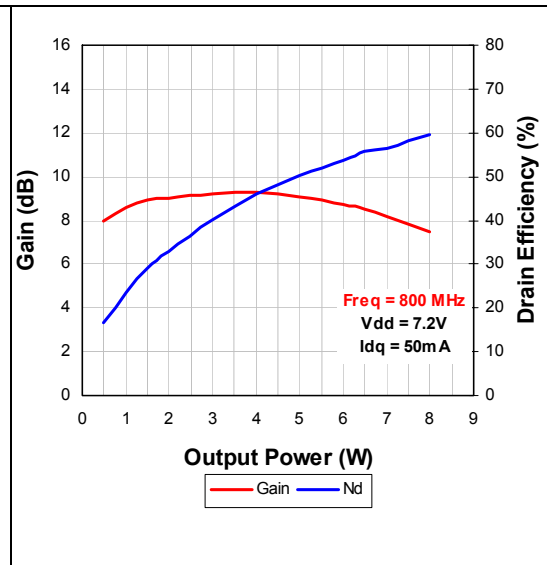


Figure 6. Power gain & efficiency vs frequency

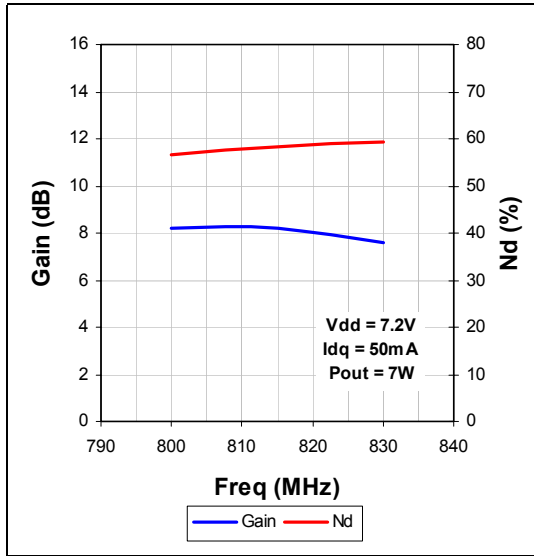


Figure 7. Input return loss vs frequency

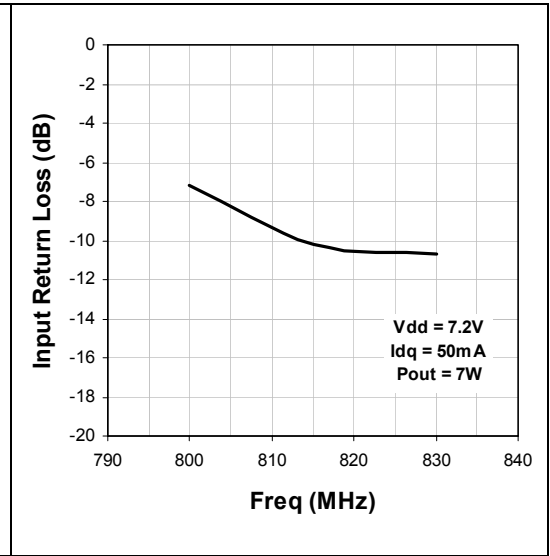


Figure 8. Output power vs drain voltage

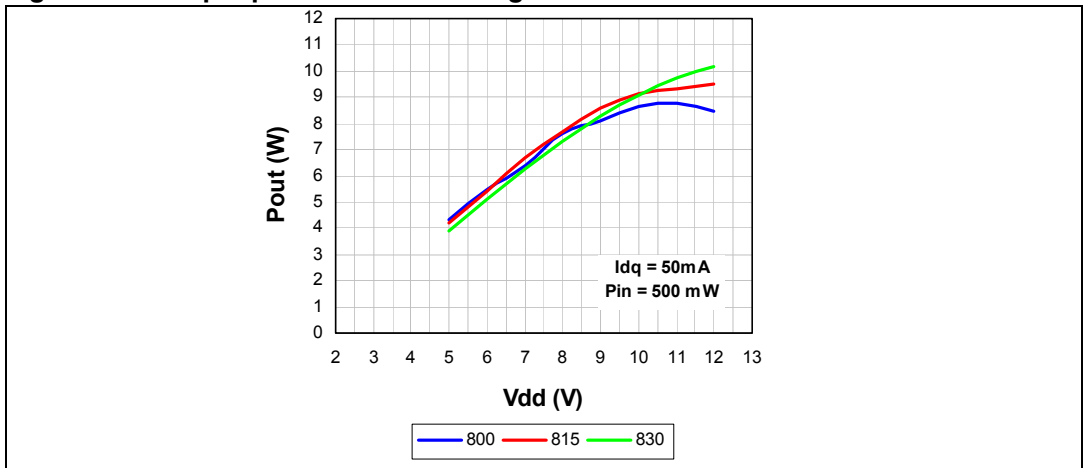
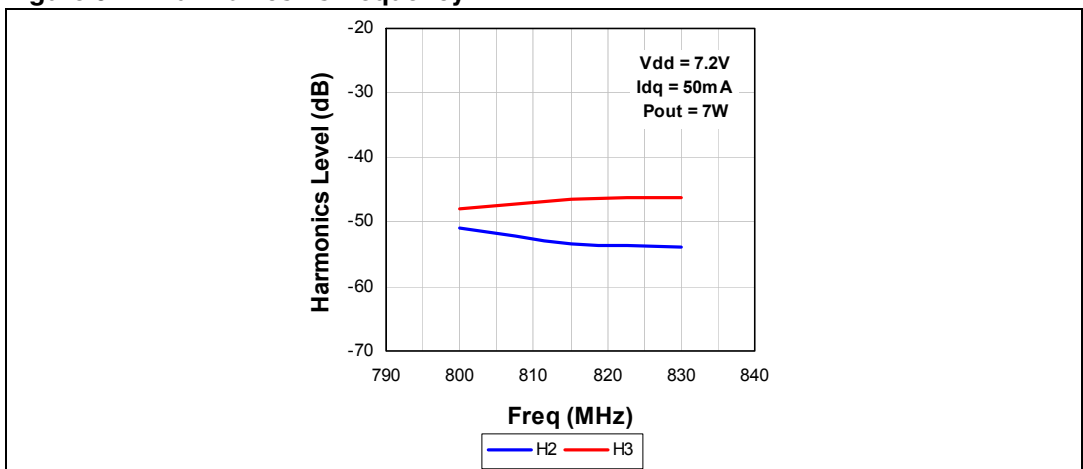


Figure 9. Harmonics vs frequency



# 5 Test circuit

Table 4. Test circuit schematic

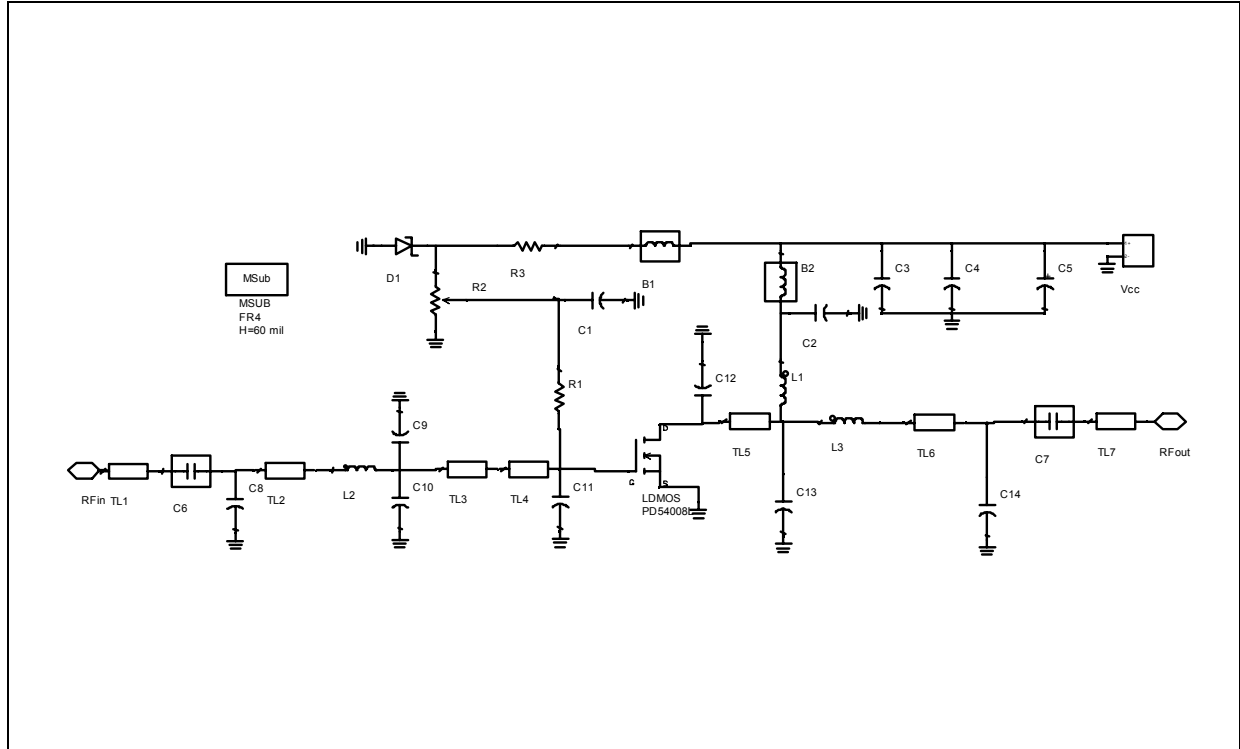


Table 5. Component part list

Component ID	Description	Value	Case size	Manufacturer	Part Code
C4	Capacitor	10nF	1206	Murata	GRM42-6X7R104K50
C3	Capacitor	1nF	1206	Murata	GRM42-6C0G102J50
C1	Capacitor	120pF	1206	Murata	GRM42-6C0G121J50
C2	Capacitor	120pF	1206	Murata	GRM42-6C0G121J50
C6	Capacitor	51pF	100B	ATC	510
C7	Capacitor	51pF	100B	ATC	510
C9	Capacitor	1.1pF	100B	ATC	1R1
C10	Capacitor	3.6pF	100B	ATC	3R6
C11	Capacitor	15pF	100B	ATC	150
C12	Capacitor	18pF	100B	ATC	180
C13	Capacitor	15pF	100B	ATC	150
C8	Variable Capacitor	0.8 -:- 8pF		Johnson	27293
C14	Variable Capacitor	0.8 -:- 8pF		Johnson	27293

Table 5. Component part list

Component ID	Description	Value	Case size	Manufacturer	Part Code
C5	Capacitor	10 uF	SMT	Panasonic	EEVHB1V100P
B2	Ferrite Bead			PANASONIC	EXCELDRC35C
B1	Ferrite Bead			PANASONIC	EXCELDRC35C
L1	Inductor	8nH		Coilcraft	A03T Mini Spring
L2	Inductor	3.85nH		Coilcraft	0906-4 Micro Spring
L3	Inductor	1.65nH		Coilcraft	0906-2 Micro Spring
PD54008L	LDMOS			STMicroelectronics	PD54008L
R2	Potentiometer	10K		BOURNS ELECTRONICS	3214W-1-103E
R3	Resistor	1K	1206	TYCO ELECTRONICS	01623440-1
R1	Resistor	680	1206	TYCO ELECTRONICS	
RF in	SMA-CONN			Johnson	142-0701-801
RF out	SMA-CONN			Johnson	142-0701-801
TL1	Transmission Line	W=2.87mm ; L=8.6mm			
TL2	Transmission Line	W=2.87mm ; L= 6.3mm			
TL3	Transmission Line	W=2.87mm ; L=2.8mm			
TL4	Transmission Line	W=4.9mm ; L=8mm			
TL5	Transmission Line	W=4.9mm ; L=5.86mm			
TL6	Transmission Line	W=4.9mm ; L=10.9mm			
TL7	Transmission Line	W=2.87mm ; L=7.5mm			
D1	Zener Diode	5.1 V	SOD110	PHILIPS	BZX284C5V1
FR-4 THk=0.060" 2OZ Cu Both Sides					



## 6 Circuit layout

Figure 10. Test fixture component layout

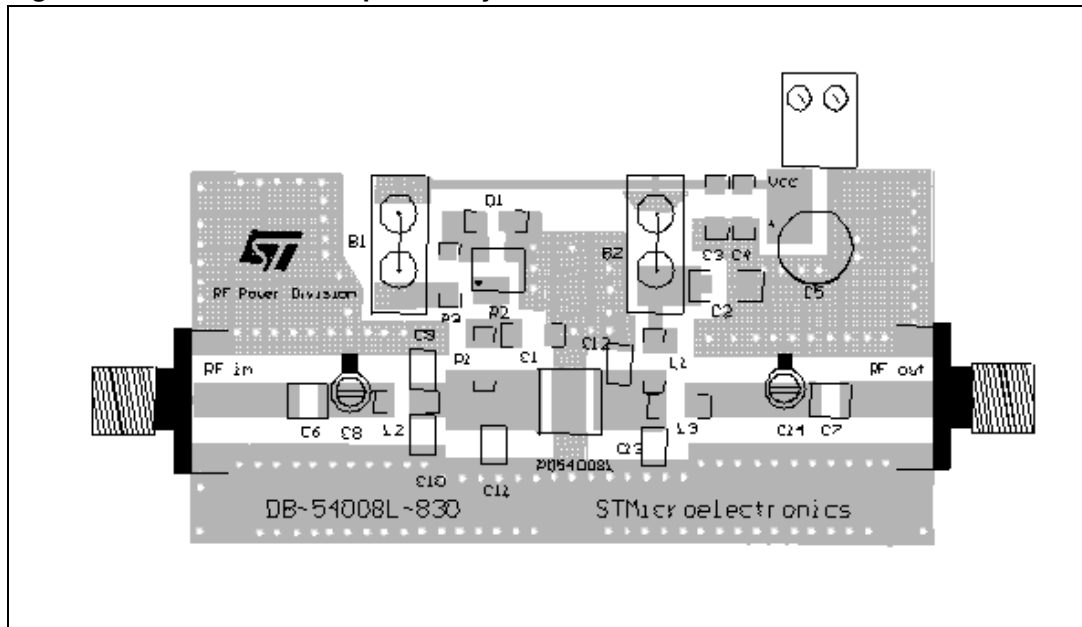
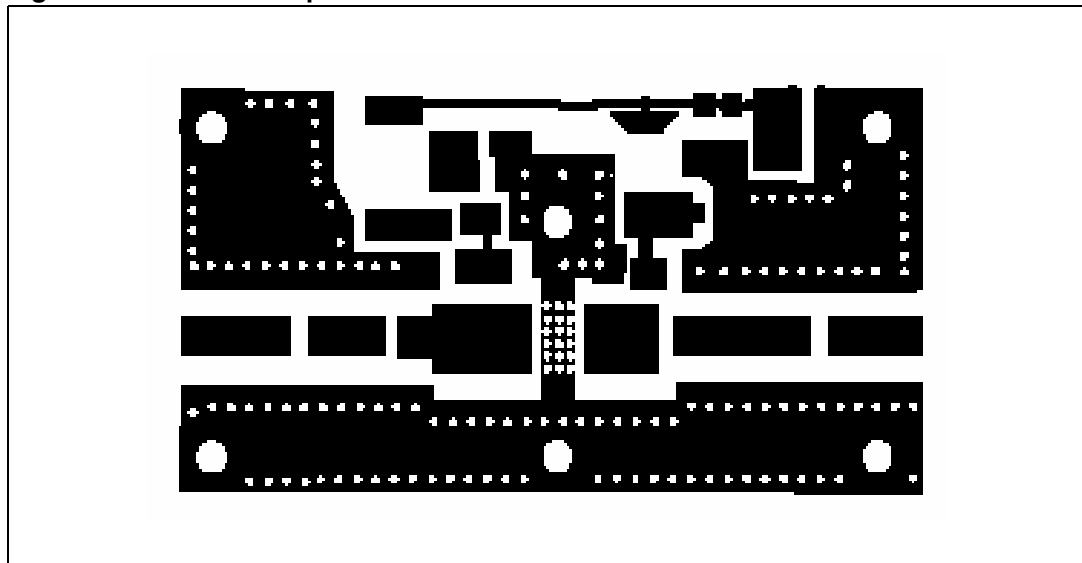
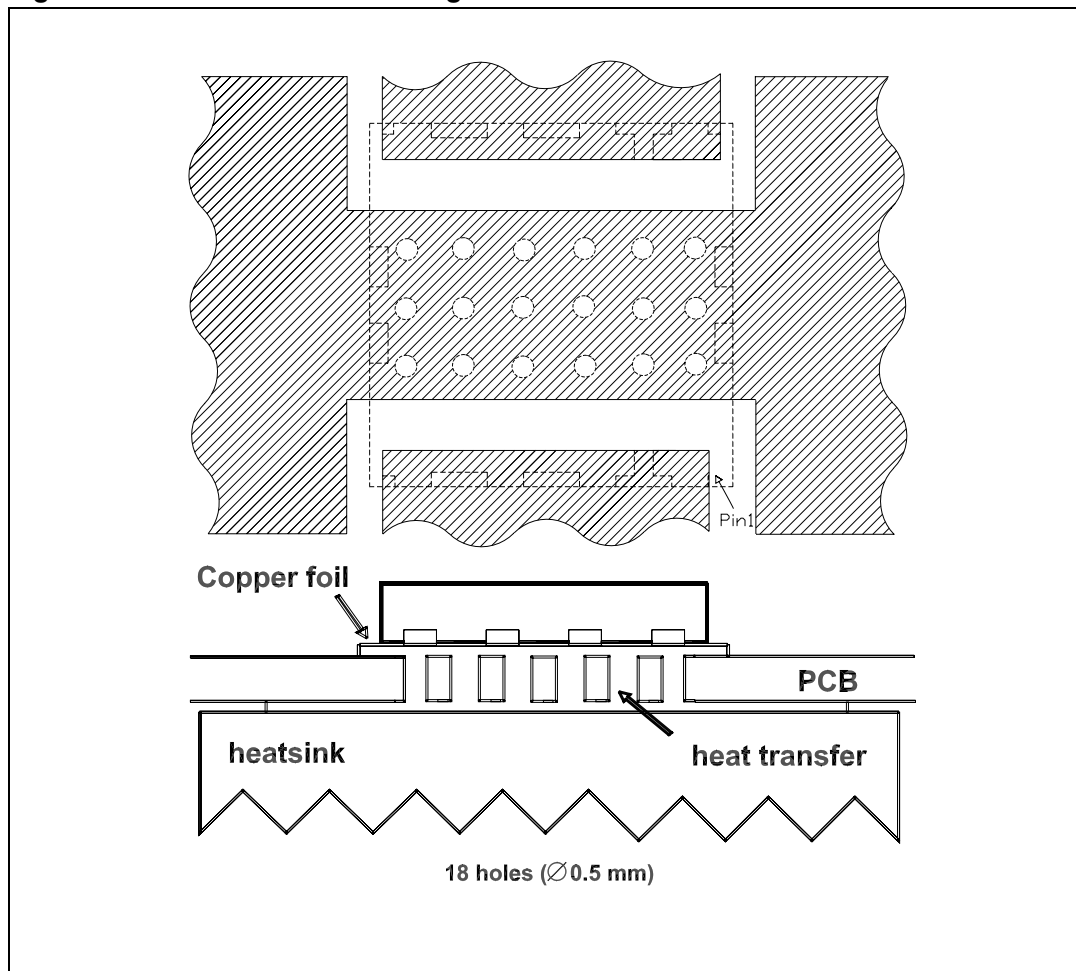


Figure 11. Test circuit photomaster



# 7 Mounting indications

Figure 12. Standard SMD Mounting



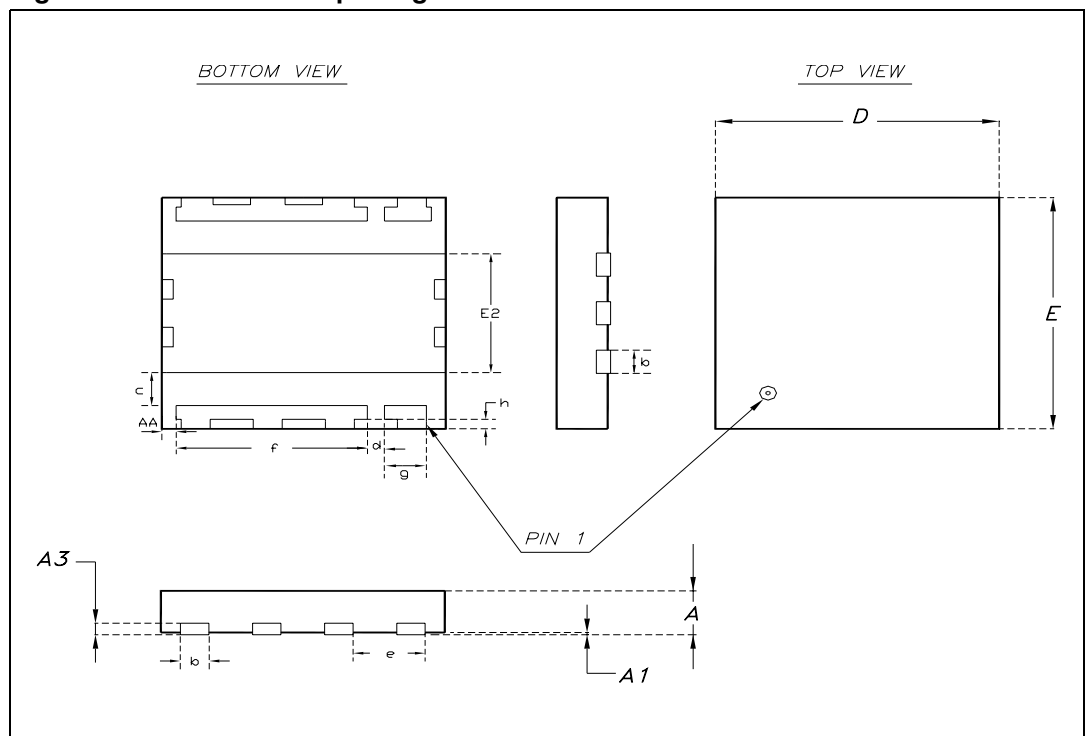
## 8 Package mechanical data

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](http://www.st.com)

Table 6. 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	

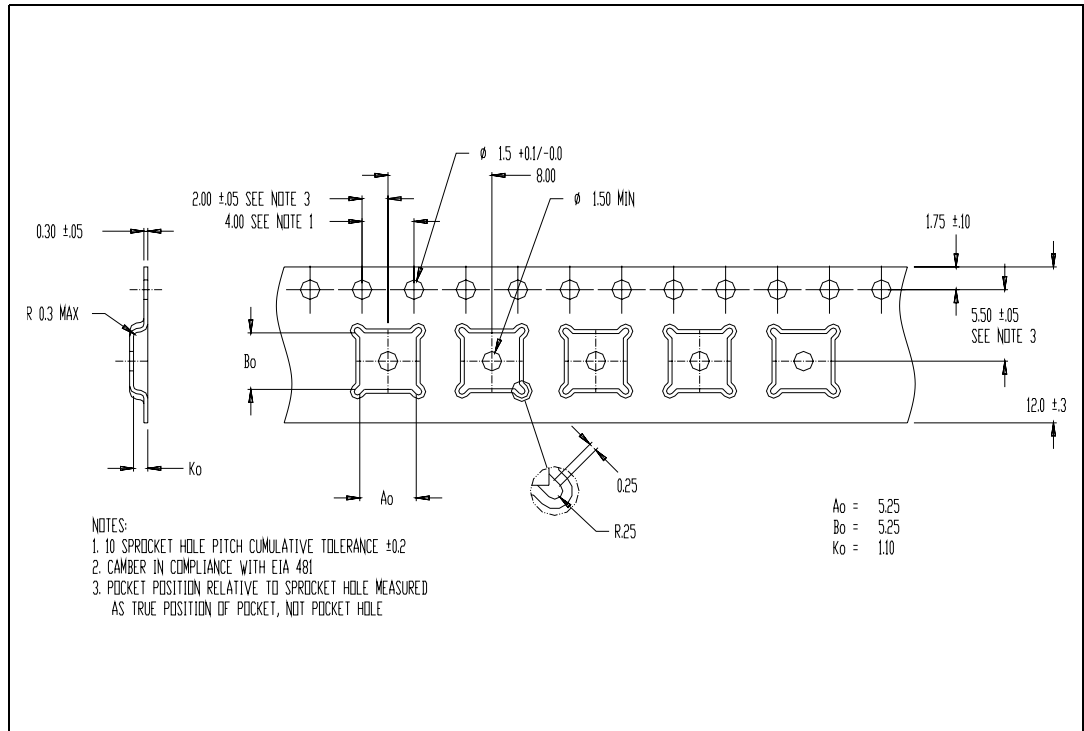
Figure 13. PowerFLAT™ package dimensions



**Table 7. PowerFLAT™ tape & 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 & reel**



## 9 Revision history

**Table 8. Revision history**

Date	Revision	Changes
19-May-2006	1	Initial release

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