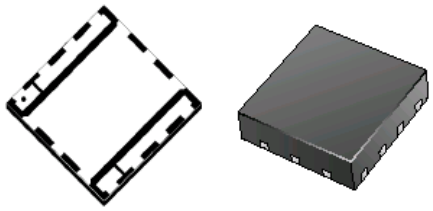
PD85006L-E

RF power transistor
the LdmoST plastic family

Features

- Excellent thermal stability
- Common source configuration
- P_{OUT} = 6 W with 15 dB gain @ 870 MHz / 13.6 V
- Plastic package
- ESD protection
- In compliance with the 2002/95/EC european directive



PowerFLAT™ (5mm x 5mm)

Description

The PD85006L-E is a common source N-channel, enhancement-mode lateral Field-Effect RF power transistor. It is designed for high gain, broadband commercial and industrial applications. It operates at 13.6 V in common source mode at frequencies of up to 1 GHz. PD85006L-E boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in leadless SMD plastic RF power package , PowerFLAT™. PD85006L-E's superior linearity performance makes it an ideal solution for mobile radio applications.

Figure 1. Pin connection

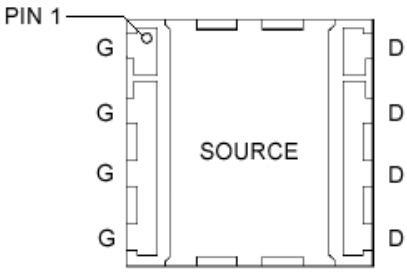


Table 1. Device summary

Order code	Marking	Package	Packaging
PD85006L-E	85006	PowerFLAT™	Tape and reel

Contents

1 **Electrical data** 3
1.1 Maximum ratings 3
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1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings (T_{CASE} = 25°C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	40	V
V_{GS}	Gate-source voltage	-0.5 to +15	V
I_D	Drain current	2	A
P_{DISS}	Power dissipation	20.8	W
T_J	Max. operating junction temperature	150	°C
T_{STG}	Storage temperature	-65 to +150	°C

1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Junction - case thermal resistance	6	°C/W

2 Electrical characteristics

T_{CASE} = +25 °C

2.1 Static

Table 4. Static

Symbol	Test conditions			Min	Typ	Max	Unit
I_{DSS}	V_{GS} = 0 V	V_{DS} = 25 V				1	µA
I_{GSS}	V_{GS} = 5 V	V_{DS} = 0 V				1	µA
$V_{GS(Q)}$	V_{DS} = 13.6 V	I_D = 200 mA			4		V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 0.25 A			0.27		V
C_{ISS}	V_{GS} = 0 V	V_{DS} = 13.6 V	f = 1 MHz		16		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 13.6 V	f = 1 MHz		14		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 13.6 V	f = 1 MHz		1.1		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions	Min	Typ	Max	Unit
P_{OUT}	V_{DD} = 13.6 V, I_{DQ} = 200 mA, P_{IN} = 0.1 W, f = 870 MHz	5	6		W
G_{PS}	V_{DD} = 13.6 V, I_{DQ} = 200 mA, P_{OUT} = 5 W, f = 870 MHz	15	17		dB
N_D	V_{DD} = 13.6 V, I_{DQ} = 200 mA, P_{OUT} = 5 W, f = 870 MHz	55	63		%
Load mismatch	V_{DD} = 13.6 V, I_{DQ} = 200 mA, P_{OUT} = 5 W, f = 870 MHz All phase angles	20:1			VSWR

2.3 ESD protection characteristics

Table 6. ESD protection characteristics

Test conditions	Class
Human body model	2
Machine model	M3

2.4 Moisture sensitivity level

Table 7. Moisture sensitivity level

Test methodology	Rating
J-STD-020B	MSL 3

3 Impedances

Figure 2. Impedances

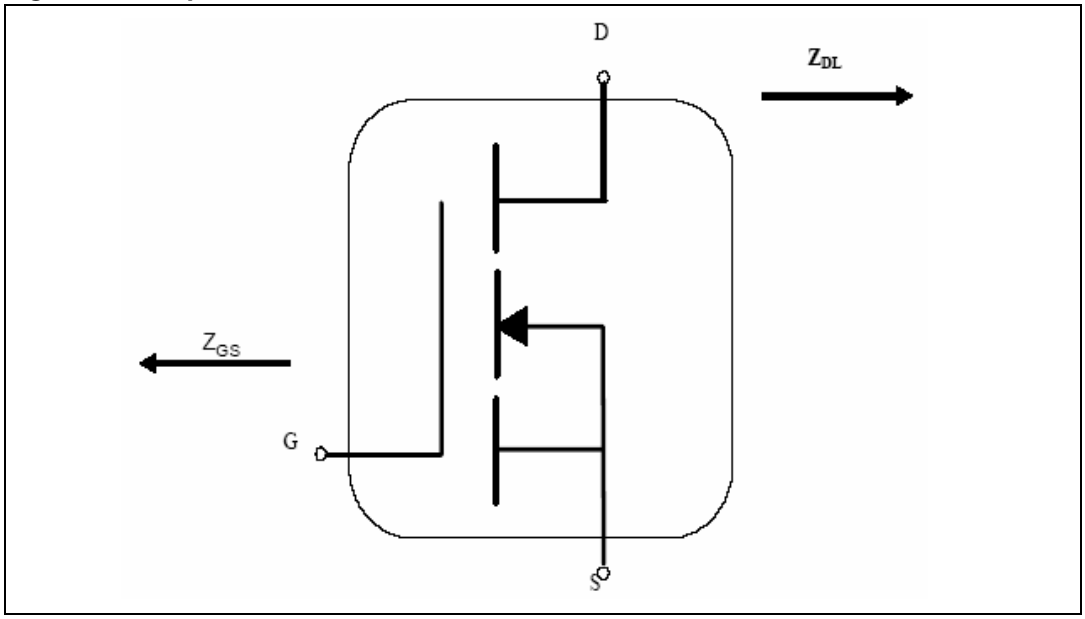


Table 8. Broadband impedances

F(MHz)	Z_{GS}	Z_{DL}
860	2.66+ j 4.28	6.23+ j 5.71
880	2.81+ j 4.35	6.46+ j 6.20
900	2.88+ j 4.34	6.73 + j 6.66
920	2.87+ j 4.25	7.06+ j 7.06
940	2.68+ j 4.20	7.40+ j 7.45
960	2.39+ j 4.20	7.80+ j 7.75

4 DC curves

Figure 3. DC output characteristics

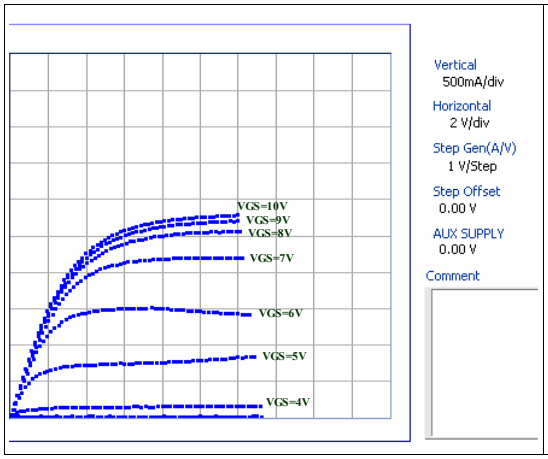


Figure 4. ID vs V_{GS}

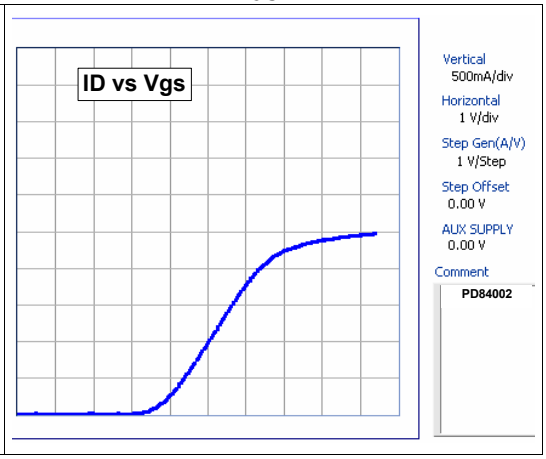
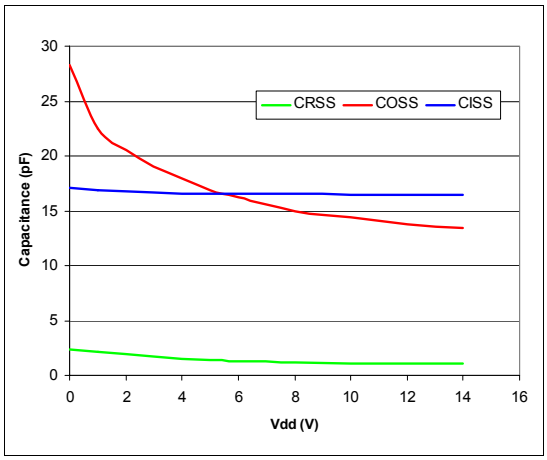


Figure 5. Capacitances vs drain voltage



5 RF curves

Figure 6. Output power and efficiency vs frequency 13.6 V / 200 mA / Pin = 21 dBm

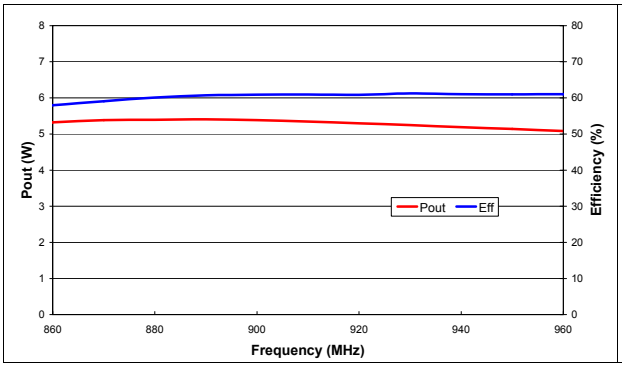


Figure 7. Gain vs frequency 13.6 V / 200 mA

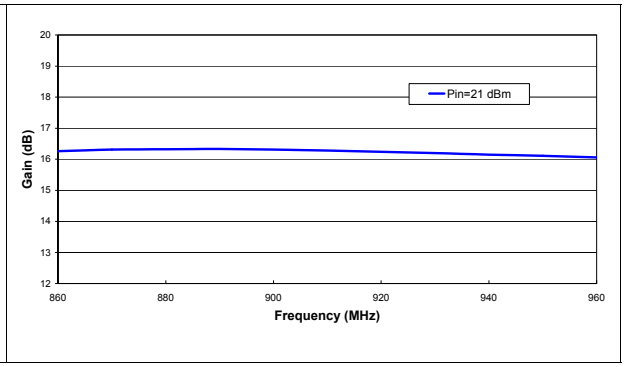


Figure 8. Input return loss vs frequency 13.6 V / 200 mA

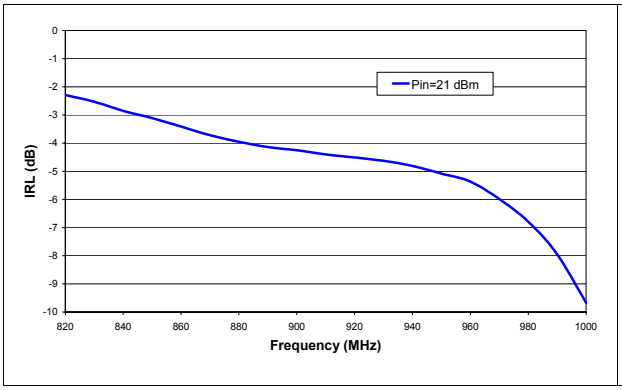


Figure 9. Gain vs pout 13.6 V / 200 mA

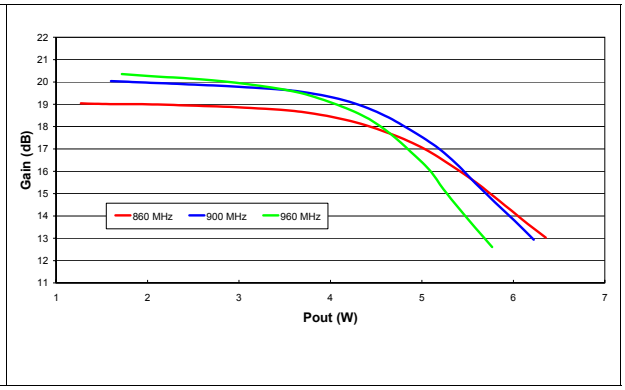


Figure 10. Id vs Pin 13.6 V / 200 mA

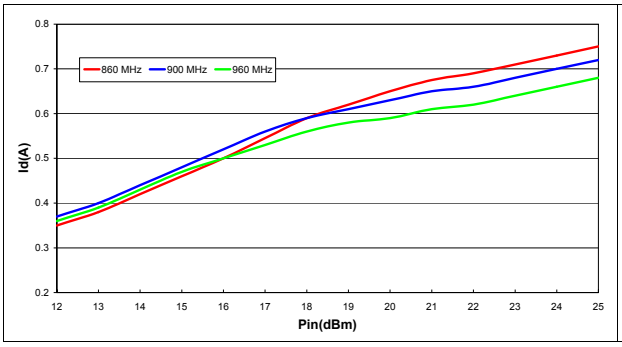


Figure 11. Pout vs pin 13.6 V / 200 mA

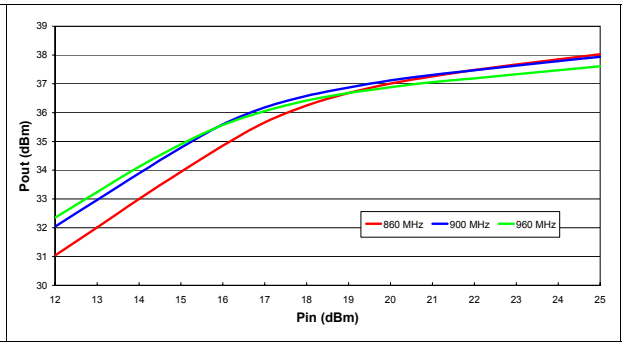
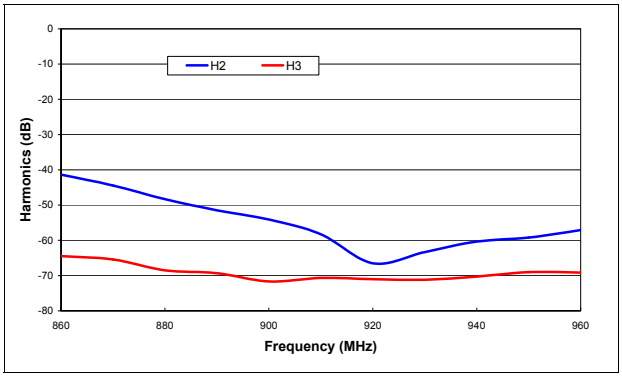


Figure 12. Harmonics vs frequency 13.6 V / 200 mA



6 Schematic and bill of material

Figure 13. Schematic and bill of material

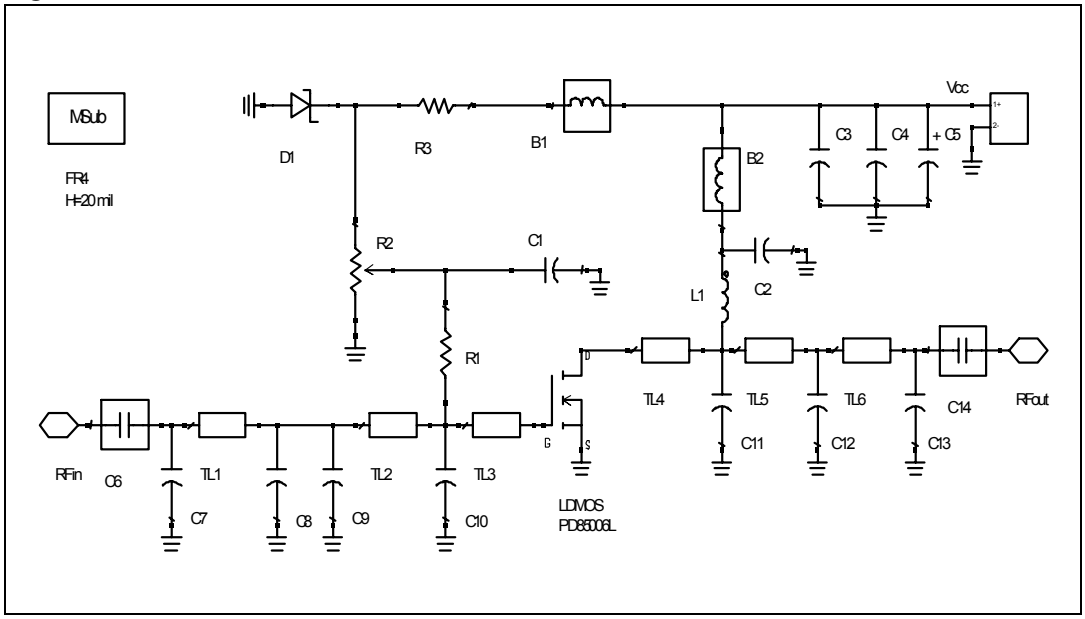
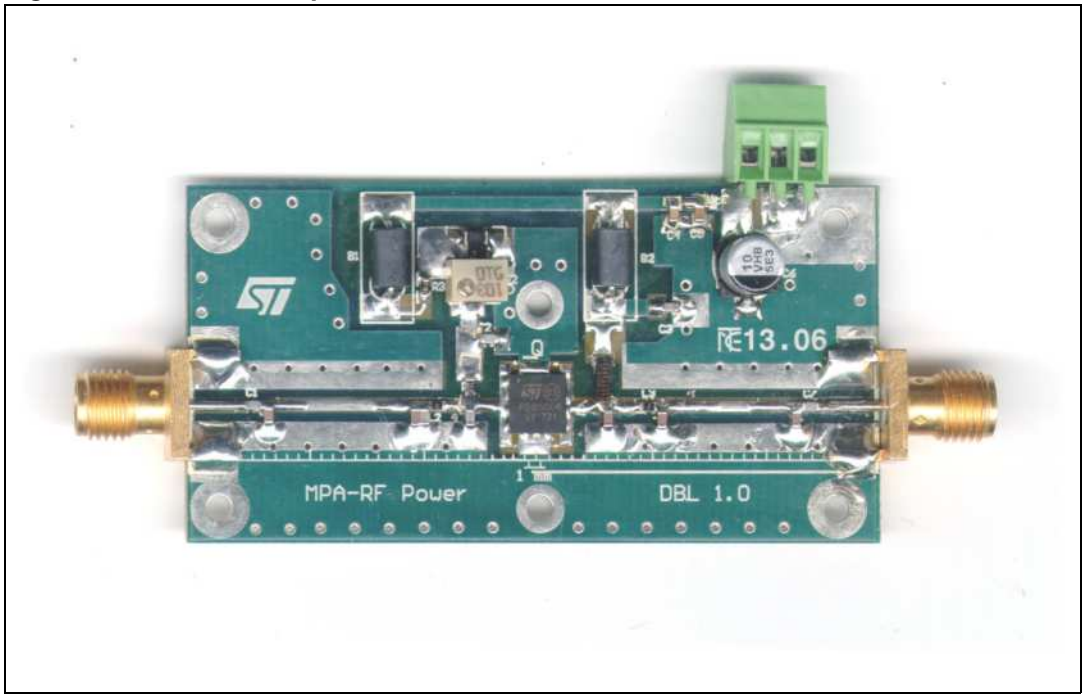


Table 9. Components part list

Component ID	Description	Value	Case size	Manufacturer	Part code
B1	Ferrite Bead			Panasonic	EXCELDRC35C
B2	Ferrite Bead			Panasonic	EXCELDRC35C
C1, C2	Capacitor	120 pF	0603	Murata	GRM39-C0G121J50D500
C3	Capacitor	1 nF	0603	Murata	GRM39-X7R102K50C560
C4	Capacitor	10 nF	0603	Murata	GRM39-X7R103K50C560
C5	Capacitor	10 uF	SMT	Panasonic	EEVHB1V100P
C6, C14	Capacitor	39 pF	0603	Murata	GRM39-C0G390J50D500
C7	Capacitor	3.3 pF	0603	Murata	GRM39-C0G3R3C50Z500
C8	Capacitor	2.7 pF	0603	Murata	GRM39-C0G2R7C50Z500
C9	Capacitor	12 pF	0603	Murata	GRM39-C0G120J50D500
C10	Capacitor	22 pF	0603	Murata	GRM39-C0G220J50D500
C11	Capacitor	8.2 pF	0603	Murata	GRM39-C0G8R2D50Z500
C12	Capacitor	6,8 pF	0603	Murata	GRM39-C0G6R8D50Z500
C13	Capacitor	3.9 pF	0603	Murata	GRM39-C0G3R9C50Z500
D1	Zener Diode	5.1 V	SOD110	Philips	BZX284C5V1
L1	Inductor	12.55 nH		Coilcraft	1606-10
R1	Resistor	510 Ω	0603	Tyco electronics	
R2	Potentiometer	10 KΩ		Bourns electronics	3214W-1-103E
R3	Resistor	1 K	0603	Tyco electronics	01623440-1
TL1	Transmission line	W=0.92mm	L=12.1 mm		
TL2	Transmission line	W=0.92mm	L=3.2 mm		
TL3	Transmission line	W=0.92mm	L=3.0 mm		
TL4	Transmission line	W=0.92mm	L=3.2 mm		
TL5	Transmission line	W=0.92mm	L=3.9 mm		
TL6	Transmission line	W=0.92mm	L=11.0 mm		
RF in, RF out	SMA-CONN	50 Ω	60 mils	JOHNSON	142-0701-801
PD85006L	LDMOS			STMicroelectronics	PD85006L
Board	FR-4 THk=0.020" 2OZ Cu both sides				

7 Demoboard photo

Figure 14. Demoboard photo



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

Table 10. PowerFLAT™ (5x5) 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 15. PowerFLAT™ (5x5) package dimensions

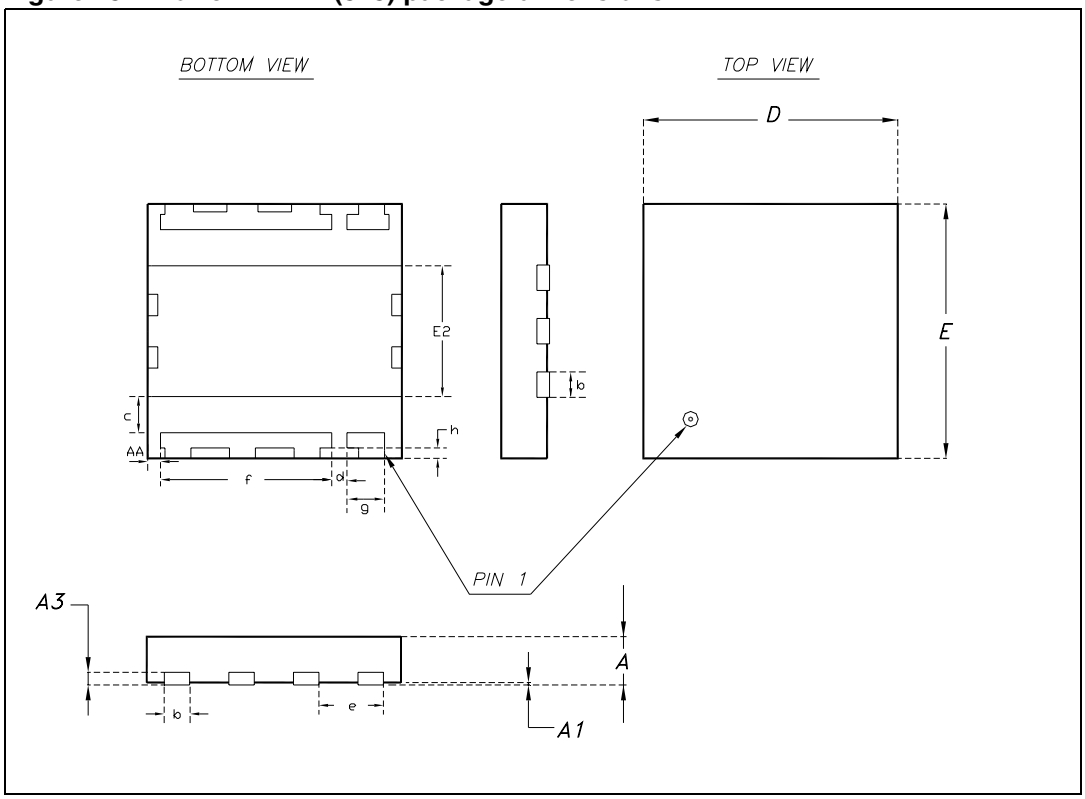


Table 11. Tape and reel dimensions

Dim.	Mm		
	Min	Typ	Max
Ao	5.15	5.25	5.35
Bo	5.15	5.25	5.35
Ko	1.0	1.1	1.2

Figure 16. Tape and reel dimensions

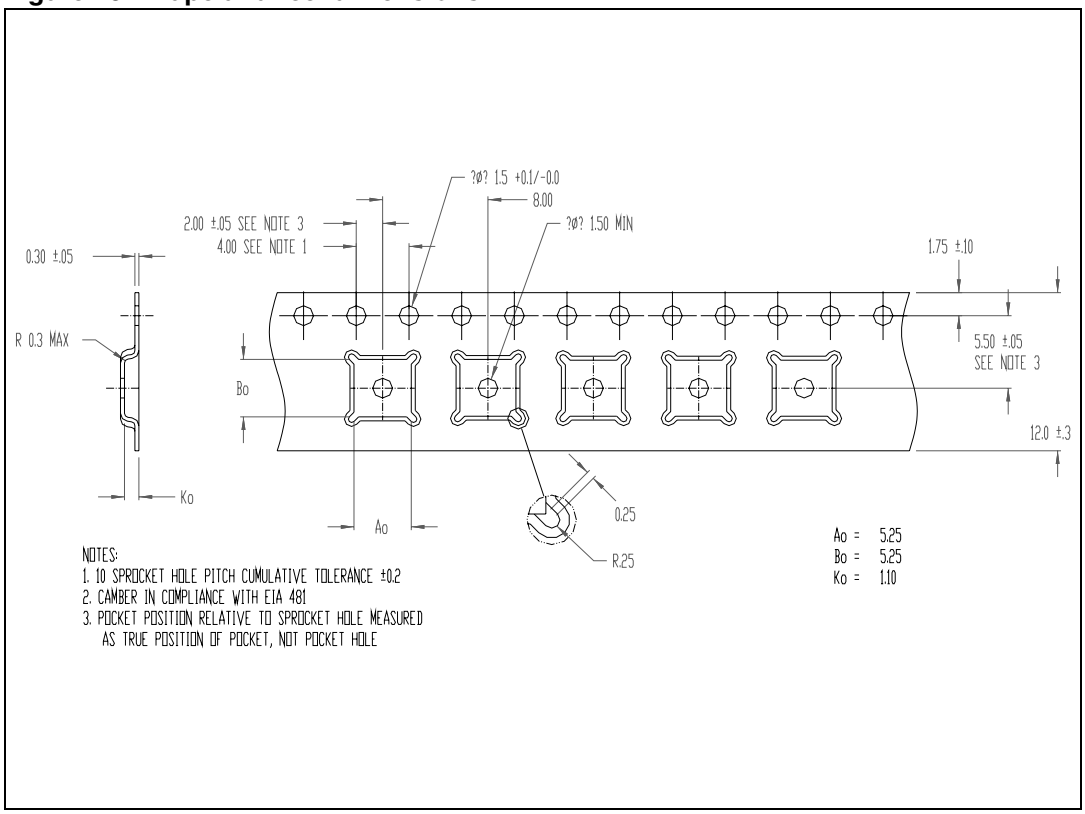
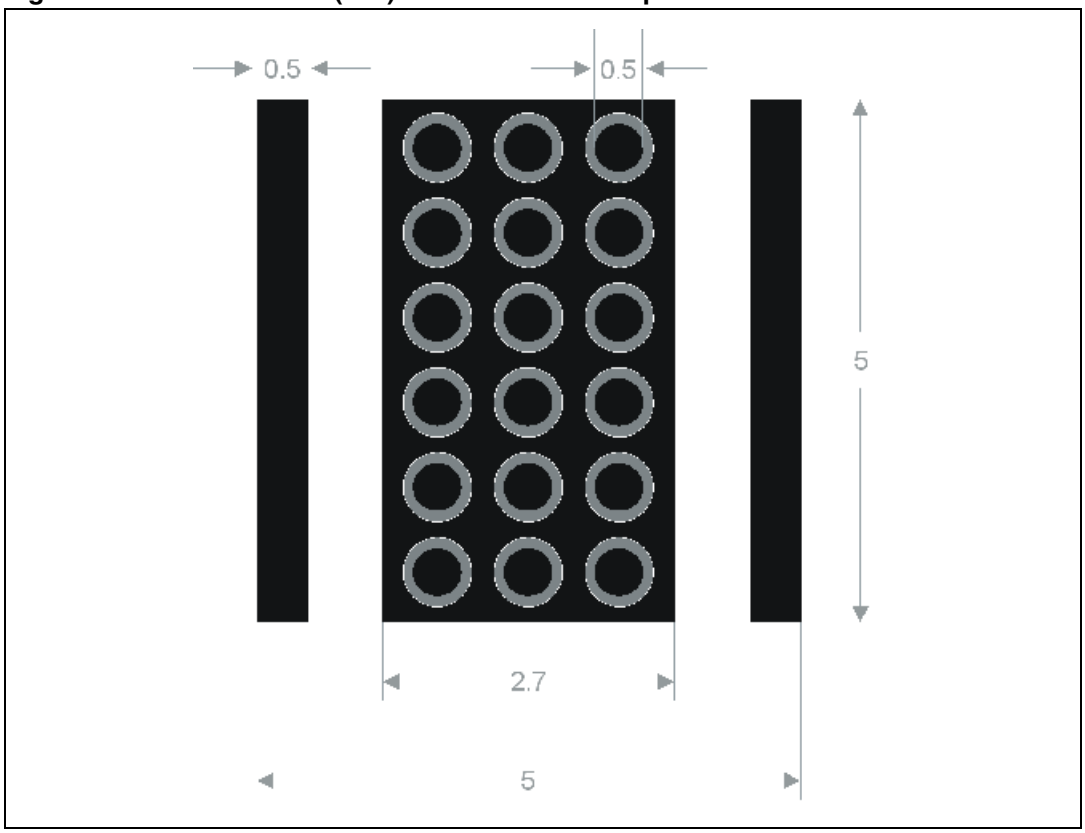


Figure 17. PowerFLAT™ (5x5) recommended footprint



9 Revision history

Table 12. Document revision history

Date	Revision	Changes
06-Dec-2007	1	Initial release.

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