PD84006-E

RF power transistor, LdmoST plastic family N-channel enhancement-mode lateral MOSFETs

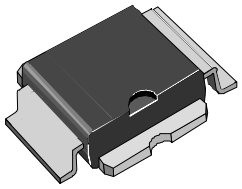
Datasheet –production data

Features

- Excellent thermal stability
- Common source configuration
- Broadband performances: P_{OUT} = 6 W with 13 dB gain @ 870 MHz
- Plastic package
- ESD protection
- In compliance with the 2002/95/EC European directive

Description

The PD84006-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 7 V in common source mode at frequencies of up to 1 GHz boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF 's superior linearity performance makes it an ideal solution for portable radio and UHF RFID reader. The PowerSO-10 plastic package, designed to offer high reliability, is the first ST JEDEC approved, high power SMD package. It has been specially optimized for RF needs and offers excellent RF performances and ease of assembly.



PowerSO-10RF (formed lead)

Figure 1. Pin connections

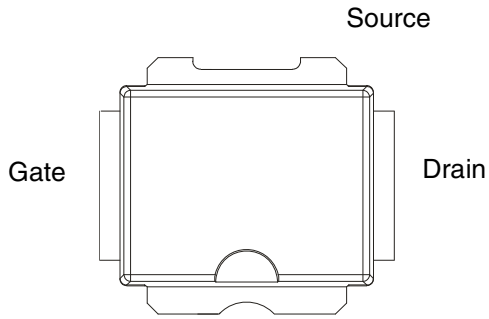


Table 1. Device summary

Order code	Package	Packaging
PD84006-E	PowerSO-10RF (formed lead)	Tube

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1 Electrical data

1.1 Maximum ratings

(T_{CASE} = 25 °C)

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-source voltage	25	V
V_{GS}	Gate-source voltage	-0.5 to +15	V
I_D	Drain current	5	A
P_{DISS}	Power dissipation (@ T_C = 70 °C)	59	W
T_J	Max. operating junction temperature	165	°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	1.6	°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} = 0V	V_{DS} = 25 V				1	µA
I_{GSS}	V_{GS} = 5 V	V_{DS} = 0 V				1	µA
$V_{GS(Q)}$	V_{DS} = 10 V	I_D = 150 mA		3.0		4.3	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 1 A			0.34		V
C_{ISS}	V_{GS} = 0V	V_{DS} = 7 V	f = 1 MHz		40		pF
C_{OSS}	V_{GS} = 0V	V_{DS} = 7 V	f = 1 MHz		33		pF
C_{RSS}	V_{GS} = 0V	V_{DS} = 7 V	f = 1 MHz		1.45		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions	Min	Typ	Max	Unit
P_3dB	V_{DD} = 7.5 V, I_{DQ} = 150 mA f = 870 MHz	5	6	-	W
G_P	V_{DD} = 7.5 V, I_{DQ} = 150 mA, P_{OUT} = 2 W, f = 870 MHz	15			dB
h_D	V_{DD} = 7.5 V, I_{DQ} = 150 mA, P_{OUT} = P_3dB, f = 870 MHz	50	60		%
Load mismatch	V_{DD} = 9.5 V, I_{DQ} = 150 mA, P_{OUT} = 8 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

3 Typical performances

Figure 2. Output power and efficiency vs. frequency Vdd = 7.2 V, Idq = 200 mA, Pin = 24 dBm

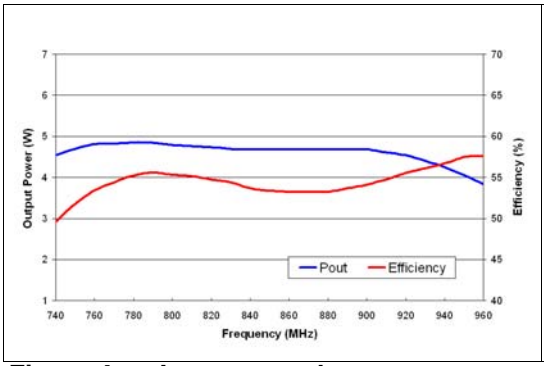


Figure 3. Gain vs. output power Vdd = 7.2 V, Idq = 200 mA

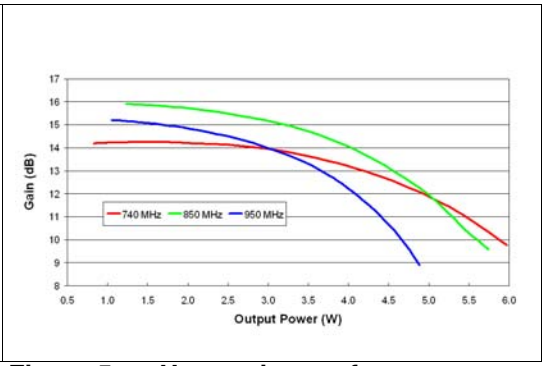


Figure 4. Input return loss vs. frequency Vdd = 7.2 V, Idq = 200 mA

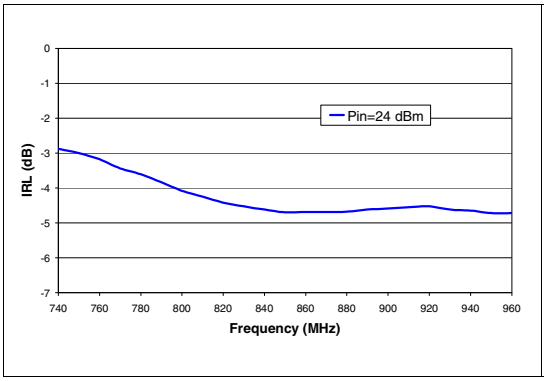


Figure 5. Harmonics vs. frequency Vdd = 7.2 V, Idq = 200 mA, Pin = 24 dBm

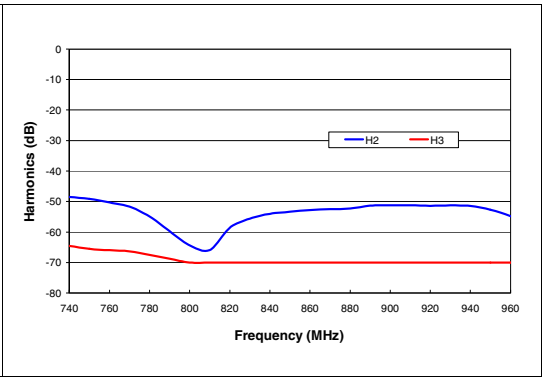
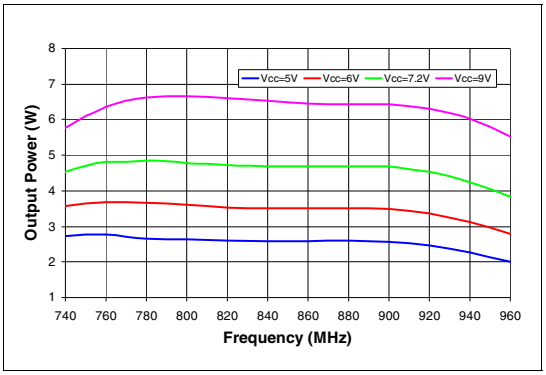


Figure 6. Output power vs. frequency and supply voltage Pin = 24 dBm, Idq = 200 mA



4 Package mechanical data

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Table 7. PowerSO-10RF formed lead (gull wing) mechanical data

Dim.	mm.			Inch.		
	Min	Typ	Max	Min	Typ	Max
A1	0	0.05	0.1	0.	0.0019	0.0038
A2	3.4	3.5	3.6	0.134	0.137	0.142
A3	1.2	1.3	1.4	0.046	0.05	0.054
A4	0.15	0.2	0.25	0.005	0.007	0.009
a		0.2			0.007	
b	5.4	5.53	5.65	0.212	0.217	0.221
c	0.23	0.27	0.32	0.008	0.01	0.012
D	9.4	9.5	9.6	0.370	0.374	0.377
D1	7.4	7.5	7.6	0.290	0.295	0.298
E	13.85	14.1	14.35	0.544	0.555	0.565
E1	9.3	9.4	9.5	0.365	0.37	0.375
E2	7.3	7.4	7.5	0.286	0.292	0.294
E3	5.9	6.1	6.3	0.231	0.24	0.247
F		0.5			0.019	
G		1.2			0.047	
L	0.8	1	1.1	0.030	0.039	0.042
R1			0.25			0.01
R2		0.8			0.031	
T	2 deg	5 deg	8 deg	2 deg	5 deg	8 deg
T1		6 deg			6 deg	
T2		10 deg			10 deg	

Note: Resin protrusions not included (max value: 0.15 mm per side)

Figure 7. Package dimensions

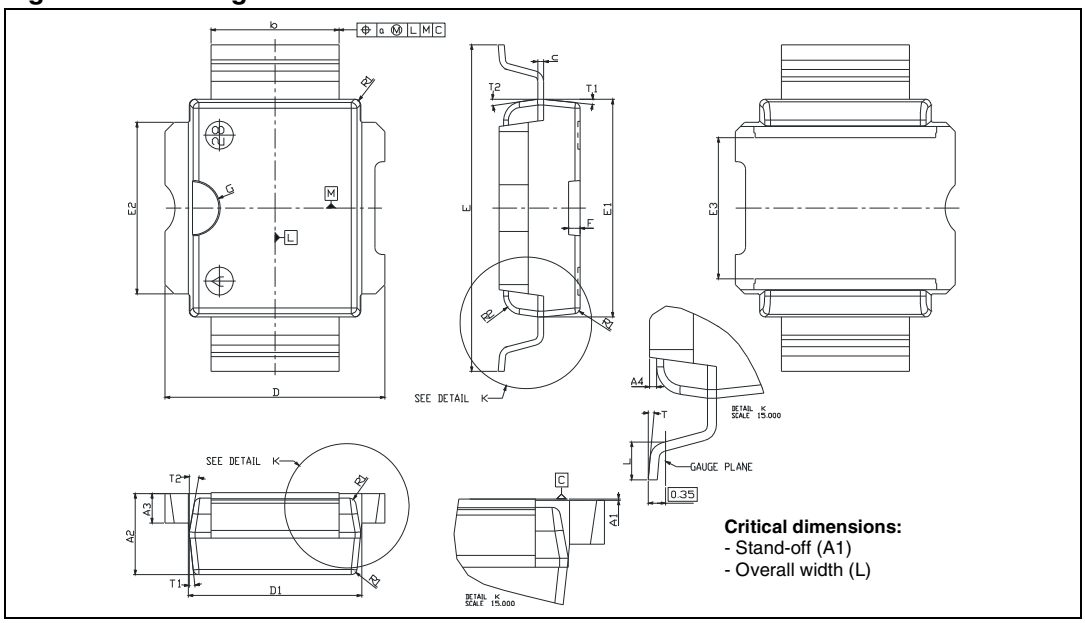
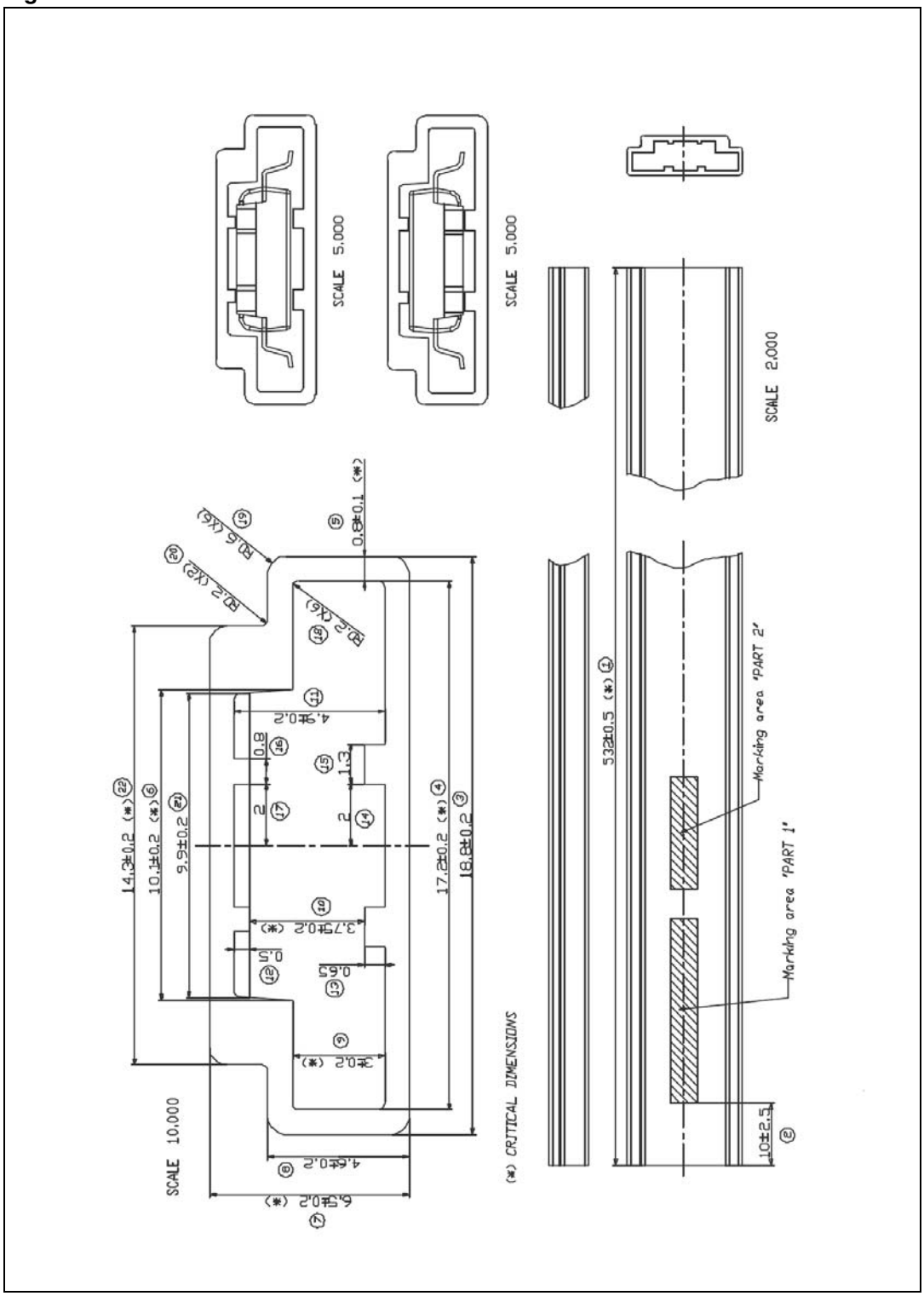


Figure 8. Tube information



5 Revision history

Table 8. Document revision history

Date	Revision	Changes
07-Aug-2009	1	Initial release.
23-May-2012	2	Updated $V_{GS(Q)}$ in *Table 4: Static*.

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