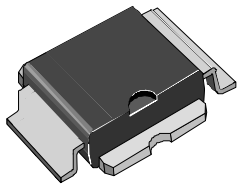
PD85015-E

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

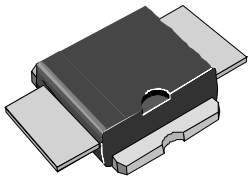
Datasheet – production data

Features

- Excellent thermal stability
- Common source configuration
- P_{OUT} = 15 W with 16 dB gain @ 870 MHz / 13.6 V
- Plastic package
- ESD protection
- In compliance with the 2002/95/EC European directive



PowerSO-10RF (formed lead)



PowerSO-10RF (straight lead)

Description

The PD85015-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. The PD85015-E boasts excellent gain, linearity and reliability thanks to ST's latest LDMOS technology mounted on the first true SMD plastic RF power package, the PowerSO-10RF. The superior linearity of the device makes it an ideal solution for car radios. The PowerSO-10 plastic package, designed for high reliability, is the first JEDEC approved, high power SMD package from ST. It is optimized for RF requirements, and offers excellent RF performance and ease of assembly.

Figure 1. Pin connection

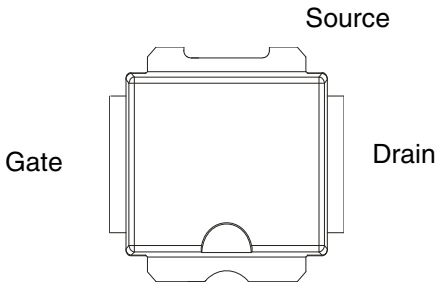


Table 1. Device summary

Order codes	Package	Packaging
PD85015-E	PowerSO-10RF (formed lead)	Tube
PD85015S-E	PowerSO-10RF (straight lead)	Tube
PD85015TR-E	PowerSO-10RF (formed lead)	Tape and reel
PD85015STR-E	PowerSO-10RF (straight lead)	Tape and reel

This is information on a product in full production. www.st.com

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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	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} = 12.5 V	f = 1 MHz		45		pF
C_{OSS}	V_{GS} = 0V	V_{DS} = 12.5 V	f = 1 MHz		36		pF
C_{RSS}	V_{GS} = 0V	V_{DS} = 12.5 V	f = 1 MHz		1.2		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions		Min	Typ	Max	Unit
P3dB	V_{DD} = 13.6 V, I_{DQ} = 150 mA	f = 870 MHz	15	20	-	W
G_P	V_{DD} = 13.6 V, I_{DQ} = 150 mA, P_{OUT} = 15 W, f = 870 MHz		16			dB
h_D	V_{DD} = 13.6 V, I_{DQ} = 150 mA, P_{OUT} = P3dB, f = 870 MHz		60	70		%
Load mismatch	V_{DD} = 1 7 V, I_{DQ} = 300 mA, P_{OUT} = 25 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 Impedance

Figure 2. Current conventions

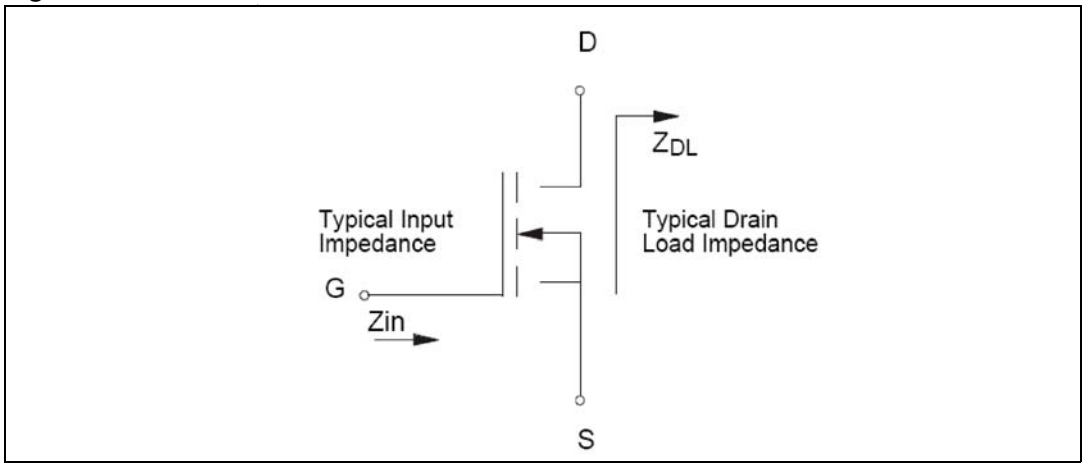


Table 7. Impedance data

Frequency	Z_{IN} (Ω)	Z_{DL}(Ω)
500 MHz	0.536 - j 2.968	4.930 + j 1.083
600 MHz	0.557 - j 1.224	4.329 + j 0.811
700 MHz	0.595 + j 0.236	3.784 + j 0.429
800 MHz	0.651 + j 1.512	3.305 - j 0.031
900 MHz	0.708 + j 2.671	2.889 - j 0.542
1000 MHz	0.761 + j 3.759	2.534 - j 1.085

4 Typical performances

Figure 3. Drain current vs gate voltage

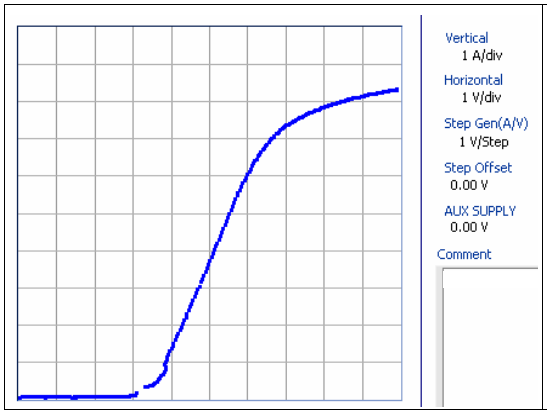


Figure 4. DC output characteristics

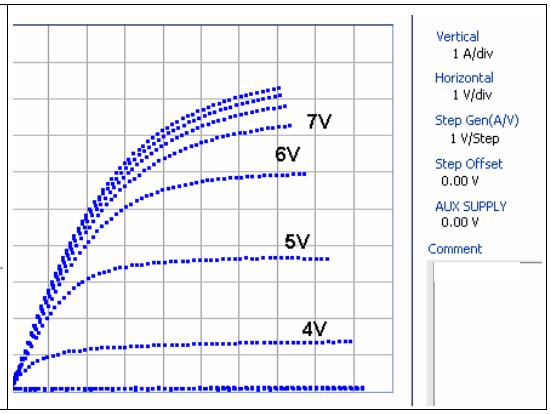
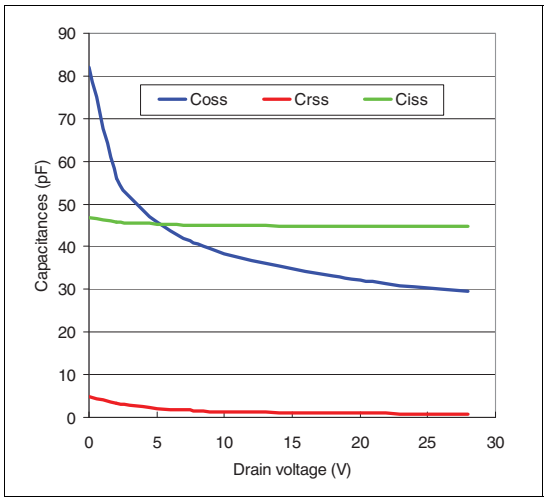


Figure 5. Capacitances vs drain voltage



5 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*.
ECOPACK® is an ST trademark.

Table 8. 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 6. Package dimensions

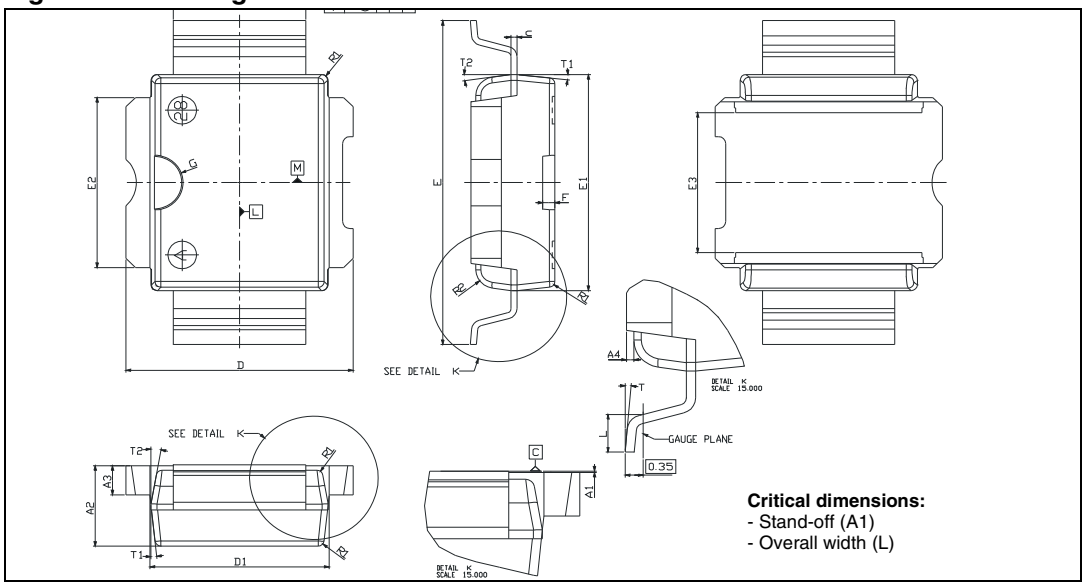


Table 9. PowerSO-10RF straight lead mechanical data

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A1	1.62	1.67	1.72	0.064	0.065	0.068
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	15.15	15.4	15.65	0.595	0.606	0.615
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	
R1			0.25			0.01
R2		0.8			0.031	
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

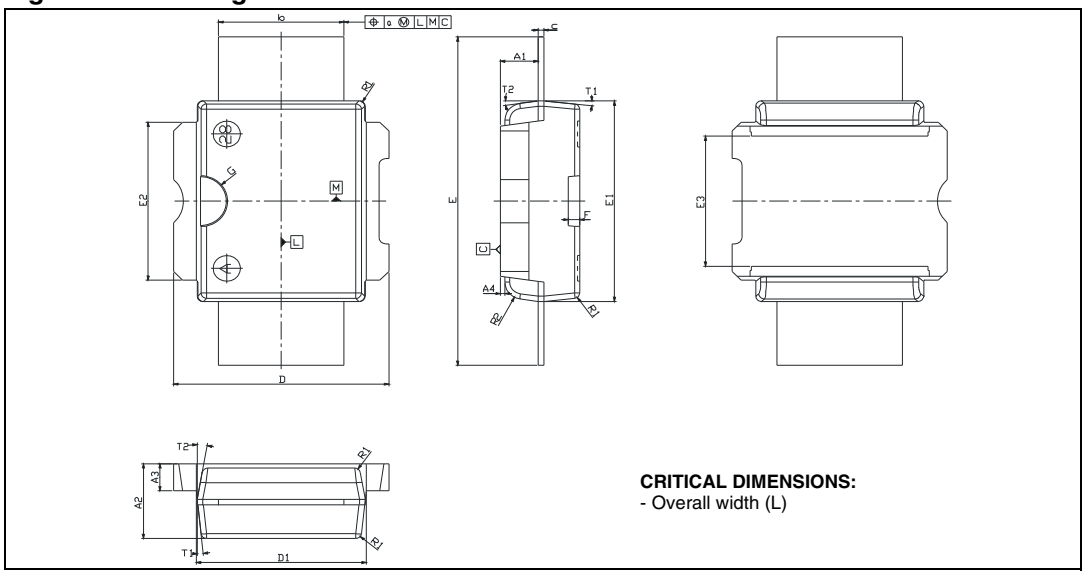


Figure 8. Tube information

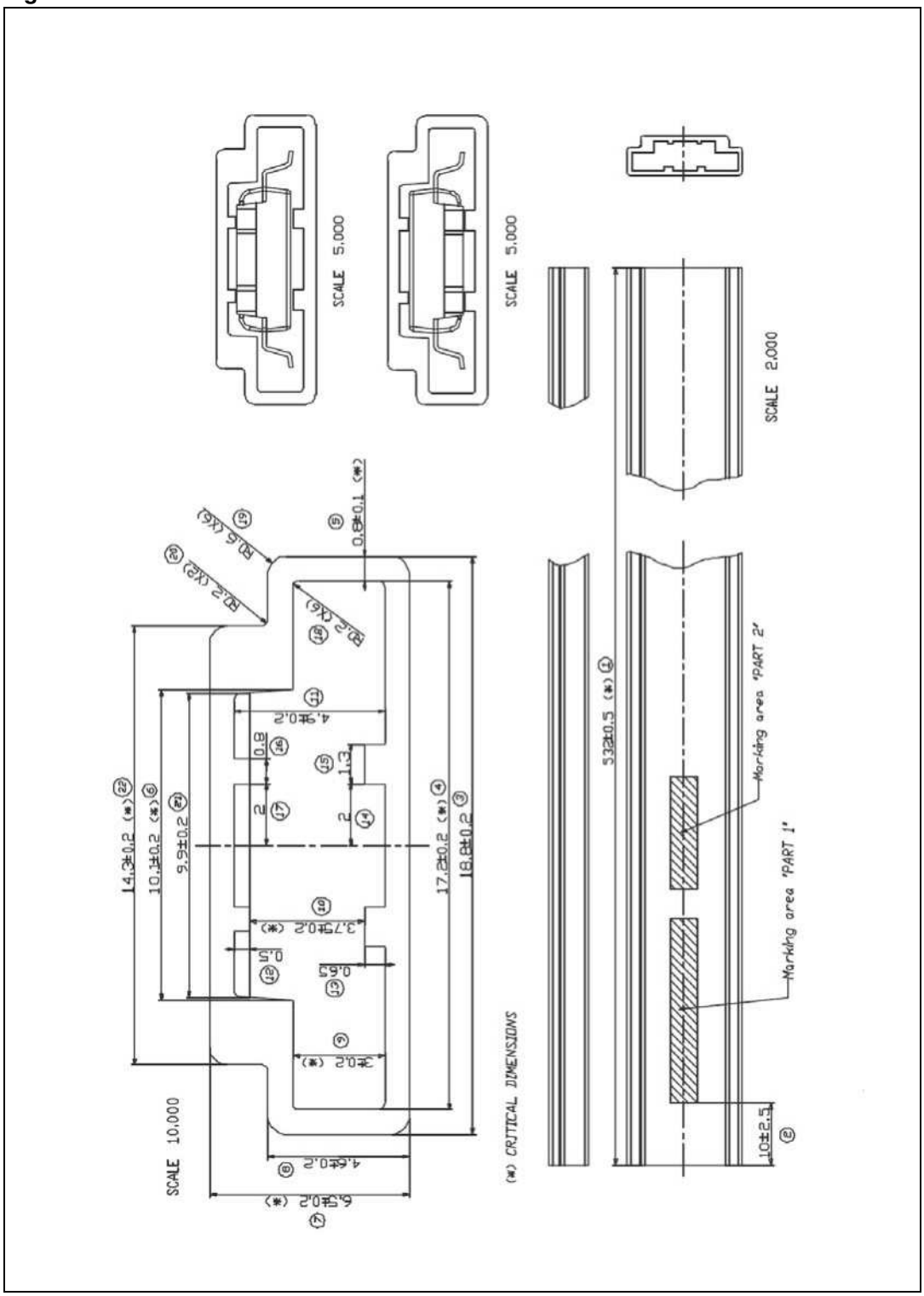
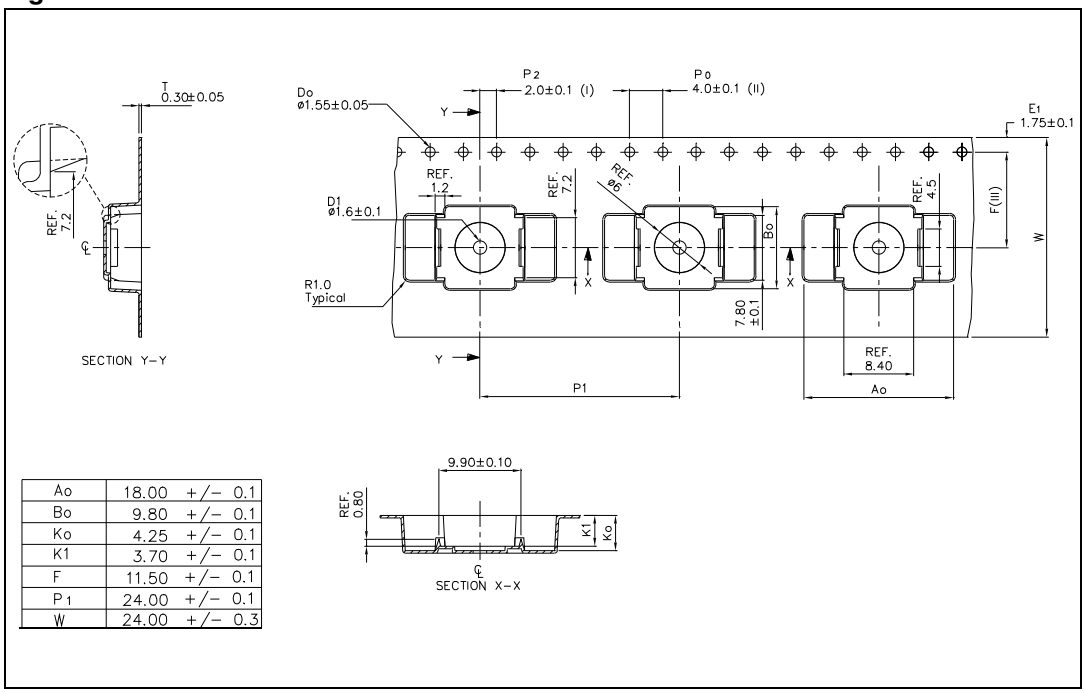


Figure 9. Reel information



Ao	18.00	+/−	0.1
Bo	9.80	+/−	0.1
Ko	4.25	+/−	0.1
K1	3.70	+/−	0.1
F	11.50	+/−	0.1
P_1	24.00	+/−	0.1
W	24.00	+/−	0.3

6 Revision history

Table 10. Document revision history

Date	Revision	Changes
10-Mar-2008	1	Initial release
06-Jul-2009	2	Document status promoted from preliminary data to datasheet.
13-Dec-2011	3	Updated values in *Table 7: Impedance data*.
24-May-2012	4	Updated $V_{GS(Q)}$ in *Figure 4: DC output characteristics*.

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