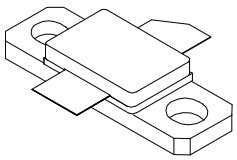
PD85025C

RF power transistor from the LdmoST family of N-channel enhancement-mode lateral MOSFETs

Datasheet — production data

Features

- Excellent thermal stability
- Common source configuration
- P_{OUT} = 25 W with 16 dB gain @ 945 MHz / 13.6 V
- BeO free package
- ESD protection
- In compliance with the 2002/95/EC european directive

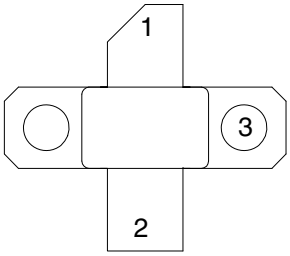


M243
Epoxy sealed

Description

The PD85025C 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. PD85025C boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology. PD85025C's superior linearity performance makes it an ideal solution for mobile applications.

Figure 1. Pin connection



1. Drain
2. Gate
3. Source

Table 1. Device summary

Order code	Package	Packing
PD85025C	M243	Box

Contents

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	±20	V
I_D	Drain current	7	A
P_{DISS}	Power dissipation (@ T_C = 70 °C)	93	W
T_J	Max. operating junction temperature	200	°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	1.4	°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_{DS} = 25 V	-		1	µA
I_{GSS}	V_{GS} = 20 V, V_{DS} = 0 V			1	µA
$V_{GS(Q)}$	V_{DS} = 10 V, I_D = 300 mA		4.1		V
$V_{DS(ON)}$	V_{GS} = 10 V, I_D = 1 A		270	310	mV
C_{ISS}	V_{GS} = 0, V_{DS} = 12.5 V, f = 1 MHz		49		pF
C_{OSS}	V_{GS} = 0, V_{DS} = 12.5 V, f = 1 MHz		35		pF
C_{RSS}	V_{GS} = 0, V_{DS} = 12.5 V, f = 1 MHz		1.0		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions	Min.	Typ.	Max.	Unit
P3dB	V_{DD} = 13.6 V, I_{DQ} = 300 mA, f = 945 MHz	25	30	-	W
G_P	V_{DD} = 13.6 V , I_{DQ} = 300 mA, P_{OUT} = 10 W, f = 945 MHz	15	17.5		dB
h_D	V_{DD} = 13.6 V, I_{DQ} = 300 mA, P_{OUT} = P3dB, f = 945 MHz	60	73		%
Load mismatch	V_{DD} = 17 V, I_{DQ} = 300 mA, P_{OUT} = 45 W, f = 945 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

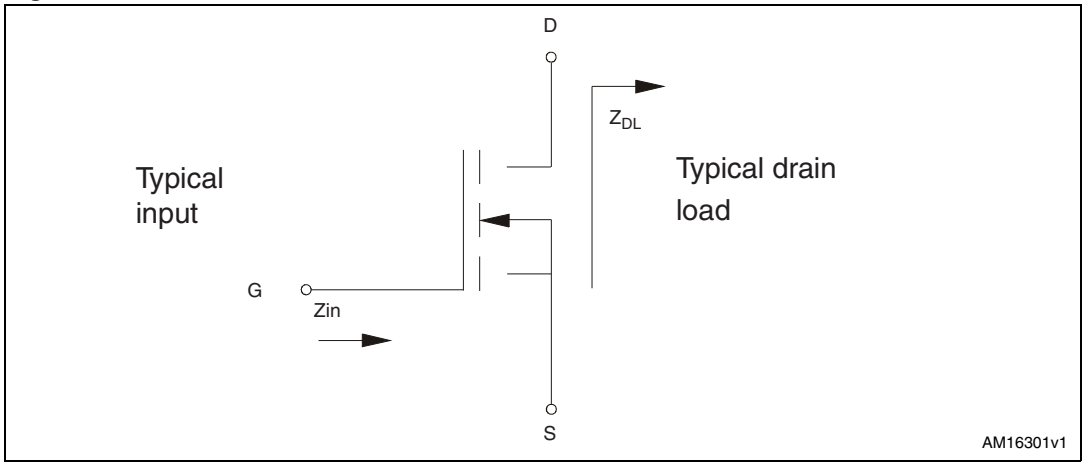


Table 7. Impedance data

Freq. (MHz)	Z_{IN} (Ω)	Z_{DL}(Ω)
945 MHz	1.01 + j 2.03	1.75 + j 2.20

4 Typical performance

Figure 3. Capacitance vs drain voltage

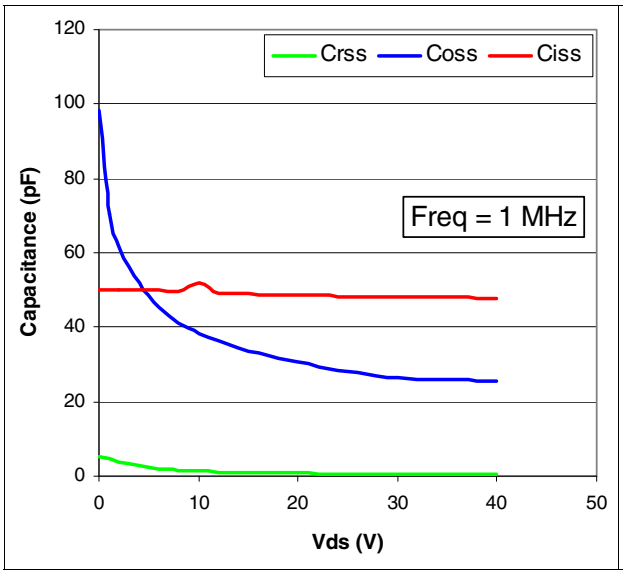


Figure 4. DC output characteristics Tamb=-40°C

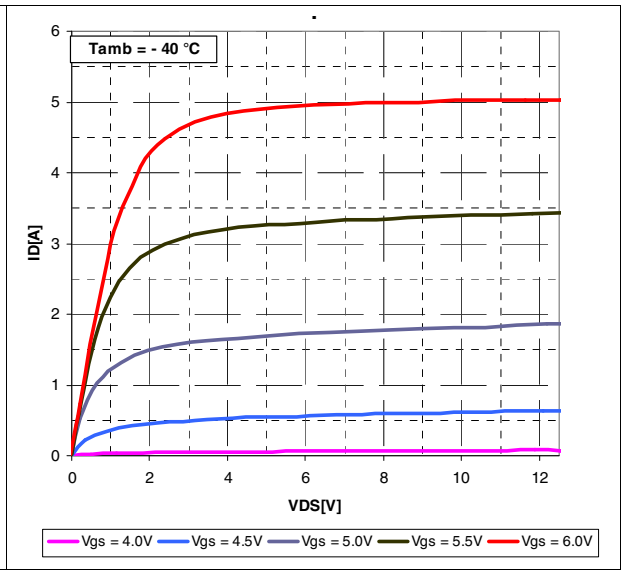


Figure 5. DC output characteristics Tamb=20°C

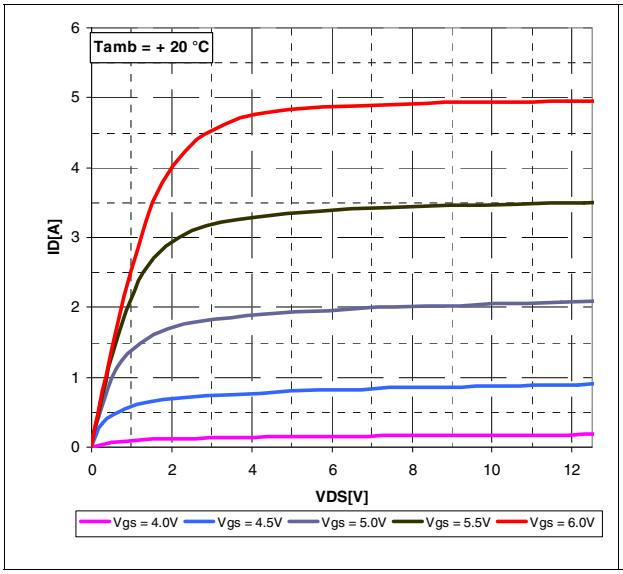


Figure 6. DC output characteristic Tamb=60°C

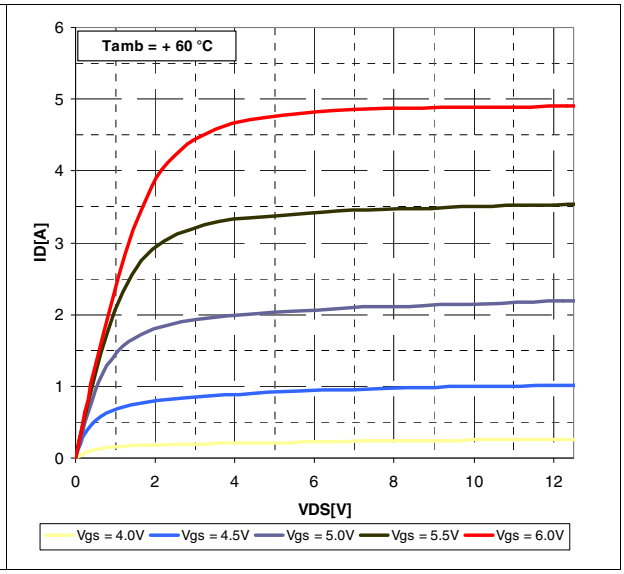


Figure 7. Output power and efficiency vs input power

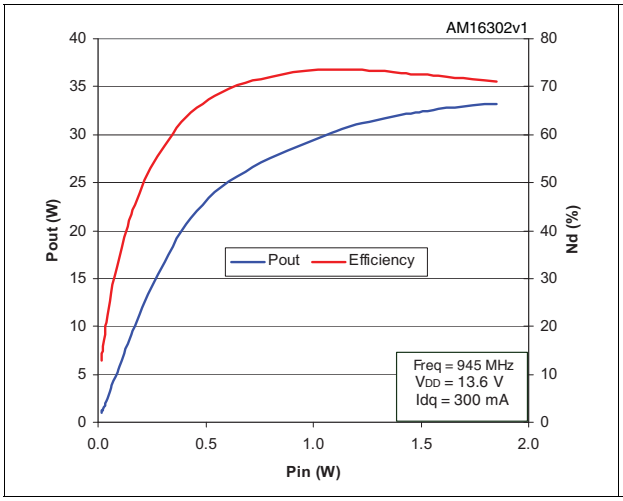


Figure 8. Gain vs output power and bias current

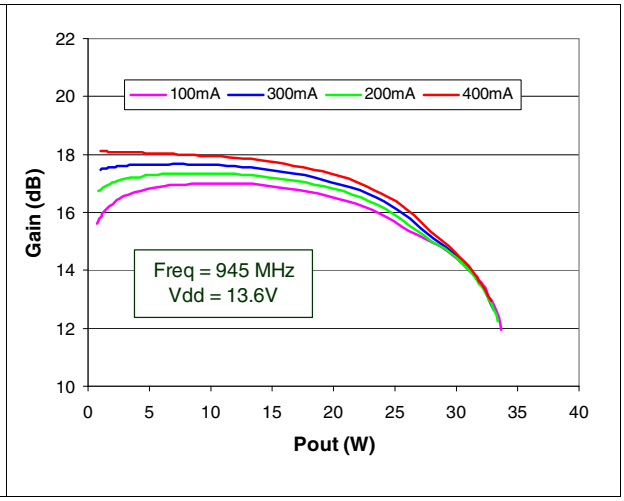


Figure 9. Pout and drain current vs gate voltage

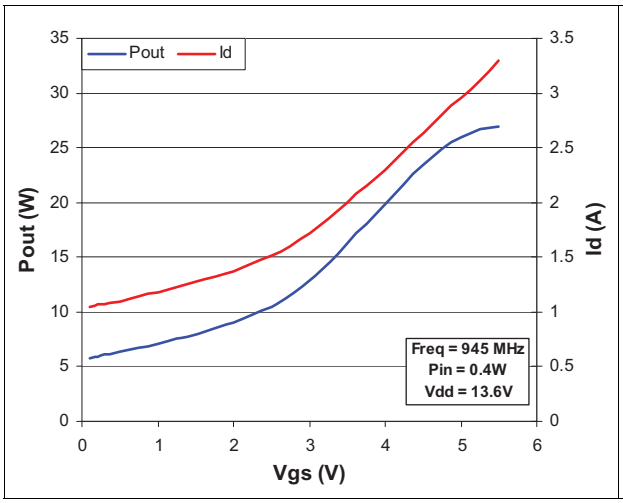


Figure 10. Pout and drain current vs supply voltage

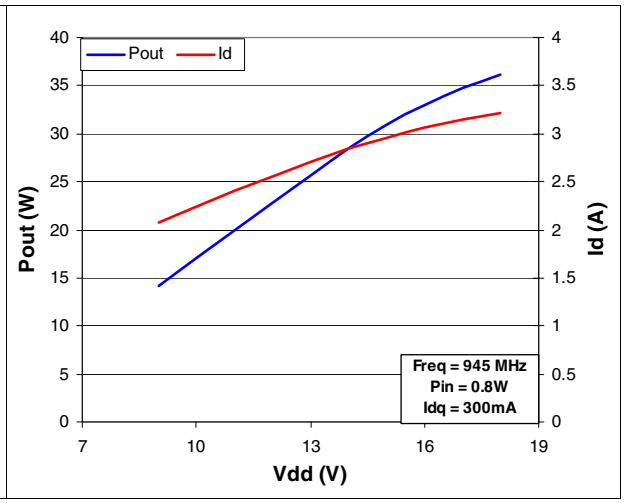
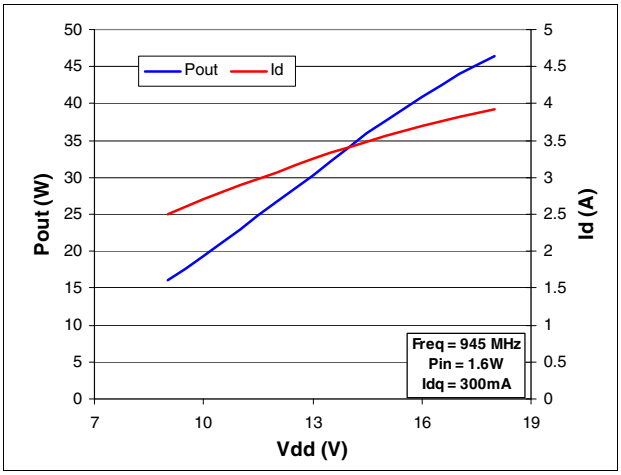


Figure 11. Pout and drain current vs supply voltage



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*.
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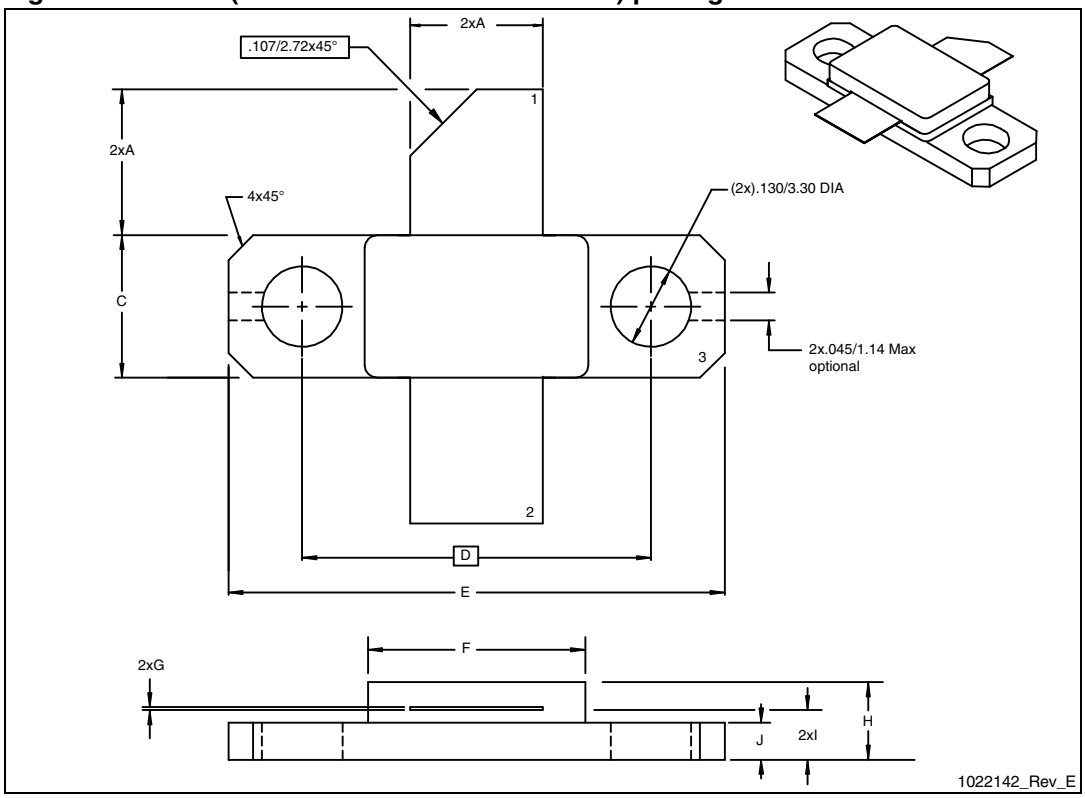
Table 8. M243 (.230 x .360 2L N/HERM W/FLG) mechanical data

Dim.	mm.			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	5.21		5.72	0.205		0.225
B	5.46		6.48	0.215		0.255
C	5.59		6.10	0.220		0.240
D		14.27			0.562	
E	20.07		20.57	0.790		0.810
F	8.89		9.40	0.350		0.370
G	0.10		0.15	0.004		0.006
H	3.18		4.45	0.125		0.175
I	1.83		2.24	0.072		0.088
J	1.27		1.78	0.050		0.070

Figure 12. M243 (.230 x .360 2L N/HERM W/FLG) package dimensions[a]



a. Controlled dimensions are in inches.

6 Revision history

Table 9. Document revision history

Date	Revision	Changes
10-Dec-2007	1	Initial release.
04-Oct-2012	2	– *Figure 7: Output power and efficiency vs input power* has been corrected. – *Section 5: Package mechanical data* has been updated. – Modified document title.

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