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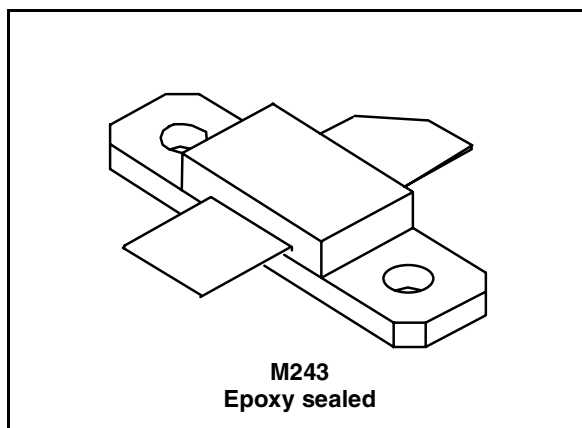
## RF power transistor, LdmoST family

### Features

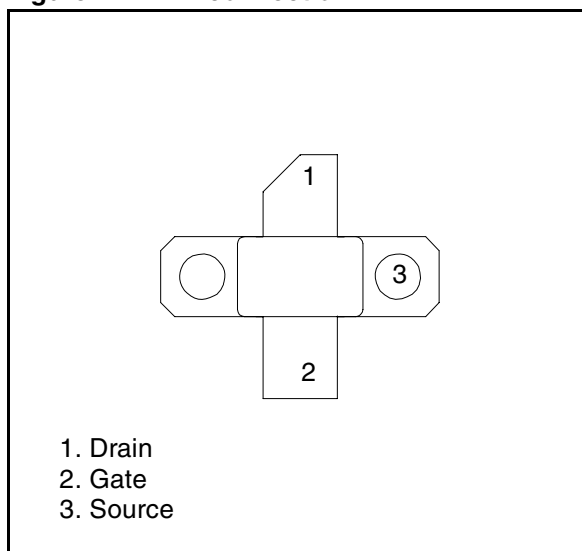
- Excellent thermal stability
- Common source configuration
- $P_{OUT} = 35\text{ W}$  with 14.5 dB gain @ 945 MHz / 13.6 V
- BeO-free ceramic package
- ESD protection
- In compliance with the 2002/95/EC european directive

### Description

The PD85035C 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. PD85035C boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology. PD85035C's superior linearity performance makes it an ideal solution for car mobile radio.



**Figure 1. Pin connection**



**Table 1. Device summary**

| Part number | Package | Packaging |
|-------------|---------|-----------|
| PD85035C    | M243    | Box       |

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# 1 Electrical data

## 1.1 Maximum ratings

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

| 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                               | 8           | A    |
| $P_{DISS}$    | Power dissipation (@ $T_C = 70\text{ °C}$ ) | 108         | 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 | 1.2   | °C/W |

## 2 Electrical characteristics

$$T_{CASE} = +25\text{ }^{\circ}\text{C}$$

### 2.1 Static

Table 4. Static

| Symbol       | Test conditions        |                          | Min                | Typ  | Max | Unit          |
|--------------|------------------------|--------------------------|--------------------|------|-----|---------------|
| $I_{DSS}$    | $V_{GS} = 0\text{ V}$  | $V_{DS} = 25\text{ V}$   |                    |      | 1   | $\mu\text{A}$ |
| $I_{GSS}$    | $V_{GS} = 20\text{ V}$ | $V_{DS} = 0\text{ V}$    |                    |      | 1   | $\mu\text{A}$ |
| $V_{GS(Q)}$  | $V_{DS} = 10\text{ V}$ | $I_D = 350\text{ mA}$    |                    | 3.9  |     | V             |
| $V_{DS(ON)}$ | $V_{GS} = 10\text{ V}$ | $I_D = 3\text{ A}$       |                    | 0.64 | 0.7 | V             |
| $C_{ISS}$    | $V_{GS} = 0\text{ V}$  | $V_{DS} = 12.5\text{ V}$ | $f = 1\text{ MHz}$ | 76   |     | pF            |
| $C_{OSS}$    | $V_{GS} = 0\text{ V}$  | $V_{DS} = 12.5\text{ V}$ | $f = 1\text{ MHz}$ | 45   |     | pF            |
| $C_{RSS}$    | $V_{GS} = 0\text{ V}$  | $V_{DS} = 12.5\text{ V}$ | $f = 1\text{ MHz}$ | 1.4  |     | pF            |

### 2.2 Dynamic

Table 5. Dynamic

| Symbol        | Test conditions  |                      | Min  | Typ  | Max | Unit |
|---------------|--|----------------------|------|------|-----|------|
| P3dB          | $V_{DD} = 13.6\text{ V}$ , $I_{DQ} = 350\text{ mA}$  | $f = 945\text{ MHz}$ | 35   |      | -   | W    |
| $G_P$         | $V_{DD} = 13.6\text{ V}$ , $I_{DQ} = 350\text{ mA}$ , $P_{OUT} = 15\text{ W}$ , $f = 945\text{ MHz}$                   |                      | 15   | 17.5 |     | dB   |
| $h_D$         | $V_{DD} = 13.6\text{ V}$ , $I_{DQ} = 350\text{ mA}$ , $P_{OUT} = P_{3dB}$ , $f = 945\text{ MHz}$                       |                      | 60   | 77   |     | %    |
| Load mismatch | $V_{DD} = 17\text{ V}$ , $I_{DQ} = 350\text{ mA}$ , $P_{OUT} = 50\text{ W}$ , $f = 945\text{ MHz}$<br>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

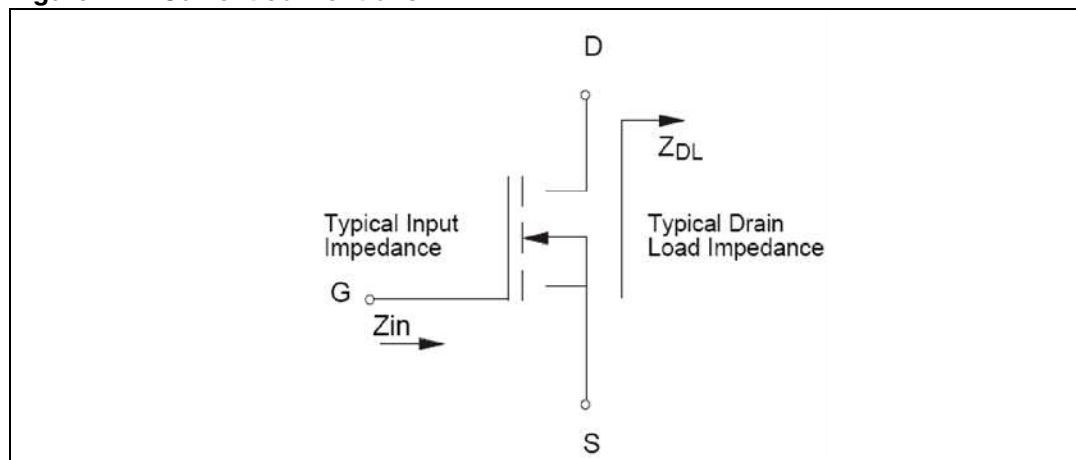


Table 7. Impedance data

| Frequency (MHz) | $Z_{IN} (\Omega)$ | $Z_{DL}(\Omega)$ |
|-----------------|-------------------|------------------|
| 945 MHz         | 1.08 + j 2.05     | 2.14 + j 2.17    |

# 4 Typical performances

Figure 3. Capacitances vs drain voltage

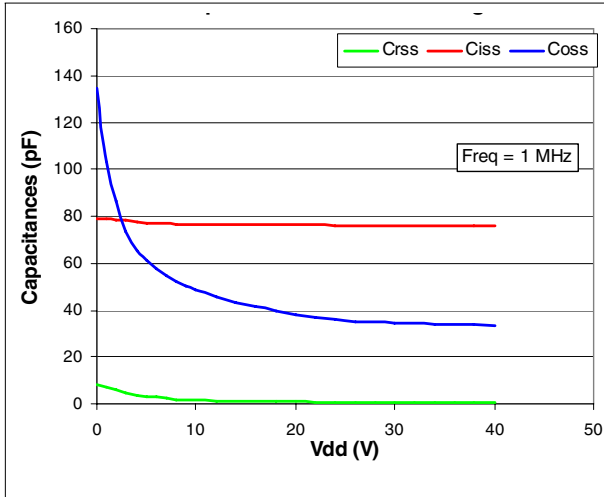


Figure 4. ID vs VGS

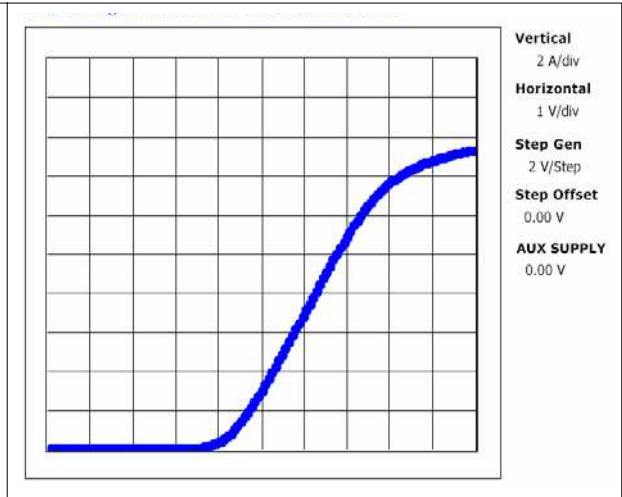


Figure 5. Threshold voltage

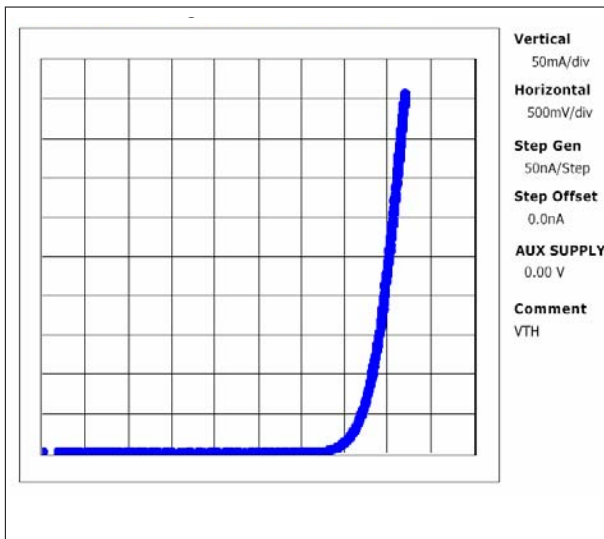


Figure 6. DC output characteristic

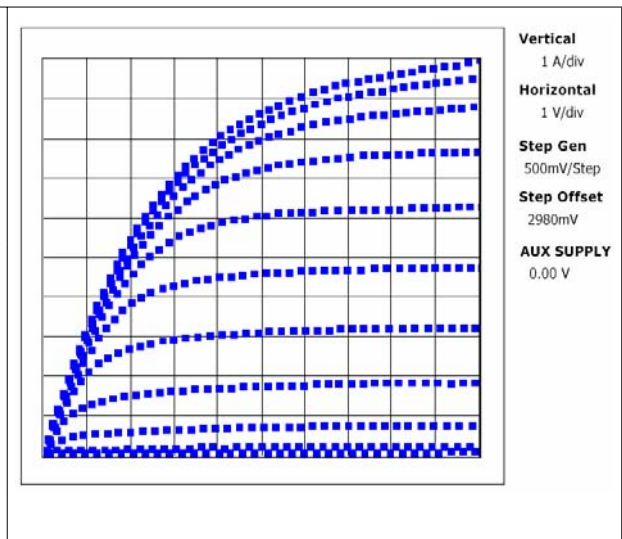


Figure 7. Gain vs output power and bias current

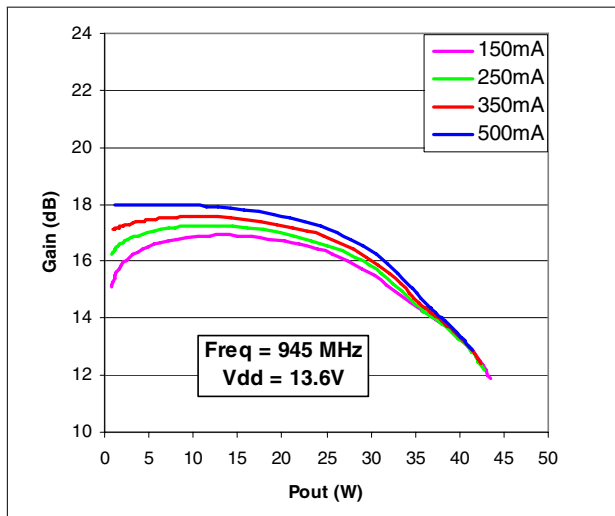


Figure 8. Pout and efficiency vs input power

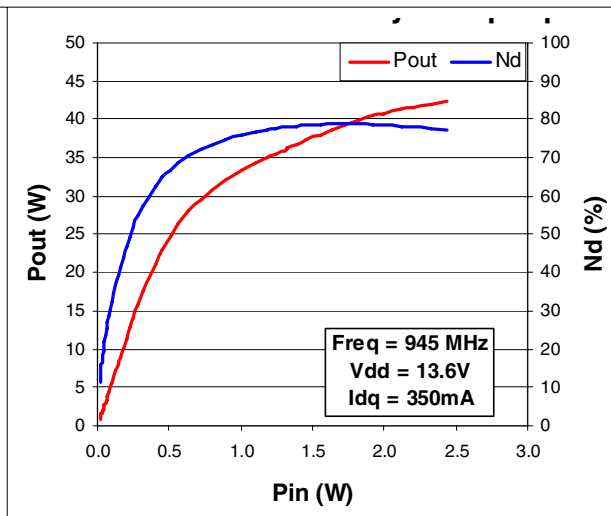


Figure 9. Pout and drain current vs supply voltage

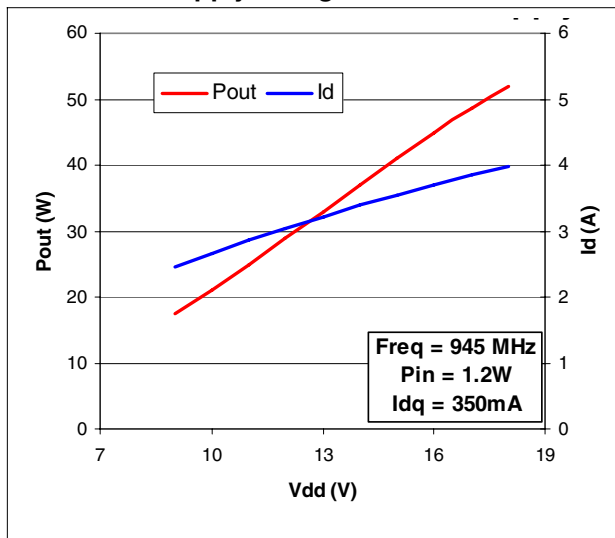
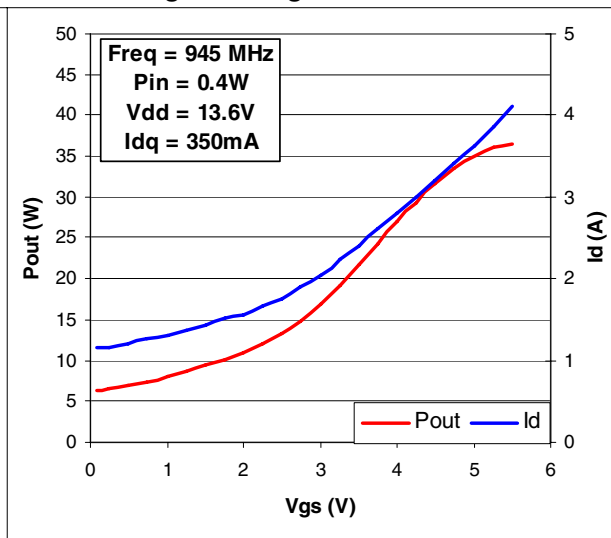


Figure 10. Pout and drain current vs gate voltage





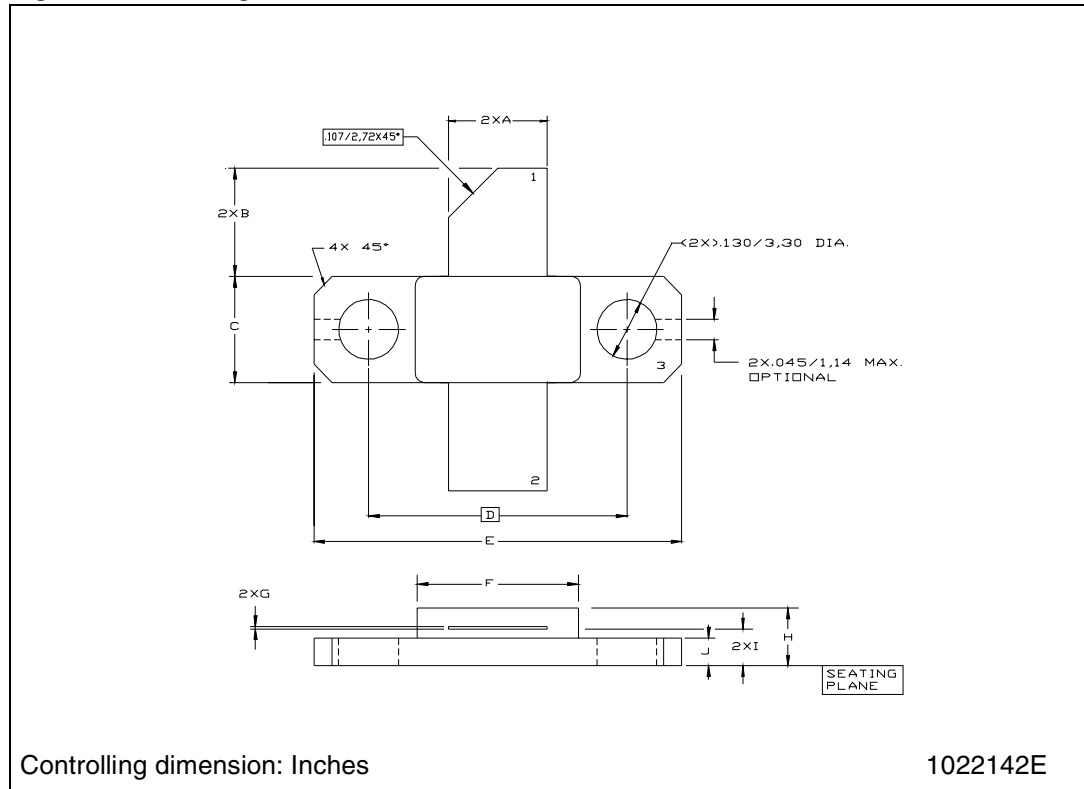
## 5 Package mechanical data

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

**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 11. Package dimensions**



## 6 Revision history

**Table 9. Document revision history**

| Date        | Revision | Changes   |
|-------------|----------|---|
| 16-Nov-2007 | 1        | Initial release   |
| 02-Jul-2009 | 2        | Document status promoted from preliminary data to datasheet |

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