



# PD55025-E PD55025S-E

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

## Features

- Excellent thermal stability
- Common source configuration
- $P_{OUT} = 25\text{ W}$  with 14.5dB gain @ 500 MHz / 12.5 V
- New RF plastic package

## Description

The device is a common source N-channel, enhancement-mode lateral field-effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 12 V in common source mode at frequencies up to 1 GHz. The device 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. The device's superior linearity performance makes it an ideal solution for car mobile radio. 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 performance and ease of assembly. Mounting recommendations are available in [www.st.com/rf/](http://www.st.com/rf/) (look for application note AN1294).

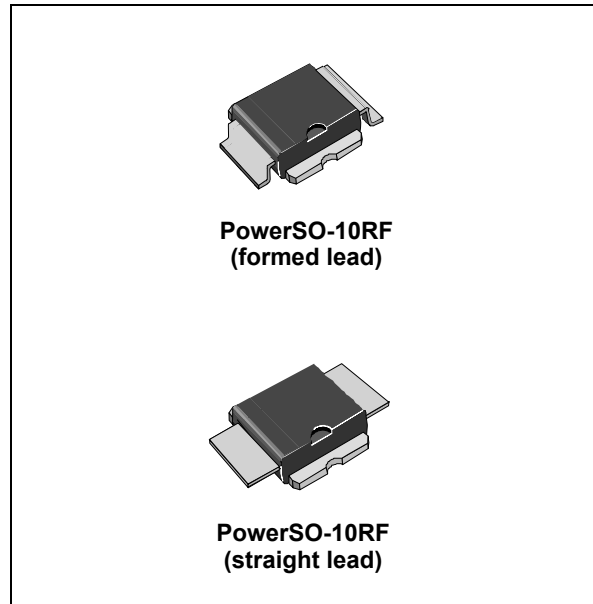


Figure 1. Pin connection

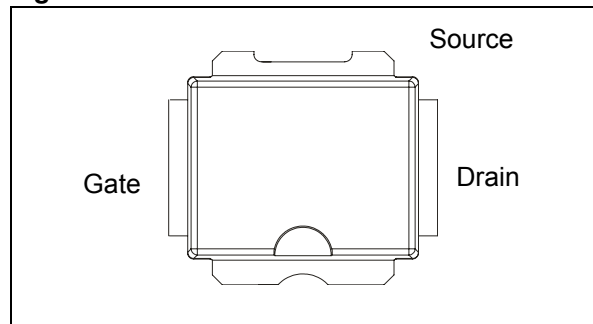


Table 1. Device summary

| Order code   | Package                      | Packing       |
|--------------|------------------------------|---------------|
| PD55025-E    | PowerSO-10RF (formed lead)   | Tube          |
| PD55025S-E   | PowerSO-10RF (straight lead) | Tube          |
| PD55015TR-E  | PowerSO-10RF (formed lead)   | Tape and reel |
| PD55015STR-E | PowerSO-10RF (straight lead) | Tape and reel |

# Contents

|          |                                   |           |
|----------|-----------------------------------|-----------|
| <b>1</b> | <b>Electrical data</b>            | <b>3</b>  |
| 1.1      | Maximum ratings                   | 3         |
| 1.2      | Thermal data                      | 3         |
| <b>2</b> | <b>Electrical characteristics</b> | <b>4</b>  |
| 2.1      | Static                            | 4         |
| 2.2      | Dynamic                           | 4         |
| 2.3      | Moisture sensitivity level        | 4         |
| <b>3</b> | <b>Impedance</b>                  | <b>5</b>  |
| <b>4</b> | <b>Typical performance</b>        | <b>6</b>  |
| <b>5</b> | <b>Test circuit</b>               | <b>11</b> |
| <b>6</b> | <b>Circuit layout</b>             | <b>12</b> |
| <b>7</b> | <b>Common source s-parameter</b>  | <b>14</b> |
| <b>8</b> | <b>Package mechanical data</b>    | <b>17</b> |
| <b>9</b> | <b>Revision history</b>           | <b>22</b> |

# 1 Electrical data

## 1.1 Maximum ratings

**Table 2. Absolute maximum ratings** ( $T_{CASE} = 25^{\circ}C$ )

| Symbol        | Parameter                                  | Value       | Unit        |
|---------------|--------------------------------------------|-------------|-------------|
| $V_{(BR)DSS}$ | Drain-source voltage                       | 40          | V           |
| $V_{GS}$      | Gate-source voltage                        | $\pm 20$    | V           |
| $I_D$         | Drain current                              | 7           | A           |
| $P_{DISS}$    | Power dissipation (@ $T_C = 70^{\circ}C$ ) | 79          | W           |
| $T_J$         | Max. operating junction temperature        | 165         | $^{\circ}C$ |
| $T_{STG}$     | Storage temperature                        | -65 to +150 | $^{\circ}C$ |

## 1.2 Thermal data

**Table 3. Thermal data**

| Symbol     | Parameter                          | Value | Unit          |
|------------|------------------------------------|-------|---------------|
| $R_{thJC}$ | Junction - case thermal resistance | 1.2   | $^{\circ}C/W$ |

## 2 Electrical characteristics

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

### 2.1 Static

**Table 4. Static**

| Symbol              | Test conditions               |                                 | Min. | Typ. | Max. | Unit          |
|---------------------|-------------------------------|---------------------------------|------|------|------|---------------|
| $I_{\text{DSS}}$    | $V_{\text{GS}} = 0$           | $V_{\text{DS}} = 28\text{ V}$   |      |      | 1    | $\mu\text{A}$ |
| $I_{\text{GSS}}$    | $V_{\text{GS}} = 20\text{ V}$ | $V_{\text{DS}} = 0$             |      |      | 1    | $\mu\text{A}$ |
| $V_{\text{GS(Q)}}$  | $V_{\text{DS}} = 28\text{ V}$ | $I_{\text{D}} = 100\text{ mA}$  | 2.0  |      | 5.0  | V             |
| $V_{\text{DS(ON)}}$ | $V_{\text{GS}} = 10\text{ V}$ | $I_{\text{D}} = 3\text{ A}$     |      | 0.7  | 0.8  | V             |
| $G_{\text{FS}}$     | $V_{\text{DS}} = 10\text{ V}$ | $I_{\text{D}} = 3\text{ A}$     | 2.5  |      |      | mho           |
| $C_{\text{ISS}}$    | $V_{\text{GS}} = 0$           | $V_{\text{DS}} = 12.5\text{ V}$ |      | 86   |      | pF            |
| $C_{\text{OSS}}$    | $V_{\text{GS}} = 0$           | $V_{\text{DS}} = 12.5\text{ V}$ |      | 76   |      | pF            |
| $C_{\text{RSS}}$    | $V_{\text{GS}} = 0$           | $V_{\text{DS}} = 12.5\text{ V}$ |      | 5.8  |      | pF            |

### 2.2 Dynamic

**Table 5. Dynamic**

| Symbol           | Test conditions                                                                                    |                                          | Min. | Typ. | Max. | Unit |
|------------------|----------------------------------------------------------------------------------------------------|------------------------------------------|------|------|------|------|
| $P_{\text{OUT}}$ | $V_{\text{DD}} = 12.5\text{ V}$ , $I_{\text{DQ}} = 200\text{ mA}$                                  | $f = 500\text{ MHz}$                     | 25   |      |      | W    |
| $G_{\text{P}}$   | $V_{\text{DD}} = 12.5\text{ V}$ , $I_{\text{DQ}} = 200\text{ mA}$ , $P_{\text{OUT}} = 25\text{ W}$ | $f = 500\text{ MHz}$                     |      | 14.5 |      | dB   |
| $h_{\text{D}}$   | $V_{\text{DD}} = 12.5\text{ V}$ , $I_{\text{DQ}} = 200\text{ mA}$ , $P_{\text{OUT}} = 25\text{ W}$ | $f = 500\text{ MHz}$                     |      | 50   |      | %    |
| Load mismatch    | $V_{\text{DD}} = 15.5\text{ V}$ , $I_{\text{DQ}} = 200\text{ mA}$ , $P_{\text{OUT}} = 25\text{ W}$ | $f = 500\text{ MHz}$<br>All phase angles | 20:1 |      |      | VSWR |

### 2.3 Moisture sensitivity level

**Table 6. Moisture sensitivity level**

| Test methodology | Rating |
|------------------|--------|
| J-STD-020B       | MSL 3  |

### 3 Impedance

Figure 2. Current conventions

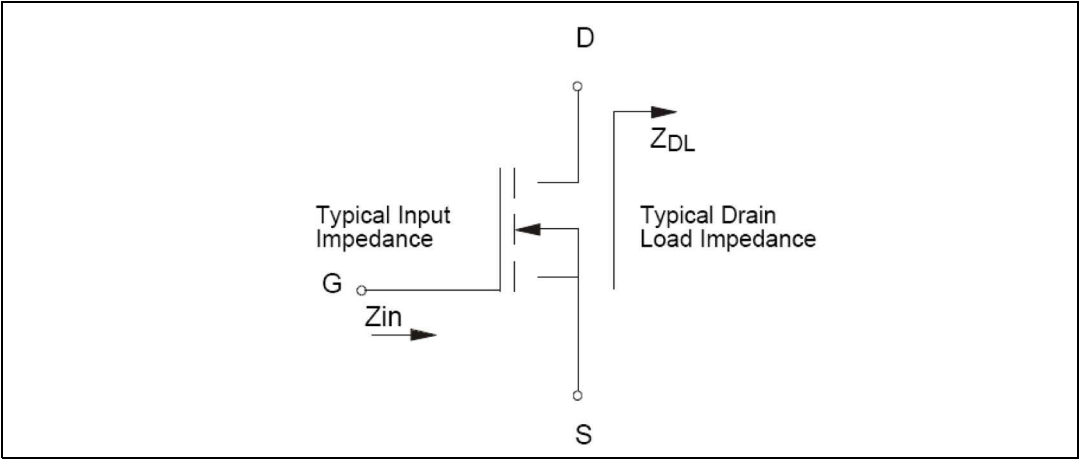


Table 7. Impedance data

| Freq. (MHz) | $Z_{IN} (\Omega)$ | $Z_{DL}(\Omega)$ |
|-------------|-------------------|------------------|
| 175         | $3.20 - j 4.41$   | $1.56 + j 2.14$  |
| 480         | $1.01 - j 1.67$   | $1.06 + j 0.22$  |
| 500         | $0.93 - j 1.53$   | $1.12 + j 0.20$  |
| 520         | $0.88 - j 1.98$   | $1.07 + j 0.83$  |

# 4 Typical performance

Figure 3. Capacitance vs supply voltage

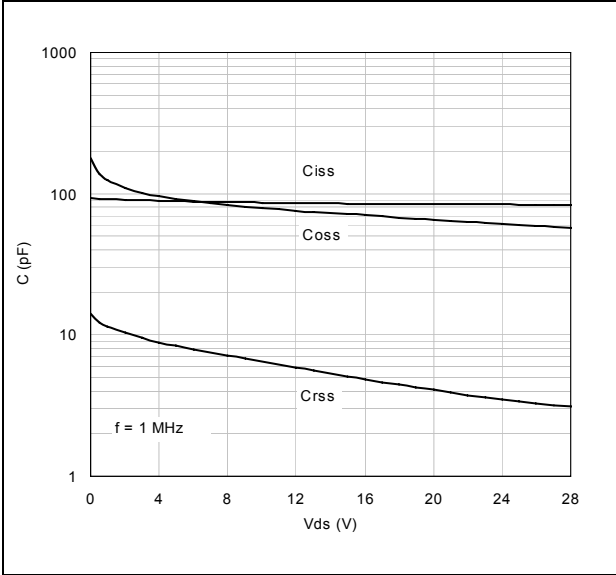


Figure 4. Drain current vs gate source voltage

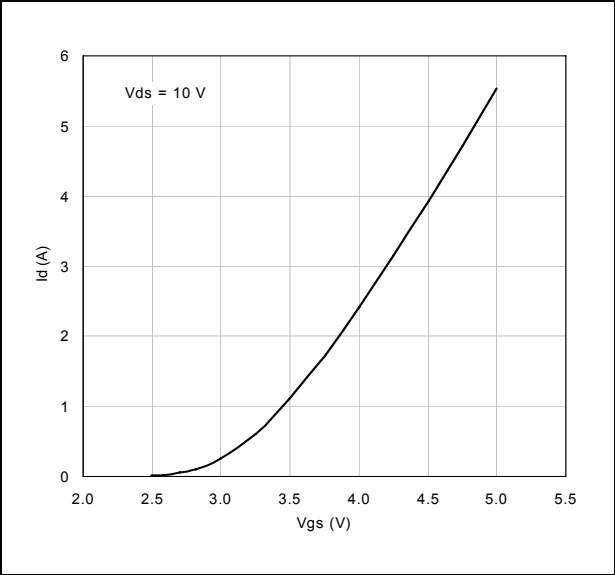


Figure 5. Gate-source voltage vs case temperature

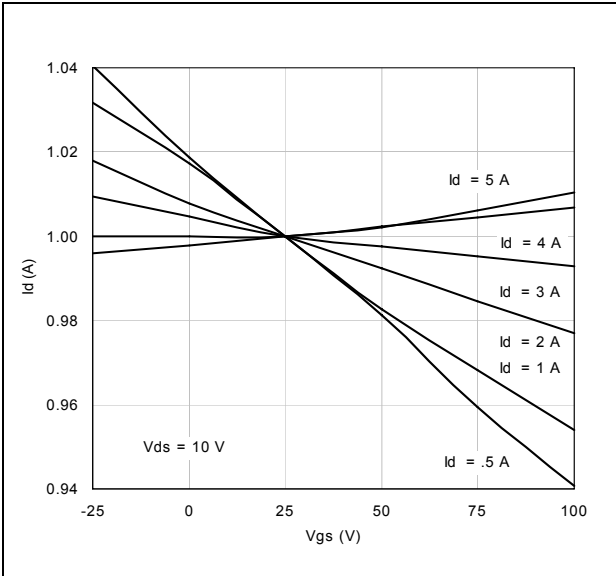


Figure 6. Output power vs input power

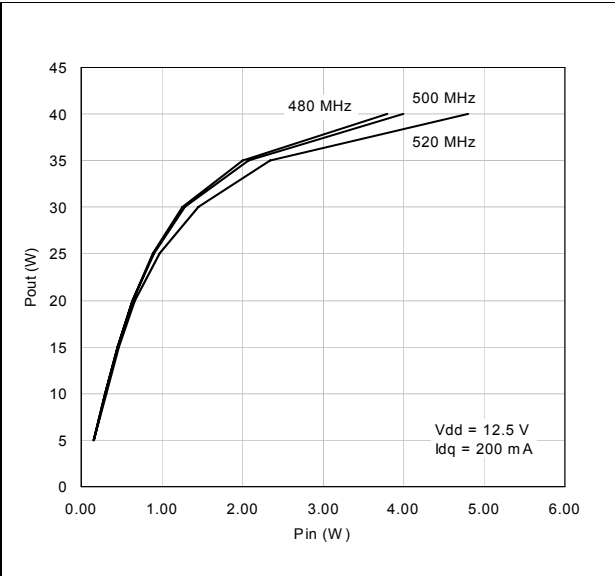


Figure 7. Output power vs input power

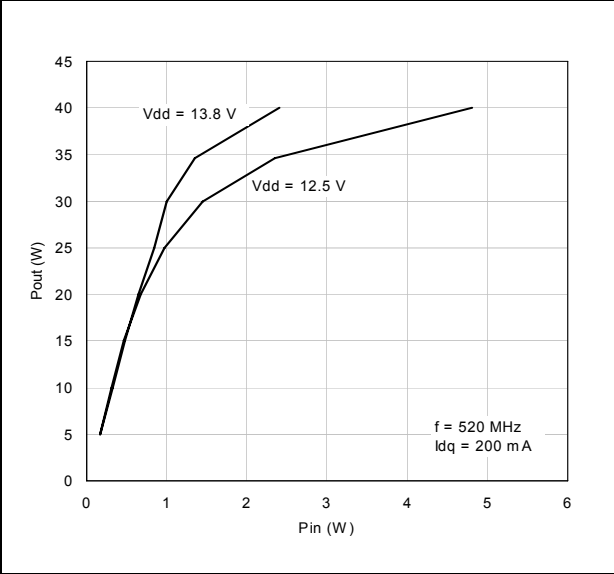


Figure 8. Power gain vs. output power

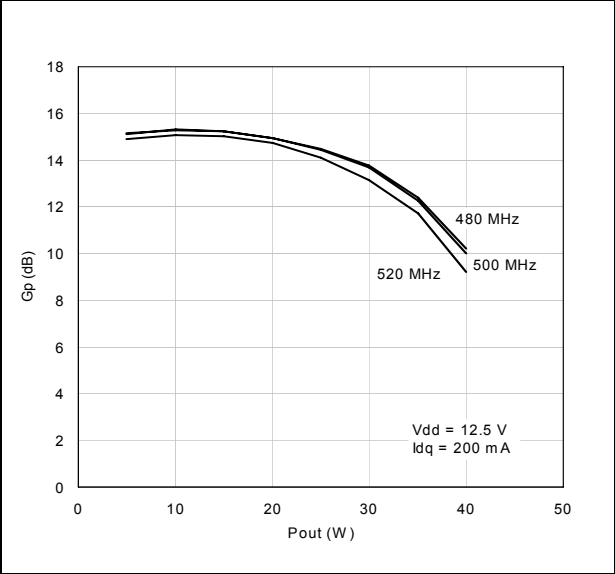


Figure 9. Drain efficiency vs output power

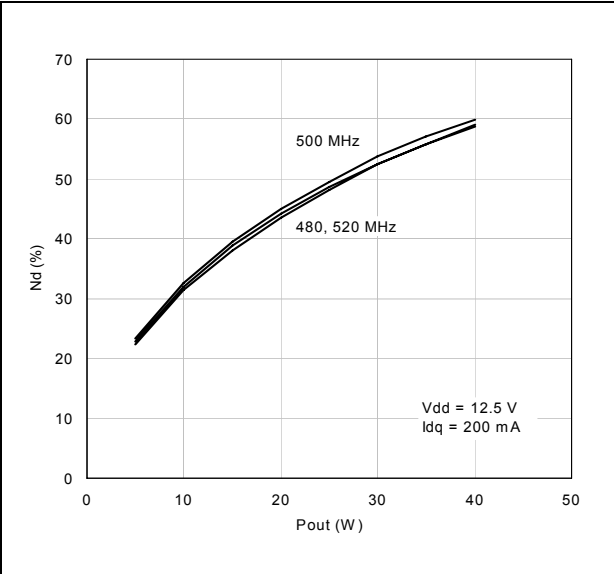


Figure 10. Input return loss vs output power

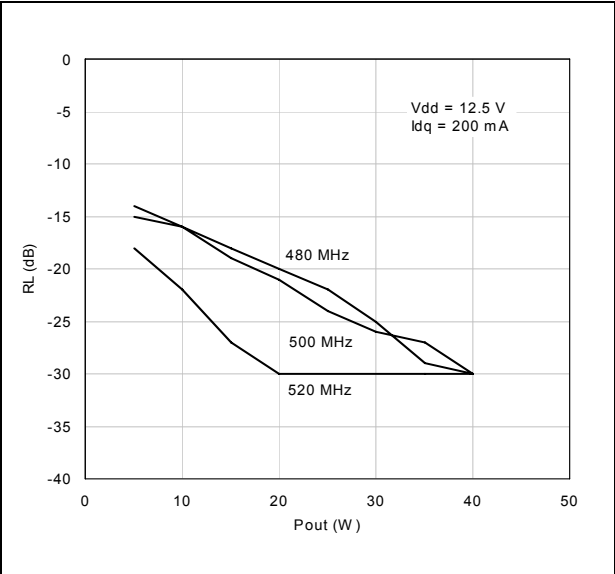


Figure 11. Output power vs bias current

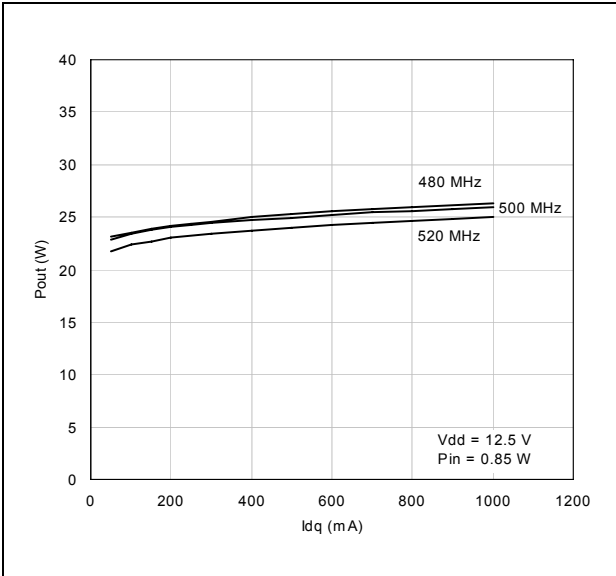


Figure 12. Drain efficiency vs bias current

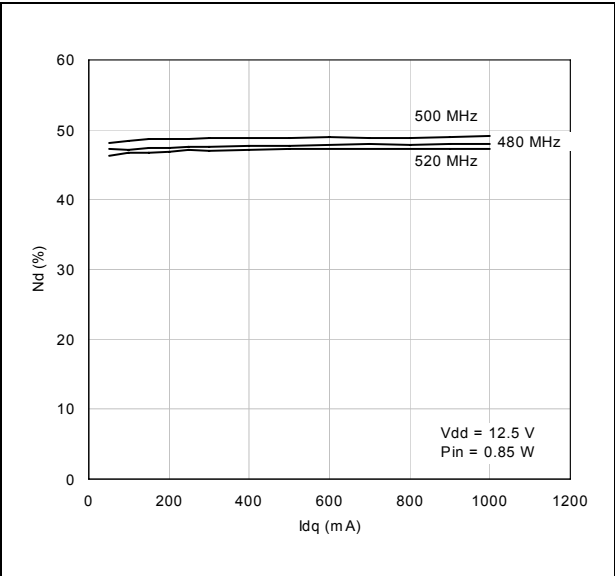


Figure 13. Output power vs supply voltage

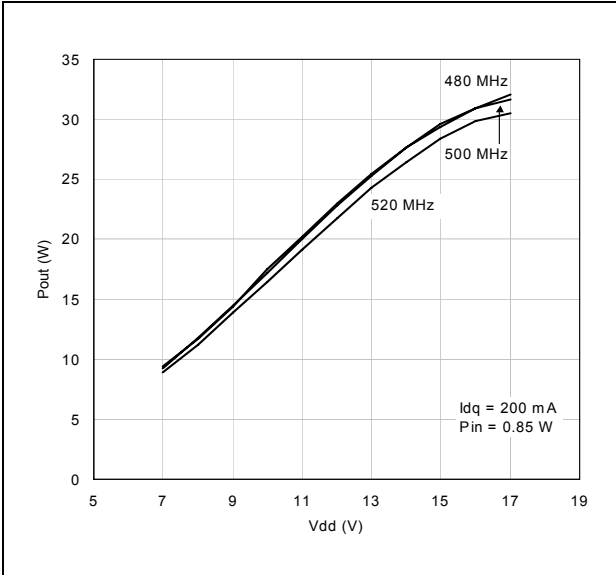


Figure 14. Drain efficiency vs supply voltage

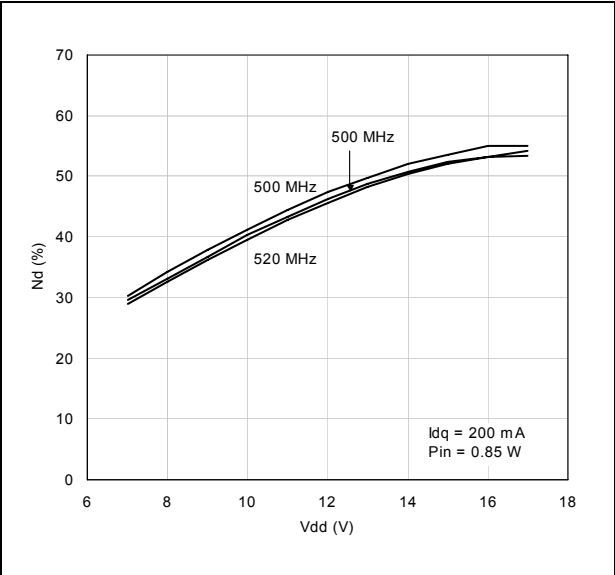


Figure 15. Output power vs gate bias voltage      Figure 16. Output power vs input power (f = 175 MHz)

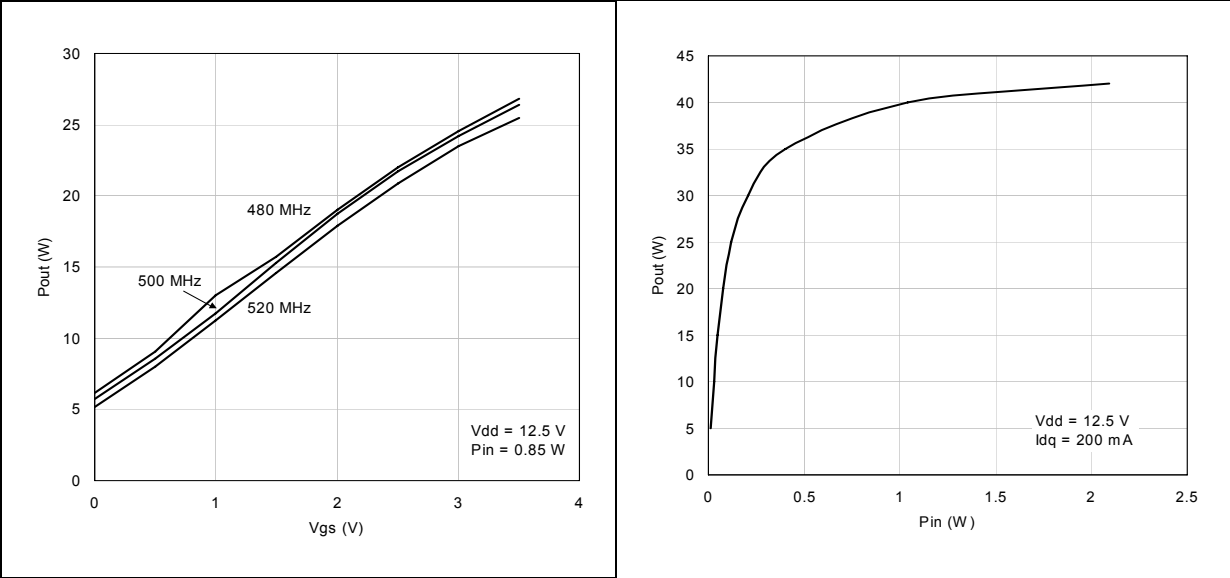
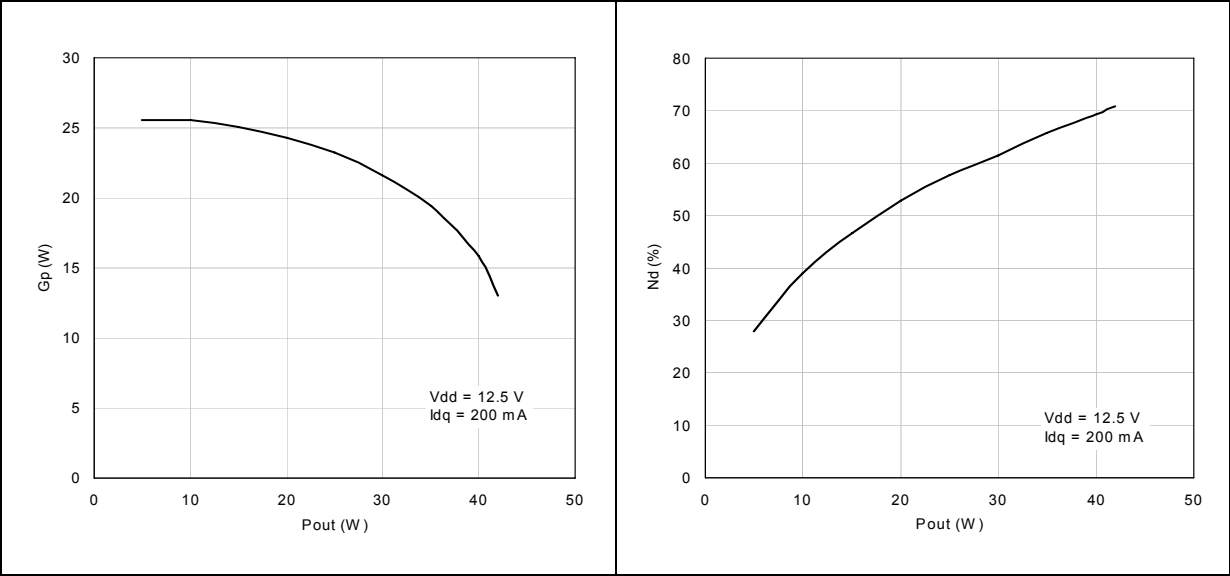
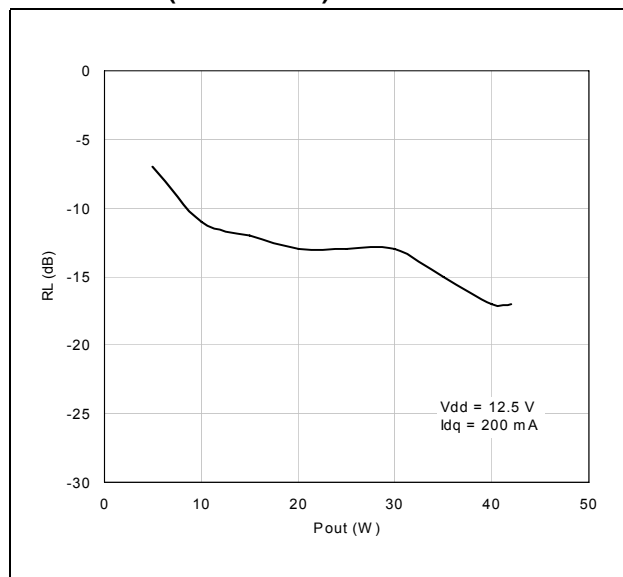


Figure 17. Power gain vs output power (f = 175 MHz)      Figure 18. Drain efficiency vs output power (f = 175 MHz)



**Figure 19. Input return loss vs output power**  
**(f = 175 MHz)**



# 5 Test circuit

Figure 20. 500 MHz test circuit schematic (engineering)

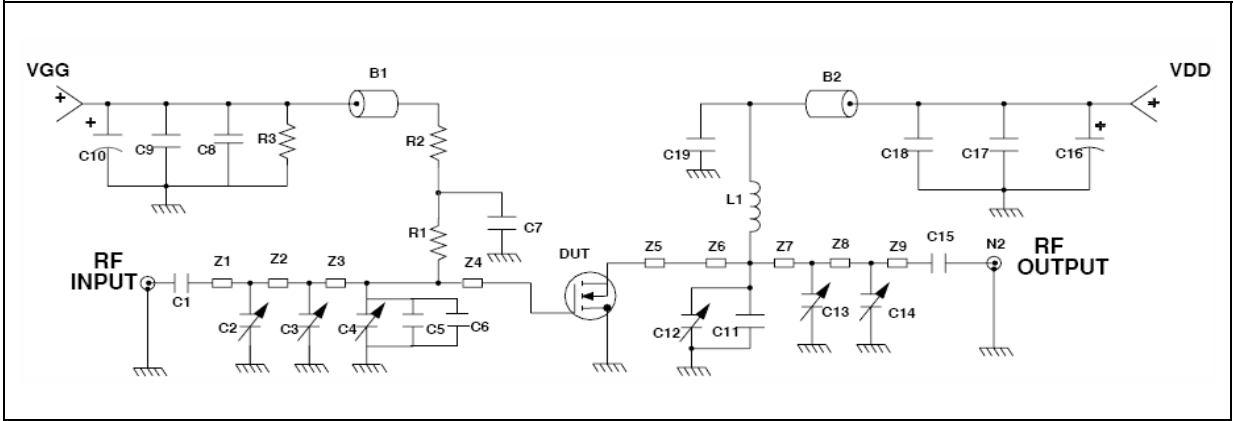


Table 8. Test circuit component part list

| Component            | Description                                                               |
|----------------------|---------------------------------------------------------------------------|
| B1,B2                | Ferrite bead                                                              |
| C1,C13               | 300 pF, 100 mil chip capacitor                                            |
| C2,C3,C4,C12,C13,C14 | 1 to 20 pF trimmer capacitor                                              |
| C6                   | 39 pF ATC 100B surface mount ceramic chip capacitor                       |
| C7, C19              | 120 pF 100 mil chip capacitor                                             |
| C10, C16             | 10 $\mu$ F, 50 V electrolytic capacitor                                   |
| C9, C17              | 0.1 mF, 100 mil chip cap                                                  |
| C8, C18              | 1.000 pF 100 mil chip cap                                                 |
| C5, C11              | 33 pF, 100 mil chip cap                                                   |
| L1                   | 56 nH, 7 TURN, Coilcraft                                                  |
| N1, N2               | Type N flange mount                                                       |
| R1                   | 15 $\Omega$ , 1 W chip resistor                                           |
| R2                   | 1 k $\Omega$ , 1 W chip resistor                                          |
| R3                   | 33 k $\Omega$ , 1 W chip resistor                                         |
| Z1                   | 0.471" X 0.080" microstrip                                                |
| Z2                   | 1.082" X 0.080" microstrip                                                |
| Z3                   | 0.372" X 0.080" microstrip                                                |
| Z4,Z5                | 0.260" X 0.223" microstrip                                                |
| Z6                   | 0.050" X 0.080" microstrip                                                |
| Z7                   | 0.551" X 0.080" microstrip                                                |
| Z8                   | 0.825" X 0.080" microstrip                                                |
| Z9                   | 0.489" X 0.080" microstrip                                                |
| Board                | Roger, ultra lam 2000 THK 0.030", $\epsilon_r$ = 2.55 2oz. ED cu 2 Sides. |

## 6 Circuit layout

Figure 21. 500 MHz test circuit

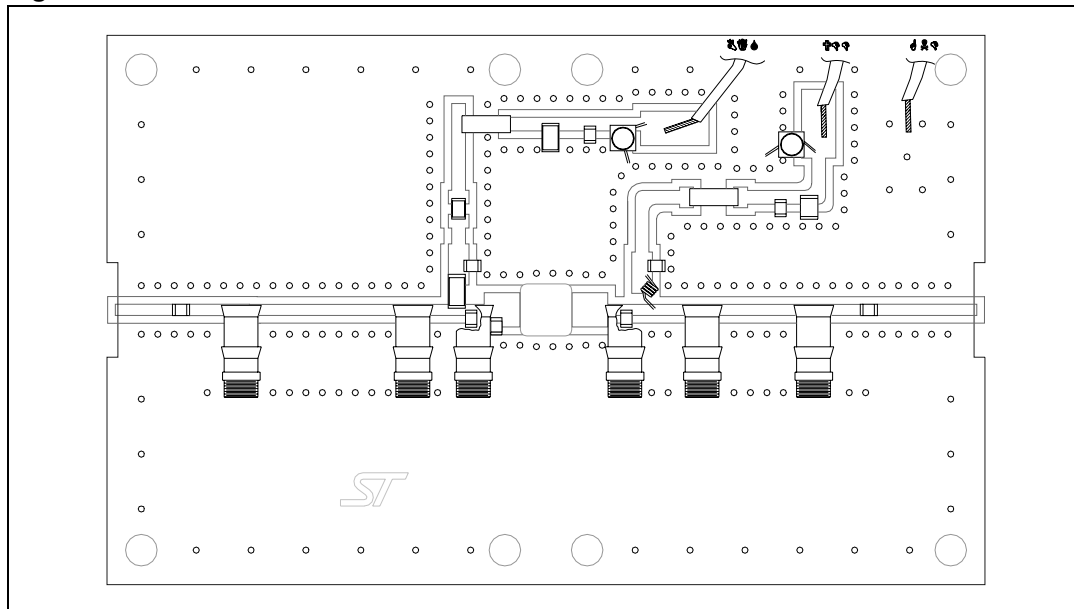
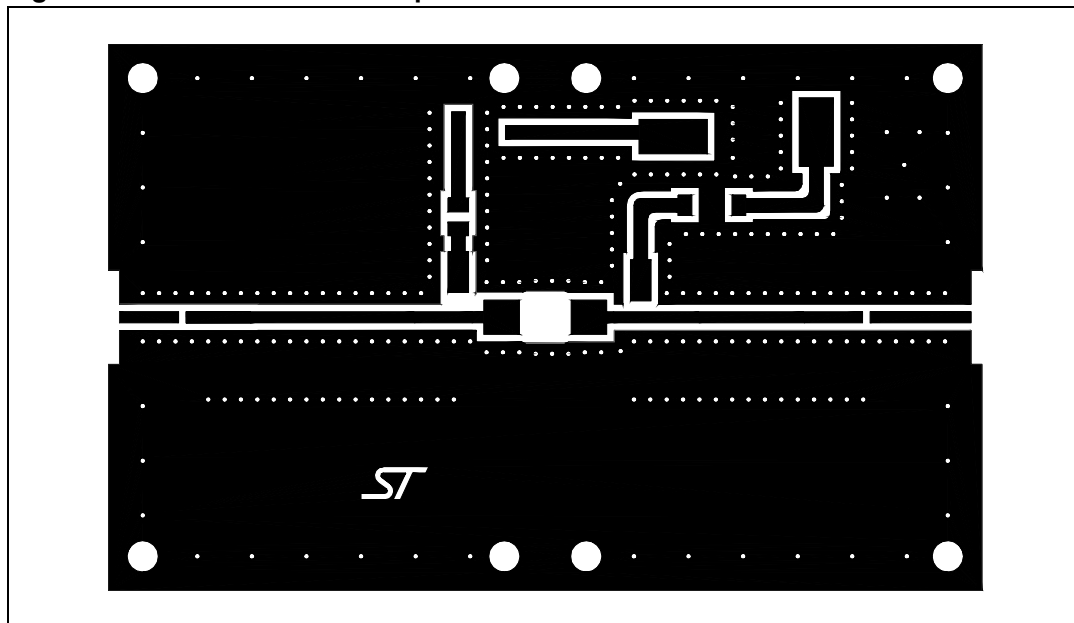
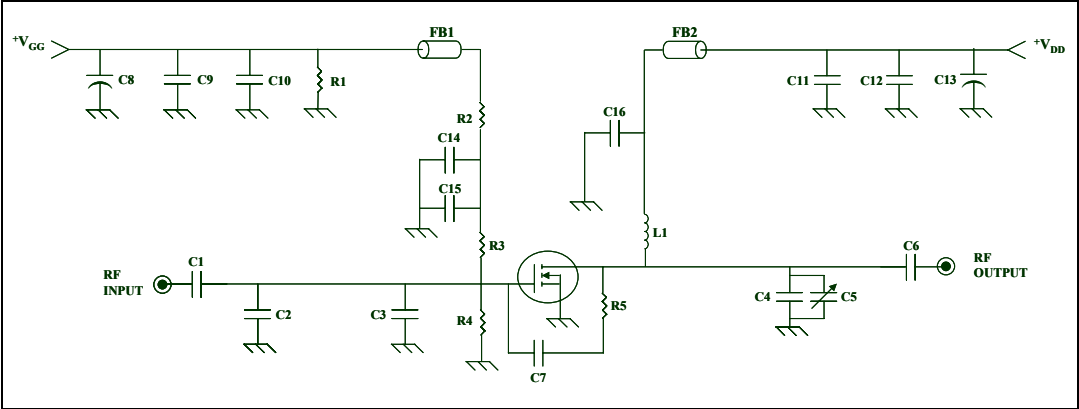


Figure 22. 500 MHz test circuit photomaster



**Figure 23. 175 MHz test circuit schematic (engineering)**



**Table 9. 175 MHz test circuit component part list**

| Component | Description                                                                |
|-----------|----------------------------------------------------------------------------|
| C1, C6    | 300 pF chip capacitor                                                      |
| C2, C3    | 91 pF chip capacitor                                                       |
| C4, C14   | 75 pF chip capacitor                                                       |
| C5        | 1-20 pF trimmer capacitor                                                  |
| C7        | .01 $\mu$ F molded capacitor                                               |
| C8, C13   | 10 $\mu$ F electrolytic capacitor                                          |
| C9, C12   | .1 $\mu$ F chip capacitor                                                  |
| C10, C11  | 1000 pF chip capacitor                                                     |
| C15, C16  | 1200 pF chip capacitor                                                     |
| FB1, FB2  | Ferrite bead                                                               |
| R1        | 33 k $\Omega$ chip resistor                                                |
| R2        | 17 $\Omega$ chip resistor                                                  |
| R3        | 15 $\Omega$ chip resistor                                                  |
| R4        | 47 $\Omega$ chip resistor                                                  |
| R5        | 220 $\Omega$ chip resistor                                                 |
| L1        | 5 turn, 16 AWG magnet wire, ID = .40", inductor                            |
| Board     | Roger, ultra lam 2000, THK 0.030", $\epsilon_r$ = 2.55 2oz. ED cu 2 SIDES. |

## 7 Common source s-parameter

**Table 10. S-parameter for PD55025S-E ( $V_{DS} = 12.5\text{ V}$   $I_D = 500\text{ mA}$ )**

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50         | 0.837      | -162            | 13.33      | 89              | 0.018      | -1              | 0.780      | -168            |
| 100        | 0.846      | -169            | 6.51       | 76              | 0.017      | -12             | 0.803      | -172            |
| 150        | 0.862      | -171            | 4.15       | 66              | 0.016      | -19             | 0.831      | -172            |
| 200        | 0.878      | -173            | 2.93       | 58              | 0.015      | -26             | 0.859      | -172            |
| 250        | 0.895      | -174            | 2.20       | 51              | 0.013      | -31             | 0.874      | -172            |
| 300        | 0.910      | -174            | 1.71       | 45              | 0.012      | -36             | 0.886      | -173            |
| 350        | 0.921      | -175            | 1.36       | 40              | 0.010      | -40             | 0.892      | -173            |
| 400        | 0.932      | -176            | 1.11       | 35              | 0.009      | -42             | 0.897      | -175            |
| 450        | 0.941      | -177            | 0.92       | 31              | 0.008      | -43             | 0.915      | -176            |
| 500        | 0.946      | -178            | 0.78       | 27              | 0.007      | -44             | 0.932      | -177            |
| 550        | 0.953      | -178            | 0.66       | 24              | 0.006      | -43             | 0.946      | -178            |
| 600        | 0.957      | -179            | 0.57       | 21              | 0.005      | -42             | 0.964      | -179            |
| 650        | 0.960      | -180            | 0.50       | 18              | 0.004      | -39             | 0.975      | -178            |
| 700        | 0.964      | 180             | 0.44       | 16              | 0.004      | -34             | 0.976      | -179            |
| 750        | 0.966      | 179             | 0.39       | 14              | 0.003      | -29             | 0.981      | -179            |
| 800        | 0.968      | 178             | 0.95       | 12              | 0.002      | -15             | 0.979      | -179            |
| 850        | 0.970      | 178             | 0.31       | 10              | 0.002      | -2              | 0.964      | -179            |
| 900        | 0.971      | 177             | 0.28       | 8               | 0.002      | 16              | 0.960      | 180             |
| 950        | 0.972      | 177             | 0.26       | 6               | 0.002      | 34              | 0.953      | 179             |
| 1000       | 0.972      | 176             | 0.23       | 5               | 0.003      | 45              | 0.940      | 178             |

**Table 11. S-parameter PD55025S-E ( $V_{DS} = 12.5\text{ V}$   $I_D = 1.5\text{ A}$ )**

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50         | 0.876      | -164            | 13.87      | 90              | 0.013      | 1               | 0.823      | -172            |
| 100        | 0.880      | -172            | 6.87       | 79              | 0.012      | -7              | 0.838      | -175            |
| 150        | 0.887      | -174            | 4.46       | 71              | 0.012      | -13             | 0.855      | -176            |
| 200        | 0.895      | -175            | 3.22       | 64              | 0.011      | -18             | 0.873      | -175            |
| 250        | 0.905      | -176            | 2.47       | 58              | 0.010      | -22             | 0.879      | -175            |
| 300        | 0.915      | -176            | 1.96       | 52              | 0.009      | -25             | 0.885      | -175            |
| 350        | 0.922      | -177            | 1.60       | 47              | 0.009      | -28             | 0.886      | -175            |

Table 11. S-parameter PD55025S-E ( $V_{DS} = 12.5\text{ V}$   $I_D = 1.5\text{ A}$ ) (continued)

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 400        | 0.931      | -178            | 1.32       | 42              | 0.008      | -30             | 0.889      | -177            |
| 450        | 0.938      | -178            | 1.11       | 38              | 0.007      | -31             | 0.906      | -178            |
| 500        | 0.942      | -179            | 0.95       | 34              | 0.006      | -31             | 0.923      | -179            |
| 550        | 0.948      | -179            | 0.82       | 31              | 0.005      | -30             | 0.937      | -179            |
| 600        | 0.952      | -180            | 0.71       | 28              | 0.005      | -27             | 0.956      | -179            |
| 650        | 0.954      | 180             | 0.63       | 25              | 0.004      | -22             | 0.967      | -179            |
| 700        | 0.959      | 179             | 0.55       | 22              | 0.003      | -16             | 0.969      | -179            |
| 750        | 0.961      | 178             | 0.49       | 20              | 0.003      | -6              | 0.973      | -179            |
| 800        | 0.963      | 178             | 0.45       | 17              | 0.003      | 3               | 0.970      | -179            |
| 850        | 0.966      | 177             | 0.40       | 15              | 0.003      | 17              | 0.956      | -180            |
| 900        | 0.967      | 177             | 0.36       | 13              | 0.003      | 27              | 0.952      | 179             |
| 950        | 0.968      | 176             | 0.33       | 11              | 0.003      | 38              | 0.945      | 179             |
| 1000       | 0.968      | 176             | 0.30       | 9               | 0.003      | 45              | 0.933      | 177             |

Table 12. S-parameter for PD55025S-E ( $V_{DS} = 12.5\text{ V}$   $I_D = 3\text{ A}$ )

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50         | 0.890      | -165            | 13.19      | 91              | 0.012      | 2               | 0.837      | -174            |
| 100        | 0.892      | -172            | 6.55       | 81              | 0.011      | -6              | 0.846      | -176            |
| 150        | 0.898      | -174            | 4.28       | 73              | 0.011      | -12             | 0.865      | -176            |
| 200        | 0.904      | -175            | 3.11       | 66              | 0.010      | -15             | 0.879      | -176            |
| 250        | 0.913      | -176            | 2.39       | 60              | 0.010      | -20             | 0.883      | -176            |
| 300        | 0.921      | -177            | 1.91       | 54              | 0.009      | -23             | 0.889      | -176            |
| 350        | 0.926      | -177            | 1.57       | 49              | 0.008      | -25             | 0.887      | -176            |
| 400        | 0.935      | -178            | 1.31       | 44              | 0.007      | -27             | 0.889      | -177            |
| 450        | 0.941      | -179            | 1.10       | 40              | 0.007      | -28             | 0.905      | -179            |
| 500        | 0.944      | -179            | 0.94       | 36              | 0.006      | -27             | 0.921      | -179            |
| 550        | 0.949      | -180            | 0.82       | 33              | 0.005      | -25             | 0.936      | -180            |
| 600        | 0.953      | 180             | 0.71       | 29              | 0.004      | -21             | 0.954      | 180             |
| 650        | 0.955      | 179             | 0.63       | 26              | 0.004      | -17             | 0.964      | -180            |
| 700        | 0.959      | 179             | 0.56       | 24              | 0.003      | -10             | 0.965      | -180            |
| 750        | 0.961      | 178             | 0.50       | 21              | 0.003      | -2              | 0.968      | -180            |
| 800        | 0.963      | 177             | 0.45       | 19              | 0.003      | 10              | 0.966      | -179            |
| 850        | 0.966      | 177             | 0.41       | 17              | 0.003      | 22              | 0.952      | -180            |

Table 12. S-parameter for PD55025S-E ( $V_{DS} = 12.5 \text{ V}$   $I_D = 3 \text{ A}$ ) (continued)

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 900        | 0.967      | 176             | 0.37       | 15              | 0.003      | 32              | 0.948      | 180             |
| 950        | 0.968      | 176             | 0.34       | 15              | 0.003      | 41              | 0.942      | 179             |
| 1000       | 0.969      | 175             | 0.31       | 11              | 0.004      | 49              | 0.930      | 177             |

Table 13. S-parameter for PD55025S-E ( $V_{DS} = 13.8 \text{ V}$   $I_D = 3 \text{ A}$ )

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50         | 0.849      | -164            | 13.99      | 91              | 0.012      | 2               | 0.833      | -173            |
| 100        | 0.881      | -171            | 6.94       | 80              | 0.011      | -6              | 0.841      | -175            |
| 150        | 0.895      | -173            | 4.51       | 72              | 0.011      | -12             | 0.857      | -175            |
| 200        | 0.903      | -175            | 3.27       | 65              | 0.010      | -16             | 0.871      | -175            |
| 250        | 0.912      | -176            | 2.50       | 58              | 0.010      | -21             | 0.877      | -175            |
| 300        | 0.921      | -176            | 1.99       | 52              | 0.009      | -24             | 0.882      | -175            |
| 350        | 0.927      | -177            | 1.62       | 47              | 0.008      | -27             | 0.883      | -176            |
| 400        | 0.936      | -178            | 1.35       | 42              | 0.007      | -29             | 0.886      | -177            |
| 450        | 0.943      | -178            | 1.13       | 38              | 0.006      | -29             | 0.904      | -178            |
| 500        | 0.946      | -179            | 0.97       | 34              | 0.006      | -29             | 0.920      | -179            |
| 550        | 0.952      | -180            | 0.83       | 31              | 0.005      | -26             | 0.935      | -179            |
| 600        | 0.955      | 180             | 0.72       | 27              | 0.004      | -23             | 0.955      | -180            |
| 650        | 0.957      | 179             | 0.64       | 24              | 0.004      | -17             | 0.965      | -179            |
| 700        | 0.961      | 179             | 0.56       | 22              | 0.003      | -8              | 0.967      | -179            |
| 750        | 0.963      | 178             | 0.50       | 19              | 0.003      | 2               | 0.970      | -179            |
| 800        | 0.965      | 178             | 0.45       | 17              | 0.003      | 14              | 0.968      | -179            |
| 850        | 0.968      | 177             | 0.41       | 15              | 0.003      | 27              | 0.953      | -179            |
| 900        | 0.969      | 176             | 0.37       | 13              | 0.003      | 36              | 0.949      | 180             |
| 950        | 0.970      | 176             | 0.34       | 11              | 0.003      | 45              | 0.943      | 179             |
| 1000       | 0.971      | 175             | 0.31       | 9               | 0.003      | 54              | 0.930      | 178             |

## 8 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 14. 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)

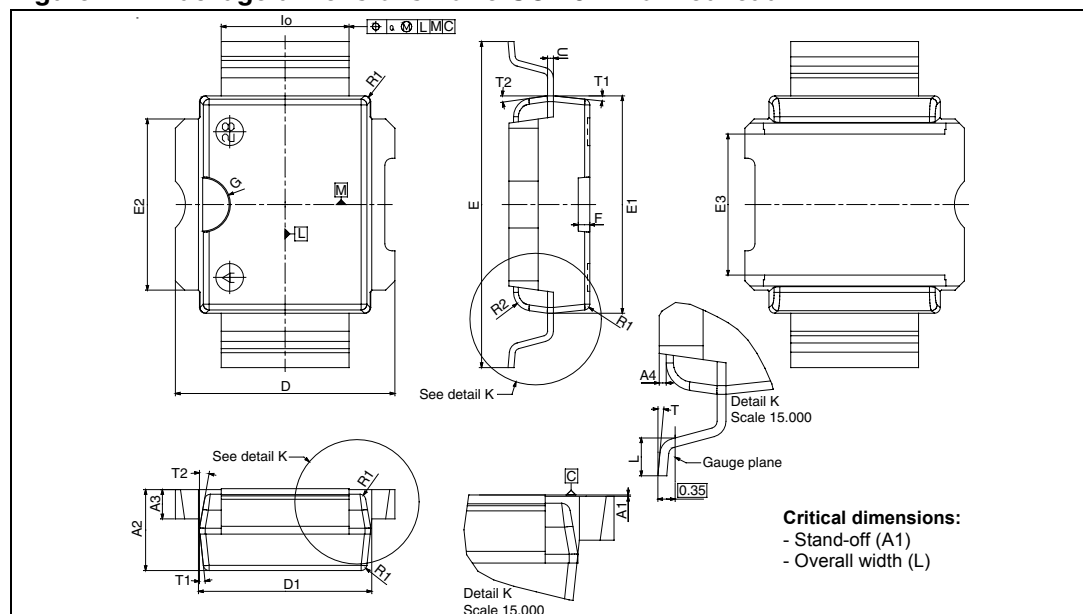
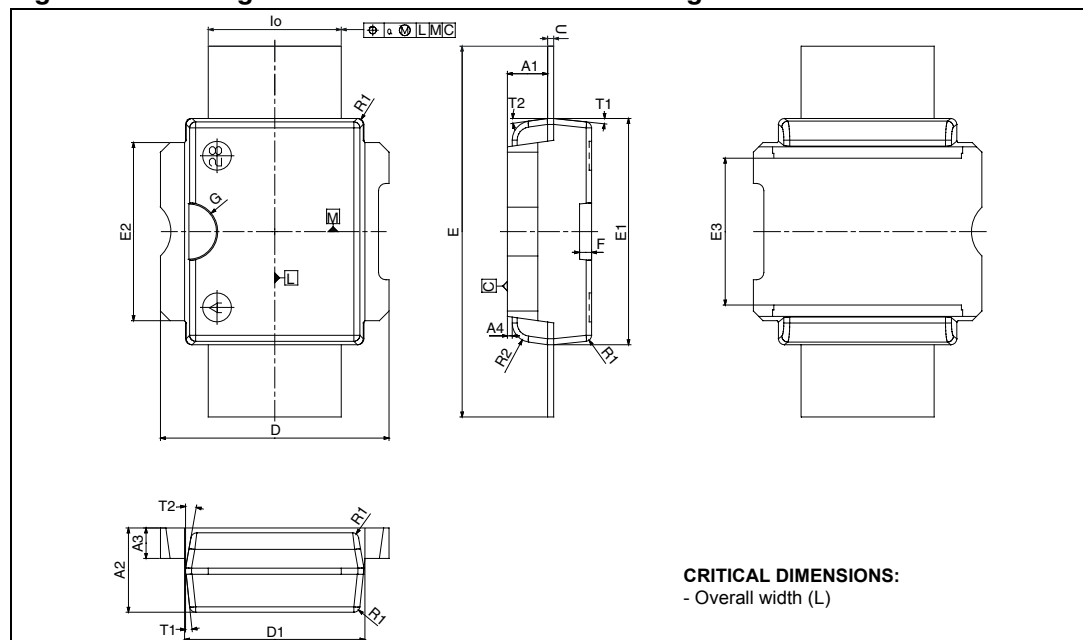
**Figure 24. Package dimensions PowerSO-10RF formed lead**

Table 15. 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 25. Package dimensions PowerSO-10RF straight lead



Technical drawing of a mechanical part, showing a top view and a side view. The drawing includes dimensions and critical dimensions.

**Top View Dimensions:**

- Overall width:  $14.3 \pm 0.2$  (\*) (22)
- Overall height:  $10.1 \pm 0.2$  (\*) (6)
- Internal width:  $9.9 \pm 0.2$  (2)
- Internal height:  $4.6 \pm 0.2$  (\*) (10)
- Internal width (left):  $3.7 \pm 0.2$  (\*) (16)
- Internal width (right):  $3.7 \pm 0.2$  (\*) (17)
- Internal height (left):  $0.8$  (15)
- Internal height (right):  $0.8$  (14)
- Internal width (center):  $0.8$  (13)
- Internal height (center):  $0.8$  (12)
- Internal width (bottom):  $0.8$  (11)
- Internal height (bottom):  $0.8$  (10)
- Internal width (top):  $0.8$  (9)
- Internal height (top):  $0.8$  (8)
- Internal width (left side):  $0.8$  (7)
- Internal height (left side):  $0.8$  (6)
- Internal width (right side):  $0.8$  (5)
- Internal height (right side):  $0.8$  (4)
- Internal width (center side):  $0.8$  (3)
- Internal height (center side):  $0.8$  (2)
- Internal width (bottom side):  $0.8$  (1)
- Internal height (bottom side):  $0.8$  (0)

**Side View Dimensions:**

- Overall width:  $53.2 \pm 0.5$  (\*) (1)
- Overall height:  $10 \pm 2.5$  (2)
- Internal width:  $17.2 \pm 0.2$  (\*) (4)
- Internal height:  $18.8 \pm 0.2$  (3)

**Critical Dimensions:**

- (\*) CRITICAL DIMENSIONS

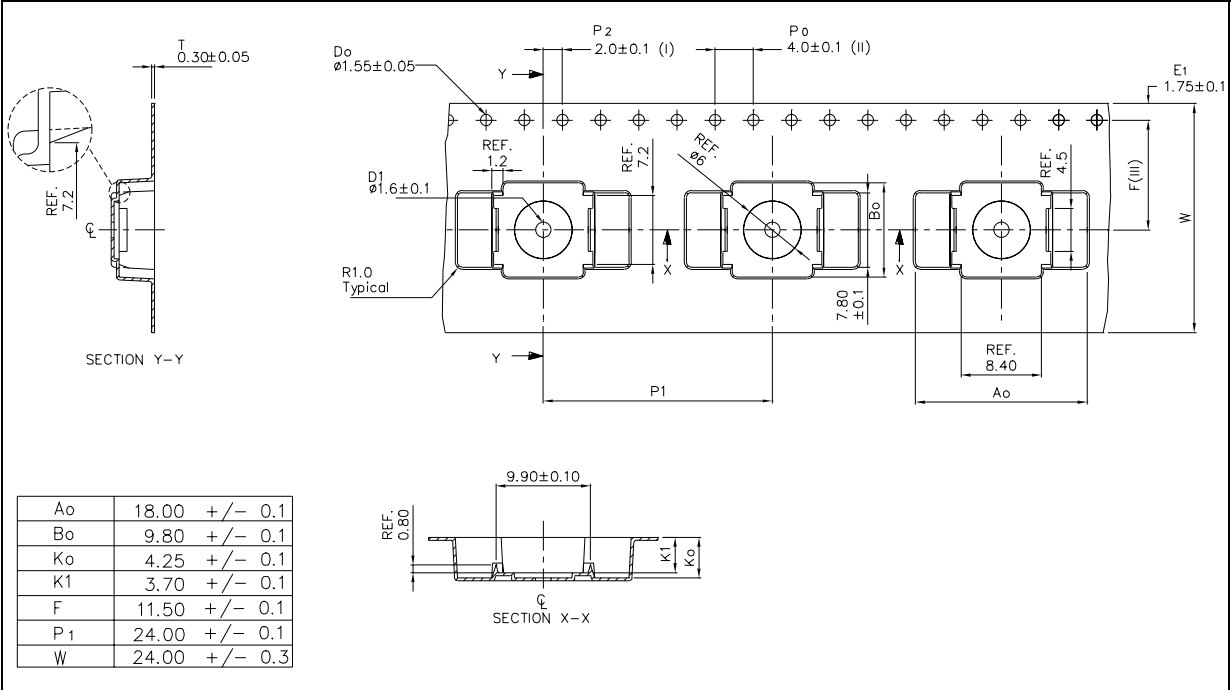
**Marking Area:**

- Marking area "PART 1"
- Marking area "PART 2"

**Scale:**

- SCALE 10.000
- SCALE 5.000
- SCALE 2.000

Figure 27. Reel information



## 9 Revision history

**Table 16. Document revision history**

| Date        | Revision | Changes                                                      |
|-------------|----------|--------------------------------------------------------------|
| 29-Apr-2006 | 1        | Initial release.                                             |
| 03-Jun-2010 | 2        | Added: <a href="#">Table 6: Moisture sensitivity level</a> . |

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2010 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)

