



# PD55035-E PD55035S-E

RF POWER transistor, LDMOST plastic family  
N-Channel enhancement-mode lateral MOSFETs

## General features

- Excellent thermal stability
- Common source configuration
- $P_{OUT} = 35W$  with 16.9dB gain @ 500MHz / 12.5V
- New RF plastic package

## Description

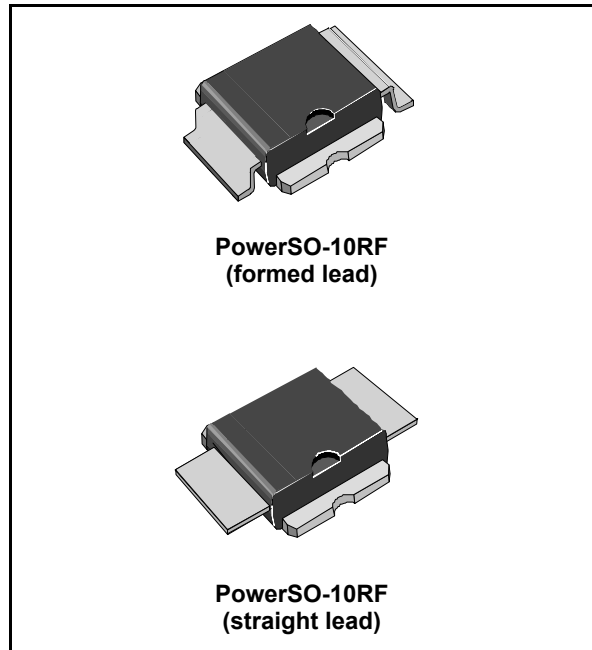
The PD55035 is a common source N-Channel, enhancement-mode lateral Field-Effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 12 V in common source mode at frequencies of up to 1 GHz. PD55035 boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF. PD55035'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 performances and ease of assembly.

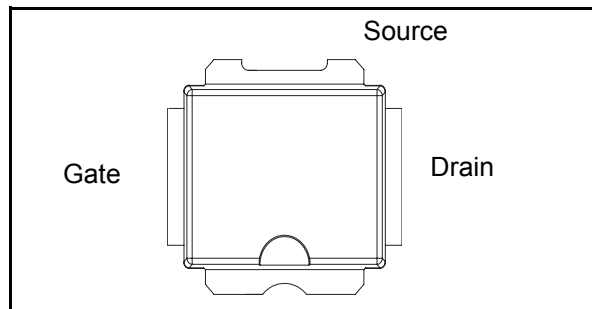
Mounting recommendations are available in [www.st.com/rf/](http://www.st.com/rf/) (look for application note AN1294)

## Order codes

| Part number  | Package                      | Packing       |
|--------------|------------------------------|---------------|
| PD55035-E    | PowerSO-10RF (formed lead)   | Tube          |
| PD55035S-E   | PowerSO-10RF (straight lead) | Tube          |
| PD55035TR-E  | PowerSO-10RF (formed lead)   | Tape and reel |
| PD55035STR-E | PowerSO-10RF (straight lead) | Tape and reel |



## Pin connection



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# 1 Electrical data

## 1.1 Maximum ratings

Table 1. 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 (@ $T_C = 70^{\circ}C$ ) | 95          | W           |
| $T_J$         | Max. operating junction temperature        | 165         | $^{\circ}C$ |
| $T_{STG}$     | Storage temperature                        | -65 to +150 | $^{\circ}C$ |

## 1.2 Thermal data

Table 2. Thermal data

| Symbol     | Parameter                          | Value | Unit          |
|------------|------------------------------------|-------|---------------|
| $R_{thJC}$ | Junction - case thermal resistance | 1.0   | $^{\circ}C/W$ |

## 2 Electrical Characteristics

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

### 2.1 Static

**Table 3. Static**

| Symbol              | Test conditions              |                                | Min. | Typ. | Max. | Unit          |
|---------------------|------------------------------|--------------------------------|------|------|------|---------------|
| $I_{\text{DSS}}$    | $V_{\text{GS}} = 0\text{V}$  | $V_{\text{DS}} = 28\text{V}$   |      |      | 1    | $\mu\text{A}$ |
| $I_{\text{GSS}}$    | $V_{\text{GS}} = 20\text{V}$ | $V_{\text{DS}} = 0\text{V}$    |      |      | 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             |
| $V_{\text{DS(ON)}}$ | $V_{\text{GS}} = 10\text{V}$ | $I_{\text{D}} = 3\text{A}$     |      | 0.8  | 0.95 | V             |
| $G_{\text{FS}}$     | $V_{\text{DS}} = 10\text{V}$ | $I_{\text{D}} = 3\text{A}$     | 2.5  |      |      | mho           |
| $C_{\text{ISS}}$    | $V_{\text{GS}} = 0\text{V}$  | $V_{\text{DS}} = 12.5\text{V}$ |      | 92   |      | pF            |
| $C_{\text{OSS}}$    | $V_{\text{GS}} = 0\text{V}$  | $V_{\text{DS}} = 12.5\text{V}$ |      | 73   |      | pF            |
| $C_{\text{RSS}}$    | $V_{\text{GS}} = 0\text{V}$  | $V_{\text{DS}} = 12.5\text{V}$ |      | 6.1  |      | pF            |

### 2.2 Dynamic

**Table 4. Dynamic**

| Symbol            | Test conditions                                                                                                                           | Min. | Typ. | Max. | Unit |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| $P_{\text{OUT}}$  | $V_{\text{DD}} = 12.5\text{V}$ , $I_{\text{DQ}} = 200\text{mA}$ $f = 500\text{MHz}$                                                       | 35   |      |      | W    |
| $G_{\text{P}}$    | $V_{\text{DD}} = 12.5\text{V}$ , $I_{\text{DQ}} = 200\text{mA}$ , $P_{\text{OUT}} = 35\text{W}$ , $f = 500\text{MHz}$                     | 13   | 16.9 |      | dB   |
| $\eta_{\text{D}}$ | $V_{\text{DD}} = 12.5\text{V}$ , $I_{\text{DQ}} = 200\text{mA}$ , $P_{\text{OUT}} = 35\text{W}$ , $f = 500\text{MHz}$                     |      | 62   |      | %    |
| Load mismatch     | $V_{\text{DD}} = 15.5\text{V}$ , $I_{\text{DQ}} = 200\text{mA}$ , $P_{\text{OUT}} = 35\text{W}$ , $f = 500\text{MHz}$<br>All phase angles | 20:1 |      |      | VSWR |

### 3 Impedance

Figure 1. Current conventions

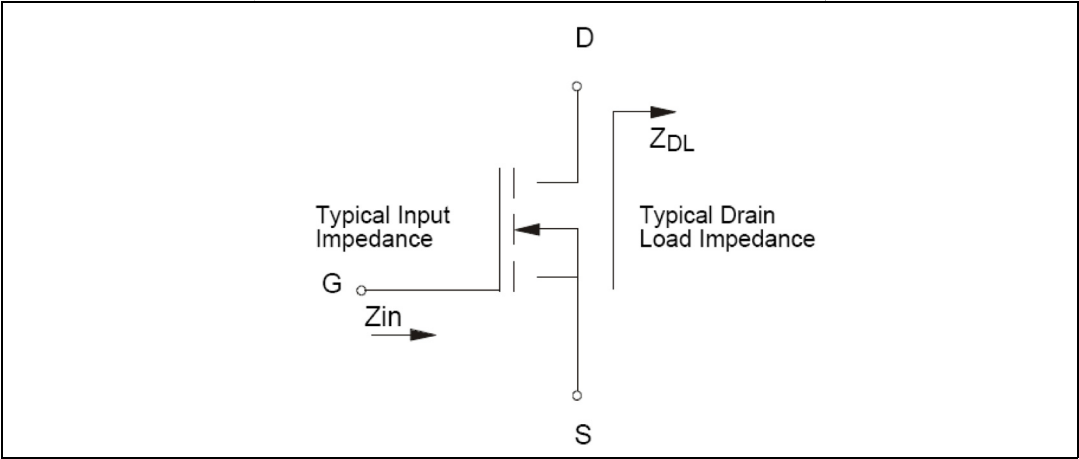


Table 5. Impedance data

| Freq. (MHz) | $Z_{IN} (\Omega)$ | $Z_{DL}(\Omega)$ |
|-------------|-------------------|------------------|
| 175         | $3.34 - j 5.84$   | $1.67 + j 1.45$  |
| 480         | $0.53 - j 1.08$   | $0.86 + j 0.25$  |
| 500         | $0.45 - j 1.21$   | $1.05 + j 0.03$  |
| 520         | $0.42 - j 1.20$   | $1.04 + j 0.15$  |

# 4 Typical performance

Figure 2. Capacitance vs supply voltage

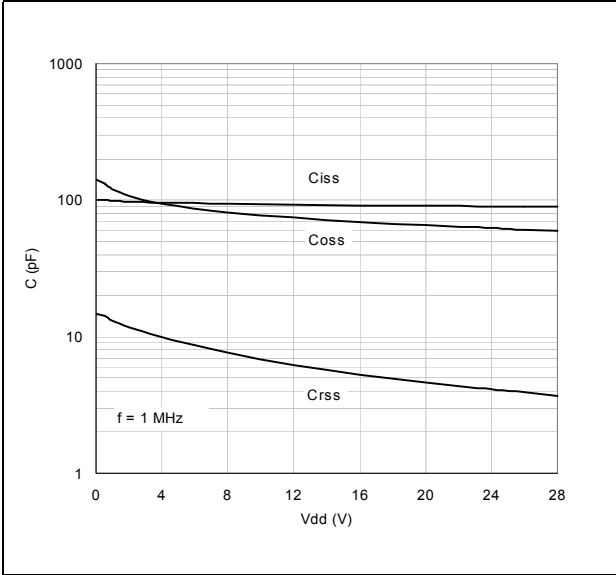


Figure 3. Drain current vs gate source voltage

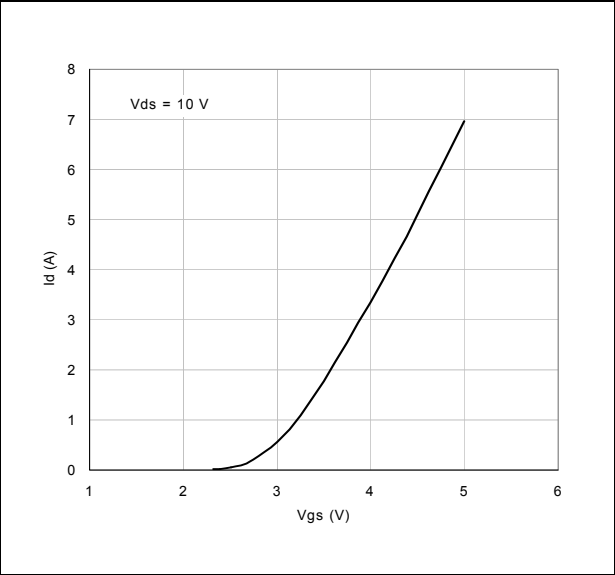


Figure 4. Gate-source voltage vs case temperature

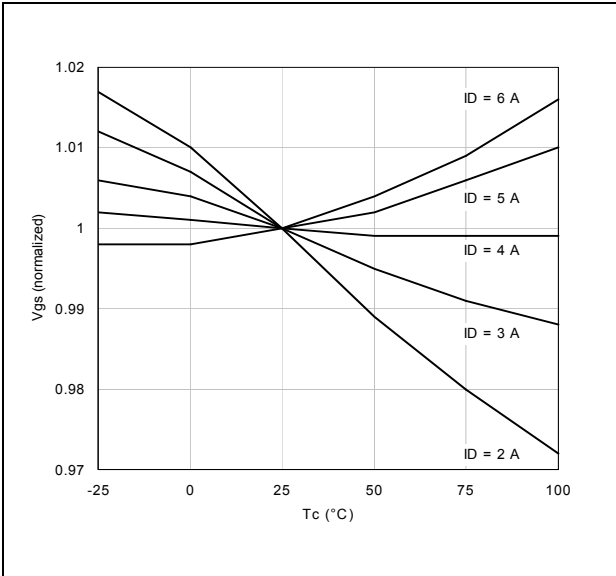


Figure 5. Output power vs input power

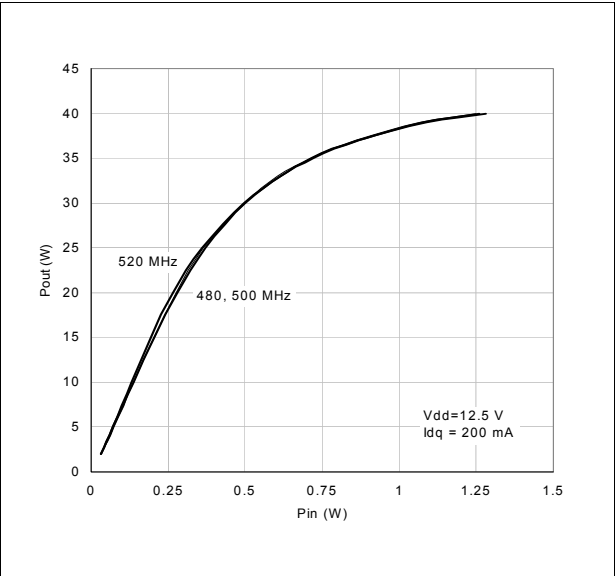


Figure 6. Power gain vs output power

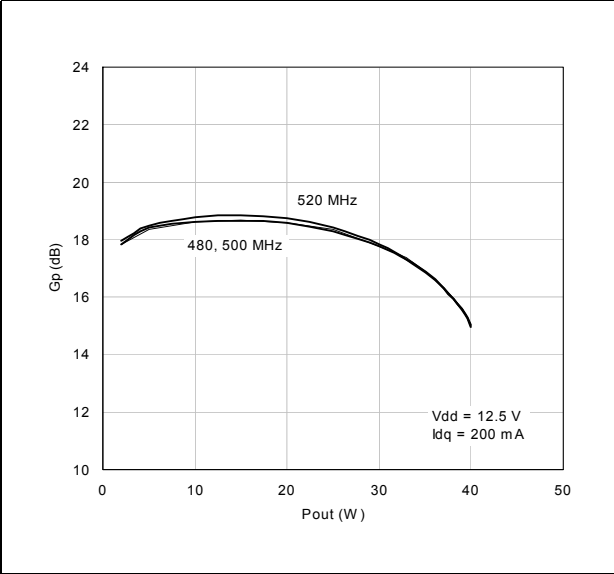


Figure 7. Efficiency vs output power

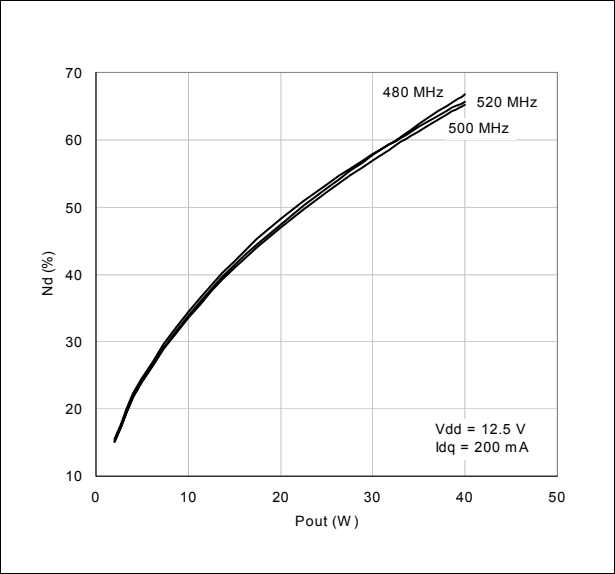


Figure 8. Input return loss vs output power

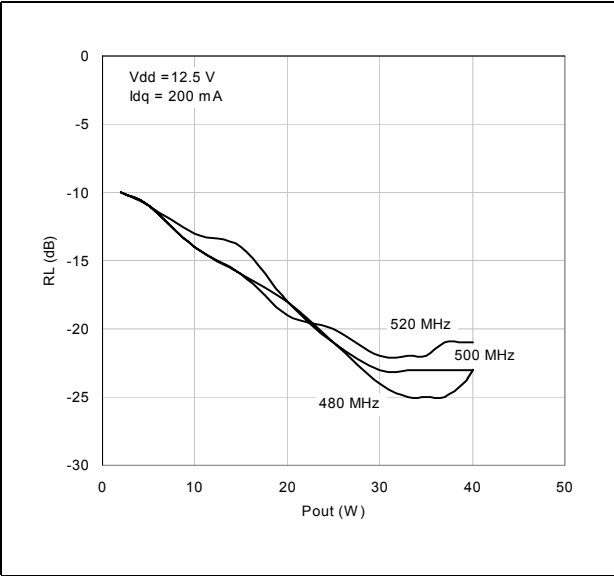


Figure 9. Output power vs bias current

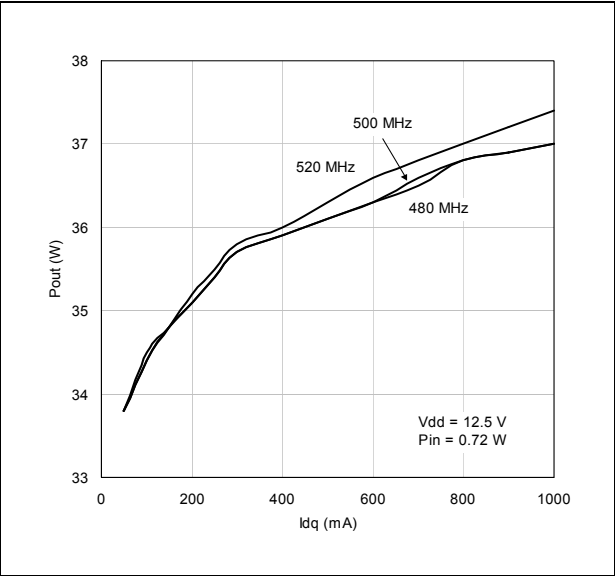


Figure 10. Efficiency vs bias current

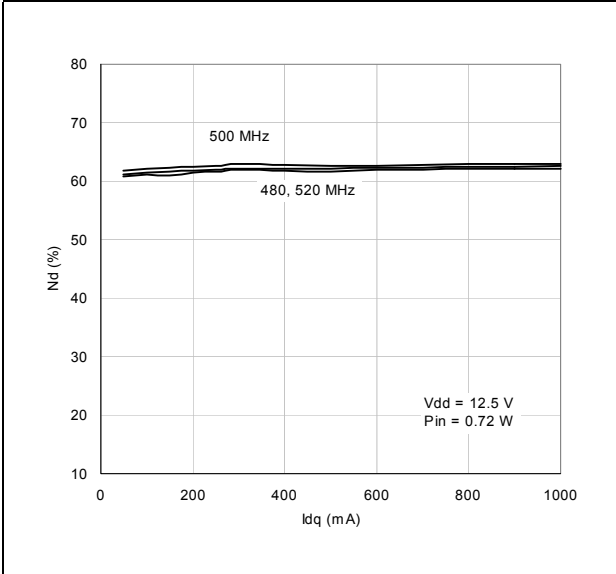


Figure 11. Output power vs supply voltage

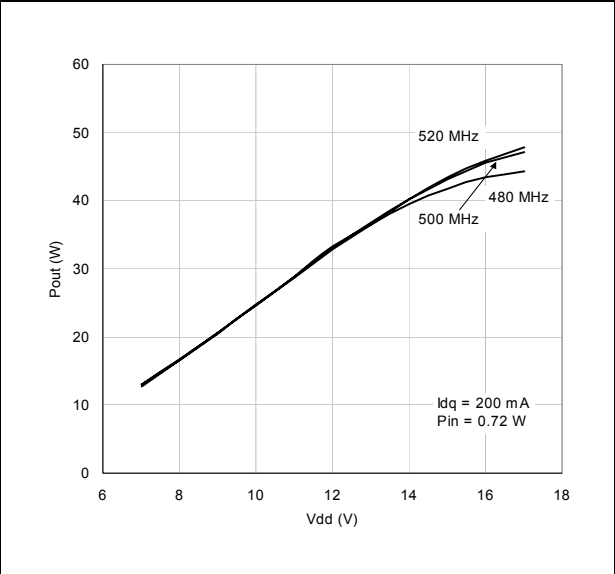


Figure 12. Efficiency vs supply voltage

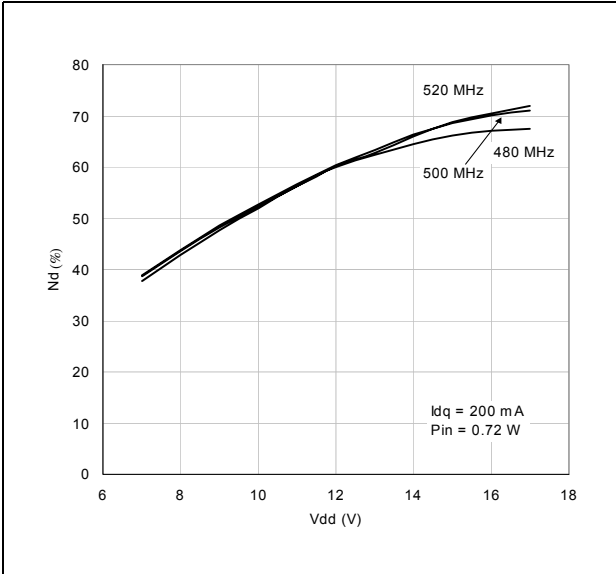
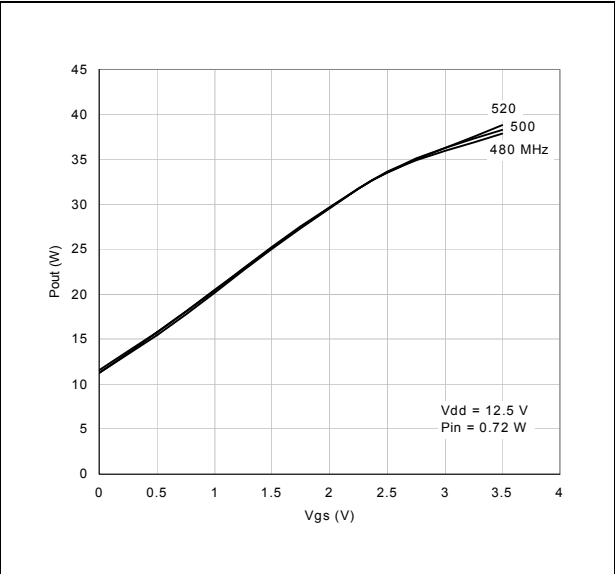


Figure 13. Output power vs gate voltage



## 5 Test circuit

Figure 14. 500MHz test circuit schematic (engineering)

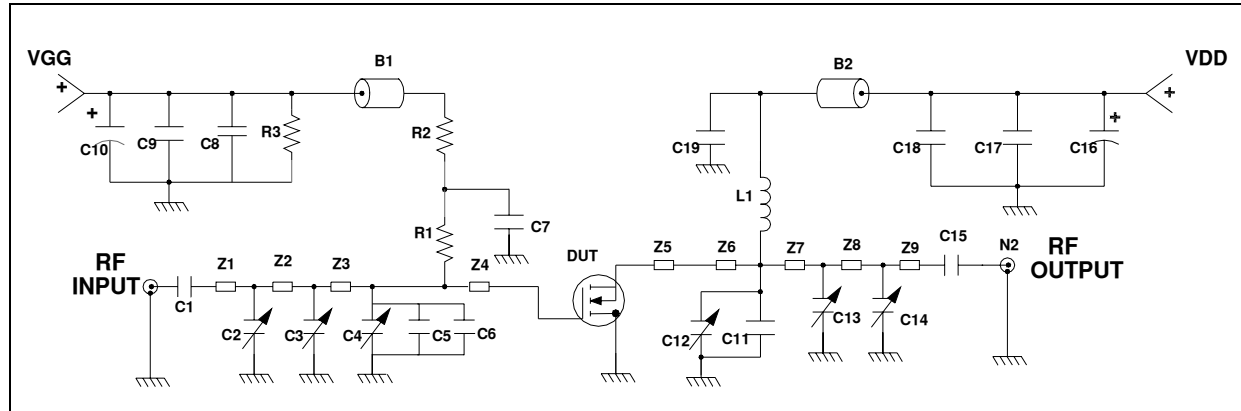


Table 6. Test circuit component part list

| 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 Typical performance 175MHz

Figure 15. Output power vs input power

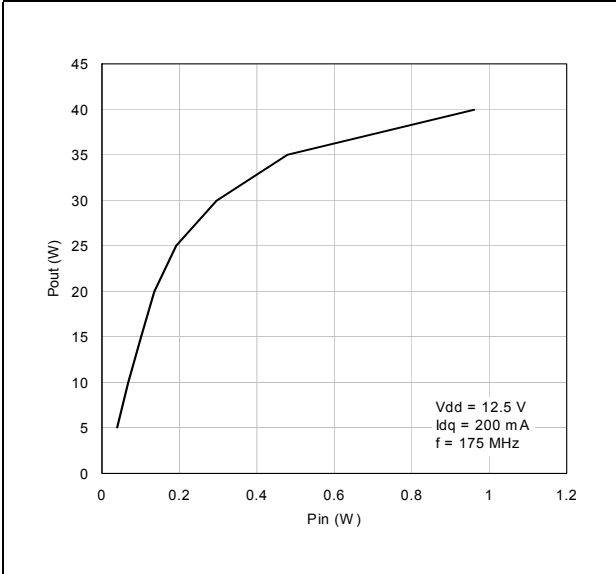


Figure 16. Power gain vs output power

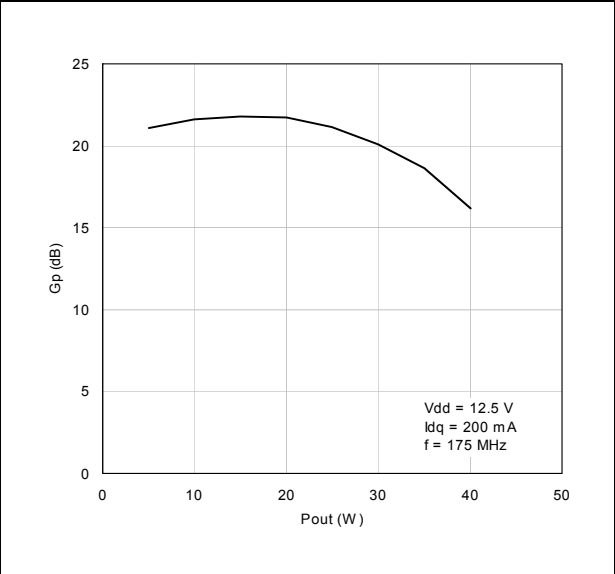


Figure 17. Efficiency vs output power

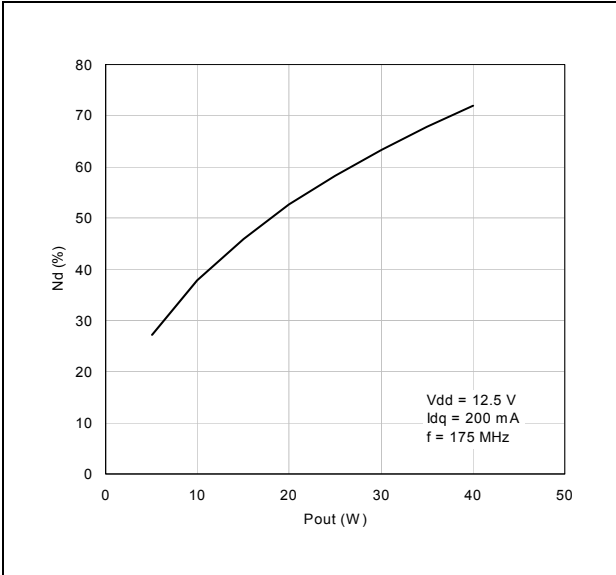
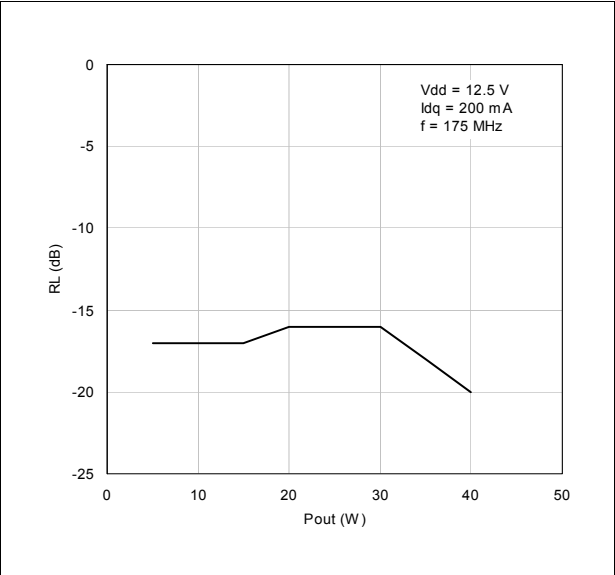
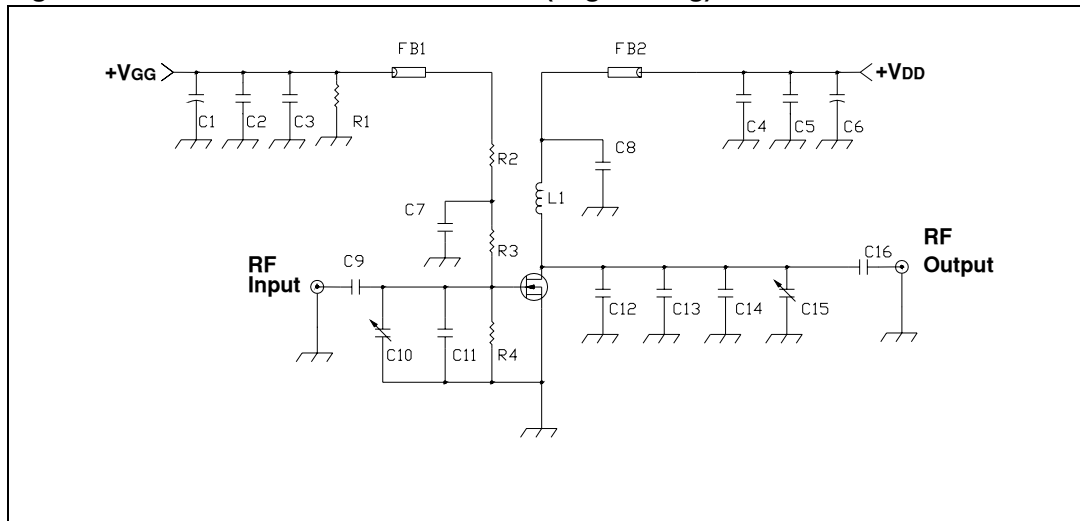


Figure 18. Input return loss vs output power



**Figure 19. 175MHz test circuit schematic (engineering)****Table 7. 175MHz test circuit component part list**

| Component | Description                                                               |
|-----------|---------------------------------------------------------------------------|
| C1,C6     | 10 $\mu$ F ELECTROLYTIC CAPACITOR                                         |
| C2,C5     | 0.1 $\mu$ F CHIP CAPACITOR                                                |
| C3, C4    | 0.01 $\mu$ F CHIP CAPACITOR                                               |
| C7, C8    | 1200 pF CHIP CAPACITOR                                                    |
| C9, C16   | 1000 pF CHIP CAPACITOR                                                    |
| C10       | ARCO 406 TRIMMER CAPACITOR                                                |
| C11       | 62 pF CHIP CAPACITOR                                                      |
| C12       | 15 pF CHIP CAPACITOR                                                      |
| C13       | 20 pF CHIP CAPACITOR                                                      |
| C14       | 75 pF CHIP CAPACITOR                                                      |
| C15       | JOHANSON 1-20 pF TRIMMER CAPACITOR                                        |
| R1        | 33 k $\Omega$ CHIP RESISTOR                                               |
| R2        | 18 $\Omega$ CHIP RESISTOR                                                 |
| R3        | 27 $\Omega$ CHIP RESISTOR                                                 |
| R4        | 47 $\Omega$ CHIP RESISTOR                                                 |
| L1        | 5 TURN, 16 AWG MAGNETWIRE, ID = 0.25", INDUCTOR                           |
| FB1, FB2  | FERRITE BEAD                                                              |
| BOARD     | ROGER, ULTRA LAM 2000 THK 0.030", $\epsilon_r = 2.55$ 2oz. ED Cu 2 SIDES. |

## 7 Common source s-parameter

### 7.1 PD55035S ( $V_{DS} = 12.5V$ $I_{DS} = 500mA$ )

**Table 8. S-parameter**

| FREQ<br>(MHz) | $ S_{11} $ | $S_{11}\angle\Phi$ | $ S_{21} $ | $S_{21}\angle\Phi$ | $ S_{12} $ | $S_{12}\angle\Phi$ | $ S_{22} $ | $S_{22}\angle\Phi$ |
|---------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|
| 50            | 0.823      | -162               | 14.28      | 86                 | 0.015      | -3                 | 0.782      | -168               |
| 100           | 0.855      | -169               | 6.87       | 75                 | 0.015      | -11                | 0.798      | -171               |
| 150           | 0.875      | -172               | 4.50       | 68                 | 0.014      | -17                | 0.813      | -172               |
| 200           | 0.891      | -173               | 3.18       | 60                 | 0.013      | -24                | 0.835      | -172               |
| 250           | 0.902      | -174               | 2.42       | 53                 | 0.012      | -29                | 0.856      | -172               |
| 300           | 0.918      | -175               | 1.90       | 47                 | 0.011      | -32                | 0.876      | -173               |
| 350           | 0.924      | -176               | 1.52       | 42                 | 0.010      | -36                | 0.890      | -173               |
| 400           | 0.934      | -176               | 1.25       | 37                 | 0.008      | -37                | 0.903      | -174               |
| 450           | 0.940      | -177               | 1.03       | 33                 | 0.007      | -38                | 0.918      | -175               |
| 500           | 0.949      | -177               | 0.87       | 29                 | 0.007      | -40                | 0.928      | -175               |
| 550           | 0.956      | -178               | 0.74       | 26                 | 0.005      | -40                | 0.935      | -176               |
| 600           | 0.958      | -179               | 0.65       | 23                 | 0.004      | -36                | 0.946      | -177               |
| 650           | 0.963      | -180               | 0.56       | 20                 | 0.004      | -36                | 0.952      | -178               |
| 700           | 0.968      | 180                | 0.49       | 18                 | 0.003      | -27                | 0.955      | -178               |
| 750           | 0.971      | 179                | 0.44       | 15                 | 0.003      | -21                | 0.959      | -179               |
| 800           | 0.970      | 179                | 0.39       | 13                 | 0.002      | -5                 | 0.962      | -179               |
| 850           | 0.973      | 178                | 0.35       | 12                 | 0.002      | 11                 | 0.967      | -180               |
| 900           | 0.975      | 178                | 0.32       | 10                 | 0.002      | 24                 | 0.967      | 179                |
| 950           | 0.974      | 177                | 0.29       | 8                  | 0.002      | 27                 | 0.971      | 179                |
| 1000          | 0.976      | 177                | 0.26       | 7                  | 0.003      | 47                 | 0.972      | 178                |
| 1050          | 0.977      | 176                | 0.24       | 5                  | 0.002      | 61                 | 0.976      | 178                |
| 1100          | 0.976      | 176                | 0.22       | 4                  | 0.003      | 69                 | 0.976      | 177                |
| 1150          | 0.978      | 176                | 0.20       | 2                  | 0.003      | 72                 | 0.974      | 177                |
| 1200          | 0.979      | 175                | 0.19       | 1                  | 0.004      | 78                 | 0.975      | 176                |
| 1250          | 0.980      | 175                | 0.18       | -1                 | 0.004      | 87                 | 0.977      | 176                |
| 1300          | 0.979      | 174                | 0.16       | -2                 | 0.005      | 86                 | 0.976      | 176                |
| 1350          | 0.977      | 174                | 0.15       | -3                 | 0.006      | 88                 | 0.975      | 175                |
| 1400          | 0.975      | 174                | 0.14       | -3                 | 0.006      | 91                 | 0.977      | 174                |
| 1450          | 0.974      | 173                | 0.13       | -3                 | 0.006      | 97                 | 0.975      | 174                |
| 1500          | 0.972      | 173                | 0.12       | -4                 | 0.007      | 117                | 0.969      | 174                |

## 7.2 PD55035S ( $V_{DS} = 12.5V$ $I_{DS} = 1A$ )

**Table 9. S-parameter**

| FREQ<br>(MHz) | $ S_{11} $ | $S_{11}\angle\Phi$ | $ S_{21} $ | $S_{21}\angle\Phi$ | $ S_{12} $ | $S_{12}\angle\Phi$ | $ S_{22} $ | $S_{22}\angle\Phi$ |
|---------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|
| 50            | 0.845      | -165               | 14.89      | 87                 | 0.012      | 0                  | 0.818      | -171               |
| 100           | 0.877      | -171               | 7.23       | 78                 | 0.011      | -8                 | 0.829      | -174               |
| 150           | 0.894      | -174               | 4.81       | 72                 | 0.011      | -12                | 0.836      | -175               |
| 200           | 0.905      | -175               | 3.46       | 65                 | 0.010      | -17                | 0.849      | -175               |
| 250           | 0.909      | -176               | 2.69       | 59                 | 0.010      | -20                | 0.863      | -175               |
| 300           | 0.920      | -176               | 2.15       | 54                 | 0.009      | -23                | 0.877      | -175               |
| 350           | 0.924      | -177               | 1.75       | 48                 | 0.008      | -27                | 0.887      | -175               |
| 400           | 0.933      | -177               | 1.46       | 44                 | 0.007      | -28                | 0.898      | -176               |
| 450           | 0.937      | -178               | 1.22       | 39                 | 0.007      | -28                | 0.910      | -176               |
| 500           | 0.946      | -178               | 1.05       | 36                 | 0.006      | -28                | 0.919      | -177               |
| 550           | 0.951      | -179               | 0.90       | 32                 | 0.005      | -26                | 0.925      | -177               |
| 600           | 0.953      | -180               | 0.79       | 29                 | 0.004      | -23                | 0.936      | -178               |
| 650           | 0.959      | 180                | 0.69       | 26                 | 0.004      | -19                | 0.942      | -178               |
| 700           | 0.963      | 179                | 0.61       | 24                 | 0.003      | -13                | 0.946      | -179               |
| 750           | 0.965      | 179                | 0.55       | 21                 | 0.003      | -4                 | 0.951      | -179               |
| 800           | 0.964      | 178                | 0.49       | 19                 | 0.003      | 6                  | 0.954      | -180               |
| 850           | 0.967      | 178                | 0.44       | 17                 | 0.003      | 14                 | 0.960      | 180                |
| 900           | 0.970      | 177                | 0.40       | 15                 | 0.003      | 31                 | 0.960      | 179                |
| 950           | 0.971      | 177                | 0.37       | 13                 | 0.003      | 39                 | 0.965      | 179                |
| 1000          | 0.972      | 176                | 0.34       | 11                 | 0.003      | 55                 | 0.964      | 178                |
| 1050          | 0.972      | 176                | 0.31       | 9                  | 0.003      | 53                 | 0.970      | 178                |
| 1100          | 0.973      | 176                | 0.29       | 8                  | 0.003      | 64                 | 0.969      | 177                |
| 1150          | 0.975      | 175                | 0.26       | 6                  | 0.004      | 70                 | 0.966      | 179                |
| 1200          | 0.976      | 175                | 0.25       | 4                  | 0.004      | 75                 | 0.971      | 176                |
| 1250          | 0.975      | 174                | 0.22       | 3                  | 0.005      | 85                 | 0.972      | 176                |
| 1300          | 0.975      | 174                | 0.21       | 2                  | 0.005      | 81                 | 0.970      | 175                |
| 1350          | 0.974      | 174                | 0.19       | 1                  | 0.005      | 85                 | 0.970      | 175                |
| 1400          | 0.973      | 174                | 0.18       | 0                  | 0.006      | 89                 | 0.971      | 174                |
| 1450          | 0.972      | 173                | 0.17       | -1                 | 0.006      | 95                 | 0.971      | 174                |
| 1500          | 0.970      | 173                | 0.16       | -1                 | 0.008      | 110                | 0.965      | 174                |

### 7.3 PD55035S ( $V_{DS} = 12.5V$ $I_{DS} = 2A$ )

**Table 10. S-parameter**

| FREQ<br>(MHz) | $ S_{11} $ | $S_{11}\angle\Phi$ | $ S_{21} $ | $S_{21}\angle\Phi$ | $ S_{12} $ | $S_{12}\angle\Phi$ | $ S_{22} $ | $S_{22}\angle\Phi$ |
|---------------|------------|--------------------|------------|--------------------|------------|--------------------|------------|--------------------|
| 50            | 0.863      | -165               | 15.03      | 88                 | 0.010      | 0                  | 0.841      | -173               |
| 100           | 0.892      | -171               | 7.33       | 80                 | 0.009      | -5                 | 0.848      | -176               |
| 150           | 0.909      | -174               | 4.91       | 74                 | 0.009      | -9                 | 0.853      | -176               |
| 200           | 0.916      | -176               | 3.56       | 68                 | 0.009      | -11                | 0.860      | -176               |
| 250           | 0.920      | -177               | 2.81       | 63                 | 0.008      | -12                | 0.872      | -177               |
| 300           | 0.927      | -177               | 2.26       | 58                 | 0.008      | -15                | 0.880      | -177               |
| 350           | 0.929      | -178               | 1.86       | 52                 | 0.007      | -18                | 0.889      | -177               |
| 400           | 0.935      | -178               | 1.57       | 48                 | 0.006      | -20                | 0.896      | -177               |
| 450           | 0.938      | -179               | 1.33       | 44                 | 0.006      | -20                | 0.906      | -178               |
| 500           | 0.944      | -179               | 1.14       | 40                 | 0.005      | -16                | 0.914      | -177               |
| 550           | 0.950      | -180               | 0.99       | 37                 | 0.005      | -15                | 0.918      | -178               |
| 600           | 0.952      | 180                | 0.87       | 33                 | 0.004      | -14                | 0.929      | -179               |
| 650           | 0.956      | 179                | 0.77       | 30                 | 0.004      | -9                 | 0.935      | -179               |
| 700           | 0.960      | 179                | 0.69       | 28                 | 0.003      | 4                  | 0.940      | -179               |
| 750           | 0.964      | 179                | 0.61       | 25                 | 0.003      | 11                 | 0.946      | 180                |
| 800           | 0.964      | 178                | 0.55       | 23                 | 0.003      | 20                 | 0.949      | 180                |
| 850           | 0.965      | 177                | 0.50       | 21                 | 0.003      | 32                 | 0.955      | 179                |
| 900           | 0.968      | 177                | 0.46       | 18                 | 0.003      | 38                 | 0.954      | 179                |
| 950           | 0.969      | 177                | 0.42       | 17                 | 0.003      | 46                 | 0.959      | 178                |
| 1000          | 0.971      | 176                | 0.39       | 14                 | 0.003      | 47                 | 0.959      | 177                |
| 1050          | 0.971      | 176                | 0.36       | 12                 | 0.004      | 57                 | 0.967      | 177                |
| 1100          | 0.970      | 176                | 0.33       | 11                 | 0.004      | 60                 | 0.964      | 177                |
| 1150          | 0.973      | 175                | 0.30       | 9                  | 0.004      | 69                 | 0.964      | 176                |
| 1200          | 0.975      | 175                | 0.28       | 7                  | 0.004      | 72                 | 0.966      | 176                |
| 1250          | 0.973      | 174                | 0.26       | 5                  | 0.005      | 78                 | 0.971      | 175                |
| 1300          | 0.971      | 174                | 0.24       | 4                  | 0.006      | 80                 | 0.968      | 175                |
| 1350          | 0.973      | 174                | 0.23       | 3                  | 0.006      | 83                 | 0.970      | 174                |
| 1400          | 0.971      | 173                | 0.21       | 2                  | 0.006      | 83                 | 0.971      | 174                |
| 1450          | 0.969      | 173                | 0.20       | 1                  | 0.006      | 91                 | 0.970      | 174                |
| 1500          | 0.968      | 173                | 0.18       | 1                  | 0.008      | 112                | 0.969      | 173                |

## 7.4 PD55035S ( $V_{DS} = 13.8V$ $I_{DS} = 3A$ )

**Table 11. S-parameter**

| FREQ<br>(MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50            | 0.867      | -165            | 14.95      | 88              | 0.009      | 2               | 0.848      | -174            |
| 100           | 0.896      | -171            | 7.31       | 80              | 0.009      | -4              | 0.856      | -177            |
| 150           | 0.913      | -175            | 4.92       | 75              | 0.008      | -7              | 0.861      | -177            |
| 200           | 0.921      | -176            | 3.57       | 69              | 0.008      | -9              | 0.866      | -177            |
| 250           | 0.921      | -177            | 2.82       | 64              | 0.008      | -13             | 0.874      | -177            |
| 300           | 0.929      | -178            | 2.28       | 59              | 0.007      | -12             | 0.882      | -177            |
| 350           | 0.930      | -178            | 1.90       | 54              | 0.007      | -14             | 0.888      | -178            |
| 400           | 0.936      | -178            | 1.59       | 50              | 0.006      | -16             | 0.896      | -177            |
| 450           | 0.938      | -179            | 1.36       | 45              | 0.005      | -14             | 0.904      | -178            |
| 500           | 0.947      | -179            | 1.17       | 42              | 0.005      | -11             | 0.915      | -178            |
| 550           | 0.950      | 180             | 1.02       | 38              | 0.004      | -10             | 0.917      | -178            |
| 600           | 0.951      | 180             | 0.90       | 35              | 0.004      | -6              | 0.927      | -179            |
| 650           | 0.956      | 179             | 0.79       | 32              | 0.004      | -3              | 0.934      | -179            |
| 700           | 0.960      | 179             | 0.71       | 29              | 0.003      | 4               | 0.935      | -179            |
| 750           | 0.963      | 178             | 0.64       | 26              | 0.003      | 17              | 0.943      | 180             |
| 800           | 0.962      | 178             | 0.58       | 24              | 0.003      | 21              | 0.948      | 179             |
| 850           | 0.964      | 177             | 0.52       | 22              | 0.004      | 32              | 0.951      | 179             |
| 900           | 0.967      | 177             | 0.48       | 20              | 0.003      | 41              | 0.949      | 178             |
| 950           | 0.969      | 177             | 0.44       | 18              | 0.003      | 36              | 0.958      | 178             |
| 1000          | 0.969      | 176             | 0.40       | 15              | 0.004      | 53              | 0.956      | 178             |
| 1050          | 0.969      | 176             | 0.37       | 14              | 0.004      | 58              | 0.963      | 177             |
| 1100          | 0.969      | 175             | 0.34       | 12              | 0.004      | 64              | 0.963      | 177             |
| 1150          | 0.971      | 175             | 0.32       | 10              | 0.004      | 69              | 0.961      | 176             |
| 1200          | 0.973      | 175             | 0.30       | 8               | 0.004      | 71              | 0.965      | 176             |
| 1250          | 0.971      | 174             | 0.27       | 6               | 0.005      | 77              | 0.967      | 175             |
| 1300          | 0.971      | 174             | 0.26       | 5               | 0.006      | 78              | 0.970      | 174             |
| 1350          | 0.973      | 174             | 0.24       | 4               | 0.006      | 80              | 0.965      | 175             |
| 1400          | 0.970      | 173             | 0.22       | 2               | 0.007      | 87              | 0.973      | 174             |
| 1450          | 0.968      | 173             | 0.21       | 3               | 0.006      | 91              | 0.967      | 174             |
| 1500          | 0.968      | 173             | 0.19       | 1               | 0.008      | 111             | 0.965      | 173             |

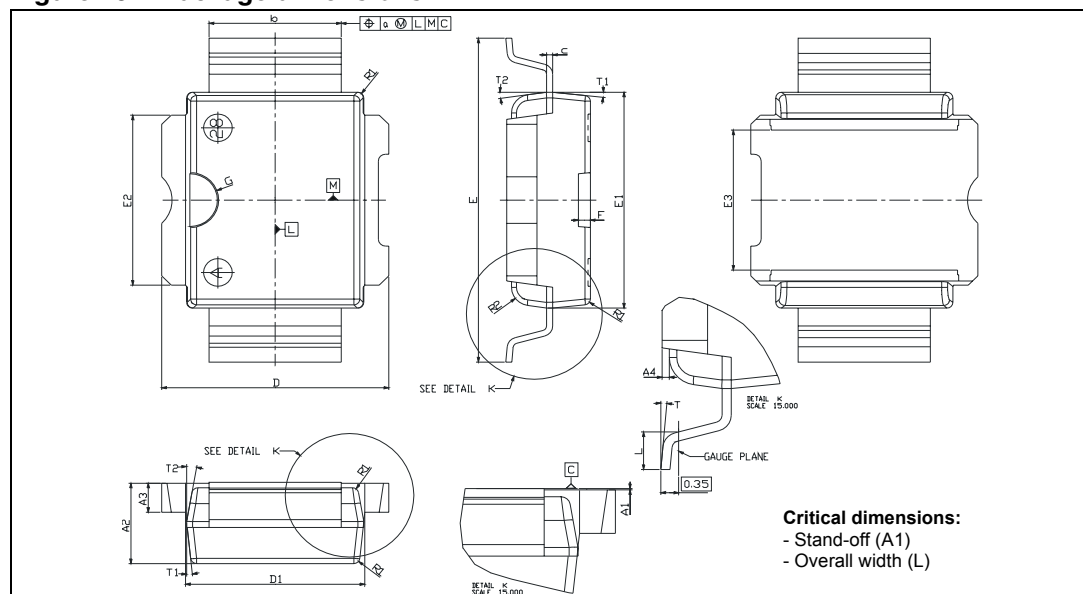
## 8 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com)

**Table 12. 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 20. Package dimensions**

**Table 13. 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)

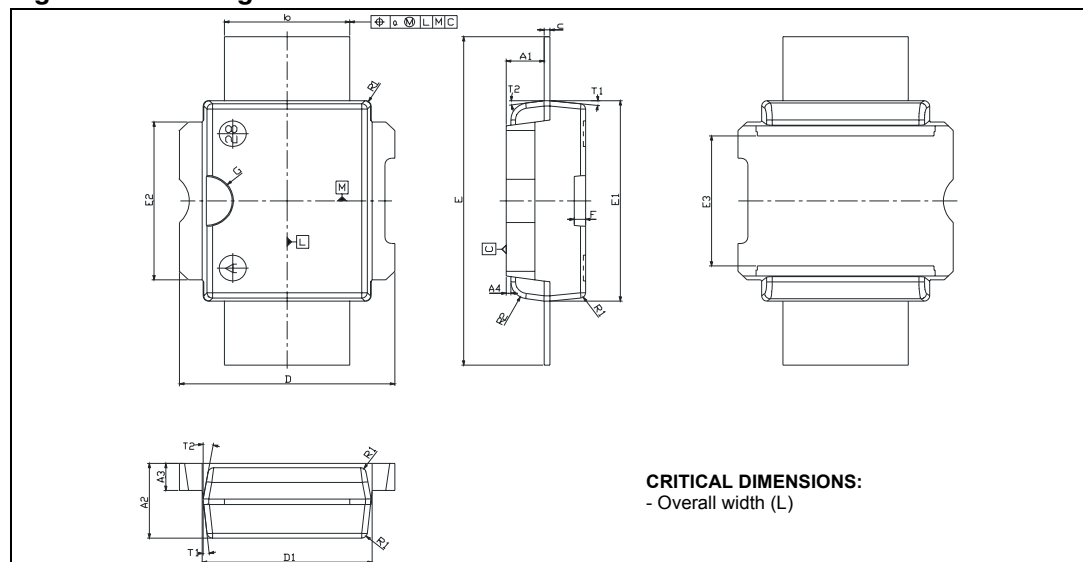
**Figure 21. Package dimensions**

Figure 22. Tube information

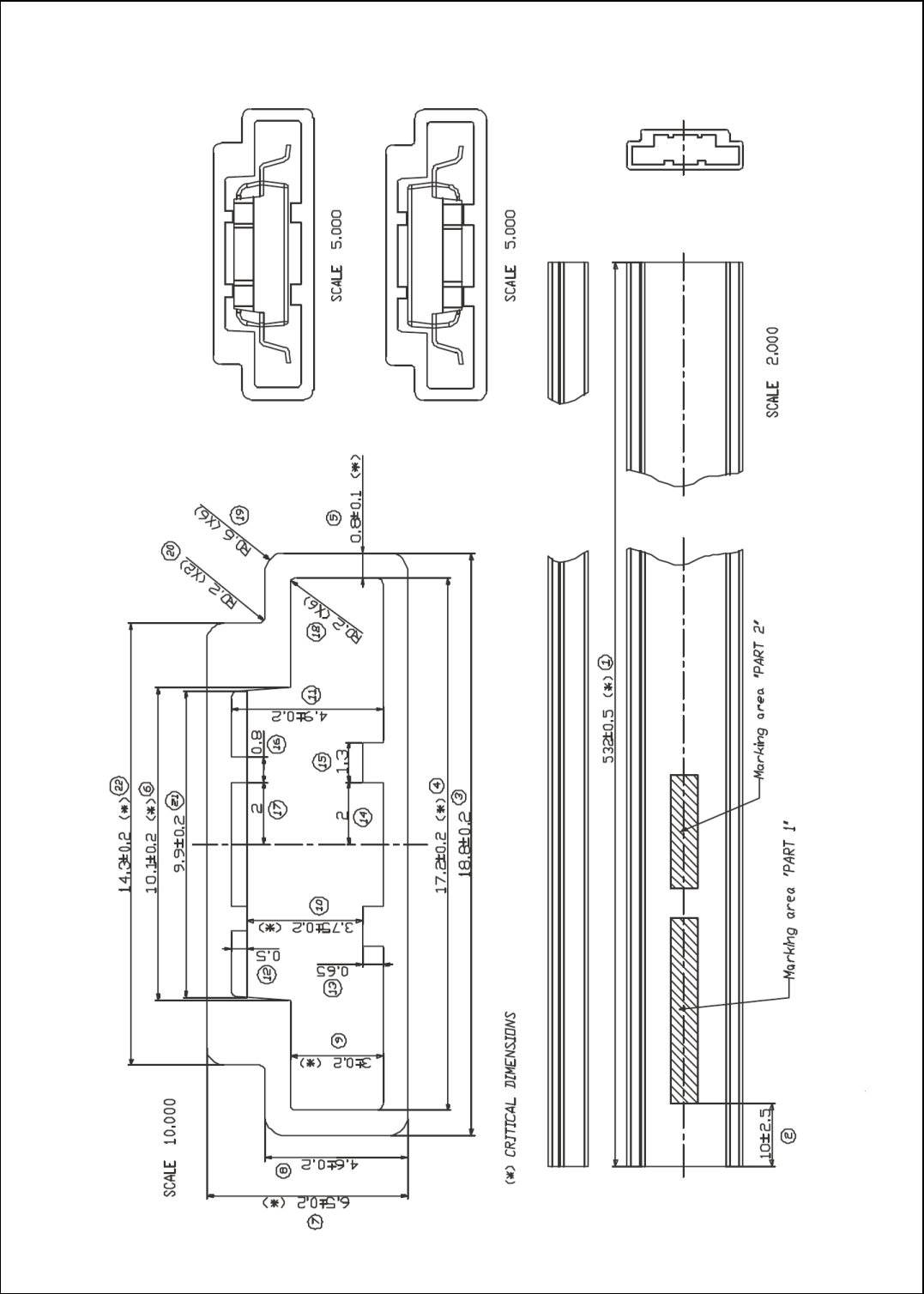
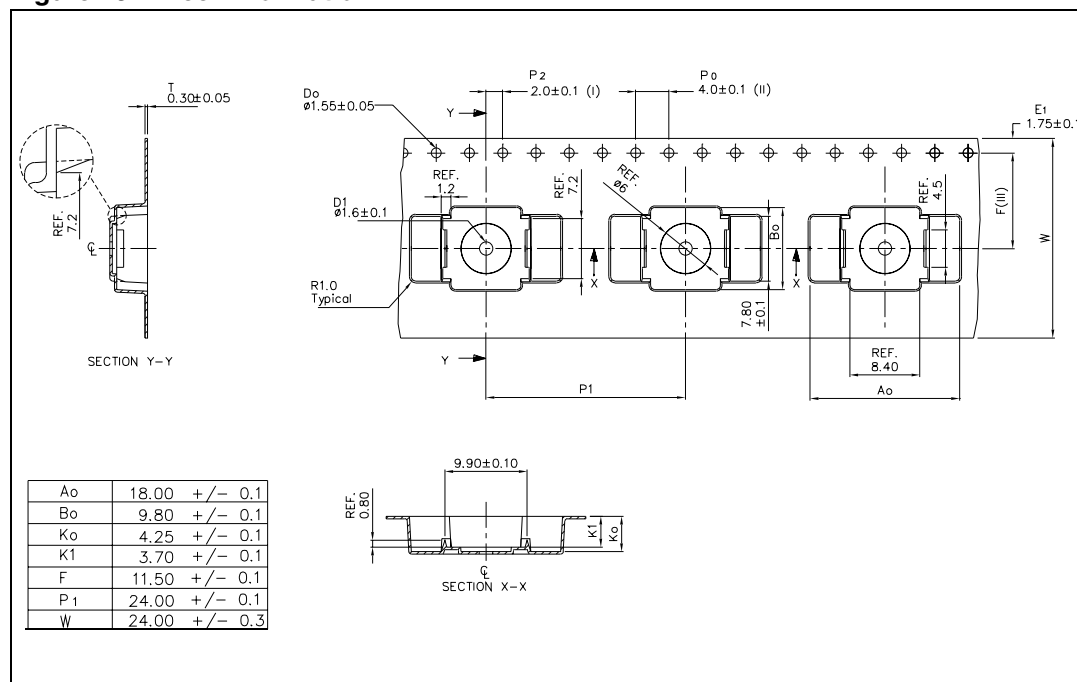


Figure 23. Reel information



## 9 Revision history

**Table 14. Revision history**

| Date        | Revision | Changes          |
|-------------|----------|------------------|
| 11-May-2006 | 1        | Initial release. |

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