



PD55008-E PD55008S-E

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

Features

- Excellent thermal stability
- Common source configuration
- $P_{OUT} = 8\text{ W}$ with 17dB 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 performances and ease of assembly.

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

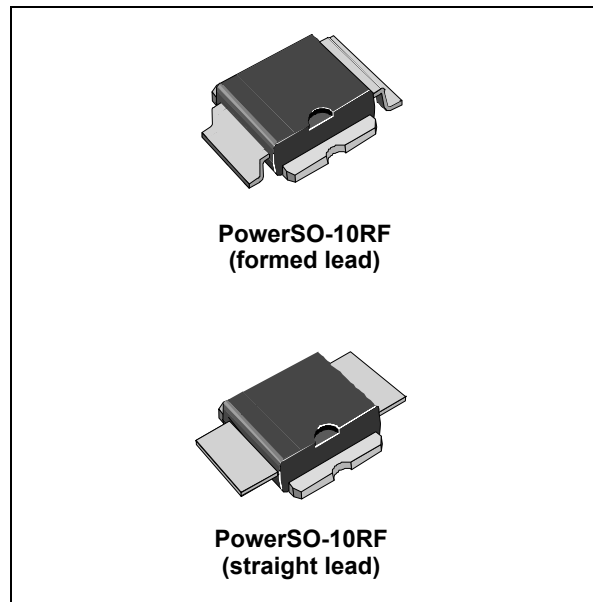


Figure 1. Pin connection

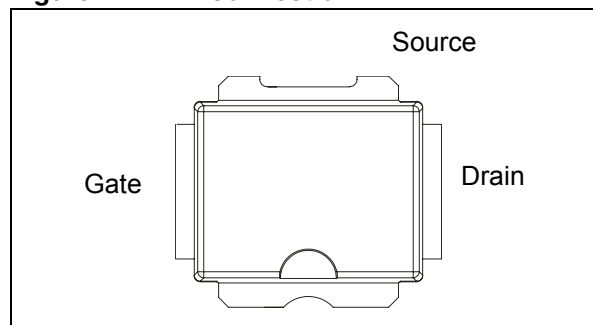


Table 1. Device summary

| Order code | Package | Packing |
|--------------|------------------------------|---------------|
| PD55008-E | PowerSO-10RF (formed lead) | Tube |
| PD55008S-E | PowerSO-10RF (straight lead) | Tube |
| PD55008TR-E | PowerSO-10RF (formed lead) | Tape and reel |
| PD55008STR-E | PowerSO-10RF (straight lead) | Tape and reel |

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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 | ± 20 | V |
| I_D | Drain current | 4 | A |
| P_{DISS} | Power dissipation (@ $T_C = 70^{\circ}C$) | 52.8 | 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 | 1.8 | $^{\circ}C/W$ |

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} | $V_{GS} = 0$ | $V_{DS} = 28\text{ V}$ | | | 1 | μA |
| I_{GSS} | $V_{GS} = 20\text{ V}$ | $V_{DS} = 0$ | | | 1 | μA |
| $V_{GS(Q)}$ | $V_{DS} = 10\text{ V}$ | $I_D = 150\text{ mA}$ | 2.0 | | 5.0 | V |
| $V_{DS(ON)}$ | $V_{GS} = 10\text{ V}$ | $I_D = 1.5\text{ A}$ | | | 0.67 | V |
| g_{FS} | $V_{DS} = 10\text{ V}$ | $I_D = 1.5\text{ A}$ | | 1.6 | | mho |
| C_{ISS} | $V_{GS} = 0$ | $V_{DS} = 12.5\text{ V}$ | | 58 | | pF |
| C_{OSS} | $V_{GS} = 0$ | $V_{DS} = 12.5\text{ V}$ | | 38 | | pF |
| C_{RSS} | $V_{GS} = 0$ | $V_{DS} = 12.5\text{ V}$ | | 2.8 | | pF |

2.2 Dynamic

Table 5. Dynamic

| Symbol | Test conditions | | Min. | Typ. | Max. | Unit |
|---------------|--|----------------------|------|------|------|------|
| P_{OUT} | $V_{DD} = 12.5\text{ V}, I_{DQ} = 150\text{ mA}$ | $f = 500\text{ MHz}$ | 8 | | | W |
| G_P | $V_{DD} = 12.5\text{ V}, I_{DQ} = 150\text{ mA}, P_{OUT} = 8\text{ W}, f = 500\text{ MHz}$ | | 15 | 17 | | dB |
| η_D | $V_{DD} = 12.5\text{ V}, I_{DQ} = 150\text{ mA}, P_{OUT} = 8\text{ W}, f = 500\text{ MHz}$ | | 50 | 55 | | % |
| Load mismatch | $V_{DD} = 15.5\text{ V}, I_{DQ} = 150\text{ mA}, P_{OUT} = 8\text{ W}, f = 500\text{ MHz}$ 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

| PD55008 | | | PD55008S | | |
|-------------|---------------------|---------------------|-------------|---------------------|---------------------|
| Freq. (MHz) | Z _{IN} (Ω) | Z _{DL} (Ω) | Freq. (MHz) | Z _{IN} (Ω) | Z _{DL} (Ω) |
| 480 | 1.141 - j 2.054 | 1.649 + j 2.916 | 480 | 1.075 - j 2.727 | 2.046 + j 1.960 |
| 500 | 1.589 - j 1.185 | 1.561 + j 2.639 | 500 | 1.409 - j 3.448 | 2.129 + j 3.219 |
| 520 | 1.649 - j 1.965 | 1.716 + j 1.552 | 520 | 1.586 - j 2.087 | 3.082 + j 2.043 |
| 800 | 1.05 + j 0.54 | 2.62 - j 1.91 | | | |
| 850 | 1.50 + j 1.00 | 2.26 - j 1.54 | | | |
| 900 | 1.95 + j 2.28 | 2.70 - j 1.90 | | | |

4 Typical performance

Figure 3. Capacitance vs. drain voltage

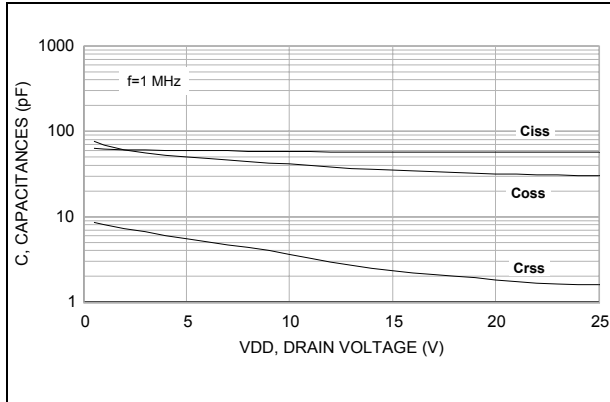


Figure 4. Drain current vs. gate-source voltage

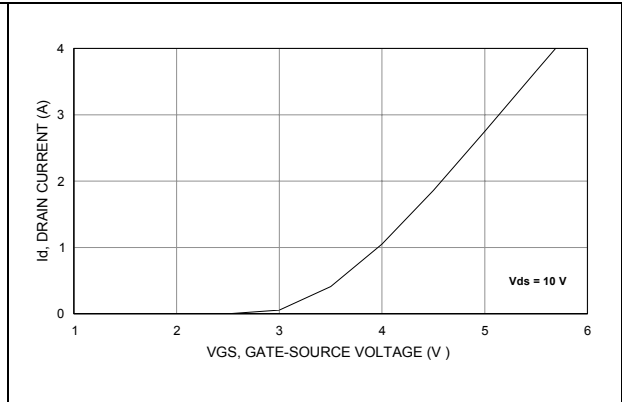
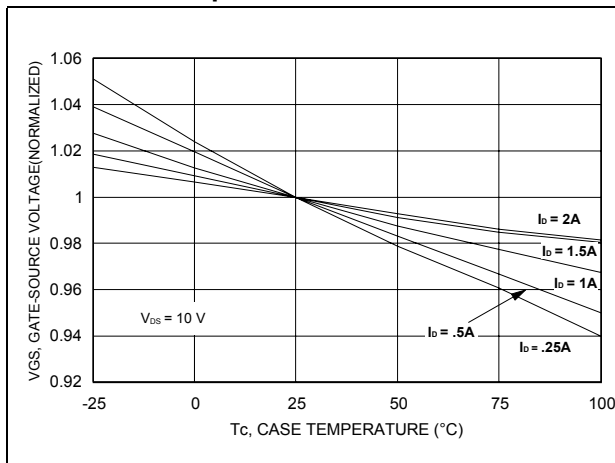


Figure 5. Gate-source voltage vs. case temperature



4.1 PD55008-E

Figure 6. Output power vs. input power

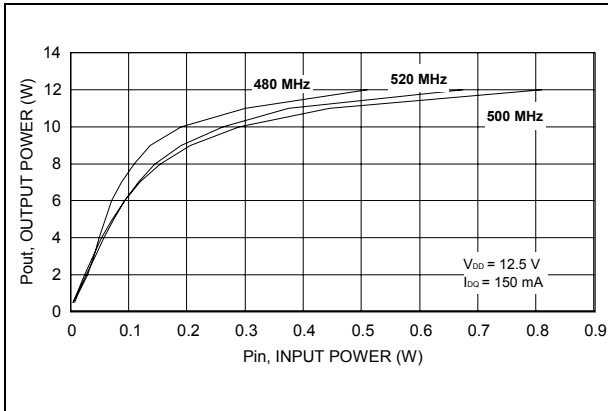


Figure 7. Power gain vs. output power

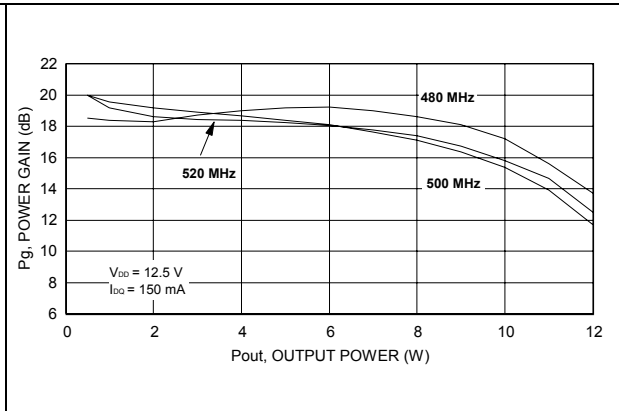


Figure 8. Drain efficiency vs. output power

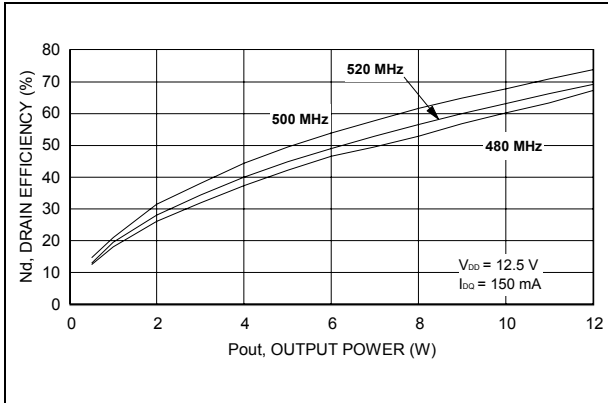


Figure 9. Input return loss vs. output power

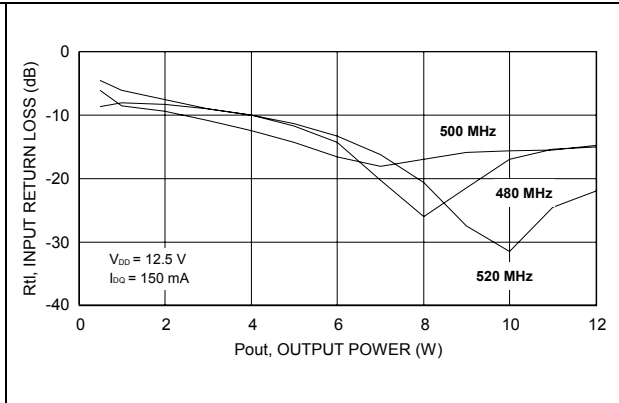


Figure 10. Output power vs. bias current

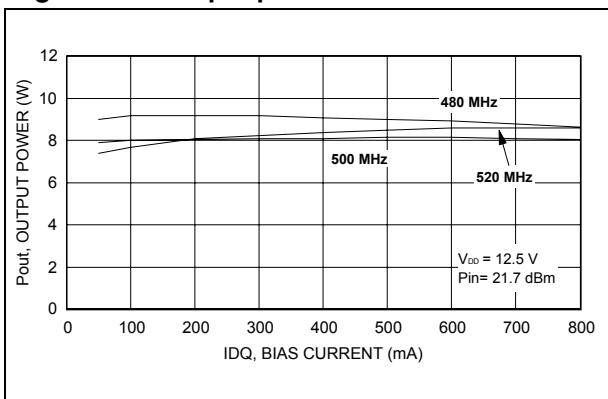


Figure 11. Drain efficiency vs. bias current

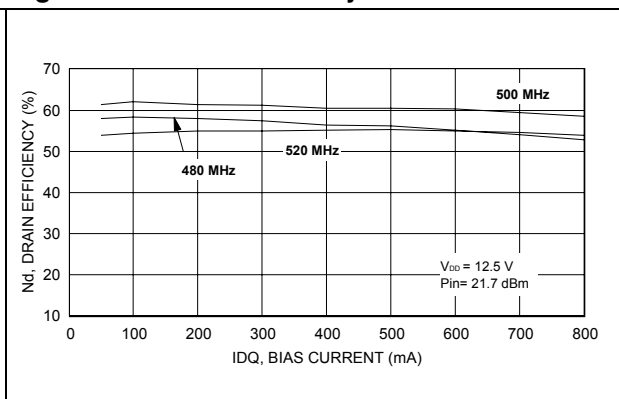


Figure 12. Output power vs. supply voltage

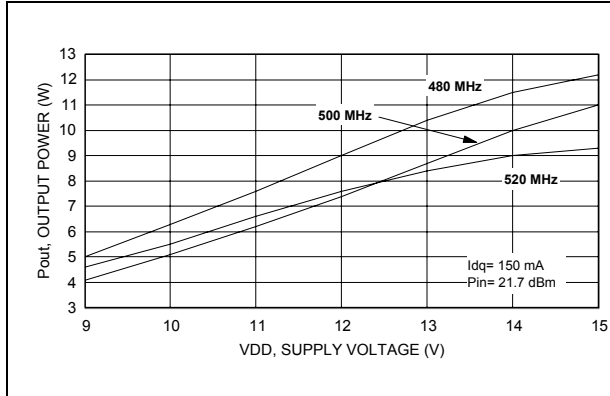


Figure 13. Drain efficiency vs. supply voltage

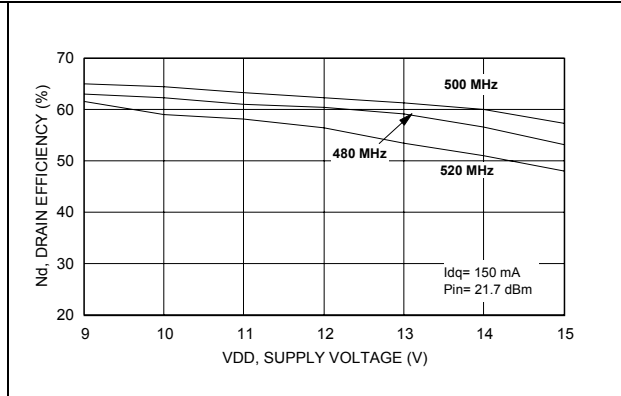


Figure 14. Output power vs. gate-source voltage

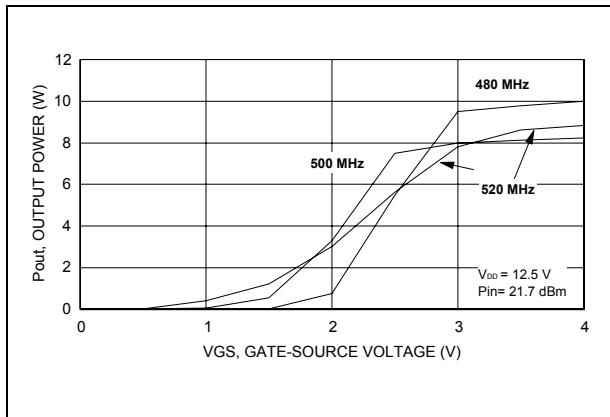


Table 8. Output power vs. input power

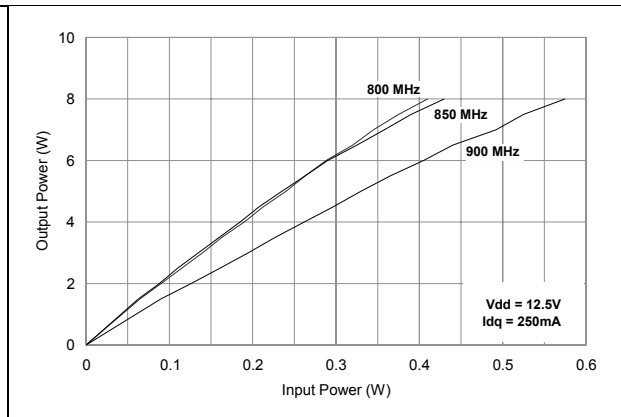


Figure 15. Drain efficiency vs. output power

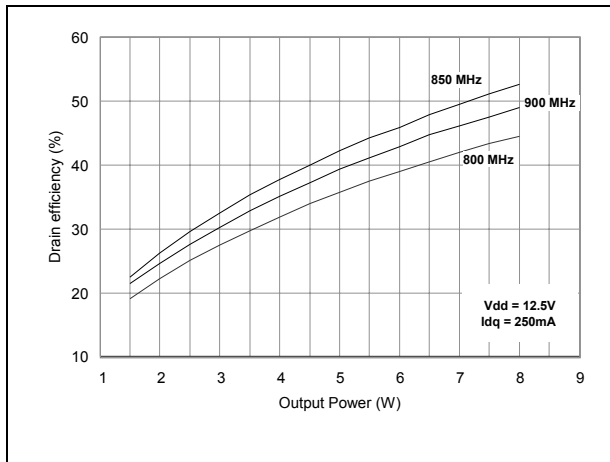
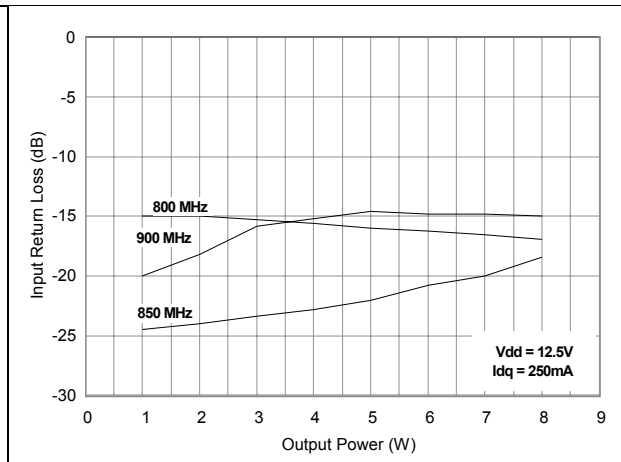


Figure 16. Input return loss vs. output power



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Figure 17. Output power vs. input power

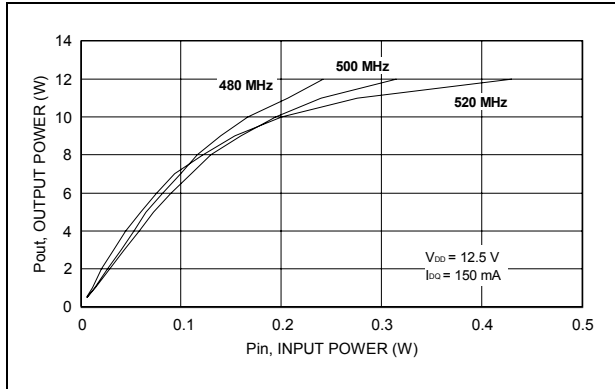


Figure 18. Power gain vs. output power

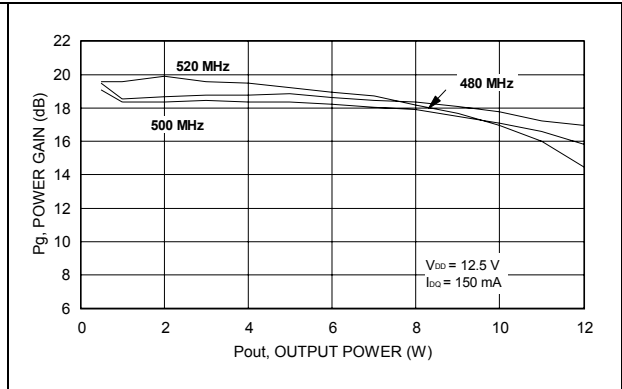


Figure 19. Drain efficiency vs. output power

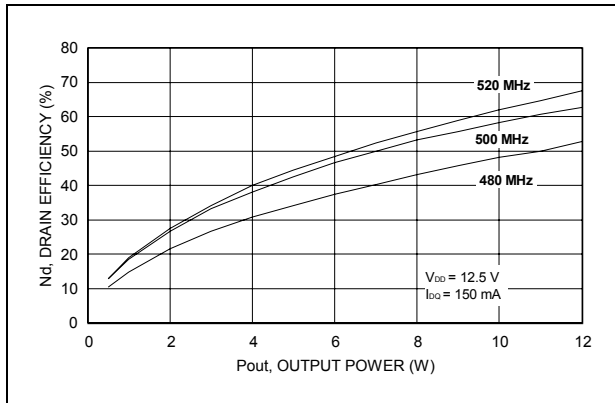


Figure 20. Input return loss vs. output power

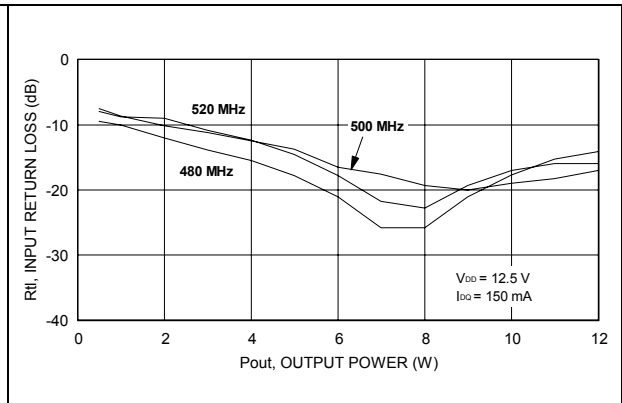


Figure 21. Output power vs. bias current

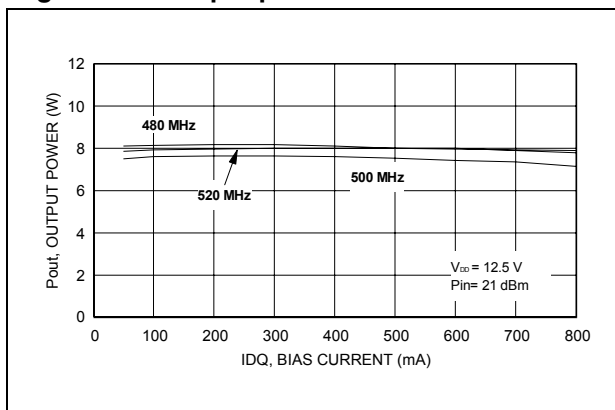


Figure 22. Drain efficiency vs. bias current

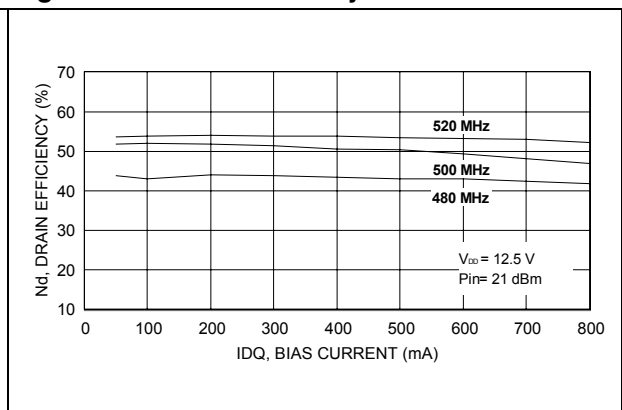


Figure 23. Output power vs. supply voltage

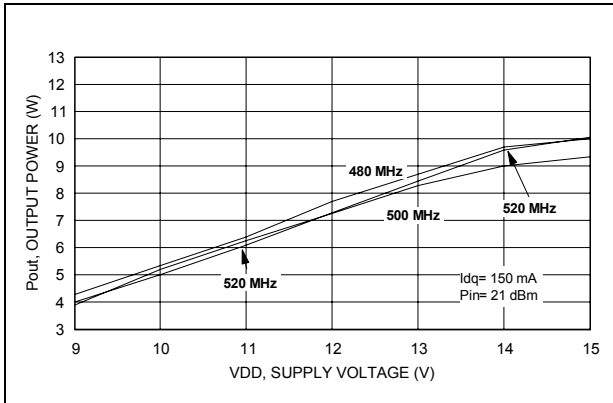


Figure 24. Drain efficiency vs. supply voltage

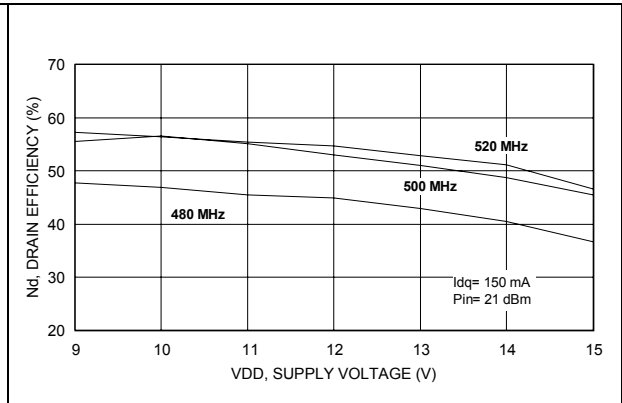
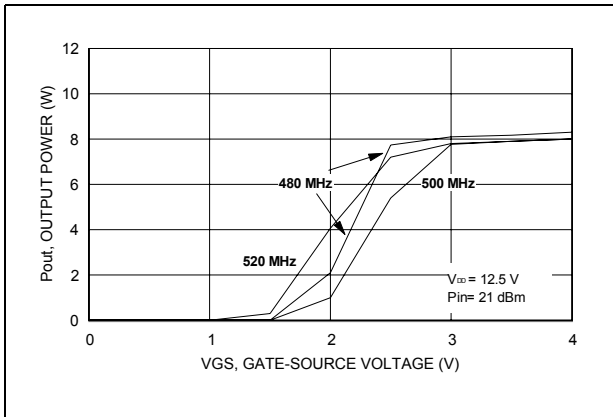


Figure 25. Output power vs. supply voltage



5 Test circuit

Figure 26. Test circuit schematic

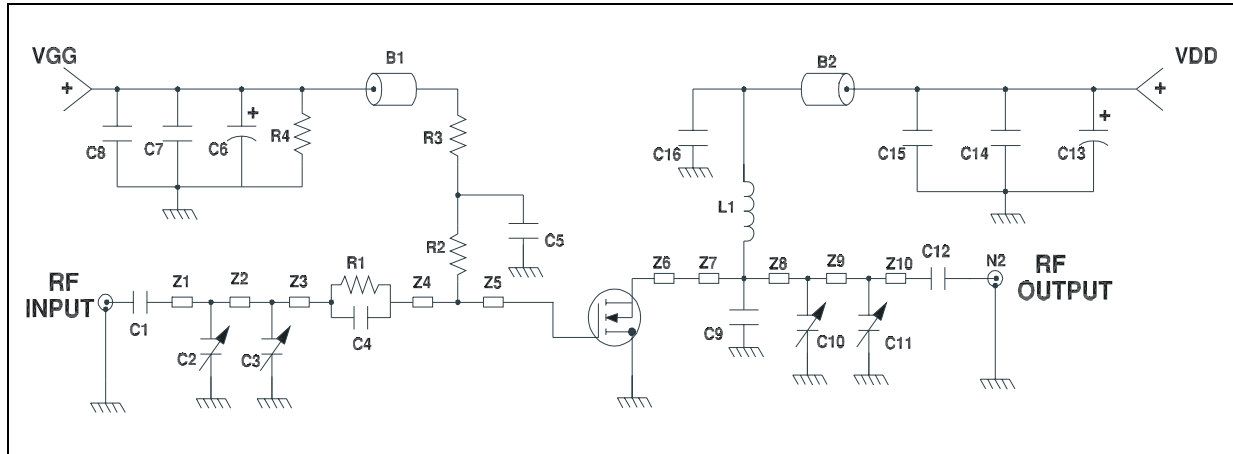


Table 9. Test circuit component part list

| Component | Description |
|---------------|---|
| B1, B2 | Short ferrite bead, fair rite products (2743021446) |
| C1, C12 | 240 pF, 100 mil chip capacitor |
| C2,C3,C10,C11 | 0 TO 20 pF, trimmer capacitor |
| C4 | 82 pF, 100 mil chip capacitor |
| C5,C16 | 120 pF, 100 mil chip capacitor |
| C6,C13 | 10 μ F, 50 V electrolytic capacitor |
| C7, C14 | 1.200 pF, 100 mil chip capacitor |
| C8,C15 | 0.1 F, 100 mil chip capacitor |
| C9 | 30 pF, 100 mil chip capacitor |
| L1 | 55.5 nH, turn, Coilcraft |
| N1, N2 | Type N flange mount |
| R1 | 15 Ω , 0805 chip resistor |
| R2 | 51 Ω , 1/2 W resistor |
| R3 | 10 Ω , 0805 chip resistor |
| R4 | 33 k Ω , 1/8 Ω resistor |
| Z1 | 0.451" X 0.080" microstrip |
| Z2 | 1.005" X 0.080" microstrip |
| Z3 | 0.020" X 0.080" microstrip |
| Z4 | 0.155" X 0.080" microstrip |
| Z5,Z6 | 0.260" X 0.233" microstrip |
| Z7 | 0.065" X 0.080" microstrip |

Table 9. Test circuit component part list (continued)

| Component | Description |
|-----------|--|
| Z8 | 0.266" X 0.080" microstrip |
| Z9 | 1.113" X 0.080" microstrip |
| Z10 | 0.433" X 0.080" microstrip |
| Board | Roger ultra lam 2000 THK 0.030" $\epsilon_r = 2.55$ 2oz ED Cu both sides |

6 Circuit layout

Figure 27. Test fixture component layout

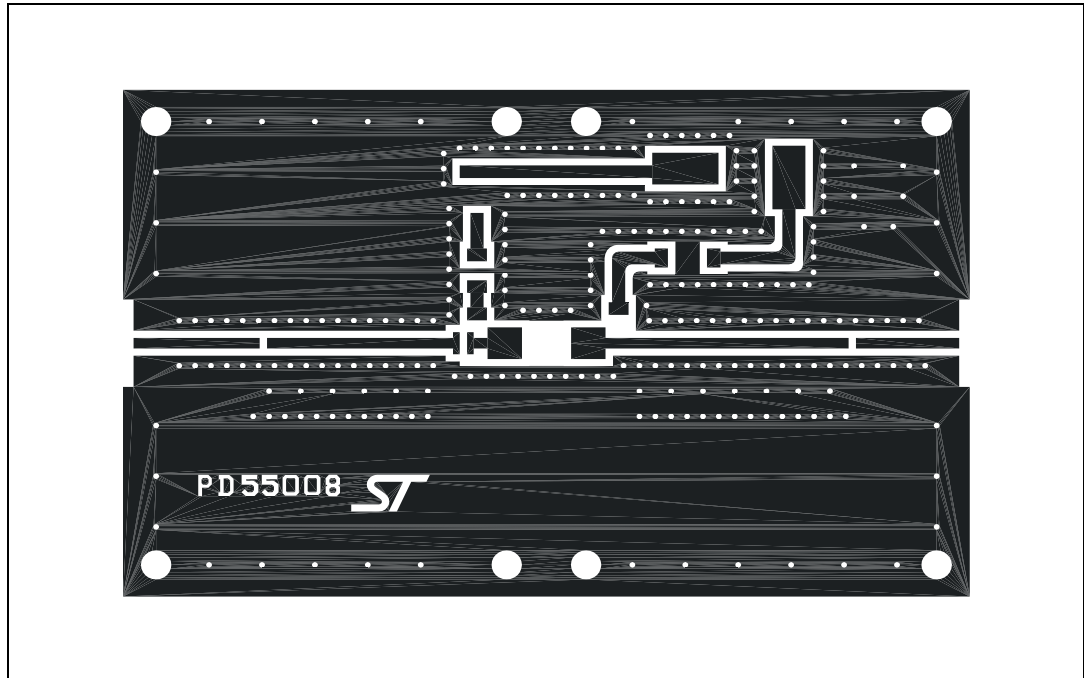
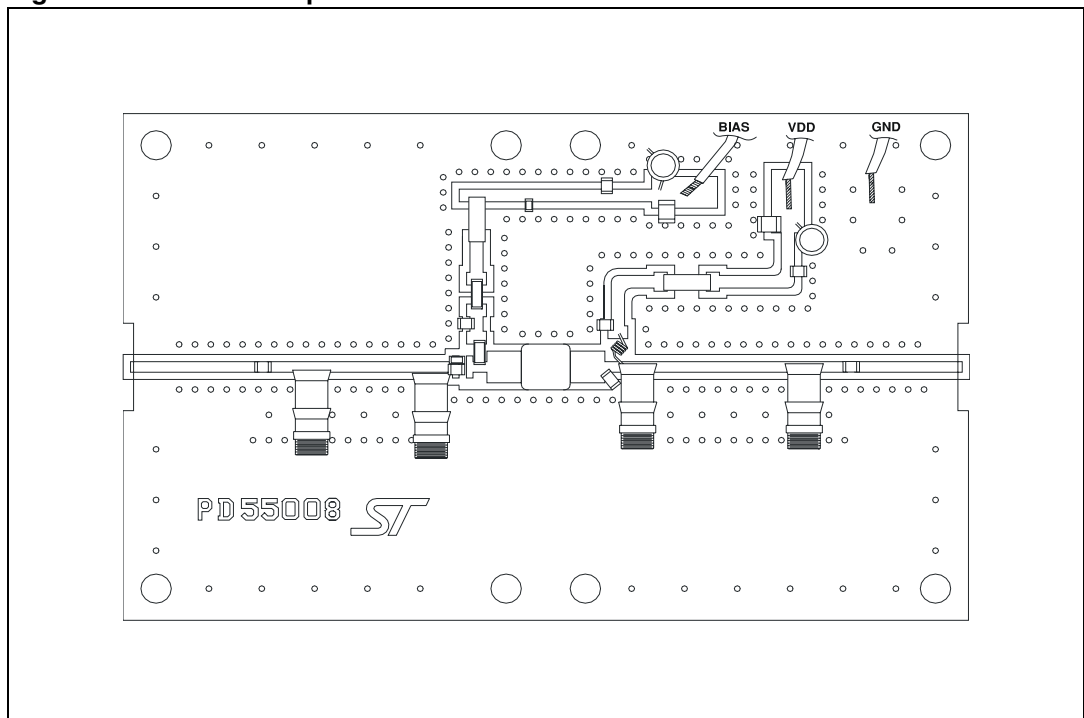


Figure 28. Test circuit photomaster



7 Common source s-parameter

Table 10. S-parameter for PD55008-E ($V_{DS} = 12.5$ V, $I_{DS} = 150$ mA)

| Freq (MHz) | $ S_{11} $ | $S_{11} < \Phi$ | $ S_{21} $ | $S_{21} < \Phi$ | $ S_{12} $ | $S_{12} < \Phi$ | $ S_{22} $ | $S_{22} < \Phi$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.781 | -141 | 16.89 | 93 | 0.035 | 4 | 0.685 | -137 |
| 100 | 0.784 | -157 | 8.14 | 77 | 0.035 | -11 | 0.681 | -151 |
| 150 | 0.803 | -162 | 5.19 | 67 | 0.032 | -18 | 0.704 | -157 |
| 200 | 0.830 | -165 | 3.69 | 58 | 0.030 | -26 | 0.743 | -159 |
| 250 | 0.852 | -167 | 2.77 | 50 | 0.027 | -34 | 0.773 | -161 |
| 300 | 0.873 | -169 | 2.16 | 44 | 0.025 | -39 | 0.812 | -164 |
| 350 | 0.892 | -171 | 1.72 | 37 | 0.022 | -43 | 0.844 | -166 |
| 400 | 0.906 | -172 | 1.40 | 33 | 0.020 | -45 | 0.862 | -168 |
| 450 | 0.919 | -173 | 1.16 | 28 | 0.017 | -47 | 0.888 | -170 |
| 500 | 0.928 | -175 | 0.97 | 24 | 0.015 | -51 | 0.903 | -171 |
| 550 | 0.936 | -176 | 0.83 | 20 | 0.012 | -52 | 0.913 | -173 |
| 600 | 0.941 | -177 | 0.71 | 17 | 0.010 | -50 | 0.921 | -174 |
| 650 | 0.946 | -178 | 0.62 | 14 | 0.010 | -52 | 0.926 | -176 |
| 700 | 0.952 | -179 | 0.55 | 11 | 0.008 | -47 | 0.934 | -177 |
| 750 | 0.954 | 180 | 0.48 | 9 | 0.006 | -48 | 0.937 | -178 |
| 800 | 0.957 | 179 | 0.44 | 7 | 0.006 | -40 | 0.940 | -180 |
| 850 | 0.959 | 178 | 0.39 | 4 | 0.004 | -30 | 0.950 | 179 |
| 900 | 0.960 | 177 | 0.35 | 3 | 0.005 | -1 | 0.952 | 178 |
| 950 | 0.963 | 176 | 0.32 | 1 | 0.004 | 17 | 0.957 | 177 |
| 1000 | 0.964 | 176 | 0.29 | -1 | 0.004 | 28 | 0.958 | 176 |
| 1050 | 0.964 | 175 | 0.27 | -3 | 0.004 | 43 | 0.953 | 175 |
| 1100 | 0.966 | 174 | 0.25 | -4 | 0.005 | 42 | 0.955 | 174 |
| 1150 | 0.963 | 173 | 0.23 | -6 | 0.005 | 59 | 0.954 | 173 |
| 1200 | 0.964 | 174 | 0.21 | -8 | 0.007 | 58 | 0.952 | 172 |
| 1250 | 0.962 | 172 | 0.20 | -9 | 0.008 | 57 | 0.956 | 171 |
| 1300 | 0.961 | 172 | 0.18 | -11 | 0.008 | 57 | 0.953 | 171 |
| 1350 | 0.960 | 171 | 0.17 | -11 | 0.010 | 68 | 0.950 | 170 |
| 1400 | 0.957 | 170 | 0.16 | -12 | 0.010 | 61 | 0.957 | 169 |
| 1450 | 0.957 | 169 | 0.15 | -12 | 0.011 | 67 | 0.942 | 168 |
| 1500 | 0.952 | 169 | 0.14 | -13 | 0.011 | 76 | 0.944 | 167 |

Table 11. S-parameter PD55003-E ($V_{DS} = 12.5$ V, $I_{DS} = 800$ mA)

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.832 | -156 | 20.68 | 90 | 0.022 | 3 | 0.740 | -157 |
| 100 | 0.833 | -167 | 9.98 | 80 | 0.022 | -6 | 0.734 | -165 |
| 150 | 0.839 | -171 | 6.51 | 73 | 0.020 | -11 | 0.741 | -169 |
| 200 | 0.851 | -172 | 4.78 | 67 | 0.020 | -16 | 0.756 | -169 |
| 250 | 0.851 | -174 | 3.71 | 60 | 0.018 | -20 | 0.767 | -170 |
| 300 | 0.861 | -174 | 3.00 | 55 | 0.017 | -22 | 0.791 | -172 |
| 350 | 0.872 | -175 | 2.46 | 49 | 0.016 | -23 | 0.813 | -172 |
| 400 | 0.883 | -176 | 2.06 | 44 | 0.014 | -26 | 0.828 | -173 |
| 450 | 0.894 | -177 | 1.75 | 40 | 0.014 | -26 | 0.849 | -174 |
| 500 | 0.902 | -178 | 1.50 | 35 | 0.012 | -26 | 0.863 | -175 |
| 550 | 0.910 | -179 | 1.30 | 31 | 0.011 | -27 | 0.874 | -176 |
| 600 | 0.919 | -179 | 1.14 | 28 | 0.010 | -29 | 0.886 | -177 |
| 650 | 0.923 | 180 | 1.01 | 25 | 0.009 | -25 | 0.890 | -178 |
| 700 | 0.929 | 179 | 0.90 | 22 | 0.008 | -20 | 0.898 | -179 |
| 750 | 0.934 | 178 | 0.81 | 19 | 0.007 | -10 | 0.905 | -180 |
| 800 | 0.937 | 177 | 0.73 | 16 | 0.006 | -3 | 0.908 | 179 |
| 850 | 0.939 | 177 | 0.66 | 13 | 0.005 | 11 | 0.925 | 178 |
| 900 | 0.942 | 176 | 0.60 | 11 | 0.005 | 17 | 0.926 | 177 |
| 950 | 0.944 | 175 | 0.55 | 9 | 0.006 | 20 | 0.929 | 176 |
| 1000 | 0.949 | 175 | 0.51 | 6 | 0.006 | 25 | 0.935 | 176 |
| 1050 | 0.952 | 174 | 0.47 | 4 | 0.008 | 35 | 0.933 | 174 |
| 1100 | 0.954 | 173 | 0.43 | 2 | 0.007 | 38 | 0.935 | 173 |
| 1150 | 0.952 | 173 | 0.40 | 0 | 0.009 | 48 | 0.936 | 173 |
| 1200 | 0.954 | 172 | 0.37 | -2 | 0.009 | 50 | 0.936 | 172 |
| 1250 | 0.951 | 171 | 0.34 | -4 | 0.010 | 53 | 0.937 | 171 |
| 1300 | 0.950 | 171 | 0.32 | -5 | 0.011 | 51 | 0.935 | 170 |
| 1350 | 0.951 | 170 | 0.30 | -6 | 0.011 | 60 | 0.935 | 169 |
| 1400 | 0.948 | 170 | 0.28 | -8 | 0.012 | 56 | 0.939 | 169 |
| 1450 | 0.947 | 169 | 0.27 | -9 | 0.012 | 64 | 0.928 | 168 |
| 1500 | 0.944 | 168 | 0.25 | -9 | 0.013 | 67 | 0.933 | 166 |

Table 12. S-parameter for PD55003-E ($V_{DS} = 12.5$ V, $I_{DS} = 1.5$ A)

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.797 | -161 | 20.72 | 90 | 0.020 | 2 | 0.743 | -159 |
| 100 | 0.824 | -168 | 10.01 | 80 | 0.019 | -5 | 0.741 | -167 |
| 150 | 0.849 | -171 | 6.54 | 74 | 0.019 | -9 | 0.746 | -170 |
| 200 | 0.861 | -173 | 4.83 | 67 | 0.018 | -14 | 0.759 | -171 |
| 250 | 0.870 | -175 | 3.76 | 61 | 0.017 | -19 | 0.770 | -171 |
| 300 | 0.879 | -175 | 3.04 | 56 | 0.016 | -20 | 0.791 | -173 |
| 350 | 0.887 | -176 | 2.51 | 50 | 0.015 | -21 | 0.811 | -173 |
| 400 | 0.897 | -177 | 2.11 | 45 | 0.013 | -26 | 0.824 | -174 |
| 450 | 0.905 | -178 | 1.80 | 41 | 0.013 | -23 | 0.847 | -175 |
| 500 | 0.911 | -178 | 1.54 | 37 | 0.011 | -21 | 0.858 | -175 |
| 550 | 0.917 | -179 | 1.35 | 33 | 0.010 | -23 | 0.871 | -176 |
| 600 | 0.924 | -180 | 1.17 | 29 | 0.009 | -21 | 0.881 | -177 |
| 650 | 0.927 | 179 | 1.04 | 26 | 0.009 | -16 | 0.887 | -178 |
| 700 | 0.933 | 179 | 0.93 | 23 | 0.007 | -8 | 0.899 | -179 |
| 750 | 0.937 | 178 | 0.83 | 20 | 0.007 | -3 | 0.901 | 180 |
| 800 | 0.940 | 177 | 0.76 | 17 | 0.006 | -2 | 0.906 | 179 |
| 850 | 0.941 | 177 | 0.68 | 14 | 0.007 | 0 | 0.918 | 178 |
| 900 | 0.944 | 176 | 0.63 | 12 | 0.006 | 21 | 0.920 | 177 |
| 950 | 0.946 | 175 | 0.58 | 10 | 0.008 | 17 | 0.927 | 176 |
| 1000 | 0.948 | 174 | 0.53 | 7 | 0.007 | 43 | 0.929 | 175 |
| 1050 | 0.952 | 174 | 0.49 | 5 | 0.008 | 44 | 0.929 | 175 |
| 1100 | 0.953 | 173 | 0.45 | 3 | 0.008 | 44 | 0.930 | 173 |
| 1150 | 0.952 | 172 | 0.42 | 1 | 0.009 | 47 | 0.931 | 173 |
| 1200 | 0.951 | 172 | 0.39 | -1 | 0.010 | 51 | 0.928 | 172 |
| 1250 | 0.952 | 171 | 0.36 | -3 | 0.010 | 51 | 0.932 | 171 |
| 1300 | 0.952 | 171 | 0.34 | -5 | 0.011 | 52 | 0.931 | 170 |
| 1350 | 0.949 | 170 | 0.31 | -7 | 0.011 | 53 | 0.931 | 169 |
| 1400 | 0.947 | 169 | 0.29 | 8 | 0.011 | 58 | 0.937 | 169 |
| 1450 | 0.945 | 169 | 0.28 | -9 | 0.012 | 60 | 0.926 | 168 |
| 1500 | 0.942 | 168 | 0.26 | -9 | 0.012 | 64 | 0.927 | 166 |

Table 13. S-parameter for PD55003S-E ($V_{DS} = 12.5$ V, $I_{DS} = 0.15$ A)

| Freq (MHz) | $ S_{11} $ | $S_{11} < \Phi$ | $ S_{21} $ | $S_{21} < \Phi$ | $ S_{12} $ | $S_{12} < \Phi$ | $ S_{22} $ | $S_{22} < \Phi$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.753 | -146 | 15.56 | 92 | 0.036 | 4 | 0.666 | -144 |
| 100 | 0.781 | -159 | 7.52 | 78 | 0.036 | -9 | 0.684 | -157 |
| 150 | 0.812 | -163 | 4.83 | 70 | 0.033 | -17 | 0.717 | -161 |
| 200 | 0.834 | -166 | 3.46 | 62 | 0.032 | -25 | 0.747 | -162 |
| 250 | 0.856 | -168 | 2.63 | 54 | 0.029 | -31 | 0.784 | -164 |
| 300 | 0.873 | -169 | 2.07 | 48 | 0.028 | -37 | 0.814 | -165 |
| 350 | 0.887 | -170 | 1.66 | 42 | 0.025 | -42 | 0.836 | -166 |
| 400 | 0.902 | -172 | 1.37 | 37 | 0.023 | -45 | 0.859 | -168 |
| 450 | 0.915 | -173 | 1.14 | 33 | 0.021 | -48 | 0.873 | -169 |
| 500 | 0.925 | -174 | 0.96 | 29 | 0.019 | -52 | 0.890 | -171 |
| 550 | 0.935 | -175 | 0.83 | 25 | 0.017 | -56 | 0.906 | -171 |
| 600 | 0.942 | -176 | 0.71 | 22 | 0.015 | -55 | 0.911 | -173 |
| 650 | 0.946 | -176 | 0.63 | 19 | 0.014 | -56 | 0.922 | -174 |
| 700 | 0.950 | -177 | 0.55 | 16 | 0.013 | -60 | 0.933 | -175 |
| 750 | 0.956 | -178 | 0.49 | 14 | 0.012 | -58 | 0.936 | -176 |
| 800 | 0.959 | -179 | 0.44 | 12 | 0.010 | -67 | 0.942 | -177 |
| 850 | 0.964 | -180 | 0.40 | 9 | 0.008 | -66 | 0.942 | -178 |
| 900 | 0.961 | 180 | 0.36 | 7 | 0.008 | -65 | 0.947 | -179 |
| 950 | 0.965 | 179 | 0.33 | 5 | 0.005 | -62 | 0.954 | -179 |
| 1000 | 0.967 | 178 | 0.30 | 3 | 0.006 | -67 | 0.957 | 180 |
| 1050 | 0.970 | 178 | 0.27 | 2 | 0.004 | -66 | 0.960 | 179 |
| 1100 | 0.970 | 177 | 0.25 | 0 | 0.004 | -43 | 0.958 | 178 |
| 1150 | 0.970 | 177 | 0.23 | -2 | 0.003 | -42 | 0.963 | 178 |
| 1200 | 0.971 | 176 | 0.22 | -3 | 0.002 | -58 | 0.961 | 177 |
| 1250 | 0.973 | 175 | 0.20 | -5 | 0.001 | -13 | 0.960 | 177 |
| 1300 | 0.969 | 175 | 0.19 | -6 | 0.001 | 31 | 0.956 | 176 |
| 1350 | 0.971 | 174 | 0.18 | -7 | 0.002 | 60 | 0.959 | 175 |
| 1400 | 0.969 | 174 | 0.16 | -7 | 0.001 | 67 | 0.957 | 175 |
| 1450 | 0.969 | 173 | 0.15 | -8 | 0.003 | 79 | 0.965 | 174 |
| 1500 | 0.968 | 173 | 0.14 | -9 | 0.004 | 125 | 0.965 | 174 |

Table 14. S-parameter for PD55003S-E ($V_{DS} = 12.5$ V, $I_{DS} = 0.8$ A)

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.862 | -157 | 18.51 | 90 | 0.021 | 7 | 0.765 | -161 |
| 100 | 0.861 | -168 | 8.97 | 81 | 0.021 | -4 | 0.767 | -170 |
| 150 | 0.869 | -171 | 5.88 | 76 | 0.020 | -10 | 0.778 | -172 |
| 200 | 0.872 | -173 | 4.33 | 70 | 0.019 | -14 | 0.782 | -172 |
| 250 | 0.879 | -174 | 3.40 | 65 | 0.019 | -18 | 0.801 | -173 |
| 300 | 0.888 | -175 | 2.77 | 60 | 0.018 | -20 | 0.810 | -173 |
| 350 | 0.894 | -175 | 2.30 | 55 | 0.017 | -26 | 0.823 | -173 |
| 400 | 0.905 | -176 | 1.96 | 50 | 0.016 | -31 | 0.836 | -173 |
| 450 | 0.910 | -177 | 1.67 | 46 | 0.015 | -33 | 0.846 | -174 |
| 500 | 0.916 | -177 | 1.44 | 42 | 0.014 | -31 | 0.862 | -175 |
| 550 | 0.926 | -178 | 1.27 | 38 | 0.013 | -32 | 0.873 | -175 |
| 600 | 0.930 | -178 | 1.11 | 35 | 0.012 | -37 | 0.880 | -176 |
| 650 | 0.934 | -179 | 0.96 | 32 | 0.011 | -39 | 0.892 | -176 |
| 700 | 0.938 | -179 | 0.89 | 29 | 0.010 | -38 | 0.901 | -177 |
| 750 | 0.944 | 180 | 0.80 | 26 | 0.009 | -38 | 0.907 | -178 |
| 800 | 0.947 | 179 | 0.73 | 24 | 0.008 | -38 | 0.913 | -178 |
| 850 | 0.951 | 179 | 0.66 | 21 | 0.007 | -36 | 0.914 | -179 |
| 900 | 0.952 | 178 | 0.60 | 18 | 0.005 | -44 | 0.920 | 180 |
| 950 | 0.953 | 178 | 0.55 | 16 | 0.005 | -36 | 0.929 | 179 |
| 1000 | 0.955 | 177 | 0.51 | 14 | 0.005 | -22 | 0.932 | 179 |
| 1050 | 0.957 | 176 | 0.48 | 11 | 0.004 | -19 | 0.937 | 178 |
| 1100 | 0.960 | 176 | 0.44 | 9 | 0.003 | -3 | 0.937 | 178 |
| 1150 | 0.961 | 176 | 0.41 | 7 | 0.004 | 2 | 0.943 | 177 |
| 1200 | 0.962 | 175 | 0.38 | 5 | 0.004 | -4 | 0.940 | 177 |
| 1250 | 0.964 | 175 | 0.35 | 4 | 0.002 | 1 | 0.939 | 176 |
| 1300 | 0.961 | 174 | 0.33 | 2 | 0.003 | 31 | 0.937 | 176 |
| 1350 | 0.961 | 174 | 0.31 | 1 | 0.004 | 47 | 0.940 | 175 |
| 1400 | 0.959 | 173 | 0.29 | 1 | 0.003 | 56 | 0.939 | 174 |
| 1450 | 0.961 | 173 | 0.27 | -1 | 0.004 | 59 | 0.945 | 173 |
| 1500 | 0.962 | 172 | 0.26 | -2 | 0.004 | 87 | 0.946 | 173 |

Table 15. S-parameter for PD55008S-E ($V_{DS} = 12.5\text{ V}$, $I_{DS} = 1.5\text{ A}$)

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.821 | -162 | 18.74 | 90 | 0.002 | 2 | 0.771 | -163 |
| 100 | 0.849 | -169 | 9.09 | 82 | 0.019 | -5 | 0.776 | -171 |
| 150 | 0.875 | -171 | 5.97 | 77 | 0.018 | -10 | 0.785 | -173 |
| 200 | 0.885 | -173 | 4.41 | 71 | 0.017 | -12 | 0.789 | -173 |
| 250 | 0.892 | -175 | 3.47 | 66 | 0.017 | 17 | 0.807 | -174 |
| 300 | 0.895 | -175 | 2.84 | 61 | 0.016 | -19 | 0.915 | -174 |
| 350 | 0.901 | -176 | 2.37 | 56 | 0.015 | -22 | 0.924 | -174 |
| 400 | 0.909 | -177 | 2.02 | 52 | 0.014 | -26 | 0.839 | -174 |
| 450 | 0.914 | -177 | 1.74 | 48 | 0.013 | -28 | 0.844 | -175 |
| 500 | 0.920 | -178 | 1.50 | 43 | 0.013 | -30 | 0.859 | -176 |
| 550 | 0.928 | -178 | 1.32 | 40 | 0.012 | -28 | 0.871 | -176 |
| 600 | 0.932 | -179 | 1.17 | 37 | 0.011 | -34 | 0.877 | -176 |
| 650 | 0.935 | -179 | 1.04 | 33 | 0.010 | -31 | 0.887 | -177 |
| 700 | 0.939 | -180 | 0.93 | 30 | 0.009 | -29 | 0.895 | -177 |
| 750 | 0.946 | 179 | 0.84 | 28 | 0.008 | -28 | 0.901 | -178 |
| 800 | 0.946 | 179 | 0.77 | 25 | 0.008 | -31 | 0.908 | -179 |
| 850 | 0.953 | 178 | 0.70 | 22 | 0.007 | -31 | 0.908 | -179 |
| 900 | 0.952 | 178 | 0.64 | 19 | 0.006 | -27 | 0.916 | 180 |
| 950 | 0.950 | 177 | 0.59 | 18 | 0.006 | -33 | 0.924 | 179 |
| 1000 | 0.954 | 177 | 0.55 | 15 | 0.005 | -21 | 0.928 | 178 |
| 1050 | 0.957 | 176 | 0.50 | 3 | 0.005 | -20 | 0.930 | 178 |
| 1100 | 0.959 | 176 | 0.47 | 11 | 0.004 | 4 | 0.933 | 178 |
| 1150 | 0.959 | 175 | 0.44 | 8 | 0.004 | 13 | 0.937 | 177 |
| 1200 | 0.961 | 175 | 0.41 | 7 | 0.004 | 30 | 0.937 | 177 |
| 1250 | 0.962 | 174 | 0.38 | 5 | 0.003 | 29 | 0.935 | 176 |
| 1300 | 0.961 | 174 | 0.35 | 3 | 0.004 | 35 | 0.935 | 175 |
| 1350 | 0.961 | 174 | 0.33 | 2 | 0.004 | 55 | 0.935 | 174 |
| 1400 | 0.959 | 173 | 0.31 | 1 | 0.005 | 62 | 0.934 | 174 |
| 1450 | 0.960 | 172 | 0.29 | 0 | 0.005 | 65 | 0.942 | 173 |
| 1500 | 0.960 | 172 | 0.27 | -1 | 0.005 | 81 | 0.942 | 173 |

8 Package mechanical data

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Table 16. 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 29. Package dimensions

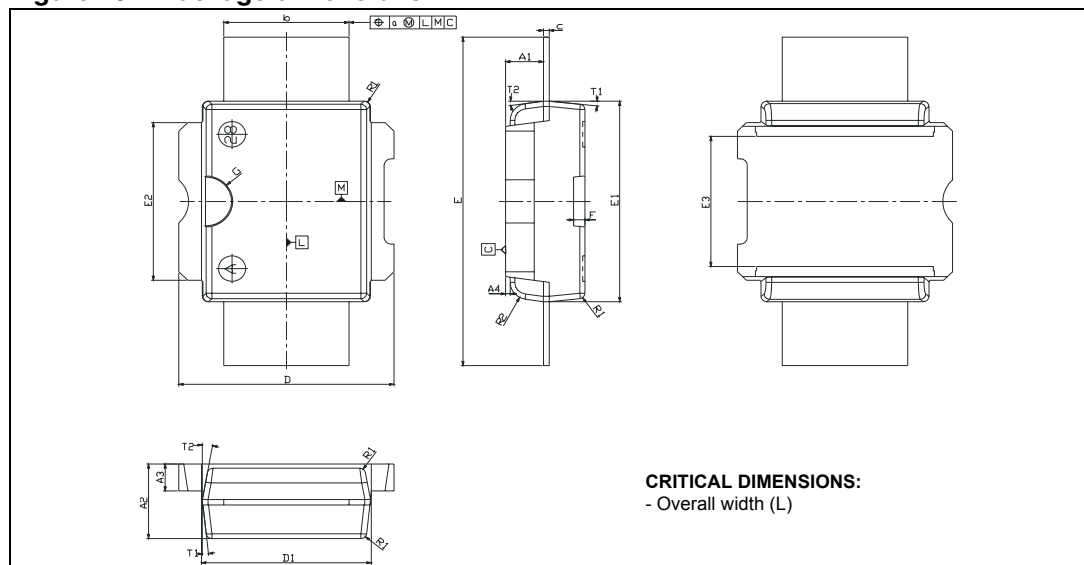


Figure 30. Tube information

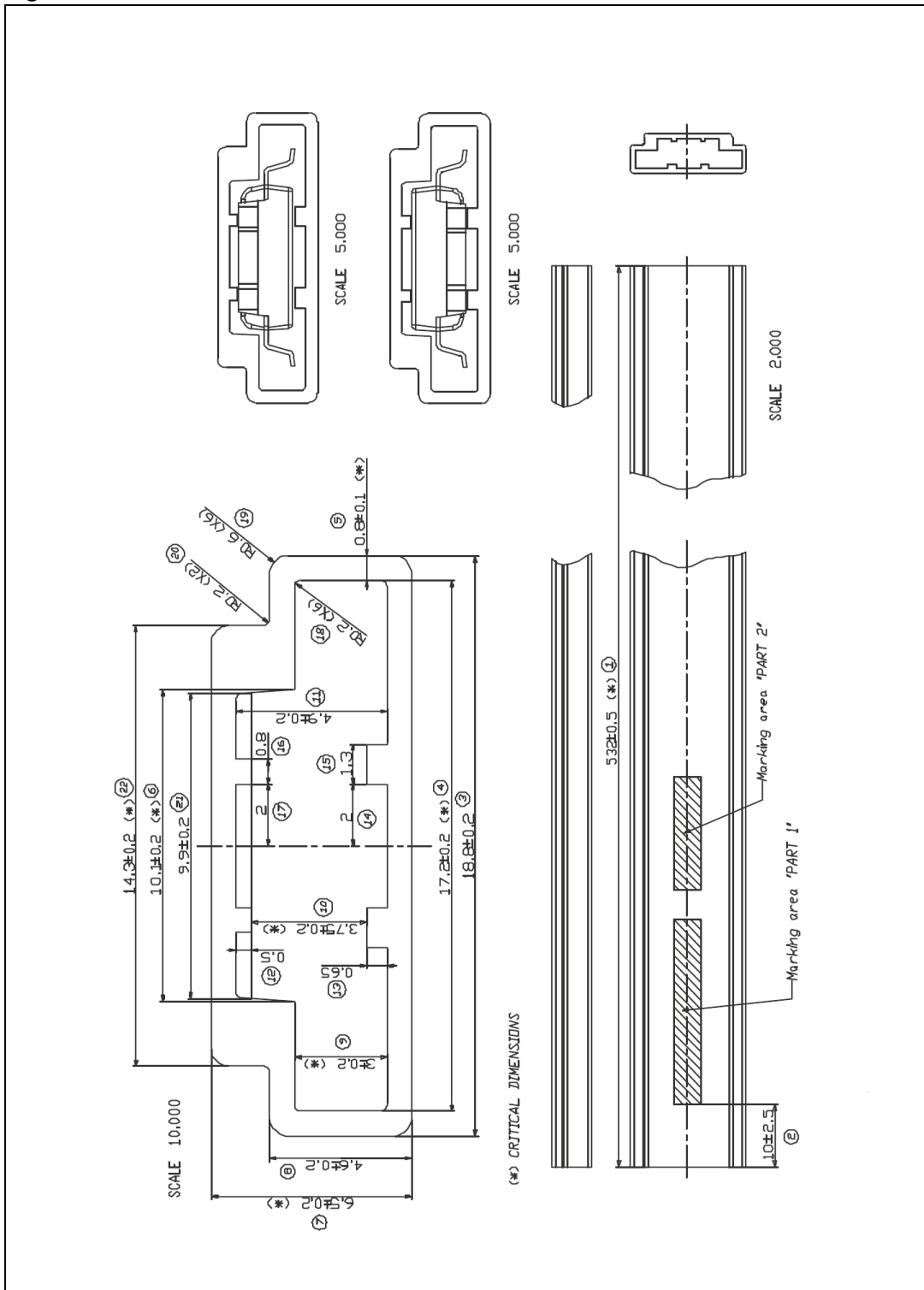
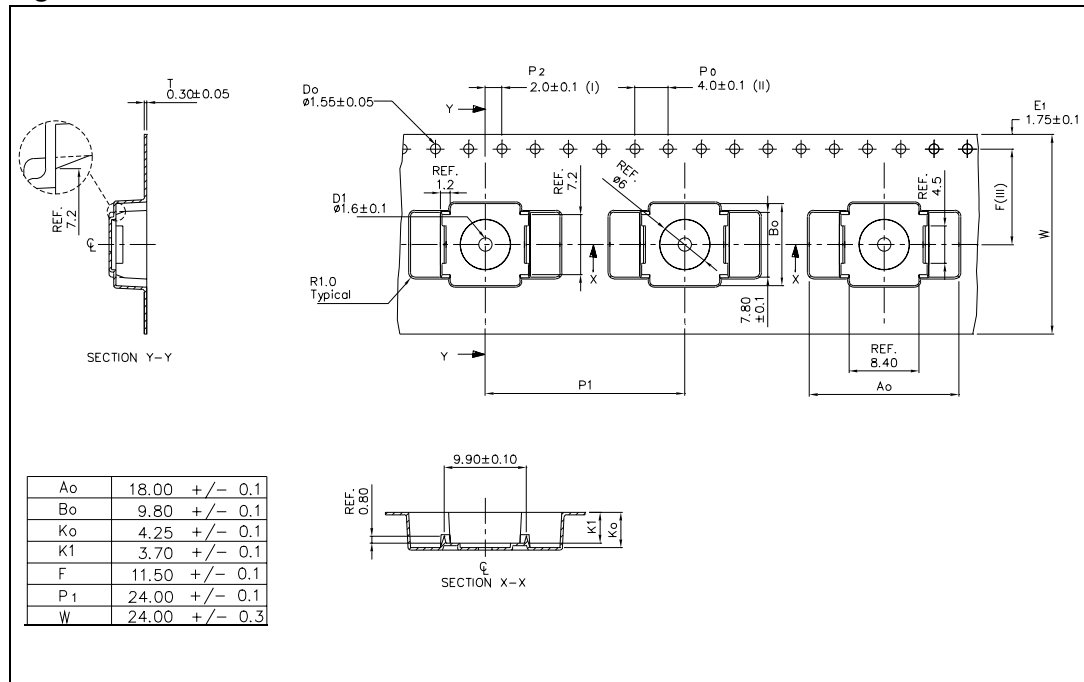


Figure 31. Reel information



9 Revision history

Table 17. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 07-Apr-2006 | 1 | Initial release. |
| 20-May-2010 | 2 | Added: Table 6: Moisture sensitivity level . |

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