



PD54003 PD54003S

RF POWER TRANSISTORS The LdmoST FAMILY

N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- $P_{OUT} = 3\text{ W}$ WITH 12 dB gain @ 500 MHz
- NEW RF PLASTIC PACKAGE

DESCRIPTION

The PD54003 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 7 V in common source mode at frequencies of up to 1 GHz. PD54003 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. PD54003's superior linearity performance makes it an ideal solution for portable 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.

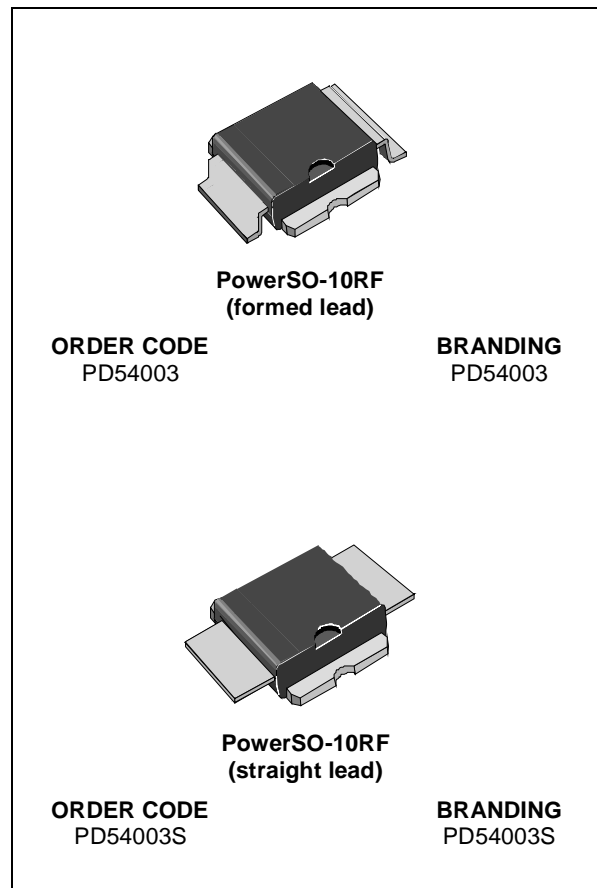
Mounting recommendations are available in www.st.com/rf/ (look for application note AN1294)

ABSOLUTE MAXIMUM RATINGS ($T_{CASE} = 25^{\circ}\text{C}$)

| Symbol | Parameter | Value | Unit |
|---------------|---------------------------------------------------|-------------|--------------------|
| $V_{(BR)DSS}$ | Drain-Source Voltage | 25 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current | 4 | A |
| P_{DISS} | Power Dissipation (@ $T_c = 70^{\circ}\text{C}$) | 52.8 | W |
| T_j | Max. Operating Junction Temperature | 165 | $^{\circ}\text{C}$ |
| T_{STG} | Storage Temperature | -65 to +150 | $^{\circ}\text{C}$ |

THERMAL DATA

| | | | |
|---------------|-----------------------------------|-----|-----------------------------|
| $R_{th(j-c)}$ | Junction -Case Thermal Resistance | 1.8 | $^{\circ}\text{C}/\text{W}$ |
|---------------|-----------------------------------|-----|-----------------------------|



PD54003 - PD54003S

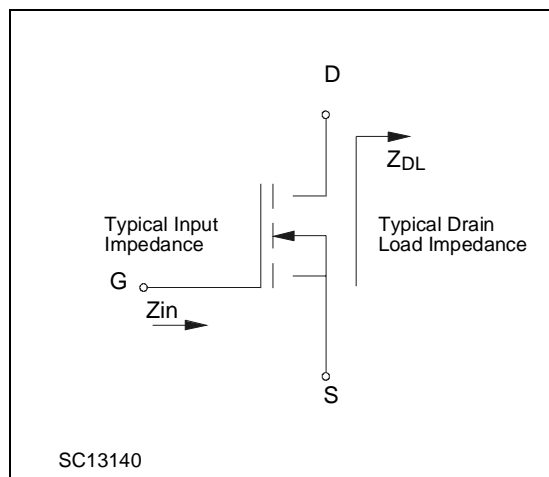
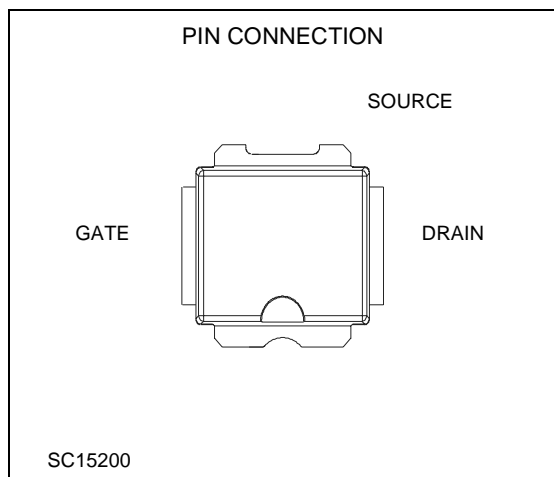
ELECTRICAL SPECIFICATION (T_{CASE} = 25°C)

STATIC (Per Section)

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|---------------------|------------------------|-------------------------|------|------|------|------|
| I _{DSS} | V _{GS} = 0 V | V _{DS} = 25 V | | | 1 | μA |
| I _{GSS} | V _{GS} = 20 V | V _{DS} = 0 V | | | 1 | μA |
| V _{GS(Q)} | V _{DS} = 10 V | I _D = 50 mA | 2.0 | | 5.0 | V |
| V _{DS(ON)} | V _{GS} = 10 V | I _D = 1 A | | | 1.3 | V |
| g _{FS} | V _{DS} = 10 V | I _D = 3.2 A | | 1.7 | | mho |
| C _{ISS} | V _{GS} = 0 V | V _{DS} = 7.5 V | | 59 | | pF |
| C _{OSS} | V _{GS} = 0 V | V _{DS} = 7.5 V | | 43 | | pF |
| C _{RSS} | V _{GS} = 0 V | V _{DS} = 7.5 V | | 4.0 | | pF |

DYNAMIC

| Symbol | Test Conditions | | Min. | Typ. | Max. | Unit |
|------------------|-------------------------|-------------------------|------|------|------|------|
| P _{OUT} | V _{DD} = 7.5 V | I _{DQ} = 50 mA | 3 | | | W |
| G _{PS} | V _{DD} = 7.5 V | I _{DQ} = 50 mA | 10 | 12 | | dB |
| η _D | V _{DD} = 7.5 V | I _{DQ} = 50 mA | 50 | 55 | | % |
| Load mismatch | V _{DD} = 9.5 V | I _{DQ} = 50 mA | 20:1 | | | VSWR |



IMPEDANCE DATA

PD54003

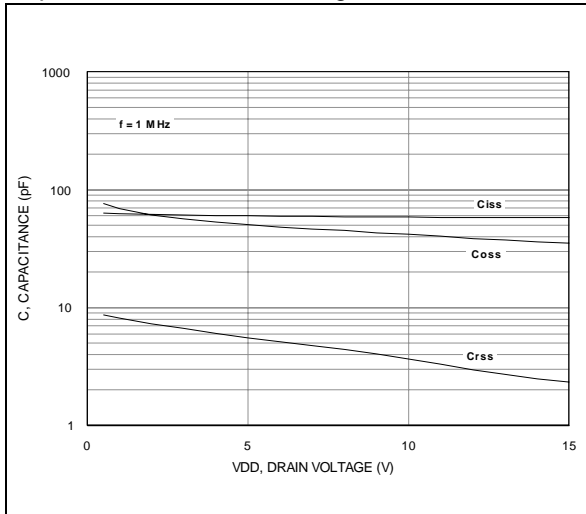
| FREQ. MHz | Z _{IN} (Ω) | Z _{DL} (Ω) |
|-----------|---------------------|---------------------|
| 480 | 2.245 - j 0.077 | 3.436 + j 1.013 |
| 500 | 1.553 - j 1.251 | 2.661 + j 0.139 |
| 520 | 1.993 - j 1.098 | 2.564 + j 0.656 |

PD54003S

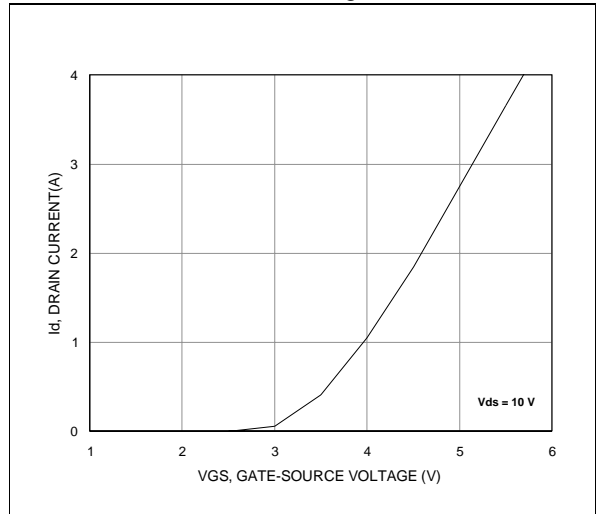
| FREQ. MHz | Z _{IN} (Ω) | Z _{DL} (Ω) |
|-----------|---------------------|---------------------|
| 480 | 1.400 - j 3.986 | 2.805 + j 2.724 |
| 500 | 1.209 - j 2.451 | 3.192 + j 3.147 |
| 520 | 1.534 - j 2.104 | 2.524 + j 2.369 |

TYPICAL PERFORMANCE

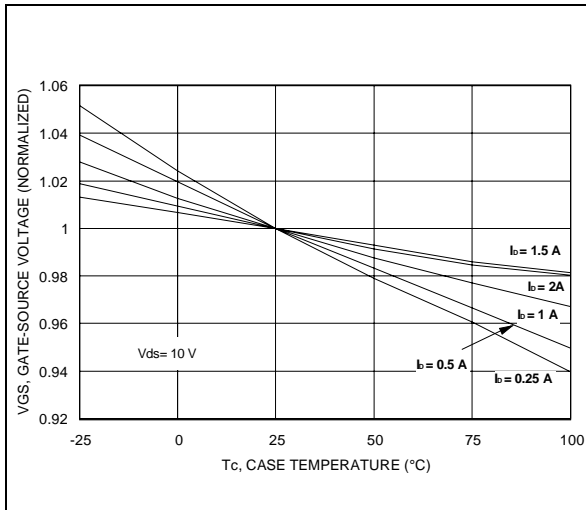
Capacitance vs. Drain Voltage



Drain Current vs. Gate Voltage



Gate-Source Voltage vs. Case Temperature

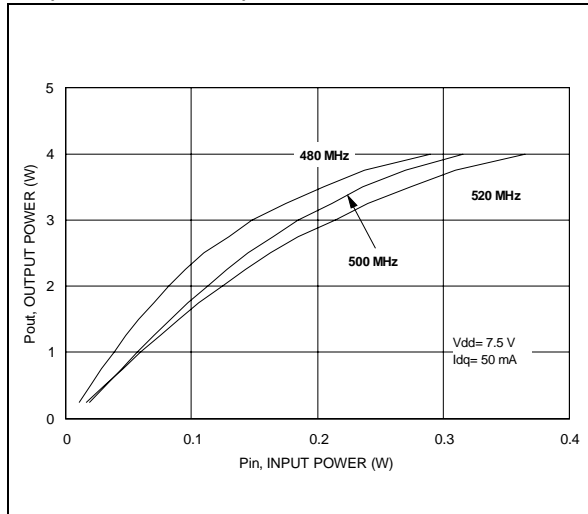


PD54003 - PD54003S

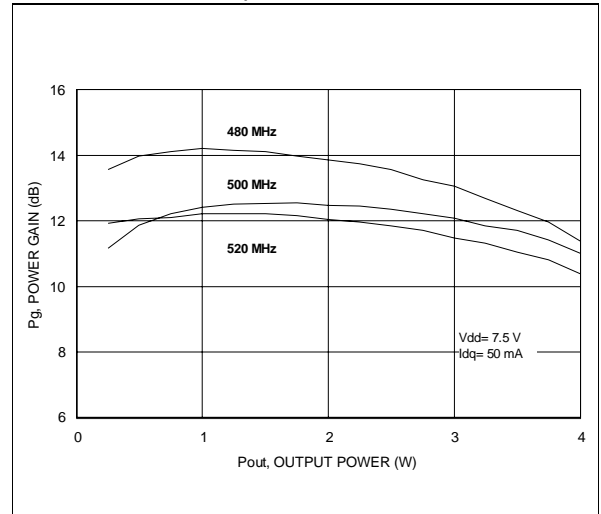
TYPICAL PERFORMANCE

Output Power vs. Input Power

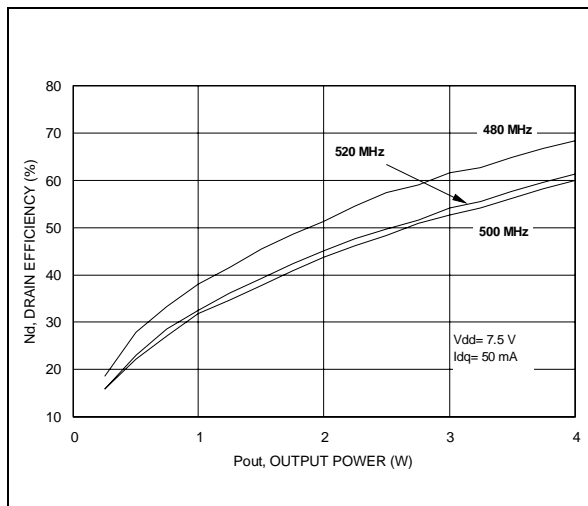
PD54003



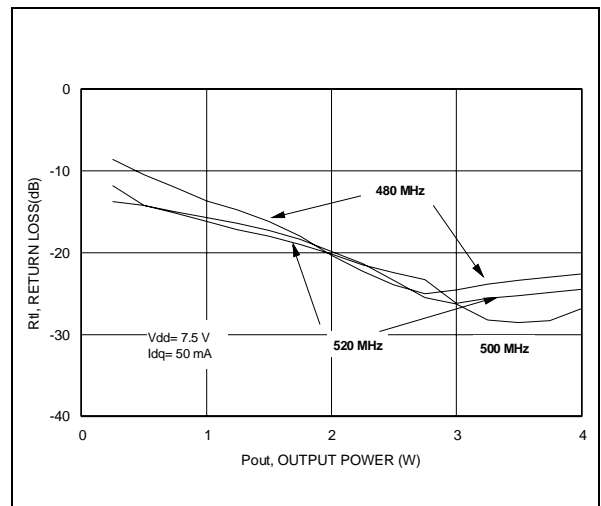
Power Gain vs. Output Power



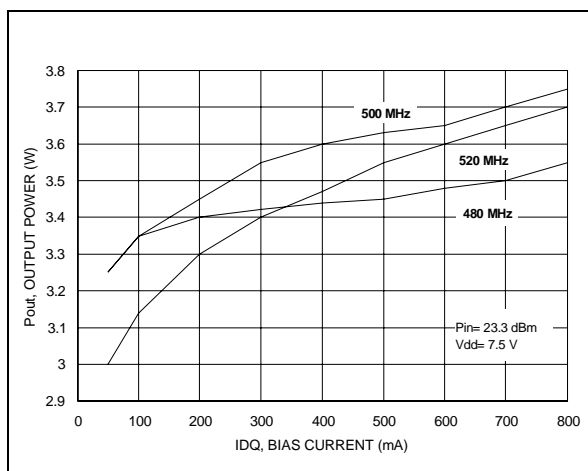
Drain Efficiency vs. Output Power



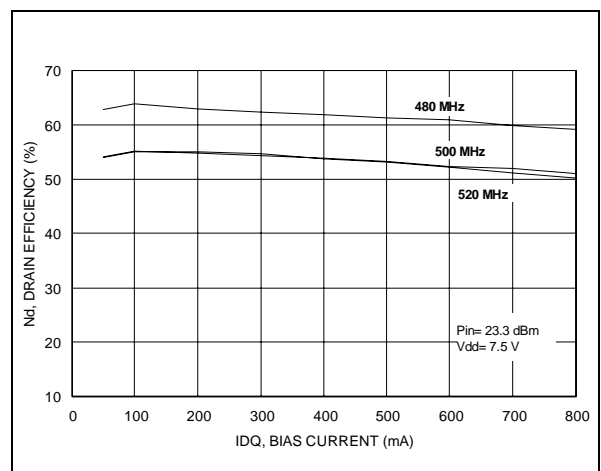
Return Loss vs. Output Power



Output Power vs. Bias Current

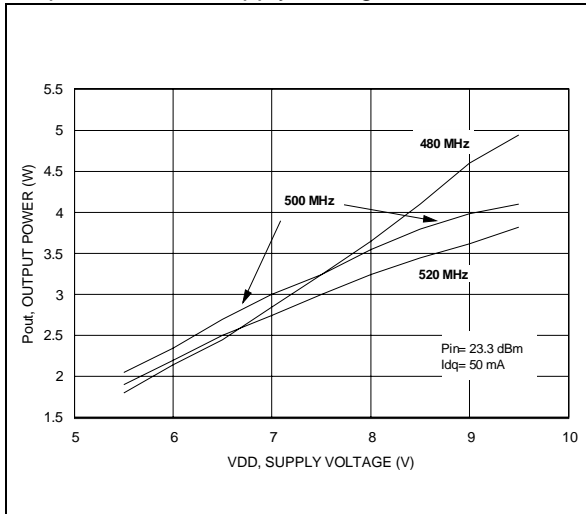


Drain Efficiency vs. Bias Current

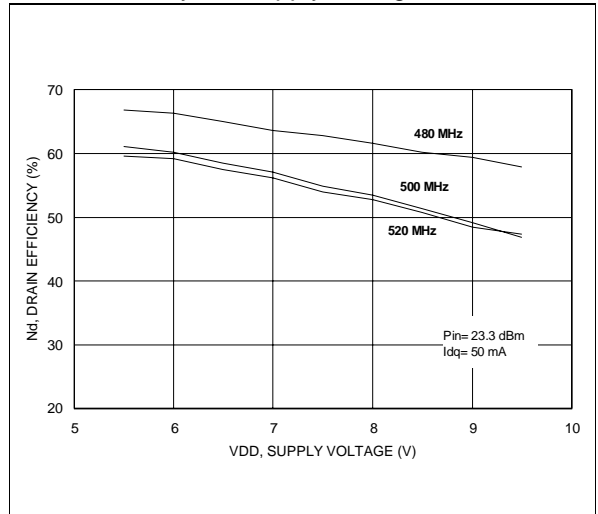


TYPICAL PERFORMANCE

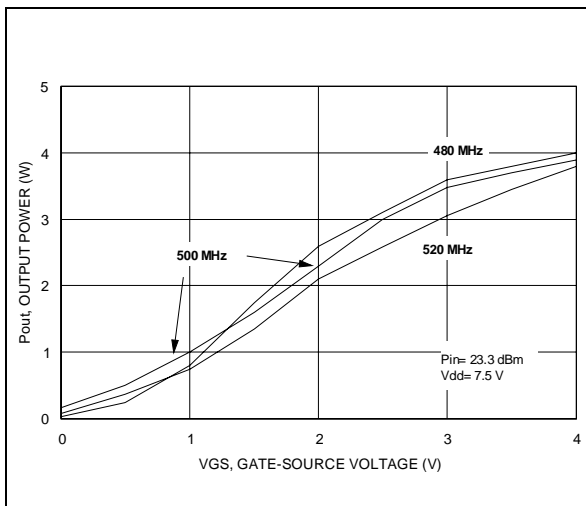
Output Power vs. Supply Voltage



Drain Efficiency vs. Supply Voltage



Output Power vs. Gate-Source Voltage

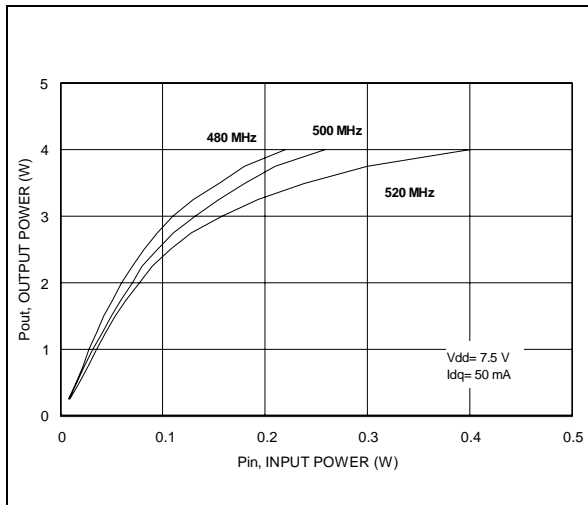


PD54003 - PD54003S

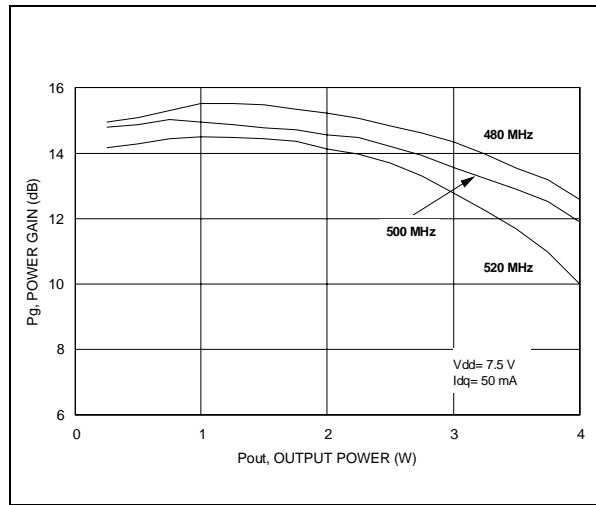
TYPICAL PERFORMANCE

Output Power vs. Input Power

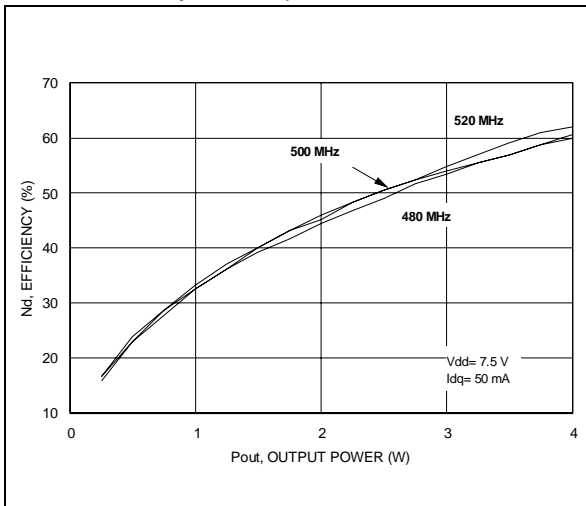
PD54003S



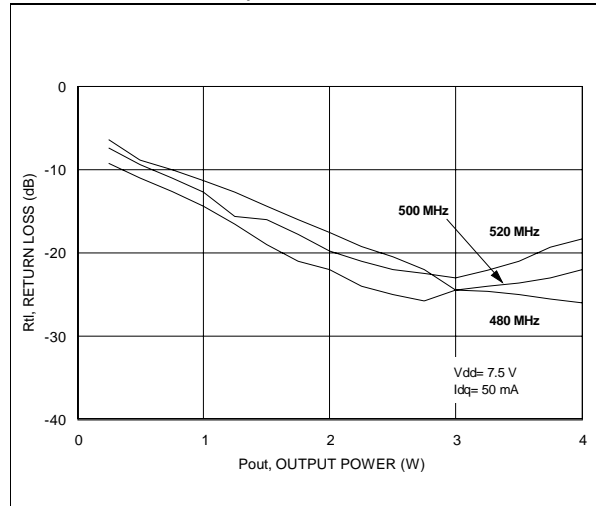
Power Gain vs. Output Power



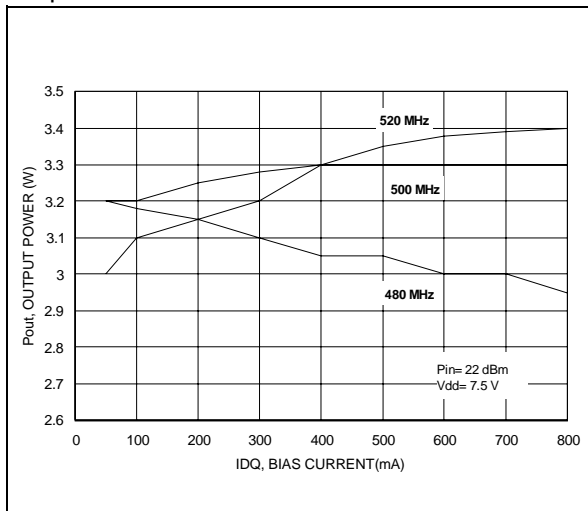
Drain Efficiency vs. Output Power



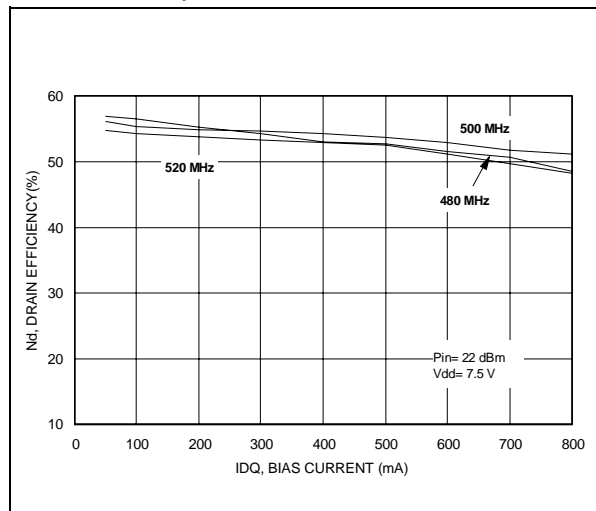
Return Loss vs. Output Power



Output Power vs. Bias Current

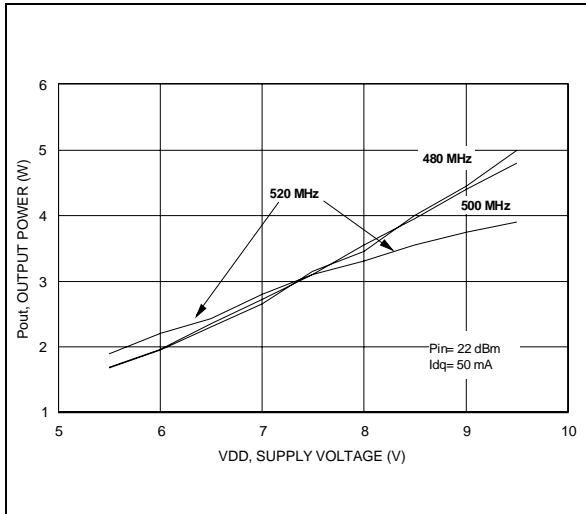


Drain Efficiency vs. Bias Current

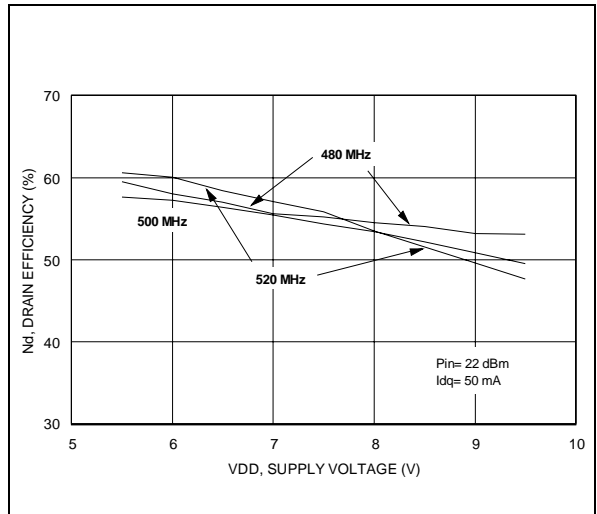


TYPICAL PERFORMANCE

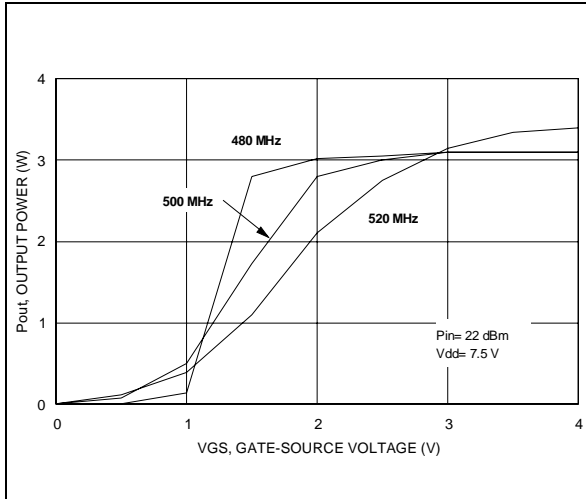
Output Power vs. Supply Voltage



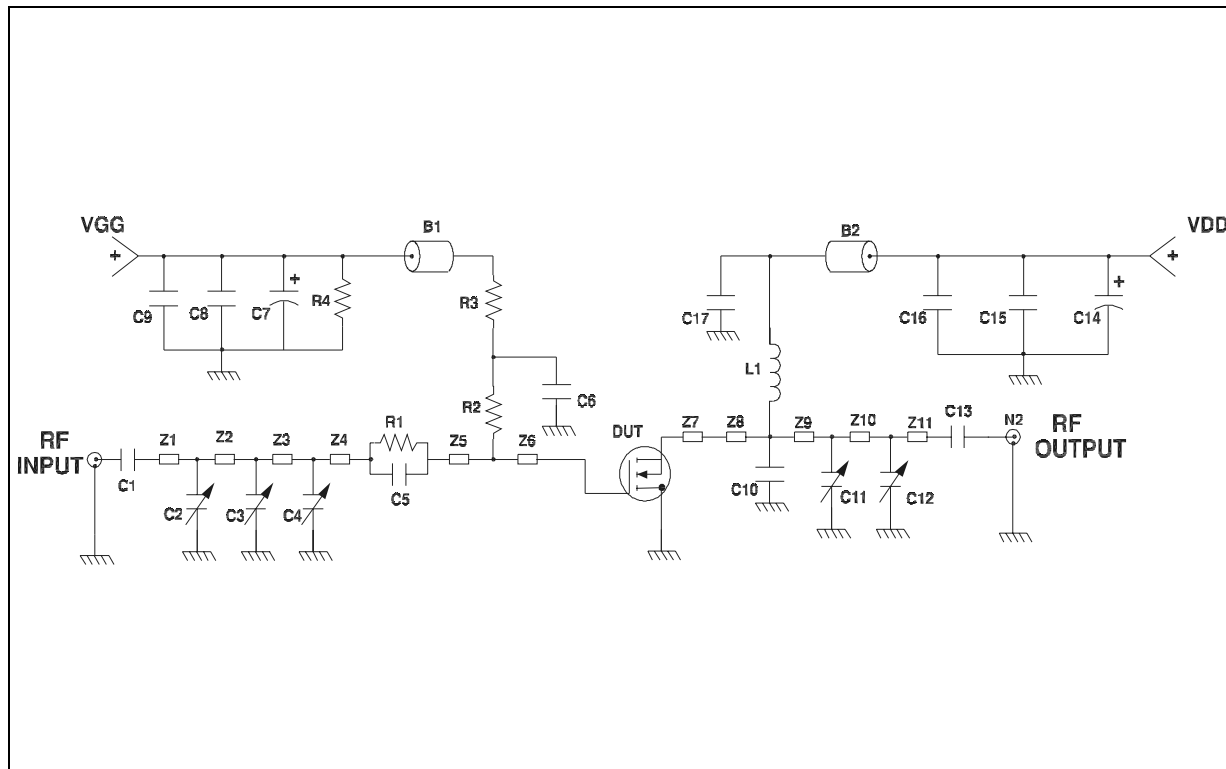
Drain Efficiency vs. Supply Voltage



Output Power vs. Gate-Source Voltage



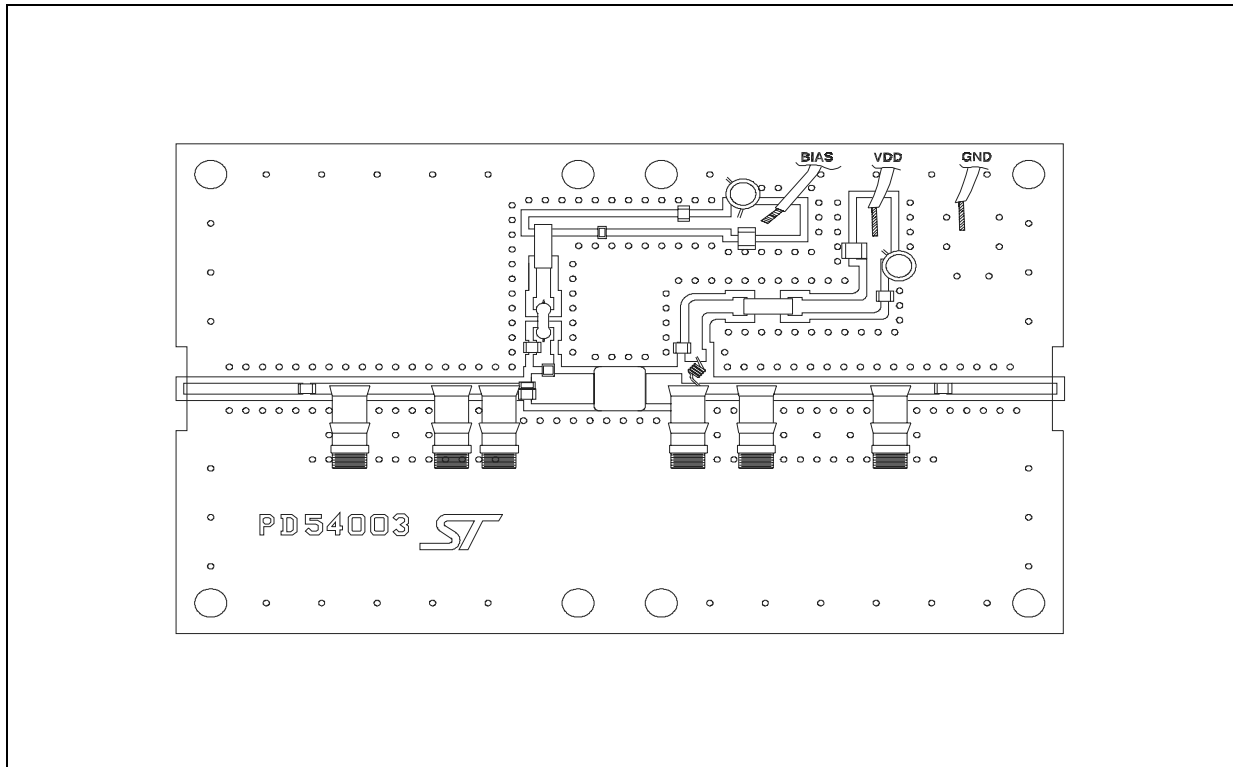
TEST CIRCUIT SCHEMATIC



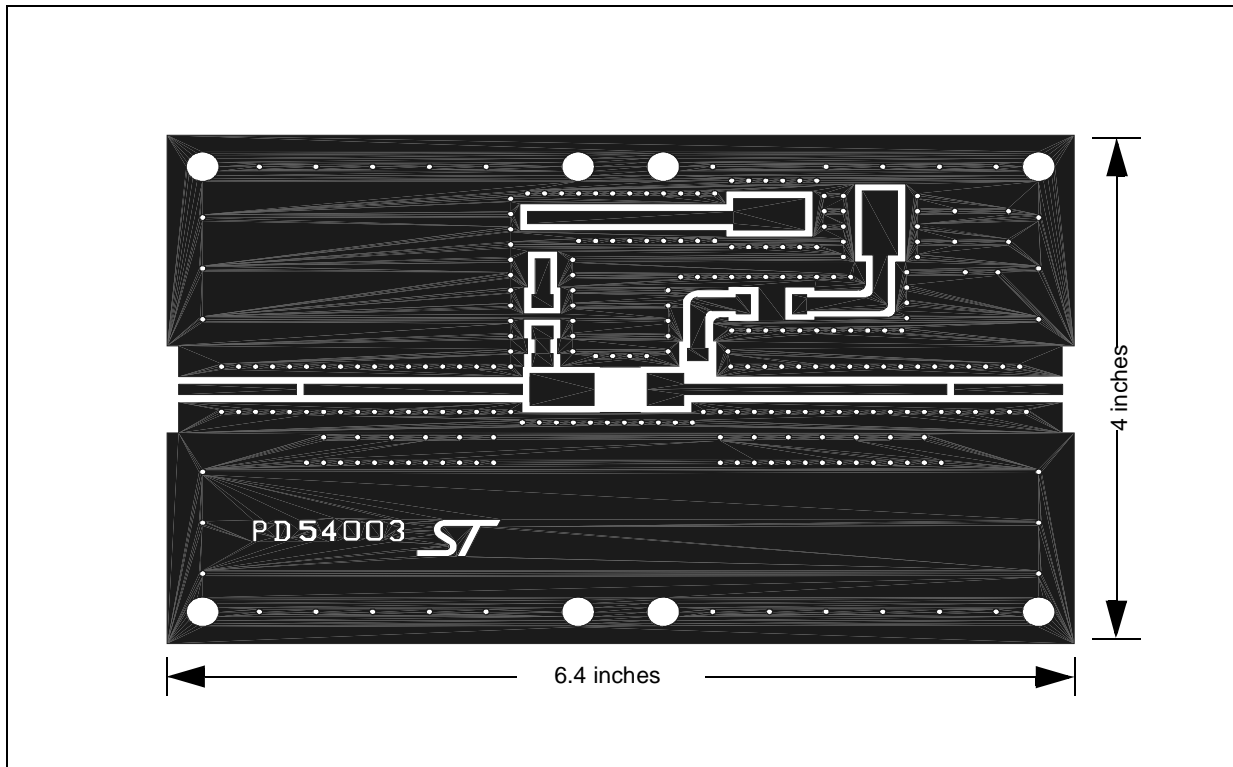
TEST CIRCUIT COMPONENT PART LIST

| COMPONENT | DESCRIPTION |
|----------------------|-----------------------------------------------------------------------------|
| B1,B2 | SHORT FERRITE BEAD, FAIR RITE PRODUCTS (2743021446) |
| C1,C13 | 240 pF, 100 mil CHIP CAPACITOR |
| C2,C3,C4,C10,C11,C12 | 0 TO 20 pF TRIMMER CAPACITOR |
| C5 | 130 pF, 100 mil CHIP CAPACITOR |
| C6,C17 | 120 pF, 100 mil CHIP CAPACITOR |
| C7,C14 | 10 μF, 50 V ELECTROLYTIC CAPACITOR |
| C8,C15 | 1.200 pF, 100 mil CHIP CAPACITOR |
| C9,C16 | 0.1 F, 100 mil CHIP CAPACITOR |
| L1 | 55,5 Nh, 5 TURN, COILCRAFT |
| N1,N2 | TYPE N FLANGE MOUNT |
| R1 | 15 Ω, 0805 CHIP RESISTOR |
| R2 | 1.0 KΩ, 1/8 W RESISTOR |
| R3 | 15 Ω, 0805 CHIP RESISTOR |
| R4 | 33 KΩ, 1/8 W RESISTOR |
| Z1 | 0.175" X 0.080" MICROSTRIP |
| Z2 | 1.049" X 0.080" MICROSTRIP |
| Z3 | 0.289" X 0.080" MICROSTRIP |
| Z4 | 0.026" X 0.080" MICROSTRIP |
| Z5 | 0.192" X 0.223" MICROSTRIP |
| Z6,Z7 | 0.260" X 0.223" MICROSTRIP |
| Z8 | 0.064" X 0.080" MICROSTRIP |
| Z9 | 0.334" X 0.080" MICROSTRIP |
| Z10 | 0.985" X 0.080" MICROSTRIP |
| Z11 | 0.472" X 0.080" MICROSTRIP |
| BOARD | ROGER, ULTRA LAM 2000 THK 0.030", ε _r = 2.55 2oz. ED cu 2 SIDES. |

TEST CIRCUIT



TEST CIRCUIT PHOTOMASTER



PD54003 - PD54003S**COMMON SOURCE S-PARAMETER (PD54003)** $(V_{DS} = 7.5V \quad I_{DS} = 50mA)$

| FREQ (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.729 | -127 | 10.26 | 94 | 0.058 | 5 | 0.702 | -122 |
| 100 | 0.759 | -146 | 4.91 | 72 | 0.056 | -15 | 0.706 | -141 |
| 150 | 0.807 | -154 | 3.02 | 59 | 0.050 | -28 | 0.749 | -149 |
| 200 | 0.845 | -159 | 2.06 | 48 | 0.044 | -38 | 0.802 | -154 |
| 250 | 0.844 | -162 | 1.48 | 40 | 0.039 | -45 | 0.839 | -185 |
| 300 | 0.901 | -165 | 1.12 | 33 | 0.034 | -52 | 0.875 | -162 |
| 350 | 0.921 | -168 | 0.86 | 27 | 0.030 | -57 | 0.899 | -165 |
| 400 | 0.932 | -170 | 0.69 | 22 | 0.027 | -60 | 0.915 | -168 |
| 450 | 0.944 | -172 | 0.56 | 18 | 0.023 | -64 | 0.935 | -170 |
| 500 | 0.952 | -173 | 0.47 | 14 | 0.019 | -66 | 0.943 | -172 |
| 550 | 0.957 | -175 | 0.39 | 11 | 0.017 | -68 | 0.951 | -173 |
| 600 | 0.962 | -176 | 0.33 | 8 | 0.014 | -72 | 0.954 | -175 |
| 650 | 0.967 | -177 | 0.29 | 5 | 0.012 | -70 | 0.958 | -176 |
| 700 | 0.969 | -178 | 0.25 | 3 | 0.010 | -71 | 0.958 | -178 |
| 750 | 0.970 | -180 | 0.22 | 1 | 0.009 | -69 | 0.963 | -179 |
| 800 | 0.972 | 179 | 0.20 | -1 | 0.008 | -71 | 0.963 | 179 |
| 850 | 0.972 | 179 | 0.18 | -2 | 0.007 | -78 | 0.969 | 178 |
| 900 | 0.973 | 178 | 0.16 | -4 | 0.004 | -76 | 0.972 | 177 |
| 950 | 0.972 | 177 | 0.15 | -5 | 0.002 | -46 | 0.972 | 176 |
| 1000 | 0.975 | 176 | 0.13 | -6 | 0.003 | -42 | 0.973 | 175 |
| 1050 | 0.975 | 175 | 0.12 | -7 | 0.001 | 14 | 0.968 | 174 |
| 1100 | 0.975 | 174 | 0.11 | -8 | 0.003 | 29 | 0.966 | 173 |
| 1150 | 0.970 | 173 | 0.10 | -10 | 0.003 | 51 | 0.967 | 172 |
| 1200 | 0.973 | 173 | 0.10 | -10 | 0.005 | 65 | 0.965 | 171 |
| 1250 | 0.972 | 172 | 0.09 | -12 | 0.005 | 62 | 0.966 | 170 |
| 1300 | 0.970 | 171 | 0.08 | -12 | 0.007 | 67 | 0.963 | 170 |
| 1350 | 0.970 | 170 | 0.08 | -12 | 0.007 | 67 | 0.959 | 169 |
| 1400 | 0.967 | 170 | 0.07 | -12 | 0.008 | 73 | 0.962 | 168 |
| 1450 | 0.968 | 169 | 0.07 | -12 | 0.010 | 64 | 0.953 | 167 |
| 1500 | 0.965 | 168 | 0.06 | -15 | 0.010 | 76 | 0.950 | 166 |

COMMON SOURCE S-PARAMETER (PD54003)(V_{DS} = 7.5V I_{DS} = 500mA)

| FREQ (MHz) | S ₁₁ | ∠S ₁₁ Φ | S ₂₁ | ∠S ₂₁ Φ | S ₁₂ | ∠S ₁₂ Φ | S ₂₂ | ∠S ₂₂ Φ |
|---------------|-----------------|--------------------|-----------------|--------------------|-----------------|--------------------|-----------------|--------------------|
| 50 | 0.779 | -162 | 16.39 | 88 | 0.026 | 4 | 0.772 | -160 |
| 100 | 0.810 | -168 | 7.93 | 79 | 0.025 | -7 | 0.768 | -168 |
| 150 | 0.836 | -171 | 5.18 | 73 | 0.024 | -13 | 0.774 | -171 |
| 200 | 0.850 | -173 | 3.81 | 67 | 0.023 | -16 | 0.784 | -172 |
| 250 | 0.861 | -174 | 2.96 | 60 | 0.022 | -21 | 0.795 | -173 |
| 300 | 0.871 | -175 | 2.39 | 55 | 0.020 | -24 | 0.815 | -174 |
| 350 | 0.881 | -176 | 1.97 | 49 | 0.018 | -27 | 0.813 | -174 |
| 400 | 0.890 | -176 | 1.65 | 45 | 0.017 | -31 | 0.845 | -175 |
| 450 | 0.901 | -177 | 1.40 | 40 | 0.016 | -30 | 0.865 | -176 |
| 500 | 0.908 | -178 | 1.20 | 36 | 0.015 | -34 | 0.876 | 176 |
| 550 | 0.915 | -179 | 1.05 | 32 | 0.013 | -32 | 0.886 | -177 |
| 600 | 0.924 | -179 | 0.92 | 28 | 0.012 | -34 | 0.894 | -178 |
| 650 | 0.928 | 180 | 0.81 | 25 | 0.010 | -33 | 0.900 | -179 |
| 700 | 0.934 | 179 | 0.72 | 22 | 0.010 | -33 | 0.906 | 180 |
| 750 | 0.937 | 178 | 0.65 | 19 | 0.008 | -29 | 0.912 | 179 |
| 800 | 0.939 | 177 | 0.59 | 17 | 0.007 | -24 | 0.920 | 178 |
| 850 | 0.943 | 177 | 0.53 | 14 | 0.006 | -15 | 0.928 | 177 |
| 900 | 0.943 | 176 | 0.48 | 12 | 0.006 | -7 | 0.932 | 176 |
| 950 | 0.948 | 175 | 0.45 | 10 | 0.005 | 9 | 0.934 | 175 |
| 1000 | 0.950 | 175 | 0.41 | 7 | 0.005 | 11 | 0.938 | 174 |
| 1050 | 0.952 | 174 | 0.38 | 5 | 0.006 | 28 | 0.934 | 173 |
| 1100 | 0.955 | 173 | 0.35 | 3 | 0.006 | 33 | 0.937 | 172 |
| 1150 | 0.954 | 172 | 0.32 | 1 | 0.007 | 41 | 0.938 | 172 |
| 1200 | 0.954 | 172 | 0.30 | 0 | 0.007 | 40 | 0.938 | 171 |
| 1250 | 0.953 | 172 | 0.28 | -3 | 0.008 | 51 | 0.940 | 170 |
| 1300 | 0.952 | 170 | 0.26 | -4 | 0.008 | 53 | 0.939 | 169 |
| 1350 | 0.954 | 170 | 0.24 | -5 | 0.010 | 55 | 0.936 | 168 |
| 1400 | 0.952 | 169 | 0.23 | -6 | 0.011 | 57 | 0.943 | 167 |
| 1450 | 0.952 | 168 | 0.22 | -7 | 0.011 | 59 | 0.933 | 167 |
| 1500 | 0.950 | 168 | 0.20 | -8 | 0.010 | 70 | 0.930 | 166 |

PD54003 - PD54003S

COMMON SOURCE S-PARAMETER (PD54003)

($V_{DS} = 7.5V$ $I_{DS} = 1A$)

| FREQ (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.802 | -166 | 16.70 | 88 | 0.021 | 0 | 0.793 | -164 |
| 100 | 0.831 | -170 | 8.10 | 80 | 0.021 | -6 | 0.790 | -171 |
| 150 | 0.855 | -173 | 5.32 | 75 | 0.020 | -8 | 0.793 | -173 |
| 200 | 0.867 | -175 | 3.94 | 69 | 0.019 | -13 | 0.801 | -174 |
| 250 | 0.876 | -175 | 3.08 | 64 | 0.019 | -16 | 0.807 | -175 |
| 300 | 0.883 | -177 | 2.52 | 59 | 0.018 | -19 | 0.822 | -176 |
| 350 | 0.887 | -177 | 2.09 | 53 | 0.017 | -22 | 0.834 | -176 |
| 400 | 0.864 | -178 | 1.77 | 49 | 0.015 | -24 | 0.844 | -177 |
| 450 | 0.903 | -178 | 1.52 | 44 | 0.014 | -23 | 0.864 | -177 |
| 500 | 0.911 | -179 | 1.32 | 40 | 0.013 | -26 | 0.871 | -178 |
| 550 | 0.916 | -180 | 1.15 | 36 | 0.012 | -27 | 0.880 | -179 |
| 600 | 0.922 | 179 | 1.01 | 33 | 0.010 | -25 | 0.886 | -179 |
| 650 | 0.926 | 179 | 0.90 | 30 | 0.010 | -20 | 0.989 | 180 |
| 700 | 0.931 | 178 | 0.81 | 27 | 0.009 | -23 | 0.898 | 179 |
| 750 | 0.934 | 177 | 0.73 | 24 | 0.008 | -15 | 0.903 | 178 |
| 800 | 0.938 | 177 | 0.66 | 21 | 0.007 | -16 | 0.911 | 177 |
| 850 | 0.941 | 176 | 0.60 | 18 | 0.007 | 2 | 0.919 | 176 |
| 900 | 0.944 | 175 | 0.55 | 16 | 0.007 | 3 | 0.923 | 175 |
| 950 | 0.945 | 175 | 0.51 | 13 | 0.007 | 14 | 0.927 | 175 |
| 1000 | 0.947 | 174 | 0.47 | 11 | 0.005 | 29 | 0.930 | 174 |
| 1050 | 0.950 | 173 | 0.43 | 9 | 0.007 | 24 | 0.930 | 173 |
| 1100 | 0.952 | 173 | 0.40 | 6 | 0.007 | 41 | 0.929 | 172 |
| 1150 | 0.947 | 172 | 0.37 | 4 | 0.007 | 35 | 0.932 | 171 |
| 1200 | 0.949 | 171 | 0.35 | 2 | 0.009 | 47 | 0.931 | 171 |
| 1250 | 0.951 | 171 | 0.32 | 0 | 0.009 | 52 | 0.934 | 170 |
| 1300 | 0.951 | 170 | 0.30 | -1 | 0.009 | 42 | 0.931 | 169 |
| 1350 | 0.948 | 169 | 0.28 | -2 | 0.011 | 51 | 0.931 | 168 |
| 1400 | 0.948 | 169 | 0.26 | -4 | 0.011 | 53 | 0.935 | 167 |
| 1450 | 0.948 | 168 | 0.25 | -5 | 0.011 | 55 | 0.927 | 167 |
| 1500 | 0.945 | 167 | 0.23 | -6 | 0.012 | 64 | 0.927 | 165 |

COMMON SOURCE S-PARAMETER (PD54003S)

($V_{DS} = 7.5V$ $I_{DS} = 50mA$)

| FREQ (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 | 0.749 | -133 | 9.42 | 93 | 0.063 | 4 | 0.702 | -130 |
| 100 | 0.760 | -151 | 4.51 | 74 | 0.060 | -15 | 0.706 | -147 |
| 150 | 0.799 | -157 | 2.81 | 62 | 0.055 | -26 | 0.747 | -153 |
| 200 | 0.837 | -160 | 1.93 | 52 | 0.051 | -36 | 0.790 | -157 |
| 250 | 0.869 | -163 | 1.41 | 43 | 0.046 | -43 | 0.835 | -160 |
| 300 | 0.893 | -165 | 1.08 | 37 | 0.041 | -49 | 0.861 | -162 |
| 350 | 0.913 | -167 | 0.84 | 31 | 0.037 | -53 | 0.885 | -165 |
| 400 | 0.932 | -169 | 0.68 | 26 | 0.033 | -58 | 0.905 | -167 |
| 450 | 0.941 | -170 | 0.55 | 21 | 0.029 | -61 | 0.918 | -169 |
| 500 | 0.949 | -172 | 0.46 | 18 | 0.026 | -66 | 0.931 | -170 |
| 550 | 0.961 | -173 | 0.39 | 14 | 0.024 | -68 | 0.943 | -172 |
| 600 | 0.965 | -174 | 0.33 | 11 | 0.021 | -69 | 0.947 | -173 |
| 650 | 0.969 | -176 | 0.29 | 9 | 0.019 | -74 | 0.954 | -174 |
| 700 | 0.970 | -177 | 0.25 | 6 | 0.017 | -73 | 0.960 | -175 |
| 750 | 0.974 | -177 | 0.22 | 4 | 0.016 | -73 | 0.962 | -177 |
| 800 | 0.977 | -178 | 0.20 | 2 | 0.014 | -77 | 0.965 | -177 |
| 850 | 0.979 | -179 | 0.18 | 1 | 0.012 | -79 | 0.965 | -178 |
| 900 | 0.977 | -180 | 0.16 | -1 | 0.011 | -82 | 0.968 | -179 |
| 950 | 0.978 | 180 | 0.15 | -3 | 0.010 | -80 | 0.971 | -180 |
| 1000 | 0.982 | 179 | 0.13 | -4 | 0.009 | -82 | 0.973 | 179 |
| 1050 | 0.983 | 178 | 0.12 | -6 | 0.007 | -88 | 0.974 | 178 |
| 1100 | 0.982 | 177 | 0.13 | -7 | 0.005 | -88 | 0.969 | 178 |
| 1150 | 0.982 | 177 | 0.10 | -8 | 0.005 | -83 | 0.975 | 177 |
| 1200 | 0.982 | 176 | 0.10 | -9 | 0.004 | -87 | 0.975 | 176 |
| 1250 | 0.984 | 176 | 0.09 | -11 | 0.000 | -90 | 0.972 | 176 |
| 1300 | 0.980 | 175 | 0.08 | -11 | 0.020 | -81 | 0.970 | 175 |
| 1350 | 0.978 | 175 | 0.08 | -12 | 0.001 | -111 | 0.974 | 175 |
| 1400 | 0.977 | 174 | 0.07 | -12 | 0.001 | -61 | 0.970 | 174 |
| 1450 | 0.979 | 174 | 0.07 | -11 | 0.001 | 19 | 0.971 | 173 |
| 1500 | 0.976 | 173 | 0.06 | -13 | 0.002 | 138 | 0.970 | 173 |

PD54003 - PD54003S**COMMON SOURCE S-PARAMETER (PD54003S)** $(V_{DS} = 7.5V \ I_{DS} = 500mA)$

| FREQ (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.805 | -165 | 13.88 | 88 | 0.025 | 1 | 0.806 | -164 |
| 100 | 0.838 | -170 | 6.74 | 81 | 0.003 | -6 | 0.80372 | -171 |
| 150 | 0.863 | -172 | 4.43 | 76 | 0.024 | -10 | 0.840 | -173 |
| 200 | 0.873 | -174 | 3.27 | 71 | 0.024 | -15 | 0.814 | -174 |
| 250 | 0.880 | -175 | 2.57 | 65 | 0.023 | -18 | 0.827 | -175 |
| 300 | 0.884 | -176 | 2.10 | 60 | 0.022 | -22 | 0.83481 | -175 |
| 350 | 0.891 | -176 | 1.75 | 56 | 0.022 | -27 | 0.845 | -175 |
| 400 | 0.901 | -177 | 1.49 | 51 | 0.020 | -28 | 0.857 | -176 |
| 450 | 0.906 | -177 | 1.27 | 47 | 0.018 | -33 | 0.863 | -176 |
| 500 | 0.914 | -178 | 1.10 | 43 | 0.017 | -35 | 0.877 | -177 |
| 550 | 0.923 | -178 | 0.97 | 39 | 0.017 | -37 | 0.881 | -177 |
| 600 | 0.927 | -179 | 0.85 | 36 | 0.015 | -36 | 0.892 | -177 |
| 650 | 0.931 | -179 | 0.76 | 33 | 0.014 | -39 | 0.902 | -178 |
| 700 | 0.934 | -180 | 0.68 | 30 | 0.013 | -38 | 0.908 | -78 |
| 750 | 0.941 | 180 | 0.62 | 27 | 0.012 | -40 | 0.914 | -179 |
| 800 | 0.944 | 179 | 0.56 | 25 | 0.012 | -47 | 0.918 | -180 |
| 850 | 0.948 | 179 | 0.51 | 22 | 0.010 | -47 | 0.920 | 180 |
| 900 | 0.949 | 178 | 0.46 | 19 | 0.009 | -42 | 0.927 | 179 |
| 950 | 0.951 | 178 | 0.43 | 17 | 0.008 | -46 | 0.933 | 178 |
| 1000 | 0.954 | 177 | 0.40 | 15 | 0.006 | -42 | 0.936 | 178 |
| 1050 | 0.955 | 177 | 0.37 | 13 | 0.007 | -36 | 0.937 | 177 |
| 1100 | 0.959 | 176 | 0.34 | 10 | 0.006 | -38 | 0.939 | 177 |
| 1150 | 0.960 | 176 | 0.32 | 9 | 0.004 | -42 | 0.942 | 176 |
| 1200 | 0.961 | 175 | 0.30 | 7 | 0.004 | -23 | 0.943 | 176 |
| 1250 | 0.965 | 175 | 0.28 | 5 | 0.004 | 0 | 0.942 | 175 |
| 1300 | 0.960 | 174 | 0.26 | 4 | 0.0036 | 2 | 0.941 | 175 |
| 1350 | 0.961 | 174 | 0.24 | 2 | 0.004 | 20 | 0.941 | 174 |
| 1400 | 0.959 | 173 | 0.23 | 1 | 0.004 | 30 | 0.941 | 173 |
| 1450 | 0.960 | 173 | 0.24 | 1 | 0.004 | 40 | 0.949 | 173 |
| 1500 | 0.959 | 172 | 0.20 | 0 | 0.003 | 50 | 0.948 | 172 |

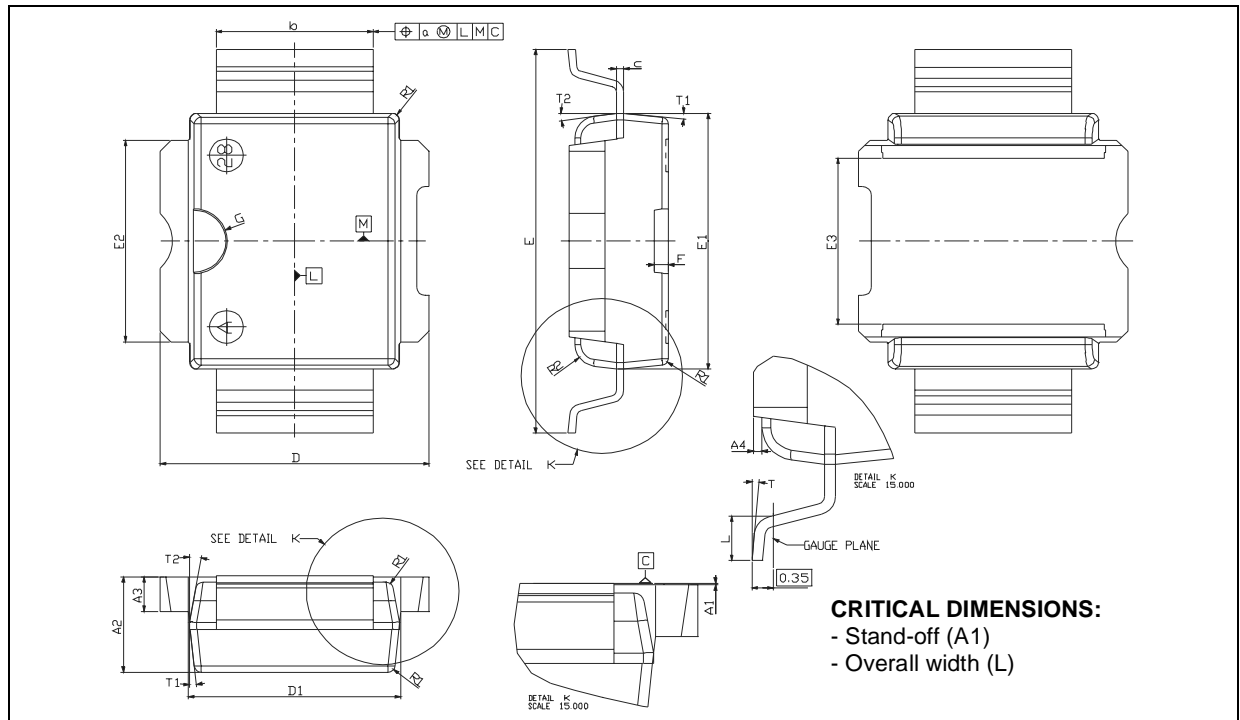
COMMON SOURCE S-PARAMETER (PD54003S) $(V_{DS} = 7.5V \ I_{DS} = 1A)$

| FREQ (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|---------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 50 | 0.879 | -164 | 14.04 | 88 | 0.021 | 0 | 0.828 | -168 |
| 100 | 0.879 | -172 | 6.82 | 82 | 0.020 | -5 | 0.826 | -174 |
| 150 | 0.885 | -174 | 4.50 | 78 | 0.020 | -9 | 0.832 | -175 |
| 200 | 0.887 | -175 | 3.34 | 73 | 0.020 | -11 | 0.831 | -176 |
| 250 | 0.890 | -176 | 2.65 | 68 | 0.019 | -16 | 0.844 | -177 |
| 300 | 0.894 | -177 | 2.18 | 64 | 0.019 | -18 | 0.847 | -176 |
| 350 | 0.898 | -177 | 1.82 | 60 | 0.018 | -21 | 0.857 | -177 |
| 400 | 0.907 | -178 | 1.57 | 55 | 0.017 | -21 | 0.864 | -177 |
| 450 | 0.910 | -178 | 1.35 | 51 | 0.016 | -25 | 0.866 | -177 |
| 500 | 0.914 | -179 | 1.18 | 47 | 0.015 | -29 | 0.877 | -178 |
| 550 | 0.922 | -179 | 1.04 | 44 | 0.014 | -30 | 0.887 | -178 |
| 600 | 0.926 | -180 | 0.93 | 41 | 0.014 | -30 | 0.888 | -179 |
| 650 | 0.930 | 180 | 0.84 | 38 | 0.130 | -33 | 0.897 | -179 |
| 700 | 0.934 | 179 | 0.75 | 35 | 0.012 | -33 | 0.905 | -180 |
| 750 | 0.938 | 179 | 0.68 | 32 | 0.011 | -34 | 0.907 | 180 |
| 800 | 0.940 | 178 | 0.62 | 30 | 0.010 | -33 | 0.914 | 179 |
| 850 | 0.946 | 178 | 0.57 | 27 | 0.010 | -30 | 0.913 | 179 |
| 900 | 0.944 | 177 | 0.52 | 24 | 0.009 | -27 | 0.921 | 178 |
| 950 | 0.946 | 177 | 0.48 | 22 | 0.008 | -28 | 0.928 | 177 |
| 1000 | 0.95 | 176 | 0.45 | 19 | 0.008 | -31 | 0.930 | 177 |
| 1050 | 0.949 | 176 | 0.42 | 17 | 0.006 | -26 | 0.933 | 177 |
| 1100 | 0.953 | 176 | 0.39 | 15 | 0.006 | -19 | 0.933 | 176 |
| 1150 | 0.954 | 175 | 0.36 | 13 | 0.005 | -16 | 0.937 | 176 |
| 1200 | 0.956 | 175 | 0.34 | 11 | 0.005 | -15 | 0.938 | 175 |
| 1250 | 0.957 | 174 | 0.32 | 9 | 0.004 | 3 | 0.934 | 175 |
| 1300 | 0.955 | 174 | 0.30 | 7 | 0.003 | 2 | 0.934 | 174 |
| 1350 | 0.955 | 173 | 0.28 | 6 | 0.005 | 25 | 0.937 | 174 |
| 1400 | 0.955 | 173 | 0.26 | 5 | 0.005 | 33 | 0.935 | 173 |
| 1450 | 0.957 | 172 | 0.25 | 4 | 0.005 | 31 | 0.943 | 172 |
| 1500 | 0.954 | 172 | 0.23 | 3 | 0.004 | 42 | 0.943 | 172 |

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 | |

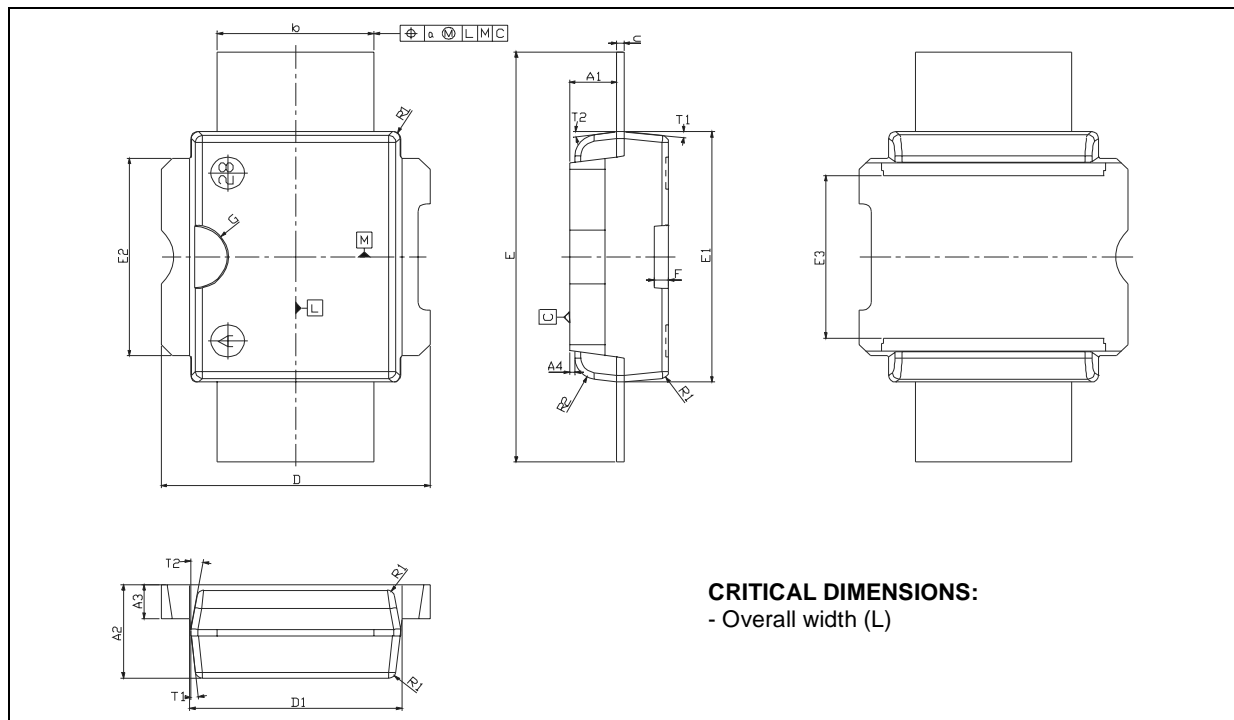
Note (1): Resin protrusions not included (max value: 0.15 mm per side)



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 (1): Resin protrusions not included (max value: 0.15 mm per side)



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