



PD57045 PD57045S

RF POWER TRANSISTORS The *LdmoST* Plastic FAMILY

PRELIMINARY DATA

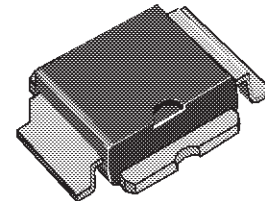
N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION
- POUT = 45 W with 13 dB gain @ 945 MHz / 28V
- NEW RF PLASTIC PACKAGE

DESCRIPTION

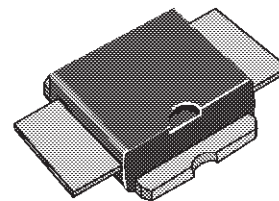
The PD57045 is a common source N-Channel, enhancement-mode, lateral Field-Effect RF power transistor. It is designed for high gain, broad band commercial and industrial applications. It operates at 28V in common source mode at frequencies of up to 1GHz. PD57045 boasts the excellent gain, linearity and reliability of ST's latest LDMOS technology mounted in the first true SMD plastic RF power package, PowerSO-10RF. PD57045's superior linearity performance makes it an ideal solution for base station applications.

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.



PowerSO-10RF
(Formed Lead)

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PD57045 XPD57045



PowerSO-10RF
(Straight Lead)

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

| Symbol | Parameter | Value | Unit |
|---------------|--|------------|-------------|
| $V_{(BR)DSS}$ | Drain-Source Voltage | 65 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current | 5 | A |
| P_{DISS} | Power Dissipation (@ $T_c = 70^{\circ}C$) | 73 | W |
| T_j | Max. Operating Junction Temperature | 165 | $^{\circ}C$ |
| T_{STG} | Storage Temperature | -65 to 165 | $^{\circ}C$ |

THERMAL DATA ($T_{CASE} = 70^{\circ}C$)

| | | | |
|---------------|----------------------------------|-----|---------------|
| $R_{th(j-c)}$ | Junction-Case Thermal Resistance | 1.3 | $^{\circ}C/W$ |
|---------------|----------------------------------|-----|---------------|

PD57045 PD57045S

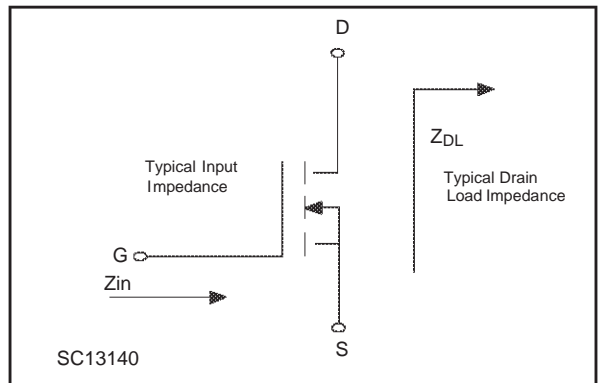
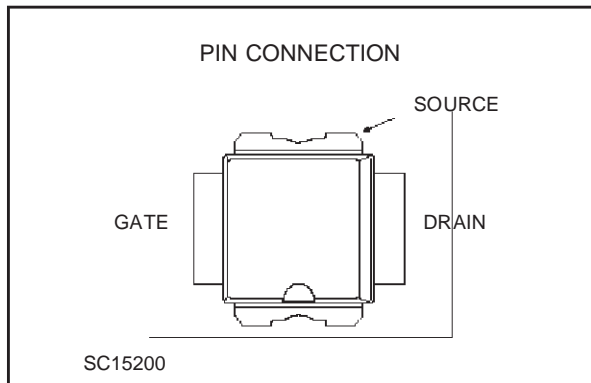
ELECTRICAL SPECIFICATION($T_{CASE} = 25\text{ }^{\circ}\text{C}$)

STATIC

| Symbol | Parameter | | Min. | Typ. | Max. | Unit |
|---------------|------------------------|------------------------|------|------|------|---------------|
| $V_{(BR)DSS}$ | $V_{GS} = 0\text{ V}$ | $I_{DS} = 1\text{ mA}$ | 65 | | | V |
| I_{DSS} | $V_{GS} = 0\text{ V}$ | $V_{DS} = 28\text{ V}$ | | | 1 | μA |
| I_{GSS} | $V_{GS} = 20\text{ V}$ | $V_{DS} = 0\text{ V}$ | | | 1 | μA |
| $V_{GS(Q)}$ | $V_{DS} = 28\text{ V}$ | $I_D = 250\text{ mA}$ | 2.0 | | 5.0 | V |
| $V_{DS(ON)}$ | $V_{GS} = 10\text{ V}$ | $I_D = 3\text{ A}$ | | 0.7 | 0.9 | V |
| g_{FS} | $V_{DS} = 10\text{ V}$ | $I_D = 5\text{ A}$ | 2.0 | 2.7 | | mho |
| C_{ISS} | $V_{GS} = 0\text{ V}$ | $V_{DS} = 28\text{ V}$ | | 86 | | pF |
| C_{OSS} | $V_{GS} = 0\text{ V}$ | $V_{DS} = 28\text{ V}$ | | 47 | | pF |
| C_{RSS} | $V_{GS} = 0\text{ V}$ | $V_{DS} = 28\text{ V}$ | | 3.6 | | pF |

DYNAMIC

| Symbol | Parameter | | | | Min. | Typ. | Max. | Unit |
|---------------|------------------------|----------------------|--------------------------|--------------------------|------|------|------|------|
| P_{OUT} | $V_{DD} = 28\text{ V}$ | $f = 945\text{ MHz}$ | $I_{DQ} = 250\text{ mA}$ | | 45 | | | W |
| G_{PS} | $V_{DD} = 28\text{ V}$ | $f = 945\text{ MHz}$ | $P_{OUT} = 45\text{ W}$ | $I_{DQ} = 250\text{ mA}$ | 13 | 14.5 | | dB |
| η_D | $V_{DD} = 28\text{ V}$ | $f = 945\text{ MHz}$ | $P_{OUT} = 45\text{ W}$ | $I_{DQ} = 250\text{ mA}$ | 50 | | | % |
| LOAD Mismatch | $V_{DD} = 28\text{ V}$ | $f = 945\text{ MHz}$ | $P_{OUT} = 45\text{ W}$ | $I_{DQ} = 250\text{ mA}$ | 10:1 | | | VSWR |



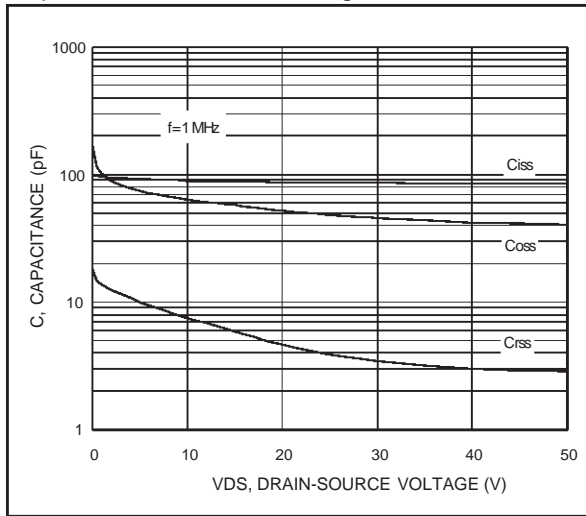
IMPEDANCE DATA

PD57045S

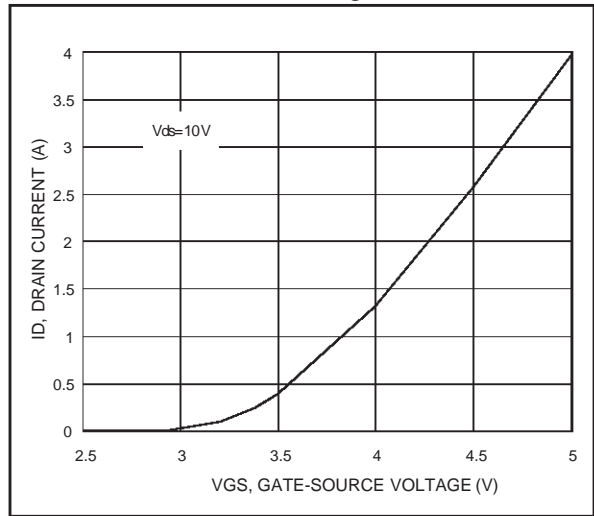
| Frequency MHz | Z_{in} Ω | Z_{dl} Ω |
|------------------|----------------------|----------------------|
| 945 | .80 + j 1.24 | 1.66 - j.44 |

TYPICAL PERFORMANCE

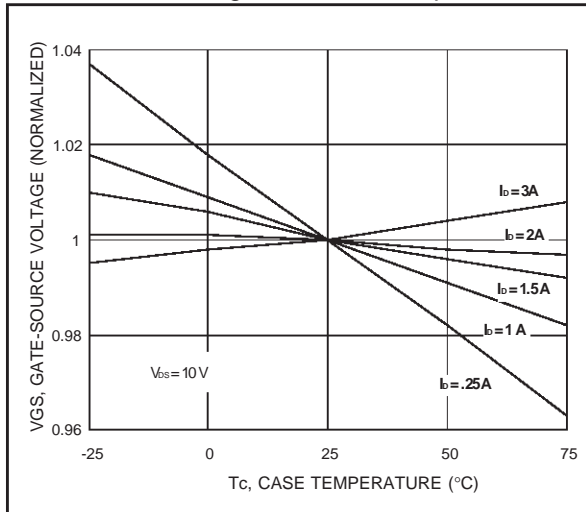
Capacitance vs. Drain Voltage



Drain Current vs. Gate Voltage



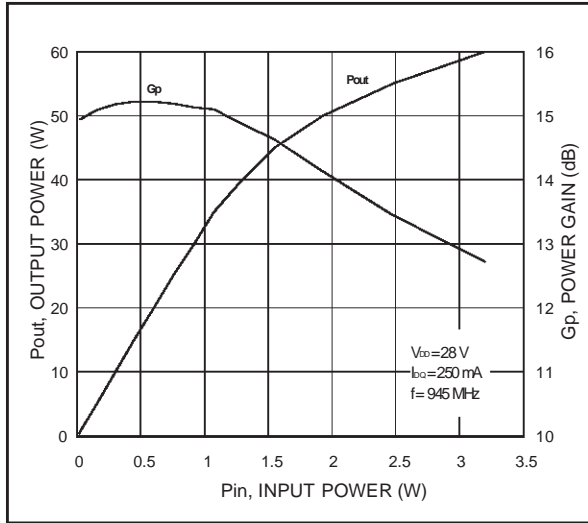
Gate-Source Voltage vs. Case Temperature



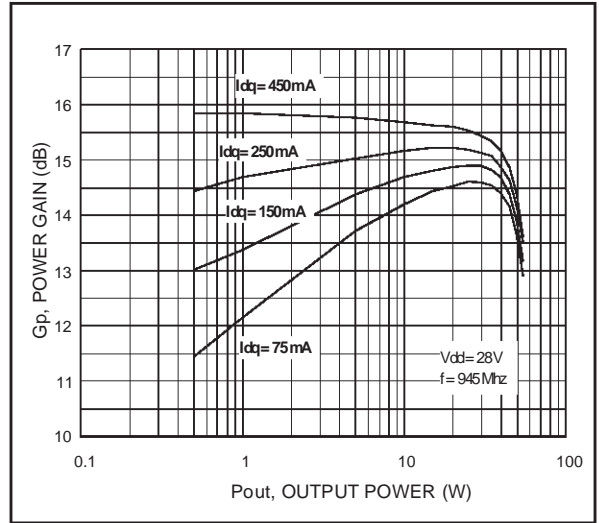
PD57045 PD57045S

TYPICAL PERFORMANCE - PD57045S

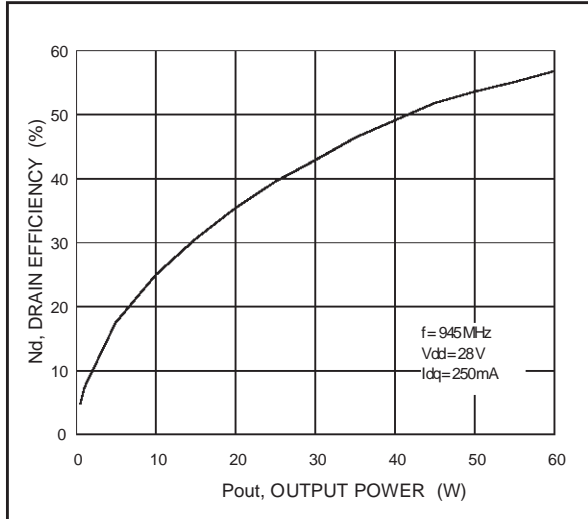
Output Power and Power Gain vs. Input Power



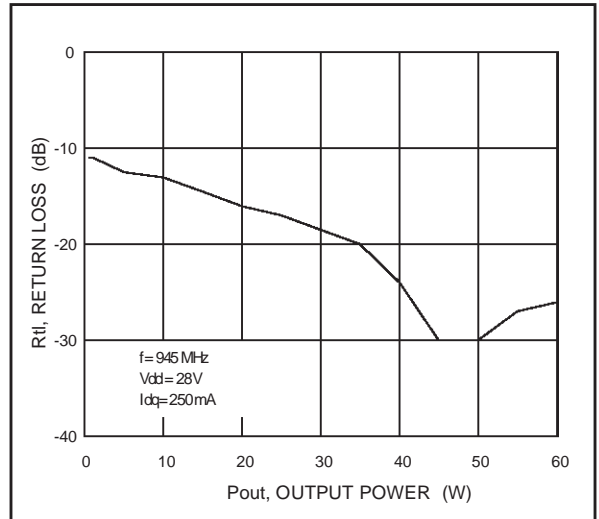
Power Gain vs. Output Power



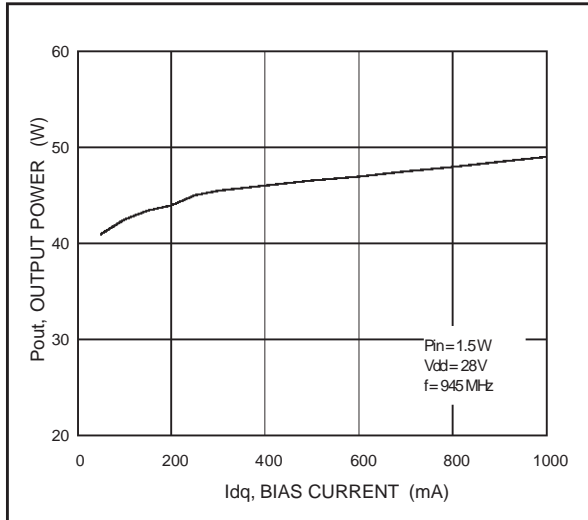
Drain Efficiency vs. Output Power



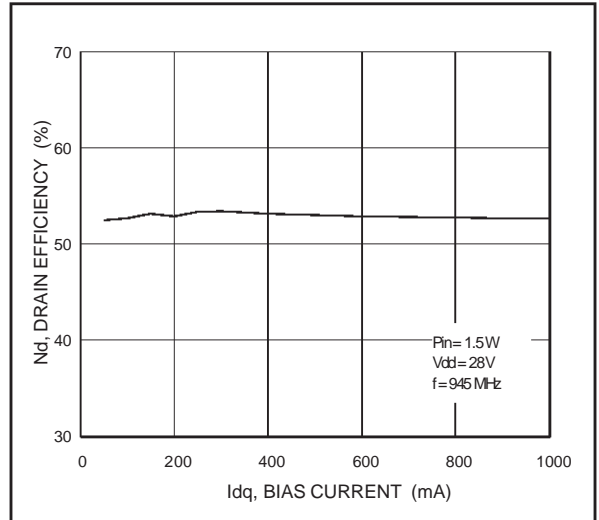
Return Loss vs. Output Power



Output Power vs. Bias Current

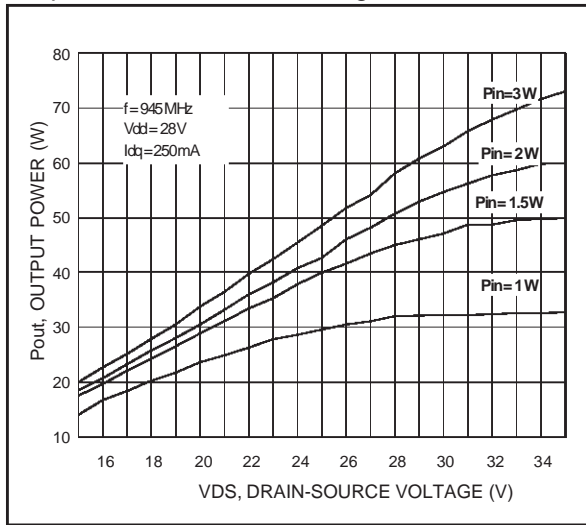


Drain Efficiency vs. Bias Current

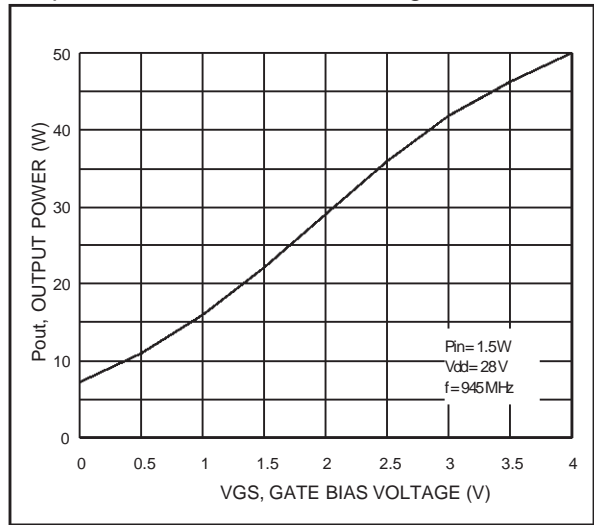


TYPICAL PERFORMANCE PD57045S

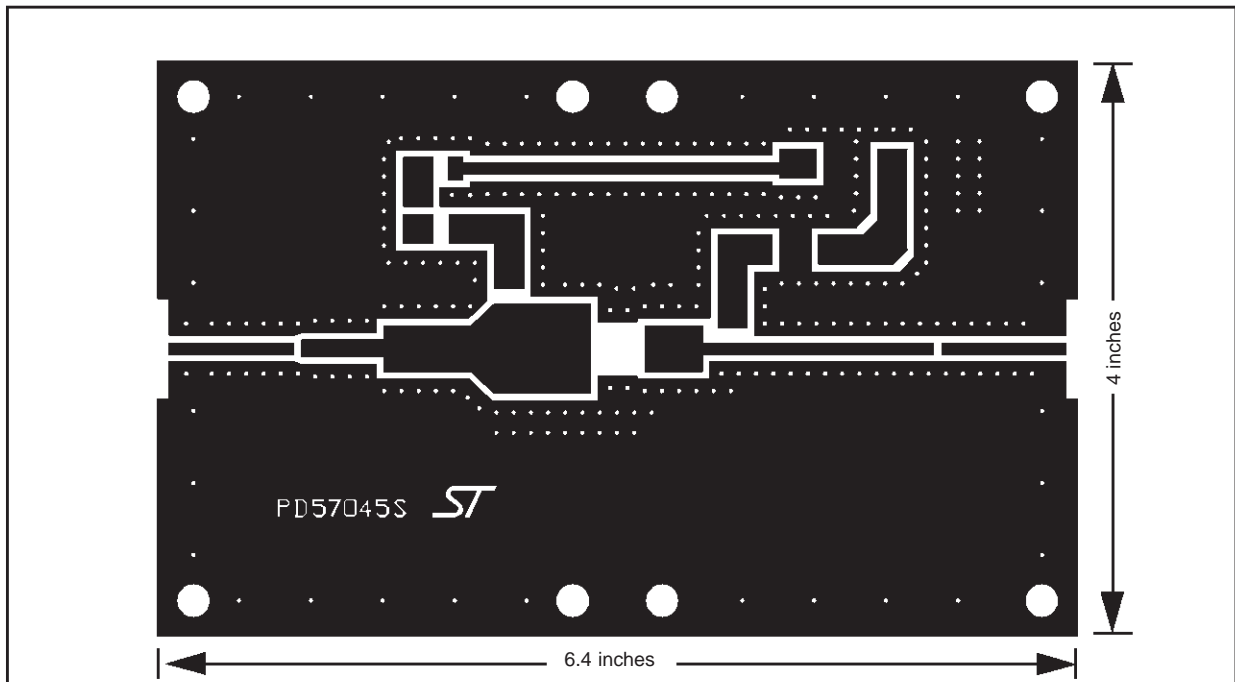
Output Power vs. Drain Voltage



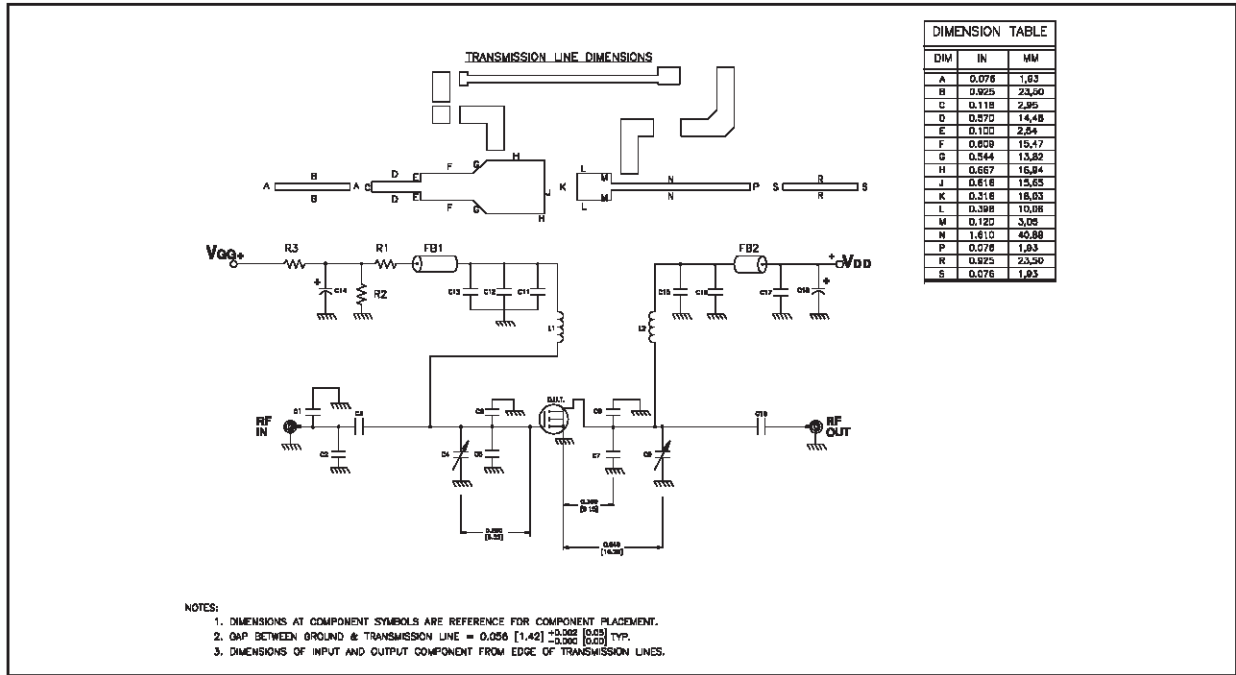
Output Power vs. Gate Bias Voltage



TEST CIRCUIT PHOTOMASTER



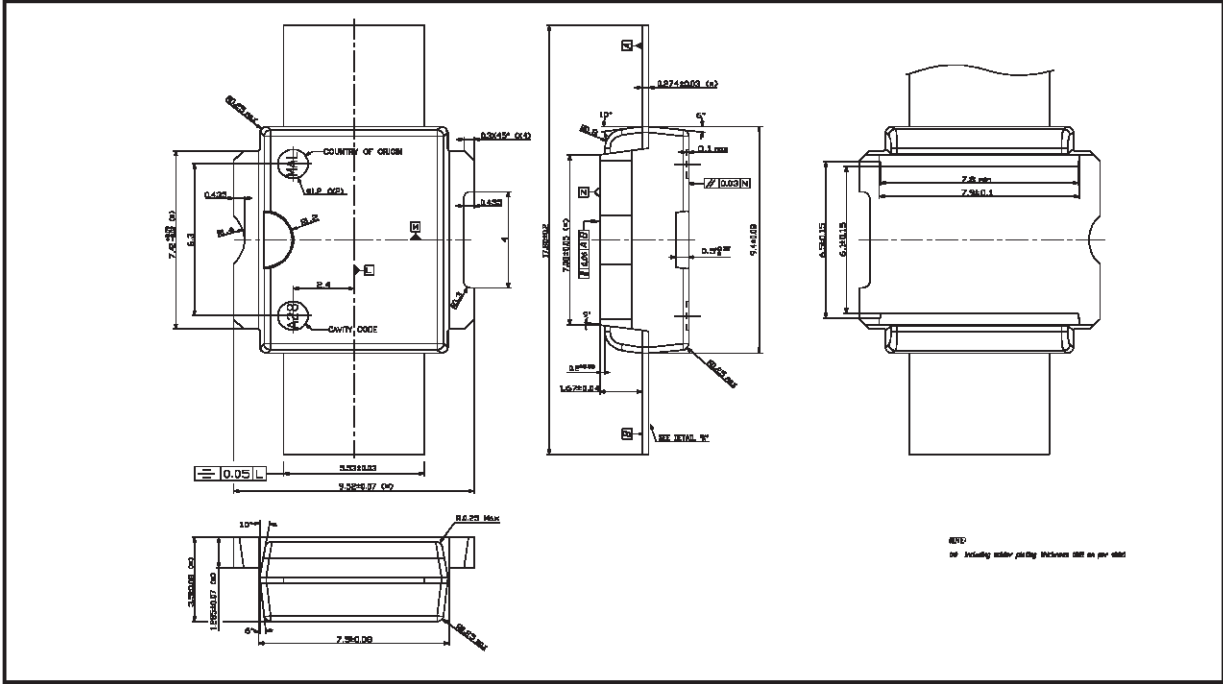
TEST CIRCUIT SCHEMATIC



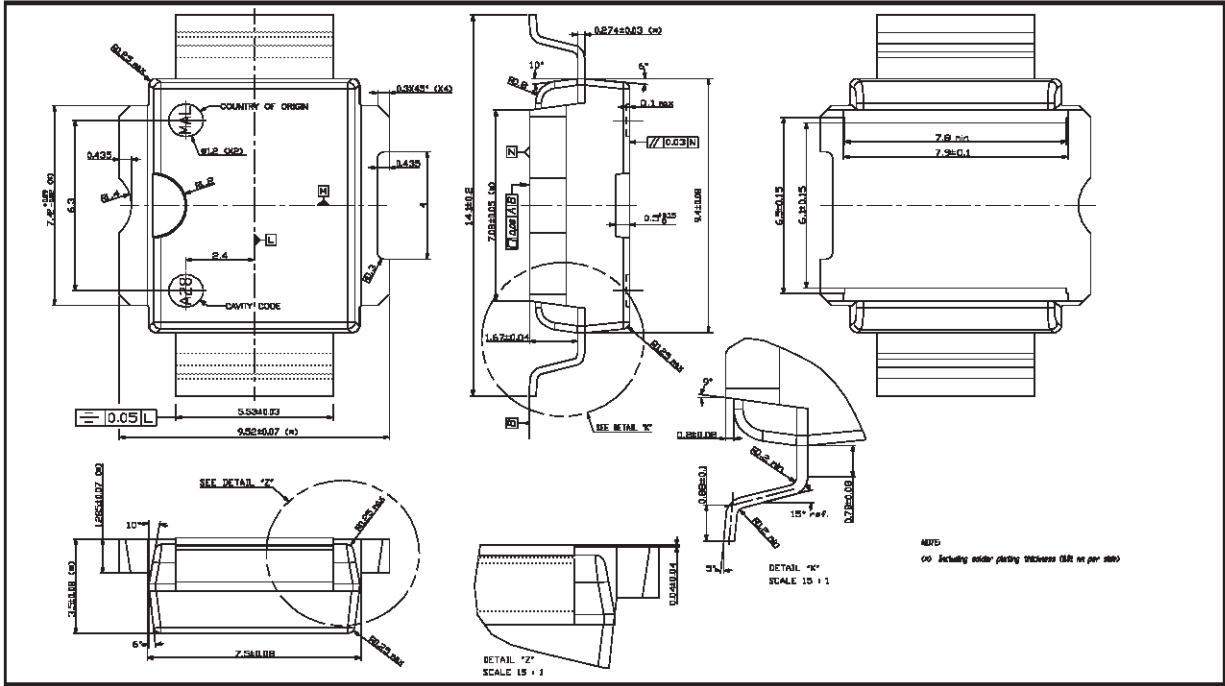
TEST CIRCUIT COMPONENT PART LIST

| | | | |
|-----|---|-------|--|
| L1 | INDUCTOR, 5TURNS AIR WOUND #22AWG, ID=0.059(1.49), NYLON COATED MAGNET WIRE | C7 | 7.5pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| L2 | INDUCTOR, 5TURNS AIR WOUND #22AWG, ID=0.059(1.49), NYLON COATED MAGNET WIRE | C8 | 7.5pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| FB1 | SHIELD BEAD SURFACE MOUNT EMI | C9 | 0.8-8.0pF GIGA TRIM VARIABLE CAPACITOR |
| FB2 | SHIELD BEAD SURFACE MOUNT EMI | C10 | 47pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| R1 | 18K OHM, 1W SURFACE MOUNT CHIP RESISTOR | C11 | 47pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| R2 | 4.7M OHM, 1W SURFACE MOUNT CHIP RESISTOR | C12 | 1000pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| R3 | 120 OHM, 2W SURFACE MOUNT CHIP RESISTOR | C13 | 0.1μF/500V SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| C1 | 3pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR | C14 | 10μF/50V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR |
| C2 | 3pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR | C15 | 47pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| C3 | 47pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR | C16 | 100pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| C4 | 0.8-8.0pF GIGA TRIM VARIABLE CAPACITOR | C17 | 0.1μF/500V SURFACE MOUNT CERAMIC CHIP CAPACITOR |
| C5 | 7.5pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR | C18 | 220μF/63V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR |
| C6 | 7.5pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR | Board | ROGER, ULTRA LAM 2000 THK 0.030" $\epsilon_r = 2.55$ 2oz ED Cu 2 SIDES |

PowerSO-10RF (Straight Lead) MECHANICAL DATA



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