



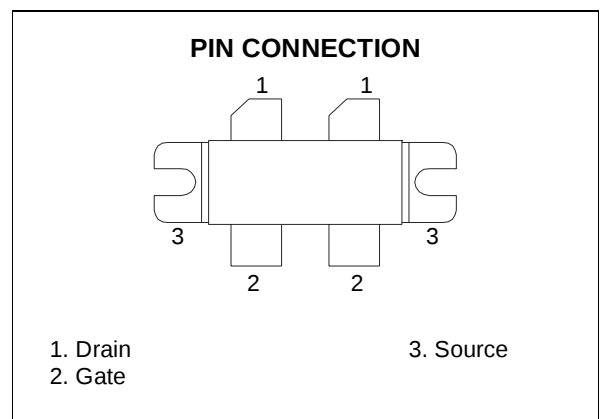
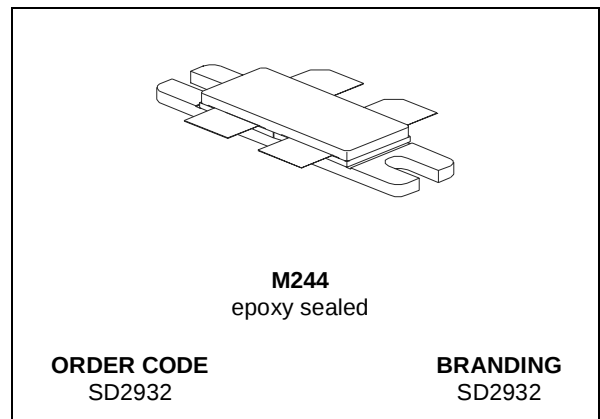
## SD2932

### RF POWER TRANSISTORS HF/VHF/UHF N-CHANNEL MOSFETs

- GOLD METALLIZATION
- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION, PUSH PULL
- $P_{OUT} = 300 \text{ W MIN. WITH } 15 \text{ dB GAIN @ } 175 \text{ MHz}$

#### DESCRIPTION

The SD2932 is a gold metallized N-Channel MOS field-effect RF power transistor. The SD2932 it is intended for use in 50 V dc large signal applications up 250 MHz.



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

| Symbol        | Parameter                                  | Value       | Unit               |
|---------------|--------------------------------------------|-------------|--------------------|
| $V_{(BR)DSS}$ | Drain Source Voltage                       | 125         | V                  |
| $V_{DGR}$     | Drain-Gate Voltage ( $R_{GS} = 1M\Omega$ ) | 125         | V                  |
| $V_{GS}$      | Gate-Source Volatge                        | $\pm 20$    | V                  |
| $I_D$         | Drain Current                              | 40          | A                  |
| $P_{DISS}$    | Power Dissipation                          | 500         | W                  |
| $T_j$         | Max. Operating Junction Temperature        | +200        | $^{\circ}\text{C}$ |
| $T_{STG}$     | Storage Temperature                        | -65 to +150 | $^{\circ}\text{C}$ |

#### THERMAL DATA

|               |                                   |      |                      |
|---------------|-----------------------------------|------|----------------------|
| $R_{th(j-c)}$ | Junction -Case Thermal Resistance | 0.35 | $^{\circ}\text{C/W}$ |
|---------------|-----------------------------------|------|----------------------|

ELECTRICAL SPECIFICATION (T<sub>CASE</sub> = 25°C)

STATIC (Per Section)

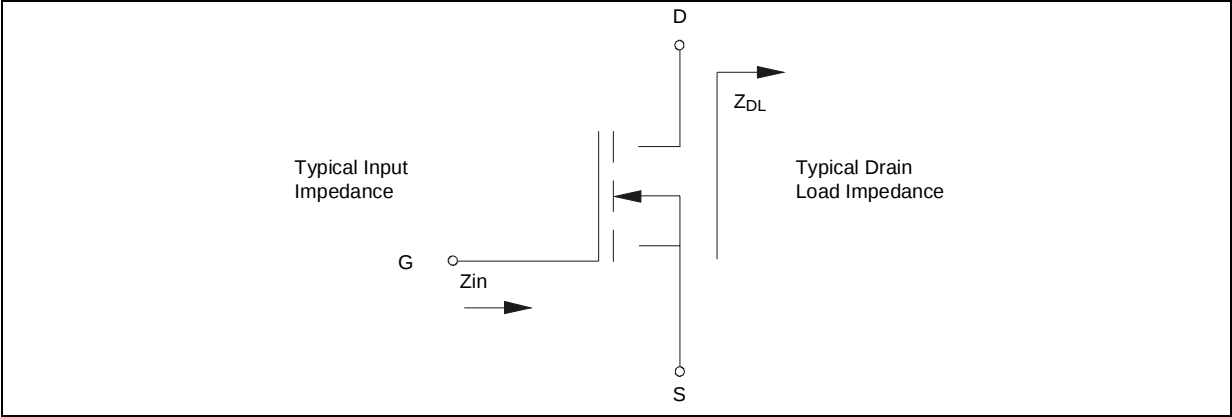
| Symbol               | Test Conditions        |                          | Min.      | Typ. | Max. | Unit |
|----------------------|------------------------|--------------------------|-----------|------|------|------|
| V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V  | I <sub>DS</sub> = 100 mA | 125       |      |      | V    |
| I <sub>DSS</sub>     | V <sub>GS</sub> = 0 V  | V <sub>DS</sub> = 50 V   |           |      | 5    | mA   |
| I <sub>GSS</sub>     | V <sub>GS</sub> = 20 V | V <sub>DS</sub> = 0 V    |           |      | 5    | μA   |
| V <sub>GS(Q)</sub>   | V <sub>DS</sub> = 10 V | I <sub>D</sub> = 250 mA  | 1.5       |      | 4    | V    |
| V <sub>DS(ON)</sub>  | V <sub>GS</sub> = 10 V | I <sub>D</sub> = 10 A    |           |      | 3    | V    |
| G <sub>FS</sub>      | V <sub>DS</sub> = 10 V | I <sub>D</sub> = 5 A     | 5         |      |      | mho  |
| C <sub>ISS</sub>     | V <sub>GS</sub> = 0 V  | V <sub>DS</sub> = 50 V   | f = 1 MHz |      | 480  | pF   |
| C <sub>OSS</sub>     | V <sub>GS</sub> = 0 V  | V <sub>DS</sub> = 50 V   | f = 1 MHz |      | 190  | pF   |
| C <sub>RSS</sub>     | V <sub>GS</sub> = 0 V  | V <sub>DS</sub> = 50 V   | f = 1 MHz |      | 18   | pF   |

REF. 7163911B

DYNAMIC

| Symbol           | Test Conditions                                                                                                   |                                                                     | Min. | Typ. | Max. | Unit |
|------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------|------|------|------|
| P <sub>OUT</sub> | V <sub>DD</sub> = 50 V                                                                                            | I <sub>DQ</sub> = 500 mA      f = 175 MHz                           | 300  |      |      | W    |
| G <sub>PS</sub>  | V <sub>DD</sub> = 50 V                                                                                            | I <sub>DQ</sub> = 500 mA    P <sub>OUT</sub> = 300 W    f = 175 MHz | 15   | 16   |      | dB   |
| η <sub>D</sub>   | V <sub>DD</sub> = 50 V                                                                                            | I <sub>DQ</sub> = 500 mA    P <sub>OUT</sub> = 300 W    f = 175 MHz | 50   | 60   |      | %    |
| Load Mismatch    | V <sub>DD</sub> = 50 V    I <sub>DQ</sub> = 500 mA    P <sub>OUT</sub> = 300 W    f = 175 MHz<br>All Phase Angles |                                                                     | 5:1  |      |      | VSWR |

IMPEDANCE DATA

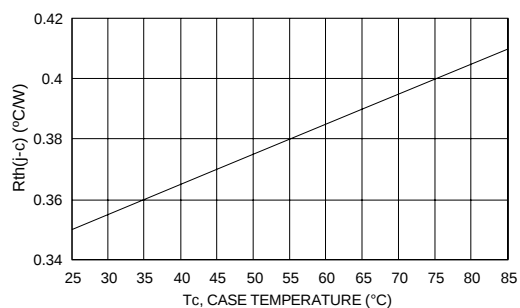


| FREQ    | Z <sub>IN</sub> (Ω) | Z <sub>DL</sub> (Ω) |
|---------|---------------------|---------------------|
| 175 MHz | 0.92 - j 0.14       | 3.17 + j 4.34       |

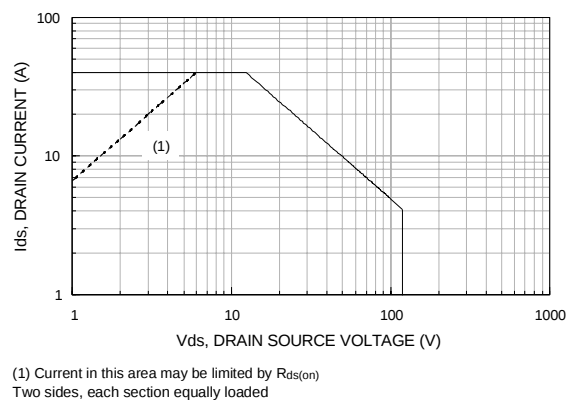
Measured Gate to Gate and Drain to Drain, respectively.

## TYPICAL PERFORMANCE

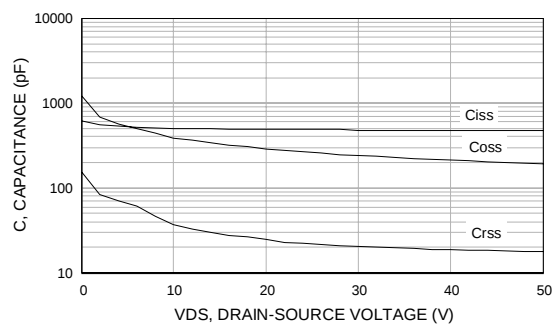
Maximum Thermal Resistance vs. Case Temperature



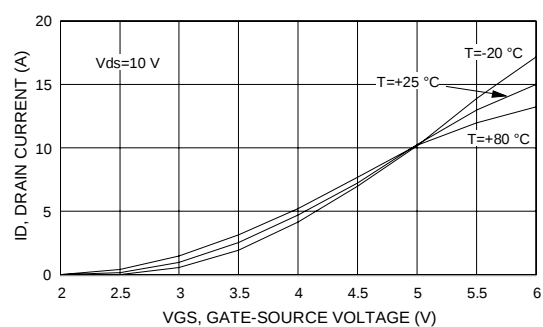
Safe Operating Area



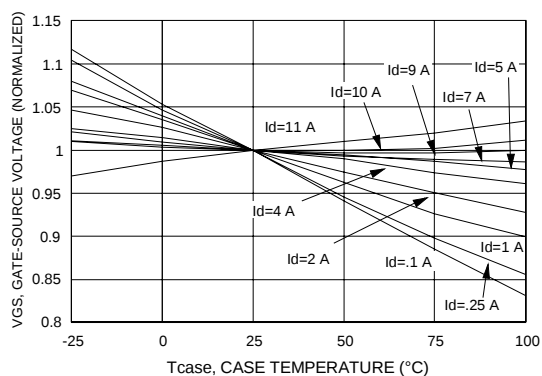
Capacitance vs. Drain-Source Voltage



Drain Current vs. Gate Voltage

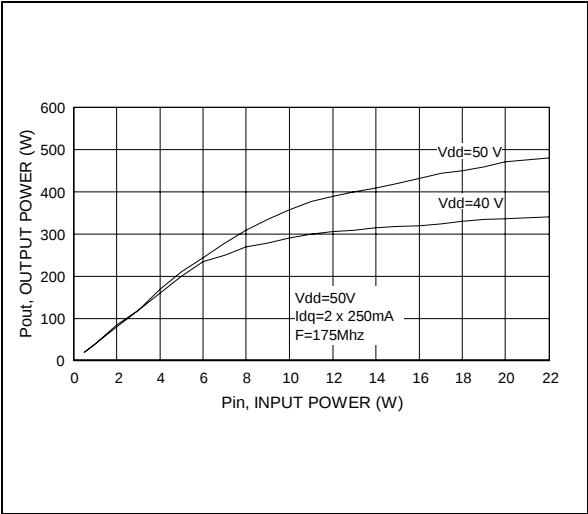


Gate Voltage vs. Case Temperature

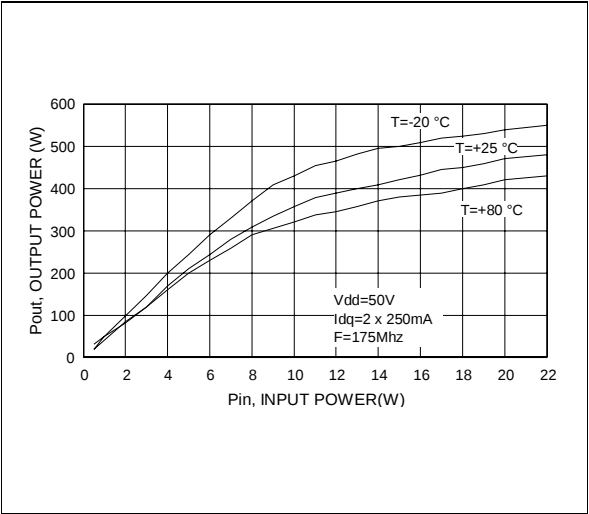


TYPICAL PERFORMANCE (175 MHz)

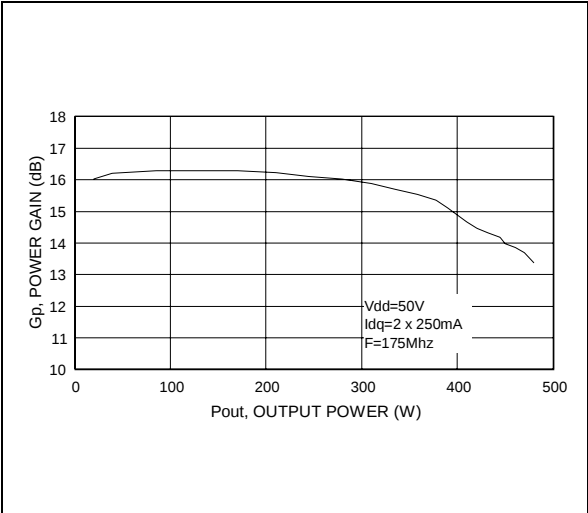
Output Power vs. Input Power



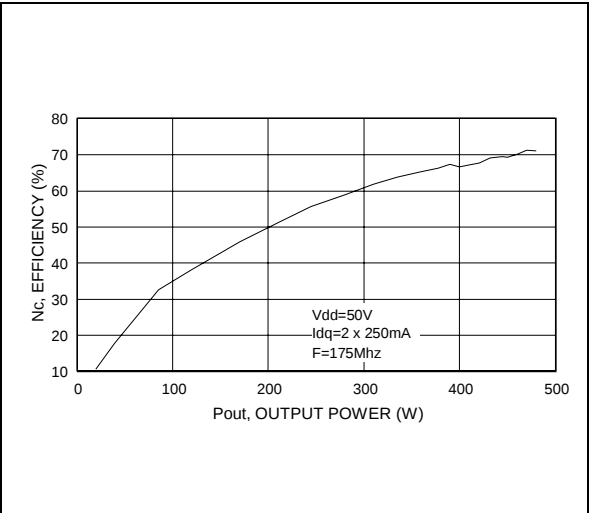
Output Power vs. Input Power



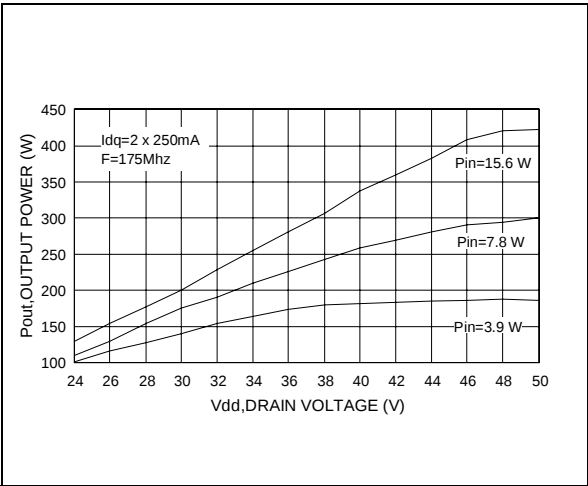
Power Gain vs. Output Power



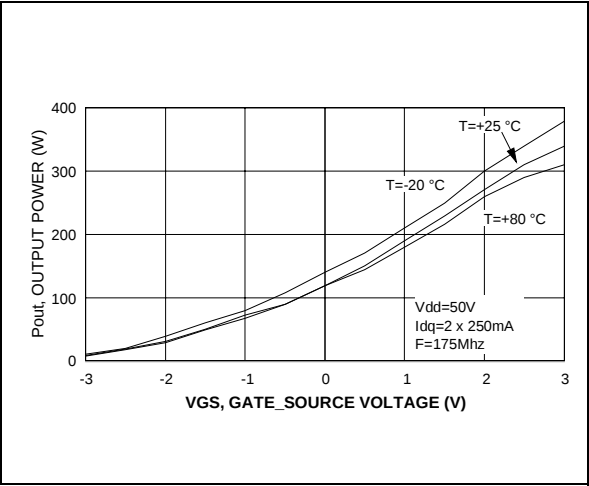
Efficiency vs. Output Power



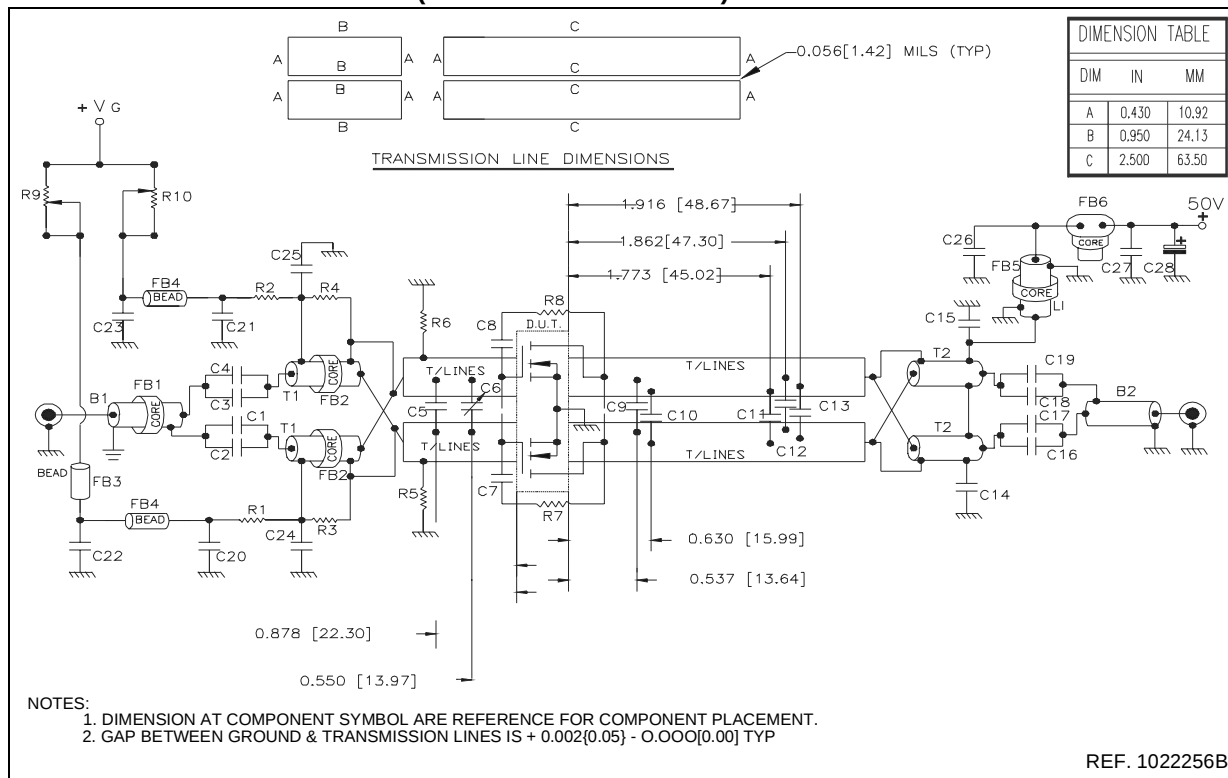
Output Power vs. Supply Voltage



Output Power vs. Gate Voltage



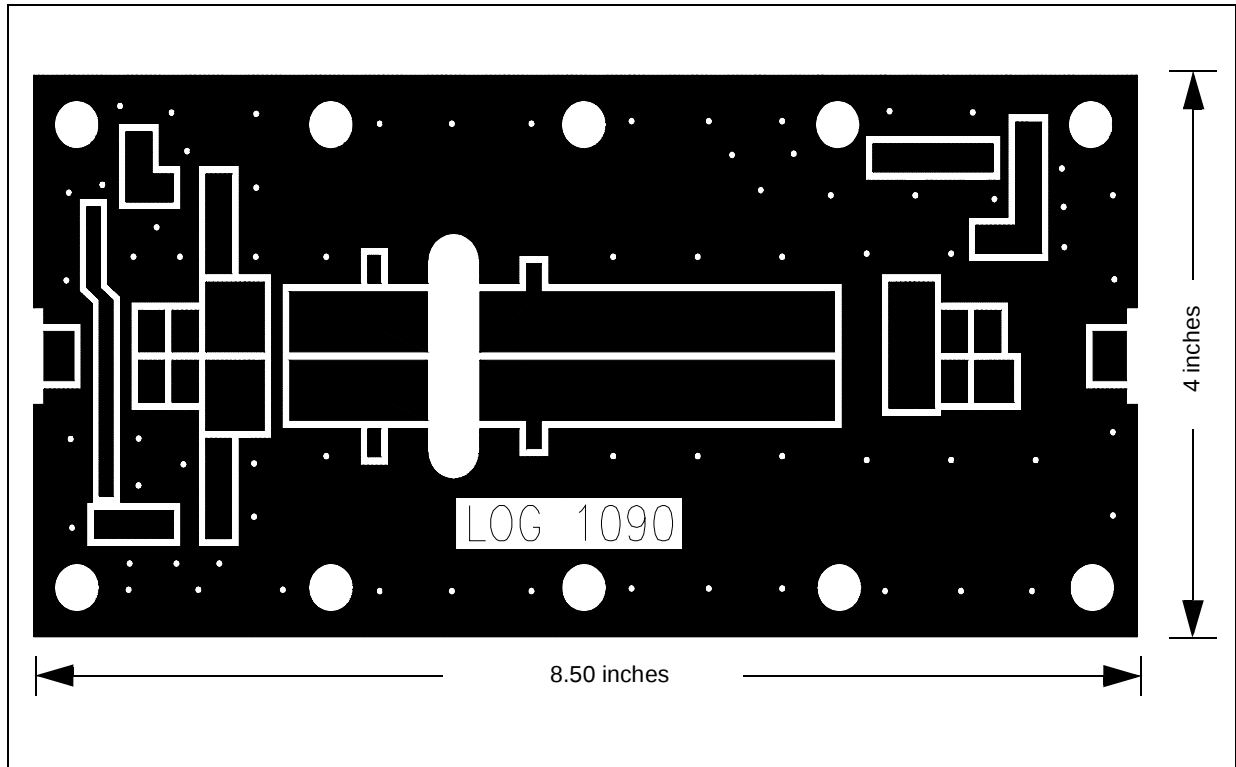
## 175 MHz Test Circuit Schematic (Production Test Circuit)



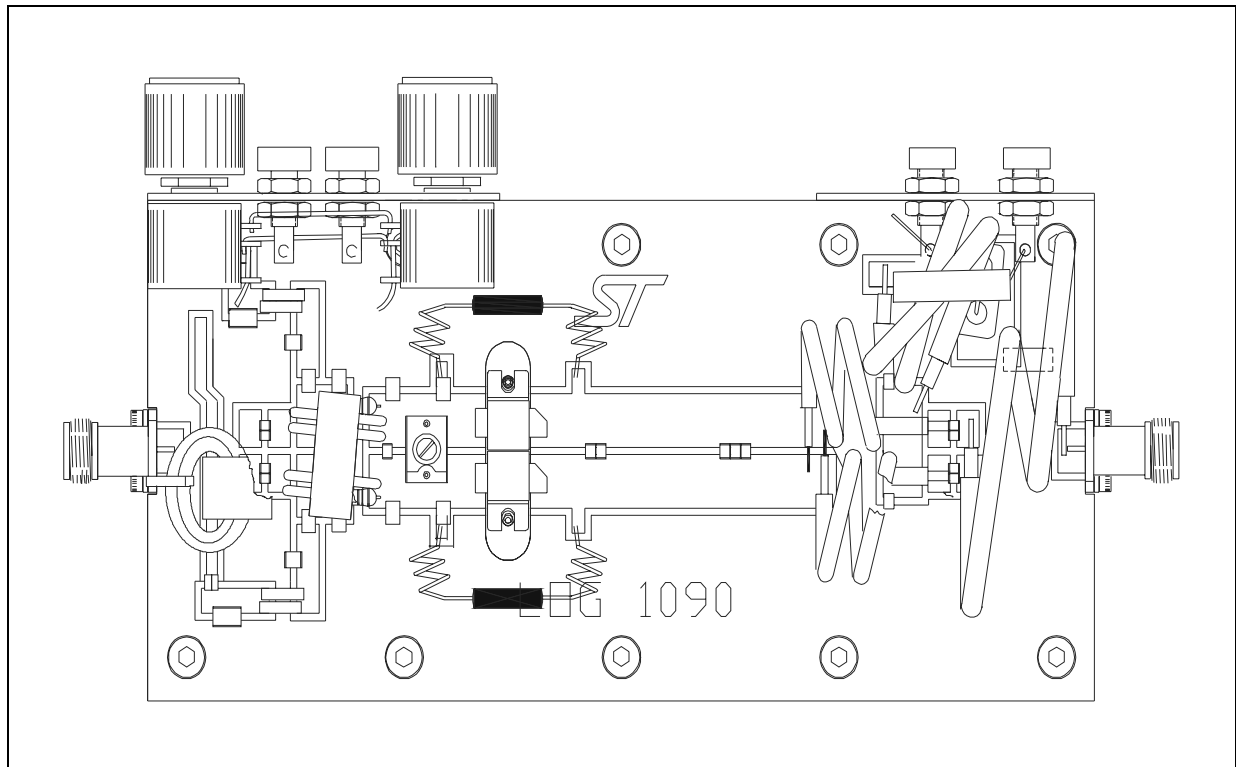
## 175 MHz Test Circuit Component Part List

|                             |                                                                                                                                              |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| R1,R2,R5,R6                 | 470 Ohm 1 W, Surface Mount Chip Resistor                                                                                                     |
| R3,R4                       | 360 Ohm 0.5 W, Carbon Comp. Axial Lead Resistor or Equivalent                                                                                |
| R7,R8                       | 560 Ohm 2 W, Resistor Two Turn Wire Air-Wound Axial Lead Resistor                                                                            |
| R9,R10                      | 20 K Ohm 3.09 W, 10 Turn Wirewound Precision Potentiometer                                                                                   |
| C1,C4                       | 680 pF ATC 130B Surface Mount Ceramic Chip Capacitor                                                                                         |
| C2,C3,C7,C8,C17,C19,C20,C21 | 10000 pF ATC 200B Surface Mount Ceramic Chip Capacitor                                                                                       |
| C5                          | 75 pF ATC 100B Surface Mount Ceramic Chip Capacitor                                                                                          |
| C6                          | ST40 25 pF - 115 pF Miniature variable Trimmer                                                                                               |
| C9,C10                      | 47 pF ATC 100B Surface Mount Ceramic Chip Capacitor                                                                                          |
| C11,C12, C13                | 43 pF ATC 100B Surface Mount Ceramic Chip Capacitor                                                                                          |
| C14,C15,C24,C25             | 1200 pF ATC 700B Surface Mount Ceramic Chip Capacitor                                                                                        |
| C16,C18                     | 470 pF ATC 700B Surface Mount Ceramic Chip Capacitor                                                                                         |
| C22,C23                     | 0.1 $\mu$ F / 500 V Surface Mount Ceramic Chip Capacitor                                                                                     |
| C26,C27                     | 0.01 $\mu$ F / 500 V Surface Mount Ceramic Chip Capacitor                                                                                    |
| C28                         | 10 $\mu$ F / 63 Aluminum Electrolytic Axial Lead Capacitor                                                                                   |
| B1                          | 50 Ohm RG316 O.D 0.076[1.93] L = 11.80[299.72] Flexible Coaxial Cable 4 Turns thru Fair-rite Bead                                            |
| B2                          | 50 Ohm RG-142B O.D 0.165[4.19] L = 11.80[299.72] Flexible Coaxial Cable                                                                      |
| T1                          | R.F. Transformer 4:1, 25 Ohm O.D RG316-25 O.D 0.080[2.03] L = 5.90[149.86] Flexible Coaxial Cable 2 Turns thru Fair-rite Multi-Aperture Core |
| T2                          | R.F. Transformer 1:4, 25 Ohm Semi-rigid Coaxial Cable O.D. 0.141[3.58] L = 5.90[149.86]                                                      |
| L1                          | Inductor $\lambda$ 1/4 Wave 50 Ohm O.D 0.165[4.19] L = 11.80 [299.72] Flexible Coaxial Cable 2 Turns thru Fair-rite Bead                     |
| FB1,FB5                     | Shield Bead                                                                                                                                  |
| FB2,FB6                     | Multi-aperture Core                                                                                                                          |
| FB3                         | Multilayer Ferrite Chip Bead (Surface Mount)                                                                                                 |
| FB4                         | Surface Mount Emi Shield Bead                                                                                                                |
| PCB                         | Woven Glass Reinforced PTFE Microwave Laminate 0.06", 1 oz EDCu, Both sides, $\epsilon_r = 2.55$                                             |

175 MHz Test Circuit Photomaster

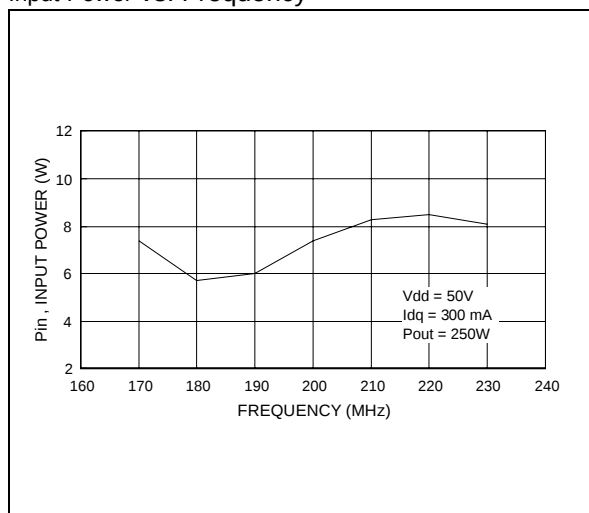


175 MHz Test Fixture

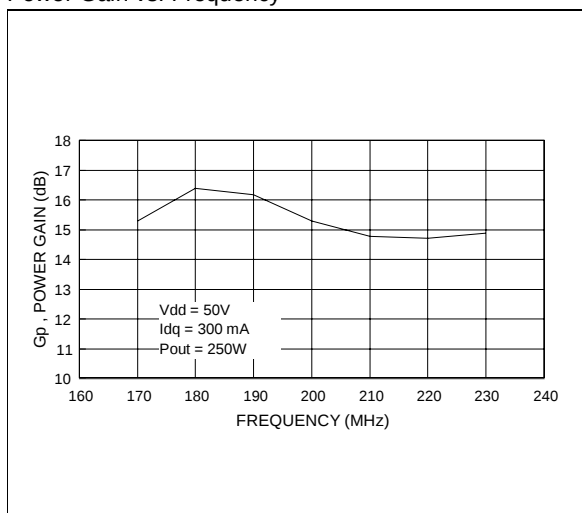


## TYPICAL BROADBAND DATA (175 - 230 MHz)

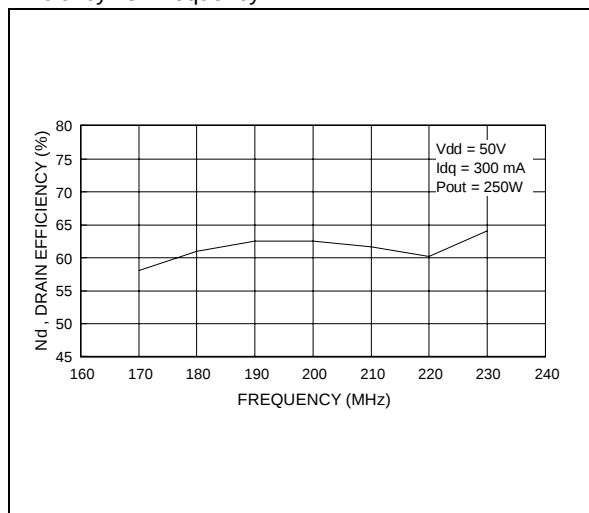
Input Power vs. Frequency



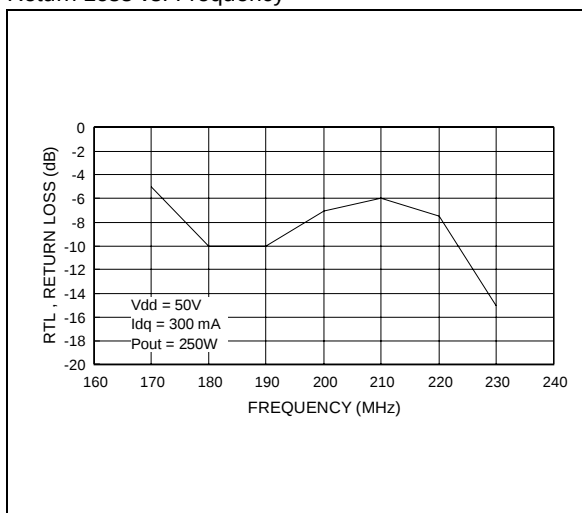
Power Gain vs. Frequency



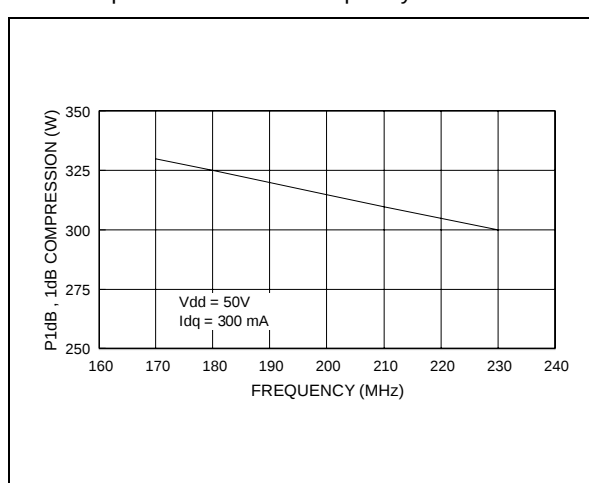
Efficiency vs. Frequency



Return Loss vs. Frequency



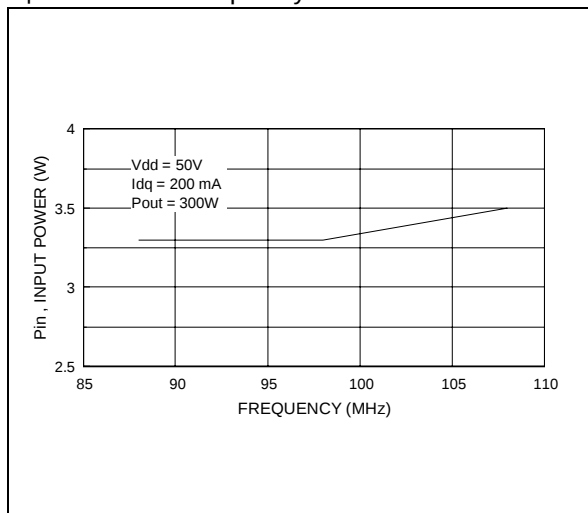
1 dB Compression Point vs. Frequency



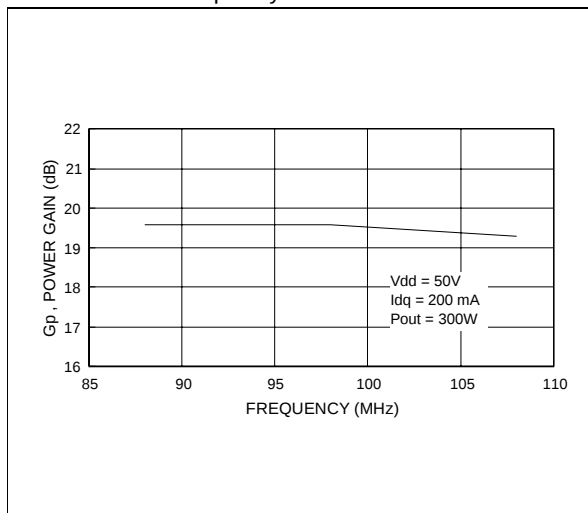


## TYPICAL BROADBAND DATA (88 -108 MHz)

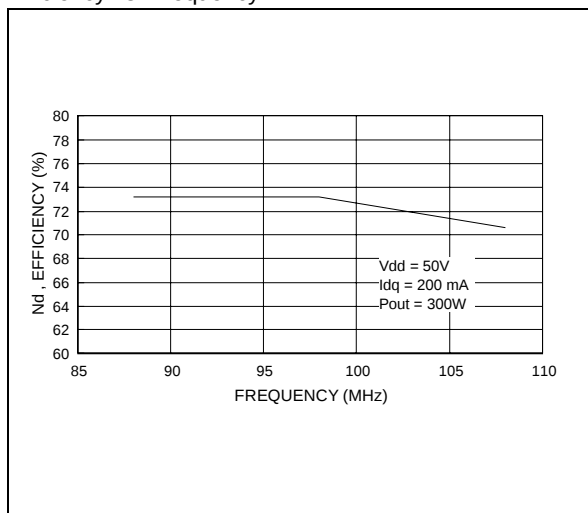
Input Power vs. Frequency



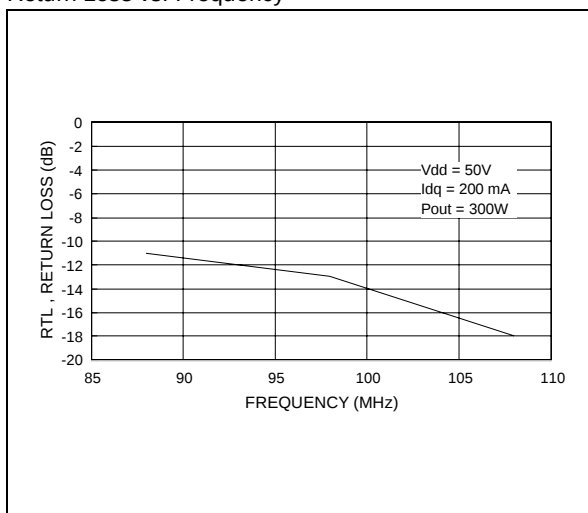
Power Gain vs. Frequency



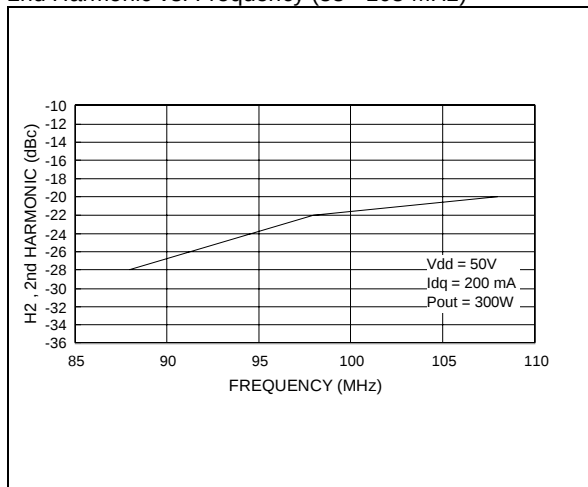
Efficiency vs. Frequency



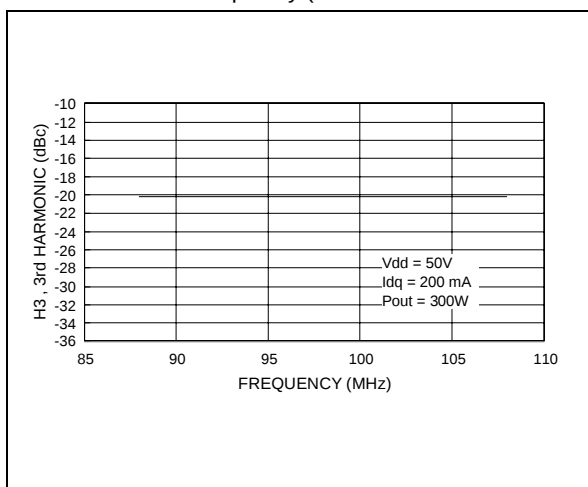
Return Loss vs. Frequency



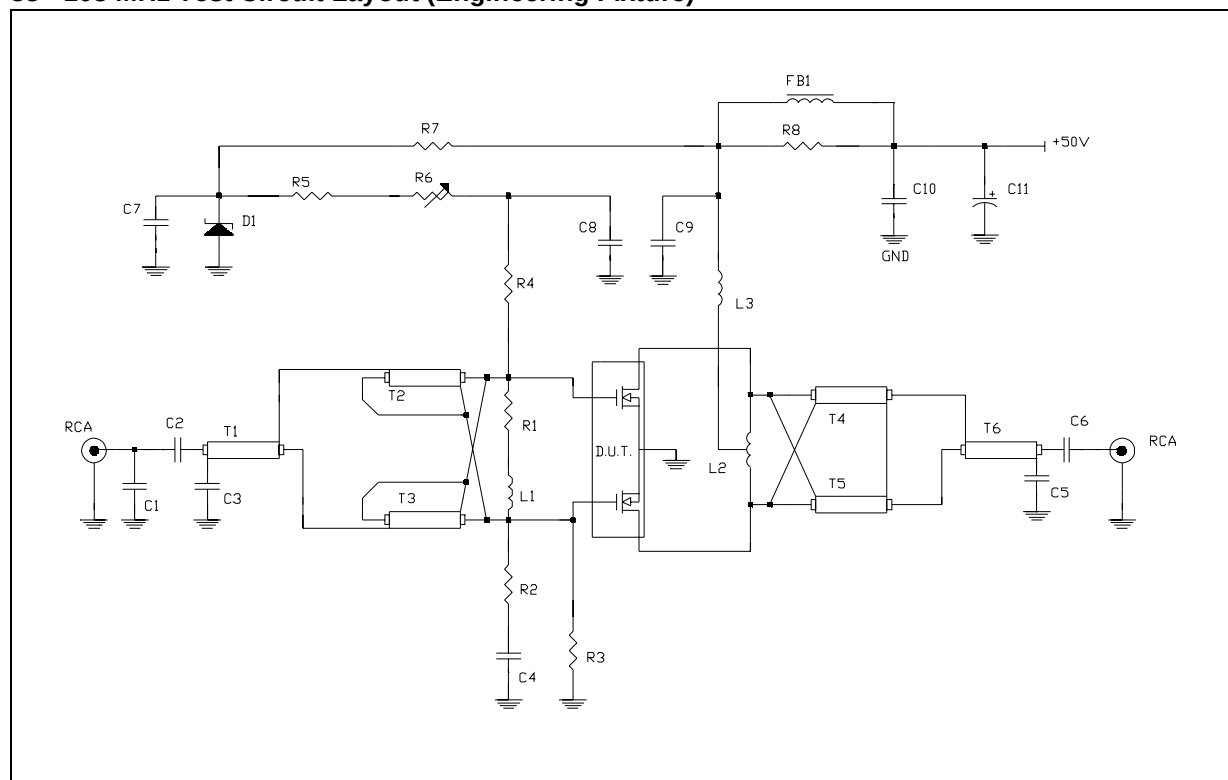
2nd Harmonic vs. Frequency (88 - 108 MHz)



3rd Harmonic vs. Frequency (88 - 108 MHz)



## 88 - 108 MHz Test Circuit Layout (Engineering Fixture)

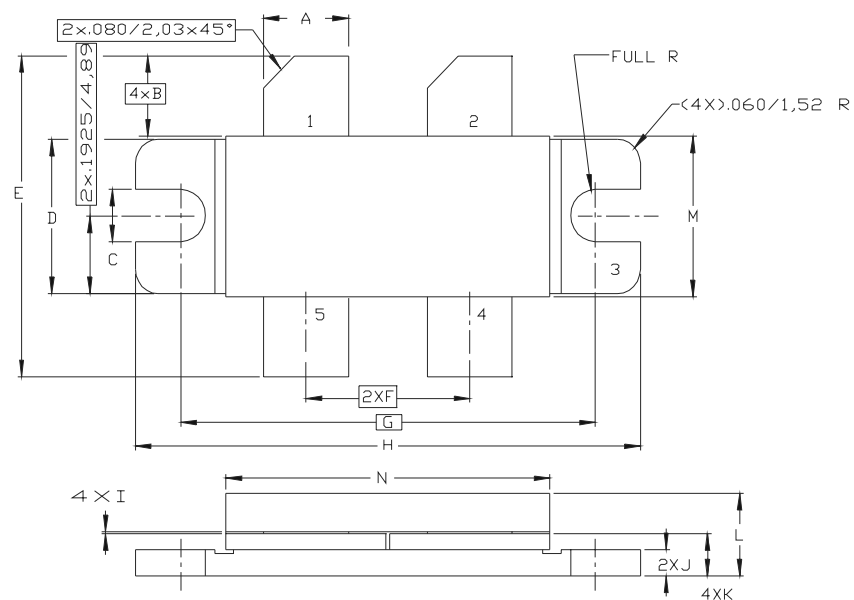


## 88 - 108 MHz Circuit Layout Component Part List

|                |                                                                                 |
|----------------|---------------------------------------------------------------------------------|
| PCB            | 1/32" Woven FiberGlass 0.030 Cu, 2 sides, $\epsilon_r = 4.8$                    |
| T1             | 50 Ohm Flexible Coax Cable OD 0.06", 5" Long                                    |
| T2,T3          | 9:1 Transformer, 25 Ohm Flexible Coax Cable OD 0.1", 3.9". Ferrite Core NEOSIDE |
| T4,T5          | 4:1 Transformer, 25 Ohm Flexible Coax Cable OD 0.1", 5" Long                    |
| T6             | 50 Ohm Flexible Coax Cable OD 0.1", 5" Long                                     |
| FB1            | vk200                                                                           |
| C1             | 10 pF Ceramic Cap                                                               |
| C2,C3,C4,C7,C8 | 1 nF Chip Cap                                                                   |
| C5,C6          | 1 nF ATC Chip Cap                                                               |
| C9             | 470 pF ATC Chip Cap                                                             |
| C10            | 100 nF Chip Cap                                                                 |
| C11            | 100 mF / 63 V Electrolytic Cap                                                  |
| R1             | 56 Ohm Resistor                                                                 |
| R2,R4          | 10 Ohm Chip Resistor                                                            |
| R3             | 10 K Ohm Resistor                                                               |
| R5             | 5.6 Ohm Resistor                                                                |
| R6             | 10 K Ohm, 10 Turn Trim Resistor                                                 |
| R7             | 3.3 K Ohm / 5 W Resistor                                                        |
| R8             | 15 Ohm / 5 W Resistor                                                           |
| D1             | 6.6 V Zener Diode                                                               |
| L1             | 10 nH Inductor                                                                  |
| L2             | 40 nH Inductor                                                                  |
| L3             | 70 nH Inductor                                                                  |

## M244 (.400 x .860 4/L BAL N/HERM W/FLG) MECHANICAL DATA

| DIM. | mm    |       |       | Inch  |       |       |
|------|-------|-------|-------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX   | MIN.  | TYP.  | MAX   |
| A    | 5.59  |       | 5.84  | 0.220 |       | 0.230 |
| B    |       | 5.08  |       |       | 0.200 |       |
| C    | 3.02  |       | 3.28  | 0.119 |       | 0.129 |
| D    | 9.65  |       | 9.91  | 0.380 |       | 0.390 |
| E    | 19.81 |       | 20.82 | 0.780 |       | 0.820 |
| F    | 10.92 |       | 11.18 | 0.430 |       | 0.440 |
| G    |       | 27.94 |       |       | 1.100 |       |
| H    | 33.91 |       | 34.16 | 1.335 |       | 1.345 |
| I    | 0.10  |       | 0.15  | 0.004 |       | 0.006 |
| J    | 1.52  |       | 1.78  | 0.060 |       | 0.070 |
| K    | 2.59  |       | 2.84  | 0.102 |       | 0.112 |
| L    | 4.83  |       | 5.84  | 0.190 |       | 0.230 |
| M    | 10.03 |       | 10.34 | 0.395 |       | 0.407 |
| N    | 21.59 |       | 22.10 | 0.850 |       | 0.870 |



Controlling Dimension: Inches

1020876B

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