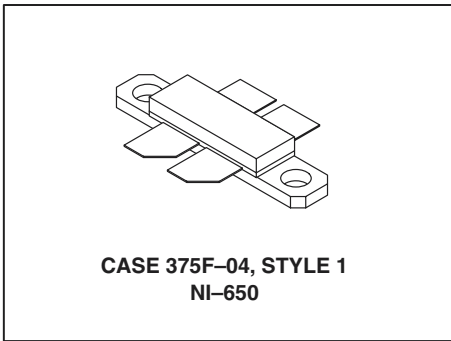


The RF MOSFET Line  
**RF Power Field-Effect Transistor**  
N-Channel Enhancement-Mode Lateral MOSFET



470 – 860 MHz, 100 W, 28 V  
LATERAL N-CHANNEL  
BROADBAND  
RF POWER MOSFET



Designed for broadband commercial and industrial applications with frequencies from 470 – 860 MHz. The high gain and broadband performance of this device make it ideal for large-signal, common source amplifier applications in 28 volt transmitter equipment.

- Typical Two-Tone Performance @ 860 MHz, 28 Volts, Narrowband Fixture  
Output Power – 100 Watts PEP  
Power Gain – 13.5 dB  
Efficiency – 36%  
IMD – -31 dBc
- Typical Performance at 860 MHz, 28 Volts, Broadband Fixture  
Output Power – 100 Watts PEP  
Power Gain – 12 dB  
Efficiency – 36%  
IMD – -34 dBc
- 100% Tested for Load Mismatch Stress at All Phase Angles with 5:1 VSWR @ 28 Vdc, 860 MHz, 100 Watts CW
- Excellent Thermal Stability
- Characterized with Differential Large-Signal Impedance Parameters

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	65	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$	Vdc
Drain Current – Continuous (per Side)	$I_D$	7	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	270 1.25	W W/ $^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 65 to +150	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	200	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.65	$^\circ\text{C}/\text{W}$

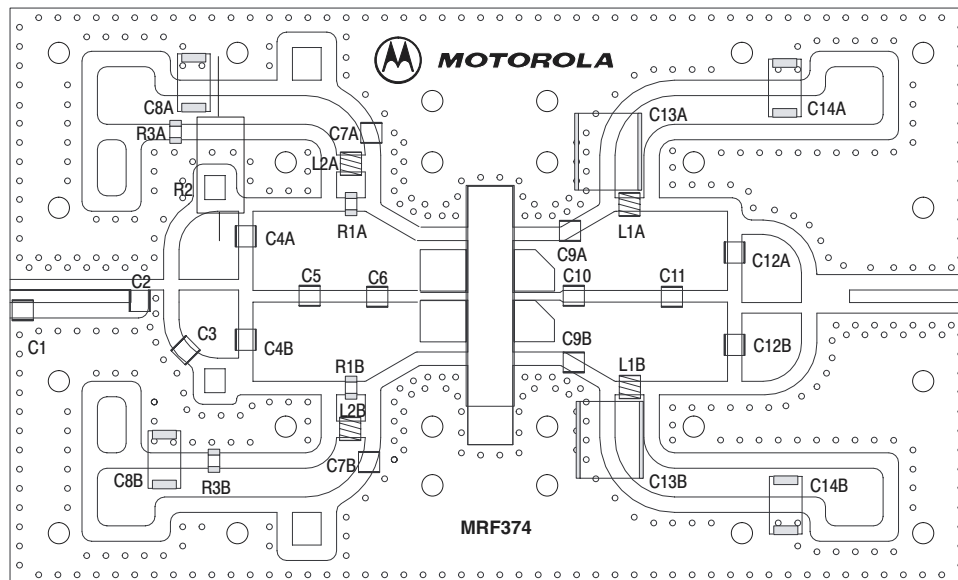
NOTE – **CAUTION** – MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

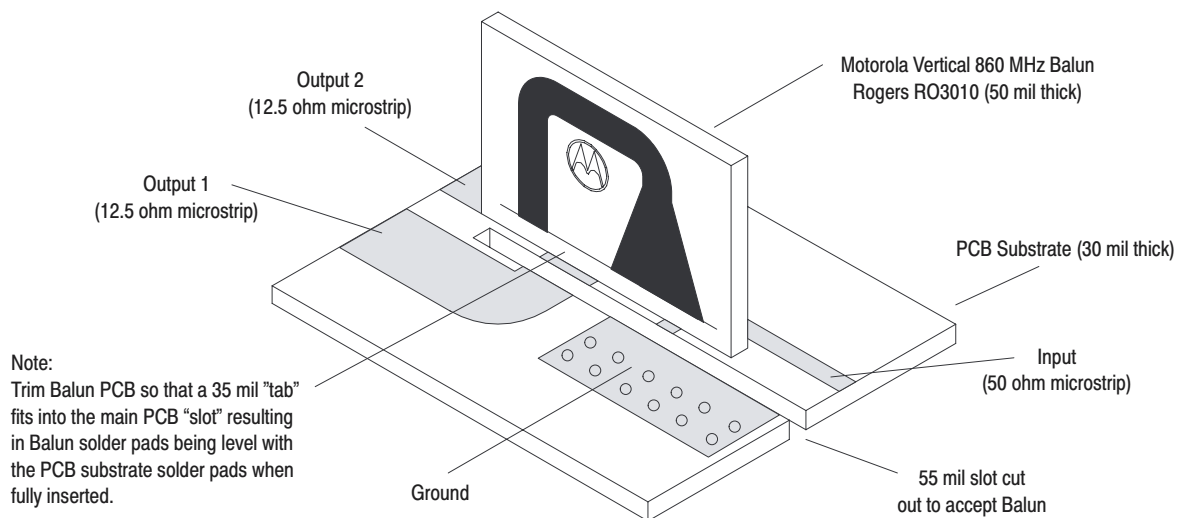
Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Drain–Source Breakdown Voltage (per Side) ( $V_{GS} = 0\text{ Vdc}$ , $I_D = 1\ \mu\text{A}$ per Side)	$V_{(BR)DSS}$	65	–	–	Vdc
Zero Gate Voltage Drain Current (per Side) ( $V_{DS} = 28\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ )	$I_{DSS}$	–	–	1	$\mu\text{Adc}$
Gate–Source Leakage Current (per Side) ( $V_{GS} = 20\text{ Vdc}$ , $V_{DS} = 0\text{ Vdc}$ )	$I_{GSS}$	–	–	1	$\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>					
Gate Threshold Voltage (per Side) ( $V_{DS} = 10\text{ V}$ , $I_D = 200\ \mu\text{A}$ per Side)	$V_{GS(th)}$	2	3.5	4	Vdc
Gate Quiescent Voltage (per Side) ( $V_{DS} = 28\text{ V}$ , $I_D = 100\text{ mA}$ per Side)	$V_{GS(Q)}$	3	4.2	5	Vdc
Drain–Source On–Voltage (per Side) ( $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ per Side)	$V_{DS(on)}$	–	0.56	0.8	Vdc
Forward Transconductance (per Side) ( $V_{DS} = 10\text{ V}$ , $I_D = 3\text{ A}$ per Side)	$g_{fs}$	2.2	2.8	–	S
<b>DYNAMIC CHARACTERISTICS (1)</b>					
Input Capacitance (per Side) ( $V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$ )	$C_{iss}$	–	80	–	pF
Output Capacitance (per Side) ( $V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$ )	$C_{oss}$	–	45	–	pF
Reverse Transfer Capacitance (per Side) ( $V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$ , $f = 1\text{ MHz}$ )	$C_{rss}$	–	3.5	–	pF
<b>FUNCTIONAL CHARACTERISTICS, TWO–TONE TESTING (2)</b>					
Common Source Power Gain ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W PEP}$ , $I_{DQ} = 400\text{ mA}$ , $f_1 = 857\text{ MHz}$ , $f_2 = 863\text{ MHz}$ )	$G_{ps}$	12.5	13.5	–	dB
Drain Efficiency ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W PEP}$ , $I_{DQ} = 400\text{ mA}$ , $f_1 = 857\text{ MHz}$ , $f_2 = 863\text{ MHz}$ )	$\eta$	30	36	–	%
Intermodulation Distortion ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W PEP}$ , $I_{DQ} = 400\text{ mA}$ , $f_1 = 857\text{ MHz}$ , $f_2 = 863\text{ MHz}$ )	IMD	–28	–31	–	dB
Load Mismatch ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W CW}$ , $I_{DQ} = 400\text{ mA}$ , $f = 860\text{ MHz}$ , VSWR 5:1 at All Phase Angles of Test)		No Degradation in Output Power			
<b>TYPICAL TWO–TONE BROADBAND</b>					
Common Source Power Gain ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W PEP}$ , $I_{DQ} = 500\text{ mA}$ , $f_1 = 857\text{ MHz}$ , $f_2 = 863\text{ MHz}$ )	$G_{ps}$	–	12	–	dB
Drain Efficiency ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W PEP}$ , $I_{DQ} = 500\text{ mA}$ , $f_1 = 857\text{ MHz}$ , $f_2 = 863\text{ MHz}$ )	$\eta$	–	36	–	%
Intermodulation Distortion ( $V_{DD} = 28\text{ Vdc}$ , $P_{out} = 100\text{ W PEP}$ , $I_{DQ} = 500\text{ mA}$ , $f_1 = 857\text{ MHz}$ , $f_2 = 863\text{ MHz}$ )	IMD	–	–34	–	dB

(1) Each side of device measured separately.

(2) Measured in push–pull configuration.



**Vertical Balun Mounting Detail**



**Figure 1. Narrowband Component Layout**

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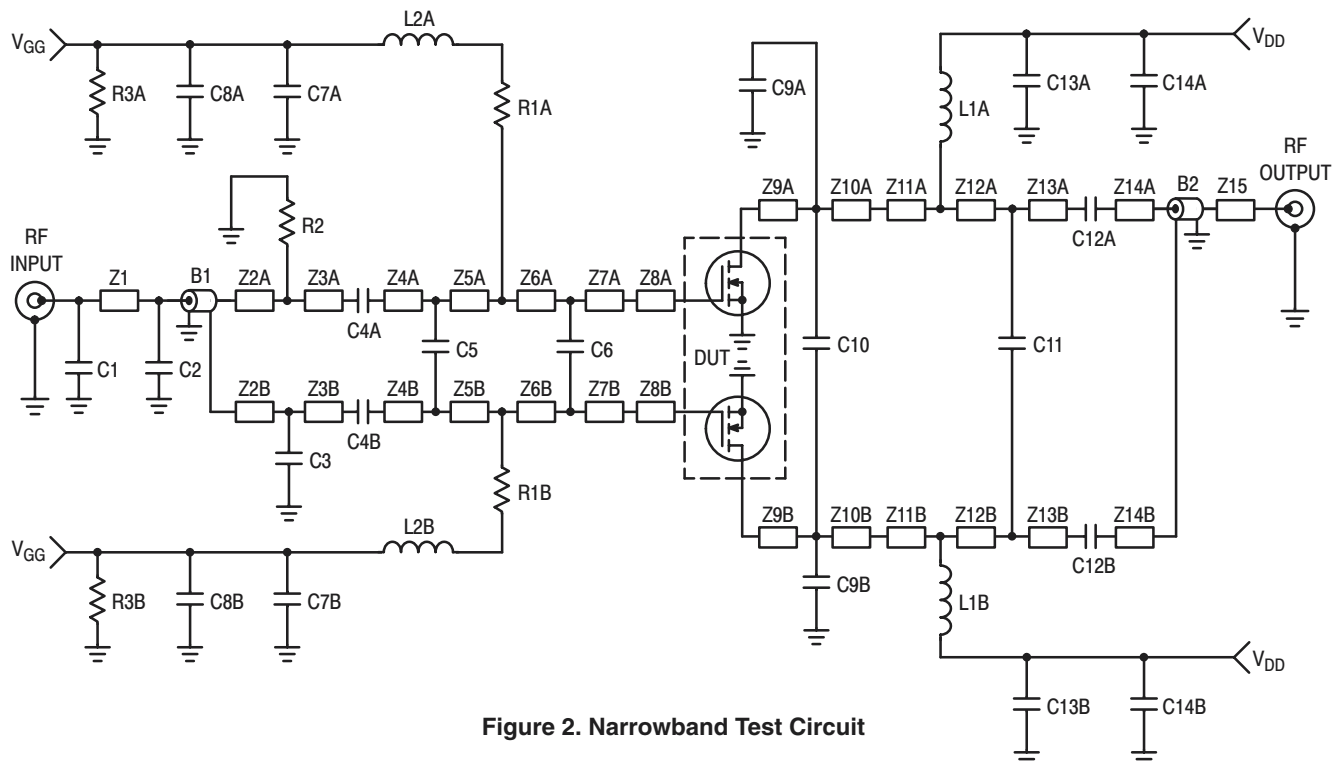


Figure 2. Narrowband Test Circuit

Table 1. Narrowband Component Designations and Values

Designation	Description
C1	0.3 pF, ATC, Case B
C2	3.0 pF, ATC, Case B
C3, C5	1.8 pF, ATC, Case B
C4A, B, C12A, B	47 pF, ATC, Case B
C6	10 pF, ATC, Case B
C7A, B	68 pF, ATC, Case B
C8A, B	10 $\mu$ F, 35 V Kemet P/N T491D106K35AS
C9A, B	15 pF, ATC, Case B
C10	5.6 pF, ATC, Case B
C11	5.1 pF, ATC, Case B
C12	3.0 pF, ATC, Case B
C13A, B	2.2 $\mu$ F, 100 V, Vishay P/N VJ3640Y225KXBAT
C14A, B	22 $\mu$ F, 35 V Kemet P/N T491D226K35AS
L1A, B	5.0 nH, Coilcraft P/N A02T
L2A, B	8.0 nH, Coilcraft P/N A03T
R1A, B	180 $\Omega$ , Vishay Dale Chip Resistor, 1/4 W (1210)
R2	10 $\Omega$ , Dale Axial Carbon Resistor, 1 W
R3A, B	3.3 k $\Omega$ , Vishay Dale Chip Resistor (1206)
PCB	MRF374 Printed Circuit Board Rev 03, Rogers RO4350, Height 30 mils, $\epsilon_r = 3.48$
Balun B1A, B	860 MHz Vertical Balun, 4:1 Impedance Translation (i.e., 12.5 $\Omega$ : 50 $\Omega$ ), Printed Circuit Board Rev 01, Rogers RO3010, Height 50 mils, $\epsilon_r = 10.2$
Connectors	N-Type (female), M/A-Com P/N 3052-1648-10
Heatsink	Motorola P/N 99-1RH-2C 3" X 5" Bedstead
Insert	Motorola P/N 99-7RI-1D Insert for LDMOS $\mu$ 650 in 3" X 5" Bedstead
Protective Cover	Motorola P/N 99-2PC-2B
End Plates	2) Motorola P/N 94-7GB-1EPL, End Plate for Type-N Connector
Banana Jack and Nut	2) Johnson P/N 108-0904-001
Brass Banana Jack	2) H.H. Smith P/N SM-101

TYPICAL TWO-TONE NARROWBAND CHARACTERISTICS

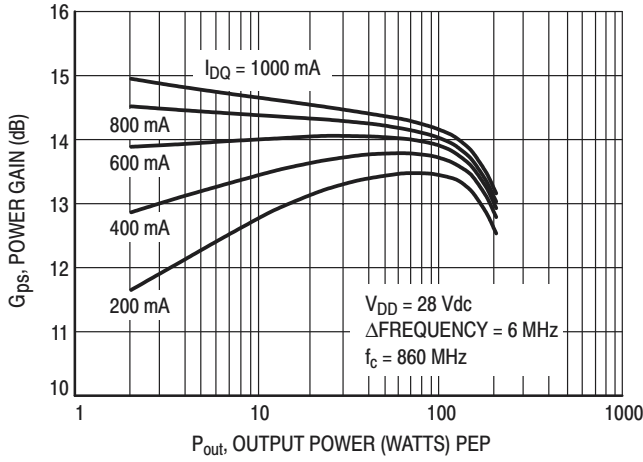


Figure 3. Power Gain versus Peak Output Power

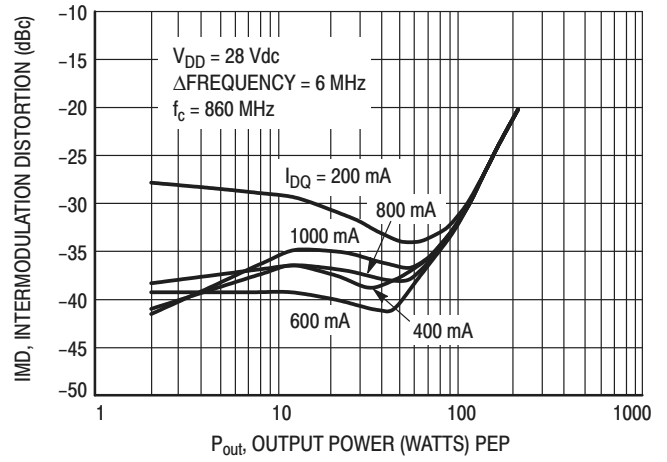


Figure 4. Intermodulation Distortion versus Peak Output Power

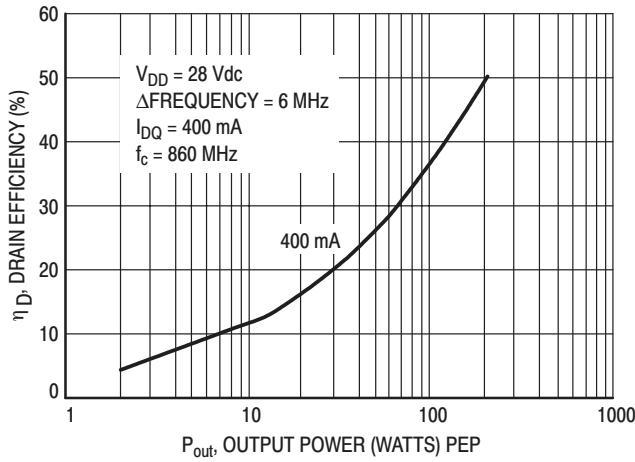


Figure 5. Drain Efficiency versus Peak Output Power

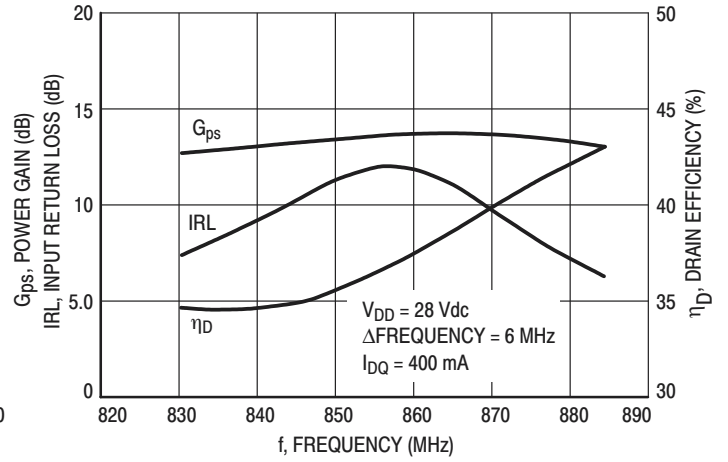


Figure 6. Performance in Narrowband Test Circuit

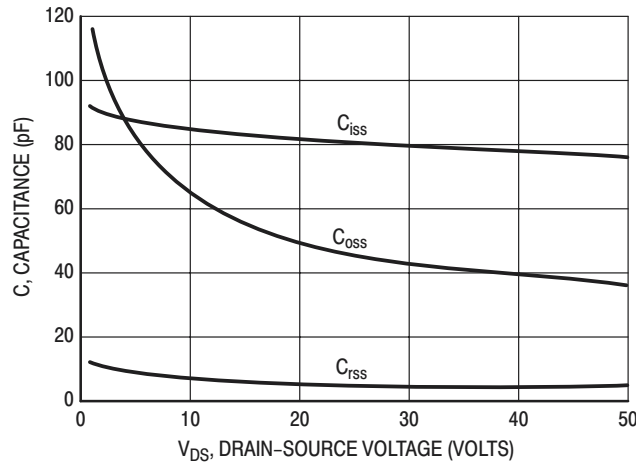


Figure 7. Capacitance versus Voltage

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# NOTES

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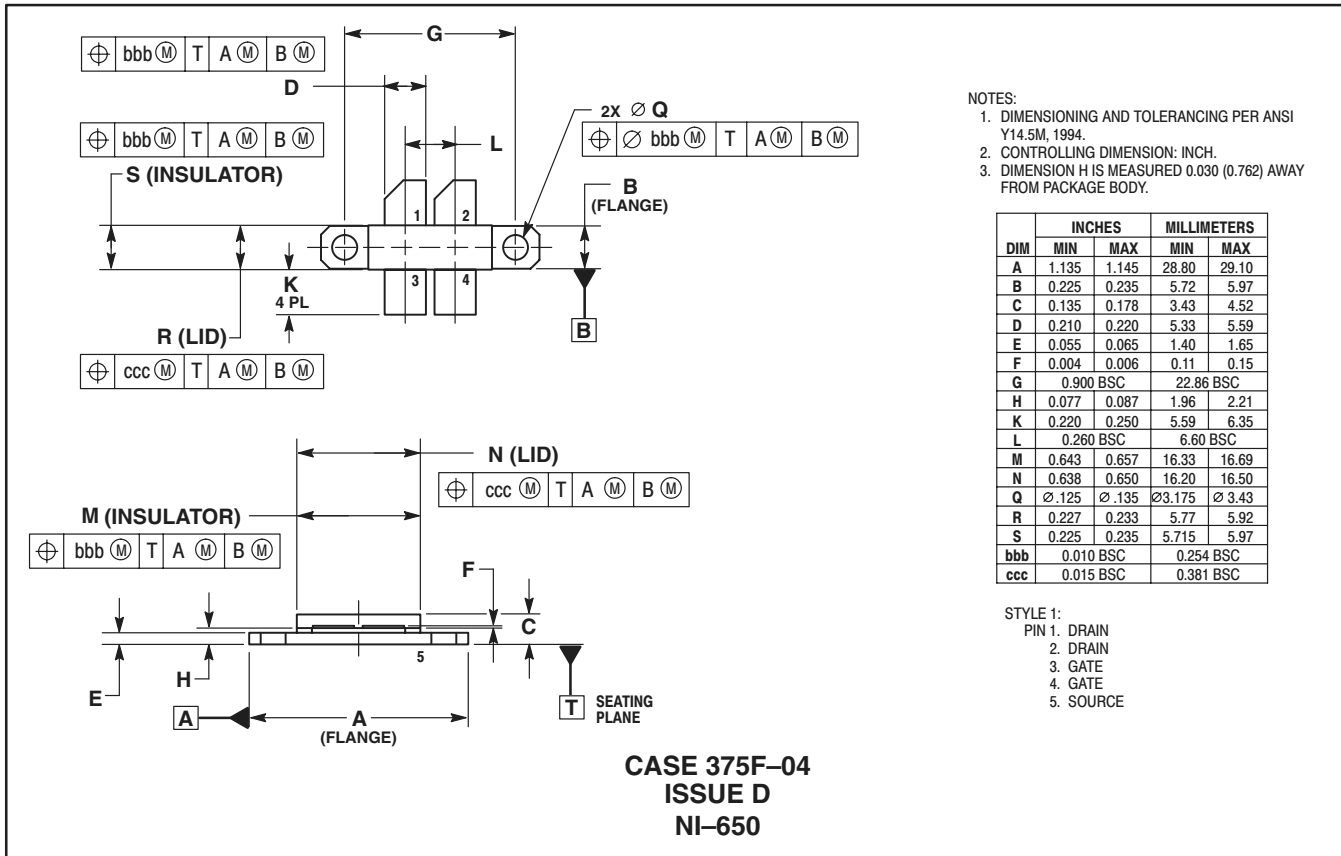
# NOTES

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# NOTES

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PACKAGE DIMENSIONS



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