MAPLST2122-030CF

RF Power Field Effect Transistor
LDMOS, 2110 — 2170 MHz, 30W, 28V

4/6/2005

Preliminary

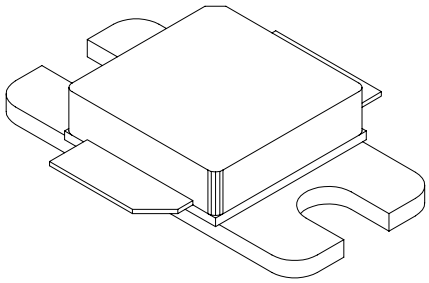
Features

Designed for W-CDMA base station applications in the 2.1 to 2.2 GHz Frequency Band. Suitable for TDMA, CDMA, and multicarrier power amplifier applications.

- 30W Output Power at P_{1dB} (CW)
- 12dB Minimum Gain at P_{1dB} (CW)

- W-CDMA Typical Performance: ($28V_{DC}$, -45dBc ACPR @ 4.096MHz)
  - Output Power: 4.5W (typ.)
  - Gain: 12dB (typ.)
  - Efficiency: 16% (typ.)
- 10:1 VSWR Ruggedness (CW @ 30W, 28V, 2110MHz)

Package Style



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Maximum Ratings

Parameter	Symbol	Rating	Units
Drain—Source Voltage	V_{DSS}	65	V_{dc}
Gate—Source Voltage	V_{GS}	20	V_{dc}
Total Power Dissipation @ T_C = 25 °C	P_D	97	W
Storage Temperature	T_{STG}	-40 to +150	°C
Junction Temperature	T_J	+200	°C

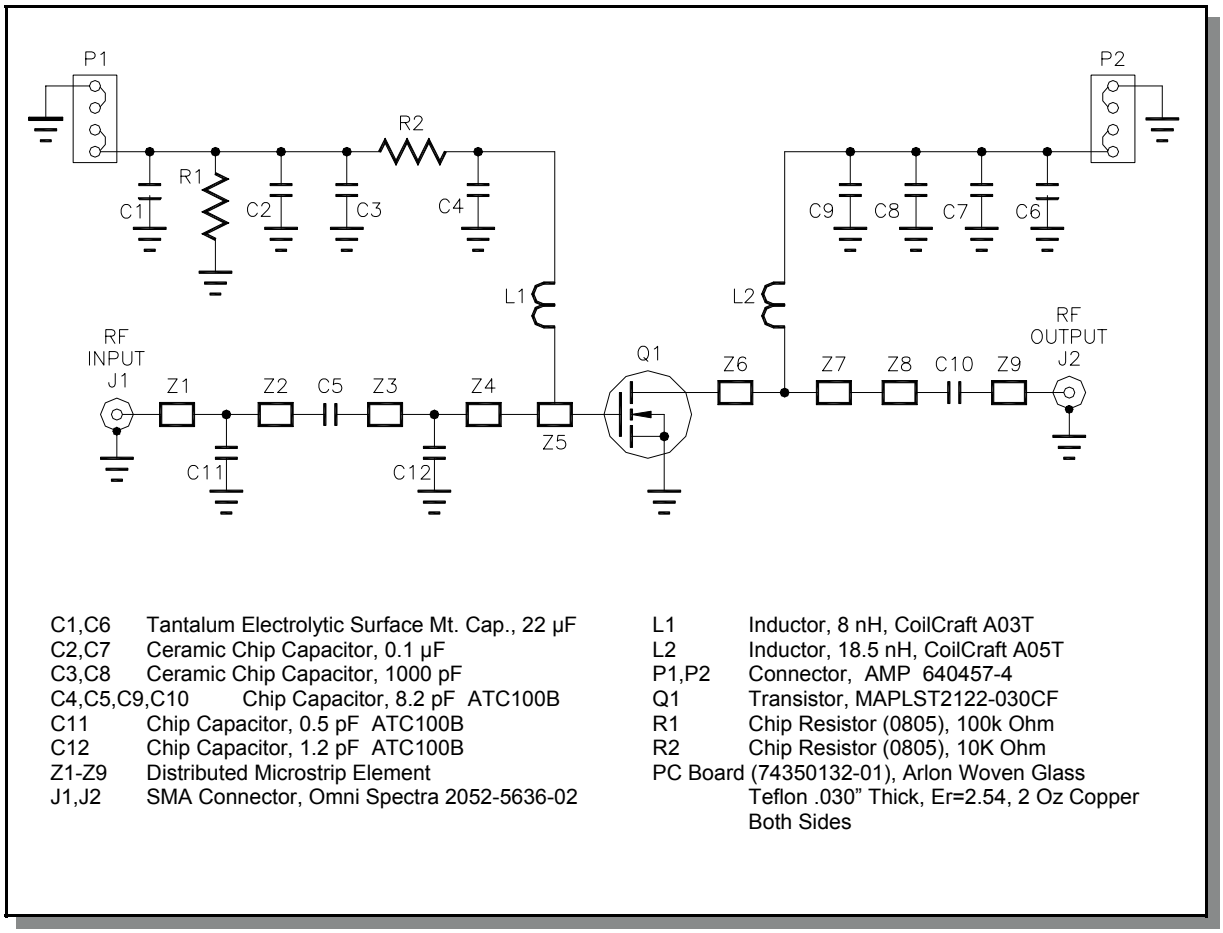
Thermal Characteristics

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\Theta JC}$	1.8	ºC/W

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

Preliminary

Characteristic	Symbol	Min	Typ	Max	Unit
DC CHARACTERISTICS @ 25ºC					
Drain-Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = 20 µAdc)	$V_{(BR)DSS}$	65	—	—	Vdc
Zero Gate Voltage Drain Leakage Current (V_{DS} = 28 Vdc, V_{GS} = 0)	I_{DSS}	—	—	1	µAdc
Gate—Source Leakage Current (V_{GS} = 5 Vdc, V_{DS} = 0)	I_{GSS}	—	—	1	µAdc
Gate Threshold Voltage (V_{DS} = 10 Vdc, I_D = 1 mA)	$V_{GS(th)}$	2	—	4	Vdc
Gate Quiescent Voltage (V_{DS} = 28 Vdc, I_D = 250 mA)	$V_{DS(Q)}$	2	—	4.5	Vdc
Drain-Source On-Voltage (V_{GS} = 10 Vdc, I_D = 1 A)	$V_{DS(on)}$	—	0.2	—	Vdc
Forward Transconductance (V_{GS} = 10 Vdc, I_D = 1 A)	Gm	—	1.2	—	S
DYNAMIC CHARACTERISTICS @ 25ºC					
Input Capacitance (Including Input Matching Capacitor in Package) (V_{DS} = 28 Vdc, V_{GS} = 0, f = 1 MHz)	C_{iss}	—	90	—	pF
Output Capacitance (V_{DS} = 28 Vdc, V_{GS} = 0, f = 1 MHz)	C_{oss}	—	32.5	—	pF
Reverse Transfer Capacitance (V_{DS} = 28 Vdc, V_{GS} = 0, f = 1 MHz)	C_{rss}	—	1.5	—	pF
RF FUNCTIONAL TESTS @ 25ºC (In M/A-COM Test Fixture)					
Two-Tone Common-Source Amplifier Power Gain (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2140.0 MHz, f2 = 2140.1 MHz)	G_{ps}	—	12.5	—	dB
Two-Tone Drain Efficiency (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2140.0 MHz, f2 = 2140.1 MHz)	EFF (η)	—	36	—	%
Two-Tone Common-Source Amplifier Power Gain (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2140.0 MHz, f2 = 2140.1 MHz)	IMD	—	-30	-28	dBc
Input Return Loss (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2140.0 MHz, f2 = 2140.1 MHz)	IRL	—	-12	—	dB
Two-Tone Common-Source Amplifier Power Gain (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2110.0 MHz, f2 = 2110.1 MHz and f1 = 2170.0 MHz, f2 = 2170.1 MHz)	G_{ps}	—	12.5	—	dB
Two-Tone Drain Efficiency (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2110.0 MHz, f2 = 2110.1 MHz and f1 = 2170.0 MHz, f2 = 2170.1 MHz)	EFF (η)	—	36	—	%
Two-Tone Common-Source Amplifier Power Gain (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2110.0 MHz, f2 = 2110.1 MHz and f1 = 2170.0 MHz, f2 = 2170.1 MHz)	IMD	—	-30	-28	dBc
Input Return Loss (V_{DS} = 28 Vdc, P_{OUT} = 30 W PEP, I_{DQ} = 250 mA, f1 = 2110.0 MHz, f2 = 2110.1 MHz and f1 = 2170.0 MHz, f2 = 2170.1 MHz)	IRL	—	-12	-9	dB
Output VSWR Tolerance (V_{DD} = 28 Vdc, P_{OUT} = 30 W, I_{DQ} = 250 mA, f = 2110 MHz, VSWR = 10:1, All Phase Angles at Frequency of Tests)	Ψ	No Degradation In Output Power Before and After Test			



C1,C6	Tantalum Electrolytic Surface Mt. Cap., 22 µF	L1	Inductor, 8 nH, CoilCraft A03T
C2,C7	Ceramic Chip Capacitor, 0.1 µF	L2	Inductor, 18.5 nH, CoilCraft A05T
C3,C8	Ceramic Chip Capacitor, 1000 pF	P1,P2	Connector, AMP 640457-4
C4,C5,C9,C10	Chip Capacitor, 8.2 pF ATC100B	Q1	Transistor, MAPLST2122-030CF
C11	Chip Capacitor, 0.5 pF ATC100B	R1	Chip Resistor (0805), 100k Ohm
C12	Chip Capacitor, 1.2 pF ATC100B	R2	Chip Resistor (0805), 10K Ohm
Z1-Z9	Distributed Microstrip Element	PC Board (74350132-01), Arlon Woven Glass Teflon .030" Thick, Er=2.54, 2 Oz Copper Both Sides	
J1,J2	SMA Connector, Omni Spectra 2052-5636-02		

Figure 1. 2110—2170 MHz Test Fixture Schematic

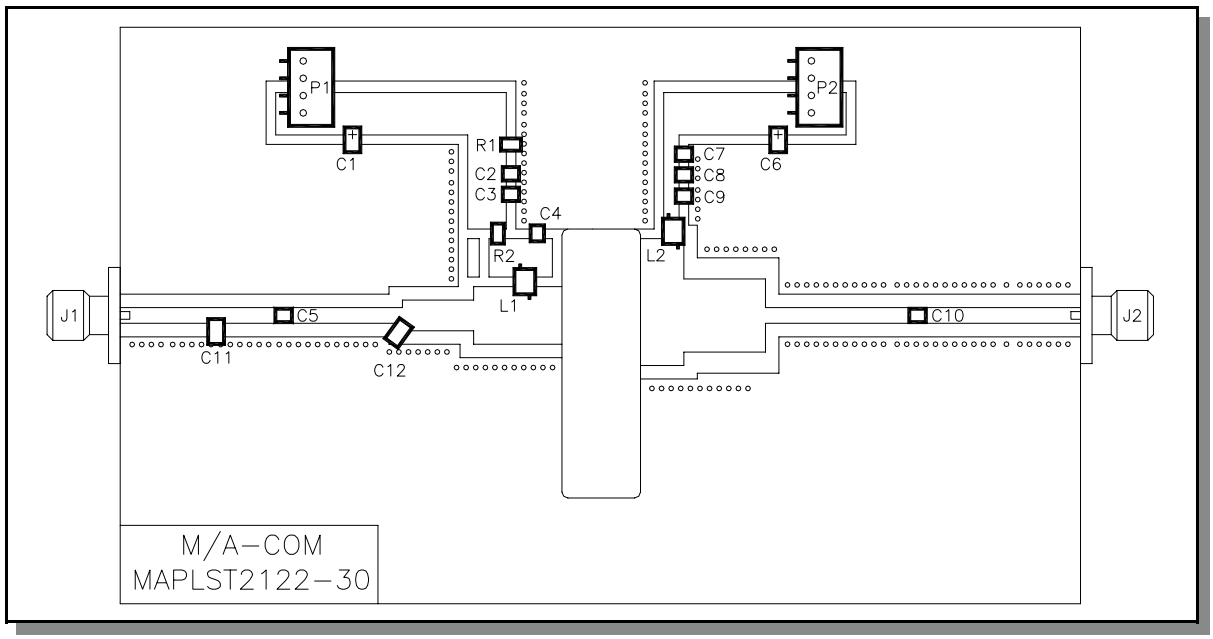
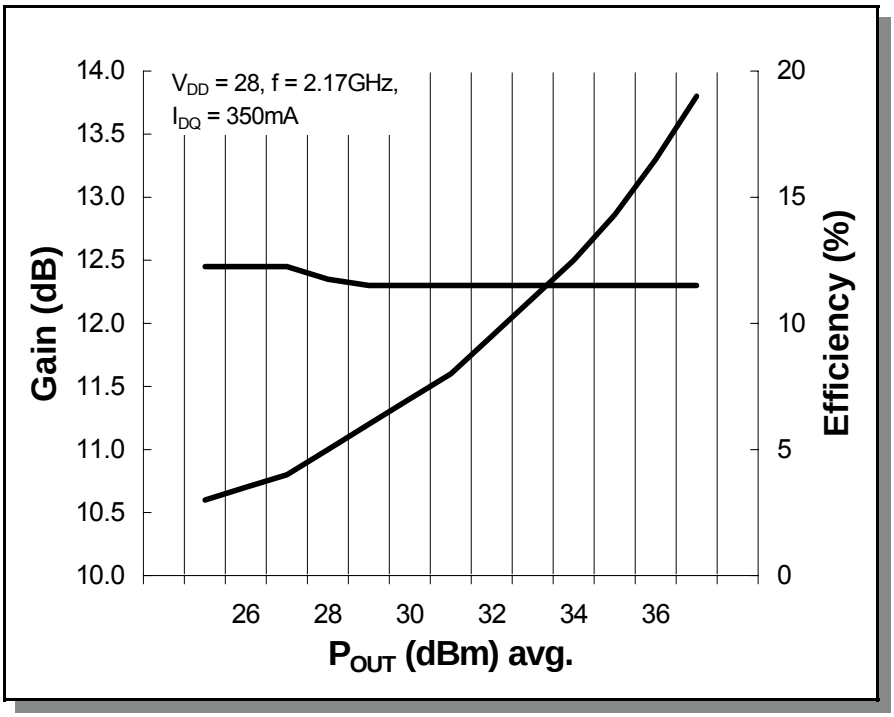
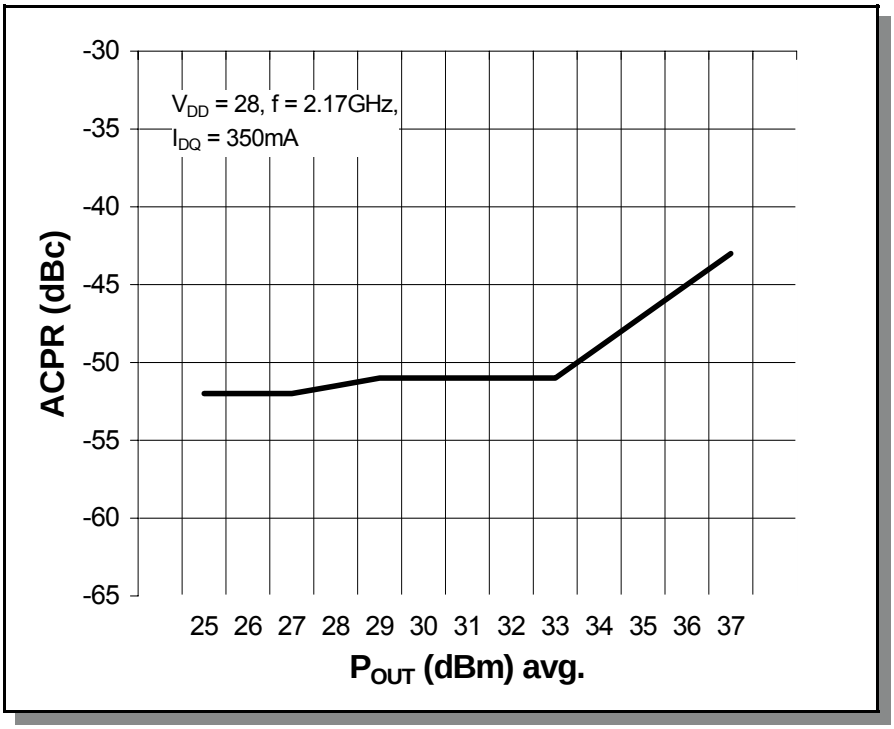


Figure 2. 2110—2170 MHz Test Fixture Component Layout

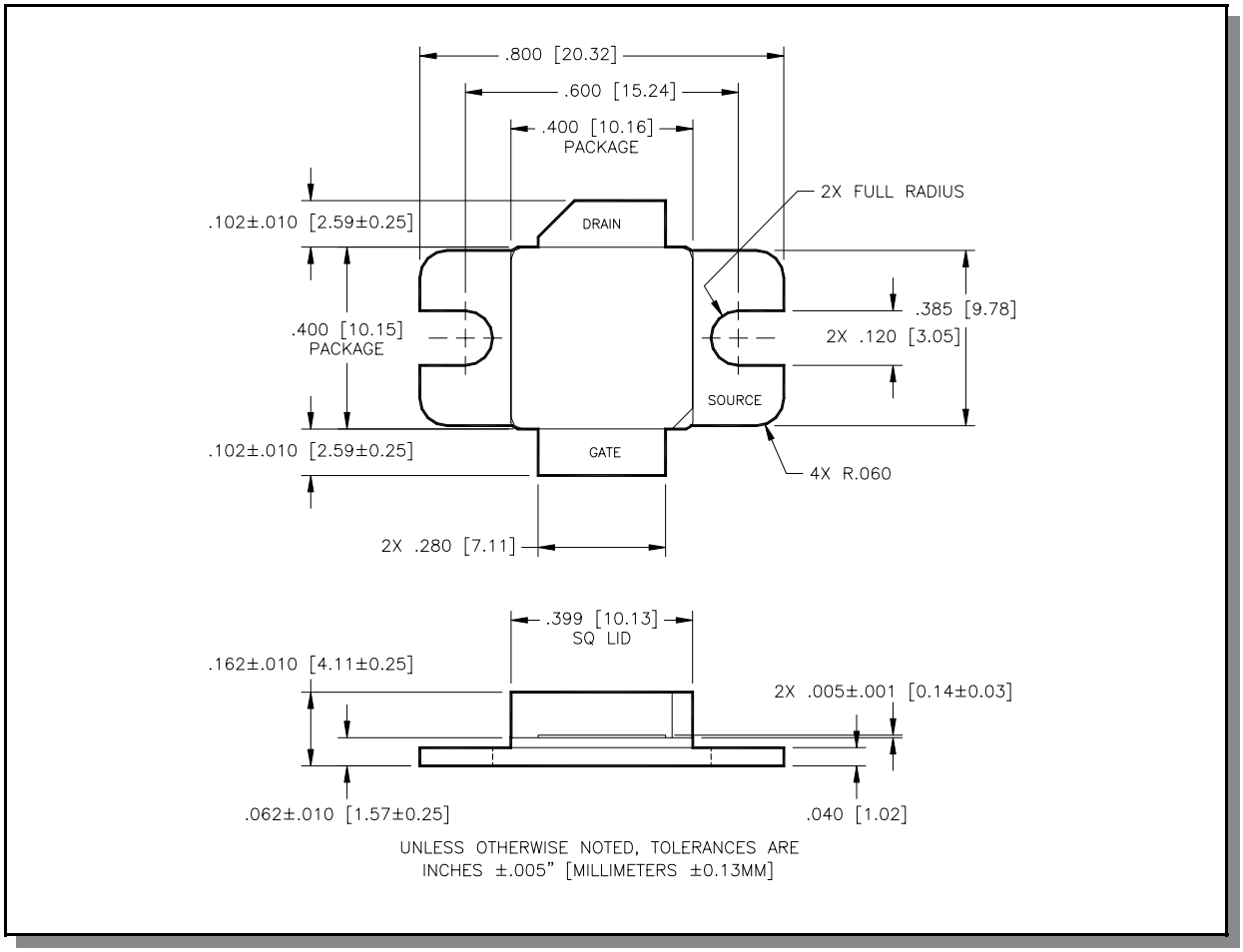


Graph 1. W-CDMA: Power Gain and Drain Efficiency vs. Output Power



Graph 2. W-CDMA: Adjacent Channel Power Ratio vs. Output Power

Package Dimensions



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