



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

4/6/2005

Preliminary

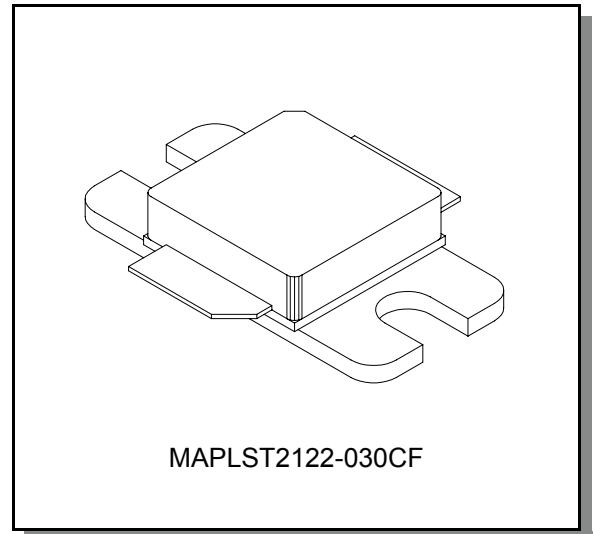
MAPLST2122-030CF

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



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 _{θJC}	1.8	°C/W

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

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Characteristic	Symbol	Min	Typ	Max	Unit
DC CHARACTERISTICS @ 25°C					
Drain-Source Breakdown Voltage ($V_{GS} = 0$ Vdc, $I_D = 20$ μ Adc)	$V_{(BR)DSS}$	65	—	—	Vdc
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 28$ Vdc, $V_{GS} = 0$)	I_{DSS}	—	—	1	μ Adc
Gate—Source Leakage Current ($V_{GS} = 5$ Vdc, $V_{DS} = 0$)	I_{GSS}	—	—	1	μ Adc
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 @ 25°C					
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 @ 25°C (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, $f_1 = 2140.0$ MHz, $f_2 = 2140.1$ MHz)	G_{ps}	—	12.5	—	dB
Two-Tone Drain Efficiency ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2140.0$ MHz, $f_2 = 2140.1$ MHz)	EFF (η)	—	36	—	%
Two-Tone Common-Source Amplifier Power Gain ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2140.0$ MHz, $f_2 = 2140.1$ MHz)	IMD	—	-30	-28	dBc
Input Return Loss ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2140.0$ MHz, $f_2 = 2140.1$ MHz)	IRL	—	-12	—	dB
Two-Tone Common-Source Amplifier Power Gain ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2110.0$ MHz, $f_2 = 2110.1$ MHz and $f_1 = 2170.0$ MHz, $f_2 = 2170.1$ MHz)	G_{ps}	—	12.5	—	dB
Two-Tone Drain Efficiency ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2110.0$ MHz, $f_2 = 2110.1$ MHz and $f_1 = 2170.0$ MHz, $f_2 = 2170.1$ MHz)	EFF (η)	—	36	—	%
Two-Tone Common-Source Amplifier Power Gain ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2110.0$ MHz, $f_2 = 2110.1$ MHz and $f_1 = 2170.0$ MHz, $f_2 = 2170.1$ MHz)	IMD	—	-30	-28	dBc
Input Return Loss ($V_{DS} = 28$ Vdc, $P_{OUT} = 30$ W PEP, $I_{DQ} = 250$ mA, $f_1 = 2110.0$ MHz, $f_2 = 2110.1$ MHz and $f_1 = 2170.0$ MHz, $f_2 = 2170.1$ 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			

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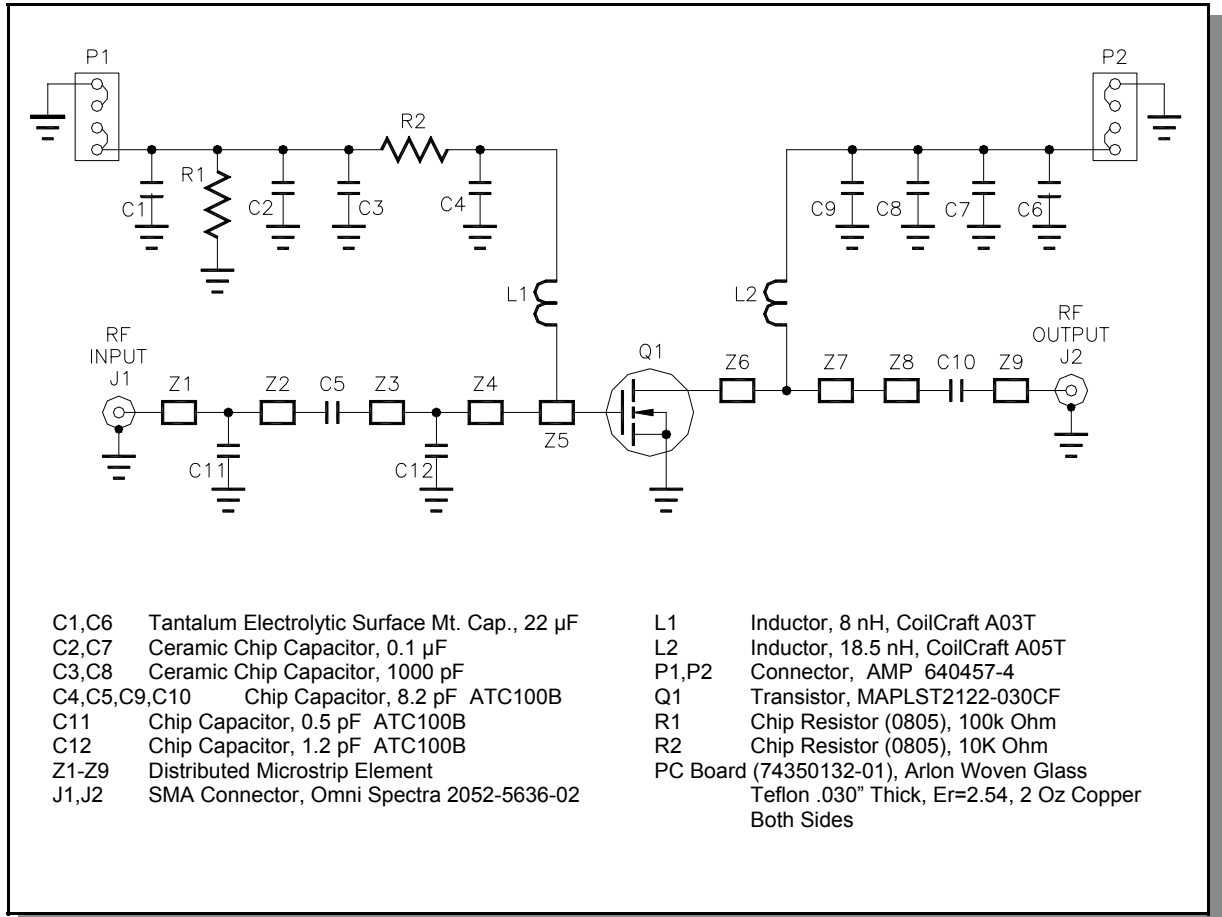


Figure 1. 2110—2170 MHz Test Fixture Schematic

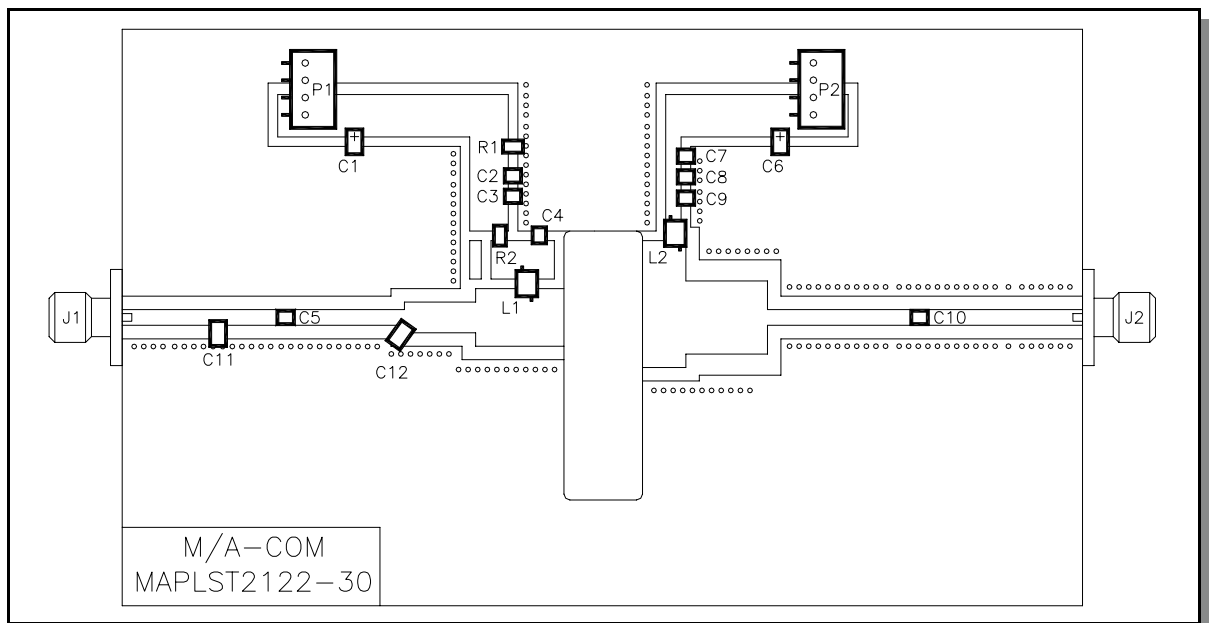
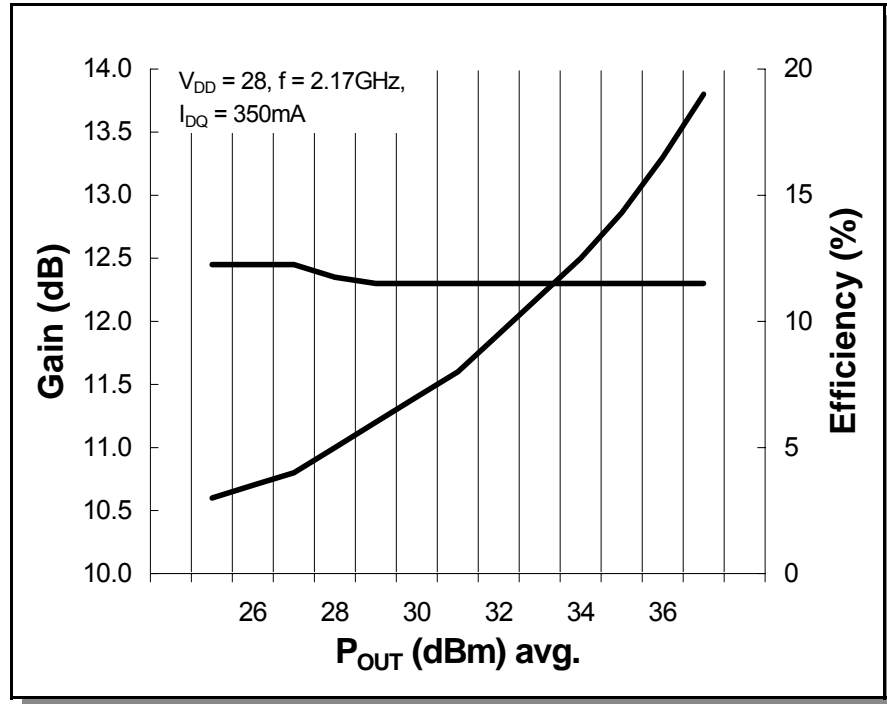
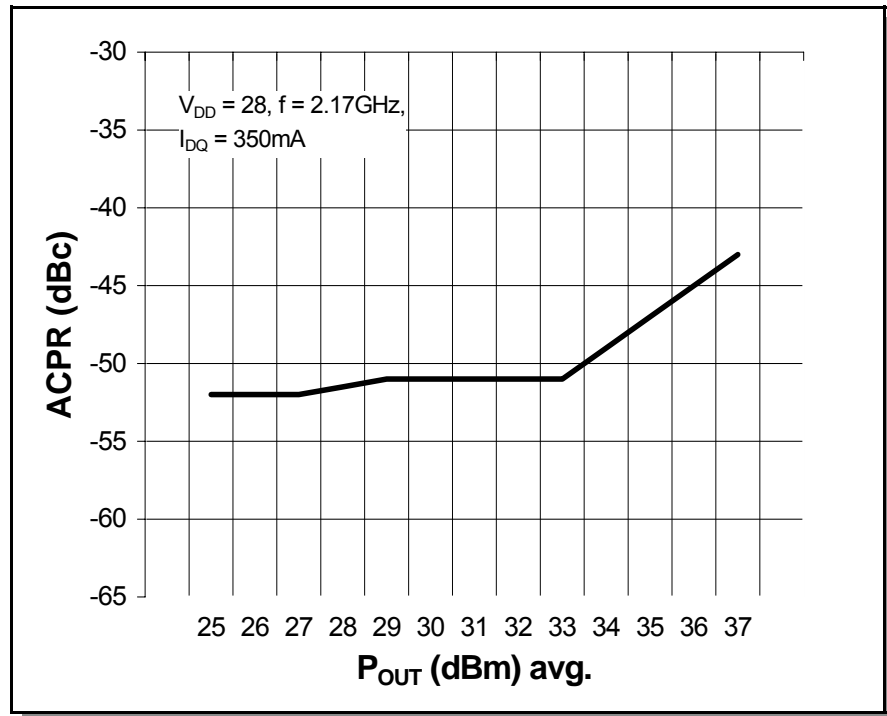


Figure 2. 2110—2170 MHz Test Fixture Component Layout

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



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

