LX5512E

InGaP HBT 2.4-2.5GHz Power Amplifier

PRELIMINARY DATA SHEET

DESCRIPTION

The LX5512E is a power amplifier optimized for WLAN applications in the 2.4-2.5 GHz frequency range. The PA is implemented as a three-stage monolithic microwave integrated circuit (MMIC) with active bias and input/output pre-matching. The device is manufactured with an InGaP/GaAs Heterojunction Bipolar Transistor (HBT) IC process (MOCVD). It operates at a single low voltage supply of 3.3V with 33 dB power gain between 2.4-2.5GHz, at a low quiescent current of 50 mA.

For 18dBm OFDM output power (64QAM, 54Mbps), the PA provides a low EVM (Error-Vector Magnitude) of 2 %, and consumes 120 mA total DC current.

The LX5512E is available in a 16-pin 3mmx3mm micro-lead package (MLP). The compact footprint, low profile, and excellent thermal capability of the MLP package makes the LX5512E an ideal solution for broadband, high-gain power amplifier requirements for IEEE 802.11b/g applications.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

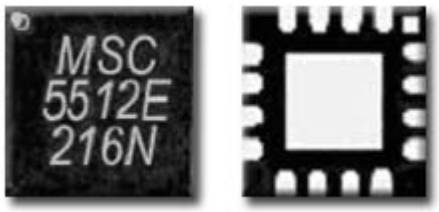
KEY FEATURES

- Advanced InGaP HBT
- 2.4-2.5GHz Operation
- Single-Polarity 3.3V Supply
- Low Quiescent Current Icq ~50mA
- Power Gain ~ 33 dB at
- 2.45GHz & Pout=18dBm
- Total Current 120 mA for Pout=18 dBm at 2.45 GHz OFDM
- EVM ~2 % for 64QAM/ 54Mbps & Pout=18dBm
- Small Footprint: 3x3mm^2
- Low Profile: 0.9mm

APPLICATIONS/BENEFITS

- FCC U-N11 Wireless
- IEEE 802.11b/g

PRODUCT HIGHLIGHT



PACKAGE ORDER INFO

T_J (°C)	LQ Plastic MLPQ 16-Pin
0 to 70	LX5512E-LQ

Note: Available in Tape & Reel.
Append the letter "T" to the part number.
(i.e. LX5512E-LQT)

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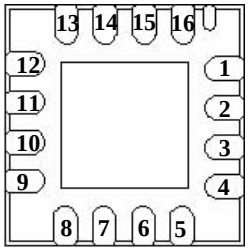
ABSOLUTE MAXIMUM RATINGS

DC Supply Voltage, RF off 5V
Collector Current 400mA
Total Power Dissipation.....2W
RF Input Power.....-5dBm
Operation Ambient Temperature .....-40 to +85°C
Storage Temperature.....-60 to 150°C

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

PACKAGE PIN OUT



LQ PACKAGE
(Bottom View)

FUNCTIONAL PIN DESCRIPTION

Name	Pin #	Description
RF IN	2,3	RF input for the power amplifier. This pin is AC-coupled to the transistor base of the first stage.
VB1	4	Bias current control voltage for the first stage.
VB2	6	Bias current control voltage for the second stage.
VB3	7	Bias current control voltage for the third stage. The VB3 pin can be connected with the first and second stage control voltage (VB1,VB2) into a single reference voltage (referred to as Vref) through an external resistor bridge.
VCC	5	Supply voltage for the bias reference and control circuits. The VCC feed line should be terminated with a 10 nF bypass capacitor close to connector pin. This pin can be combined with VC1, VC2 and VC3 pins, resulting in a single supply voltage (referred to as Vc).
RF OUT	10, 11	RF output for the power amplifier. This pin is DC-decoupled from the transistor collector of the third stage.
VC1	16	Power supply for first stage amplifier. The VC1 feedline should be terminated with a 120pF bypass capacitor, followed by a 10 Ohm resistor. This pin can be combined with VC2,VC3 and VCC pins, resulting in a single supply voltage (referred to as Vc).
VC2	14	Power supply for second stage amplifier. The VC2 feedline should be terminated with a 47 pF bypass capacitor, followed by a 5 Ohm resistor. This pin can be combined with VC1,VC3 and VCC pins, resulting in a single supply voltage (referred to as Vc).
VC3	12	Power supply for the third stage amplifier. The VC3 feedline should be terminated with a 120 pF bypass capacitor. This pin can be combined with VC1,VC2 and VCC pins, resulting in a single supply voltage (referred to as Vc).
REF	8	Power detector reference output pin should be terminated with a 100 kOhm loading resistor
DET	9	Power detector output pin should be terminated with a 100 kOhm loading resistor
GND	Center Metal	The center metal base of the MLP package provides both DC and RF ground as well as heat sink for the power amplifier.

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ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the following test conditions: Vcc = 3.3V, Vref = 2.9V, Icq = 50mA, T_A = 25°C

Parameter	Symbol	Test Conditions / Comment	LX5512E			Units
			Min	Typ	Max	
Frequency Range	f		2.4		2.5	GHz
Power Gain at Pout = 18dBm	Gp			33		dB
EVM at Pout = 18dBm		64QAM / 54Mbps		2.0		%
Total Current at Pout = 18dBm	Ic_total	64QAM / 54Mbps		120		mA
Quiescent Current	Icq			50		mA
Bias Control Reference Current	Iref	For Icq = 50mA		1.6		mA
Small – Signal Gain	S21			32		dB
Gain Flatness	ΔS21	Over 100MHz		±0.75		dB
Gain Variation Over Temperature	ΔS21	-40 to +85°C		TBD		dB
Input Return Loss	S11			8		dB
Output Return Loss	S22		10			dB
Reverse Isolation	S12			-50		dB
Second Harmonic		Pout = 18dBm		-40		dBc
Third Harmonic		Pout = 18dBm		-40		dBc
Total Current at Pout = 23dBm		11Mbps CCK		210		mA
2nd side lobe at 23dBm		11Mbps CCK		-54		dBc
Ramp-On Time	t_{ON}	10 ~ 90%		TBD		ns
Differential Detector Response		18dBm OFDM		1.4		V

Note: All measured data was obtained on a 10 mil GETEK evaluation board without heat sink.

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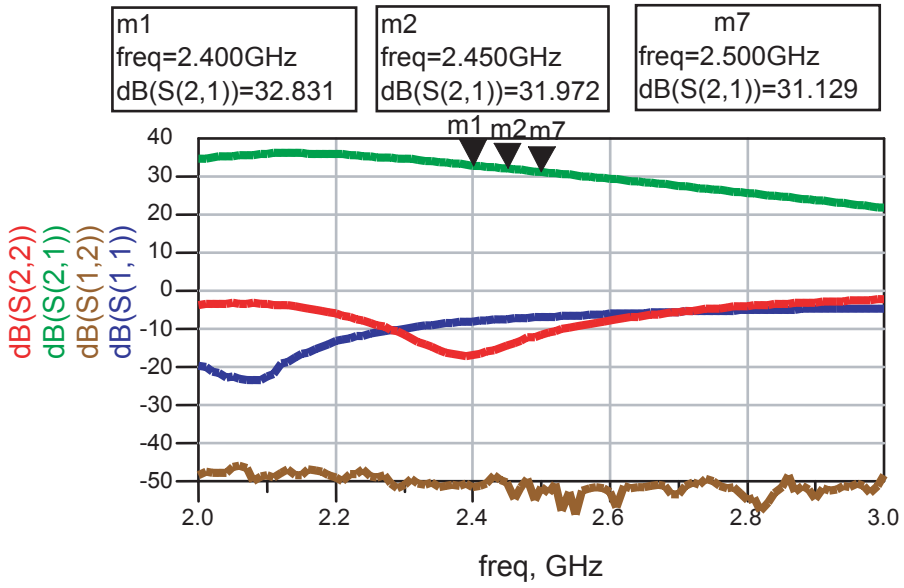
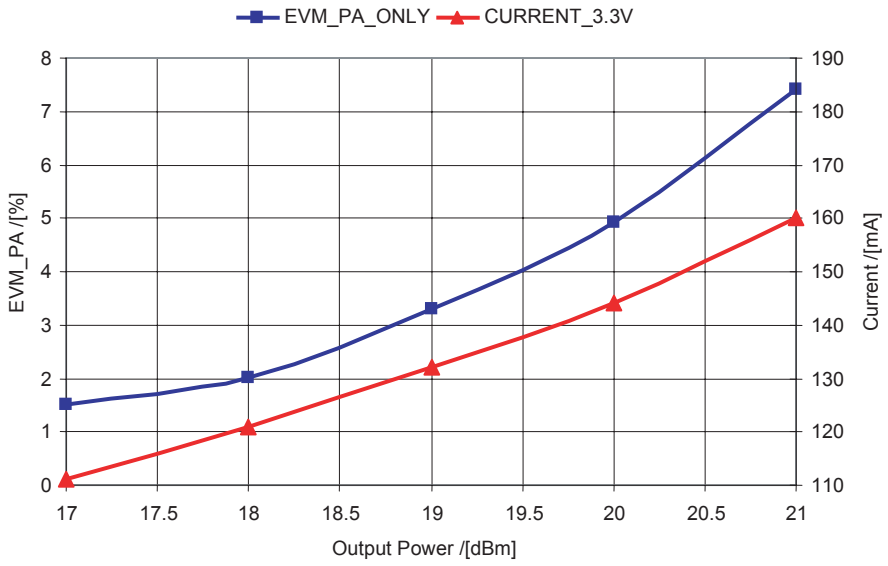
CHARACTERISTIC CURVES

S-Parameter Data
(Vc=3.3V, Vref=2.9V, Icq=50mA)

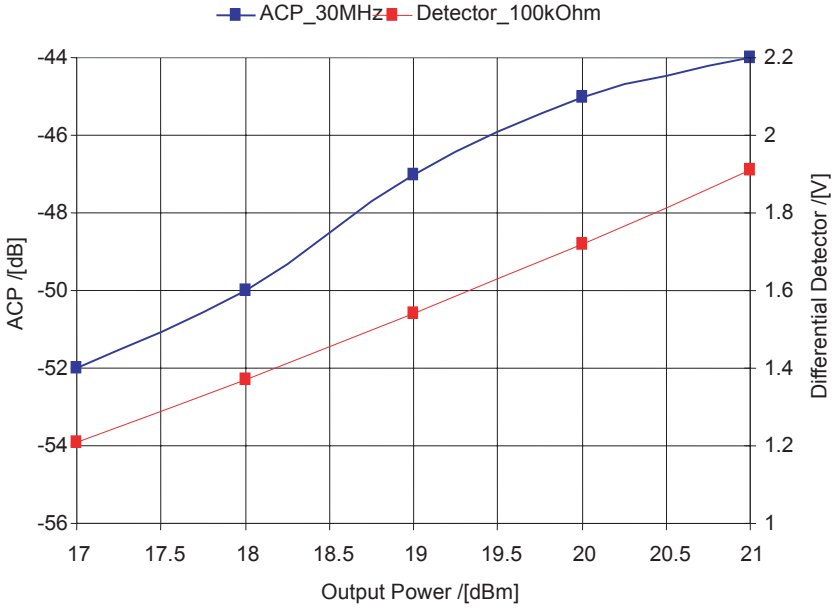


EVM Data with 54 Mb/s 64 QAM OFDM
(Vc=3.3V, Vref=2.9V, Icq=50mA,freq=2.45 GHz)

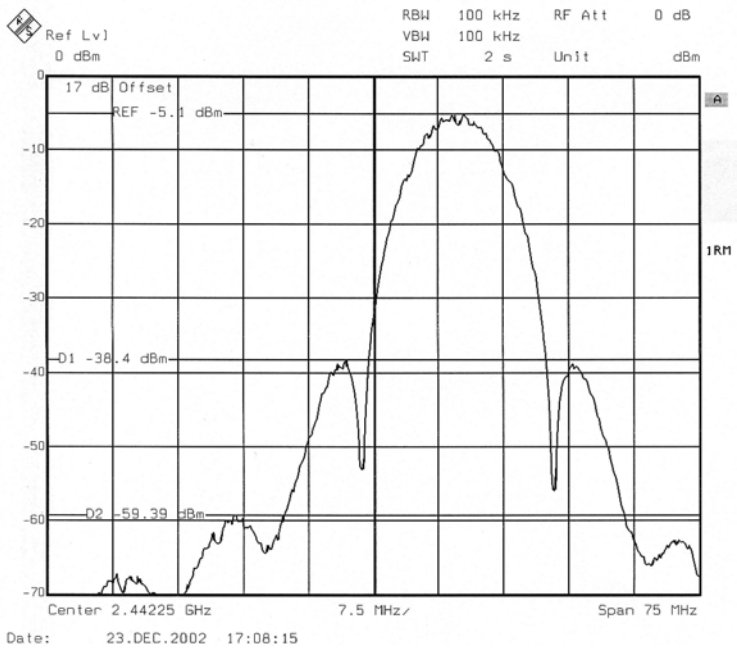


CHARACTERISTIC CURVES

ACP and Diff. Detector Data with 54 Mb/s 64 QAM OFDM
(Vc=3.3V, Vref=2.9V, Icq=50mA, freq=2.45 GHz)



23 dBm Output @ 11 Mb/s CCK
(Vc=3.3V, Vref=2.9V, Icq=50mA, freq=2.45 GHz)



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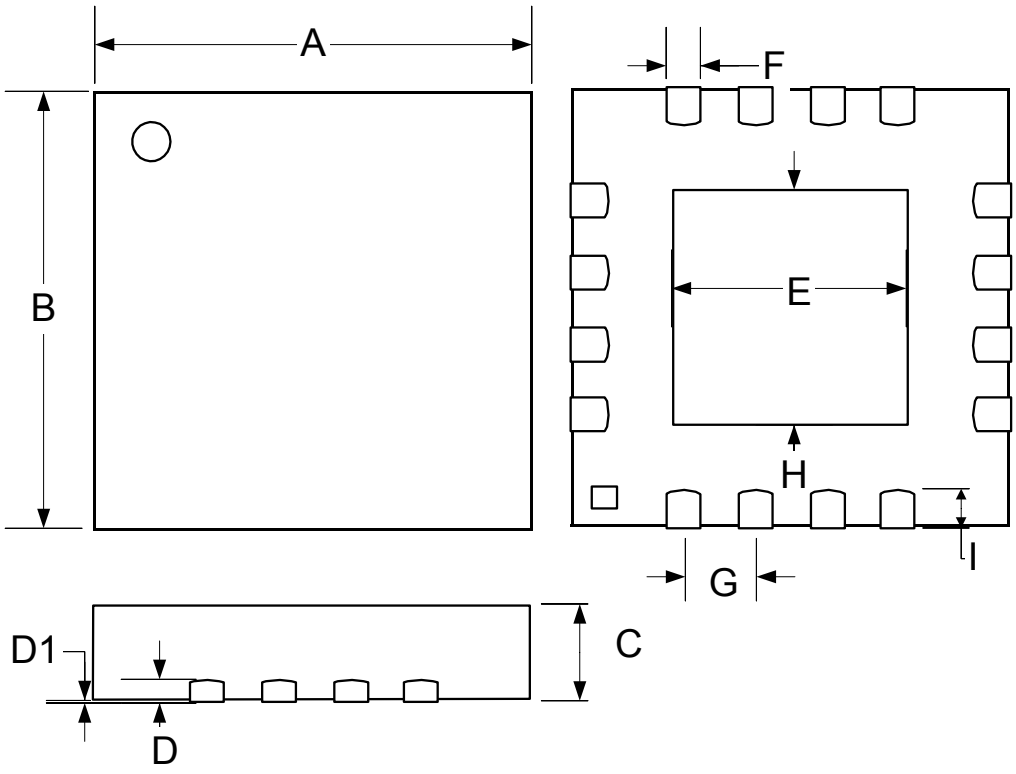
PACKAGE DIMENSIONS

LQ 16-Pin MLPQ Plastic (3x3mm EP)



Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.00 BSC		0.118 BSC	
B	3.00 BSC		0.118 BSC	
C	0.80	1.00	0.031	0.039
D	0.18	0.30	0.007	0.011
D1	0	0.05	0	0.002
E	1.30	1.55	0.051	0.061
F	0.18	0.30	0.007	0.011
G	0.50 BSC		0.019 BSC	
H	1.30	1.55	0.051	0.061
I	0.30	0.50	0.011	0.020

Note:
1. Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm(.006") on any side. Lead dimension shall not include solder coverage.

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NOTES