LX5506E

InGaP HBT 4 – 6GHz Power Amplifier

PRELIMINARY DATA SHEET

DESCRIPTION

The LX5506E is a power amplifier optimized for the FCC Unlicensed National Information Infrastructure (U-NII) band, HyperLAN2 and Japan WLAN applications in the 4.9-5.85 GHz frequency range. The PA is implemented as a three-stage monolithic microwave integrated circuit (MMIC) with active bias, on-chip input matching and output pre-matching. The device is manufactured with an InGaP/GaAs Heterojunction Bipolar Transistor (HBT) IC process (MOCVD). It also has an integrated differential output power detector pair to help reduce BOM cost and PCB board space for system implementation.

LX5506E 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 LX5506E an ideal solution for broadband, high-gain power amplifier requirements for IEEE 802.11a, and Hiperlan2 portable WLAN applications.

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

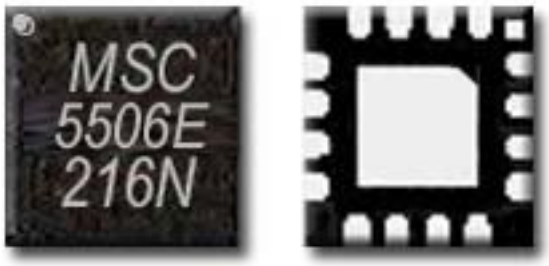
KEY FEATURES

- Advanced InGaP HBT
- 4.9-5.85GHz Operation
- Single-Polarity 3.3V Supply
- Total Current ~ 200mA for Pout=19dBm at 5.25GHz
- P1dB > +26dBm
- Power Gain ~ 23dB at 5.25GHz & Pout=19dBm
- EVM ~ 3% for 64QAM/ 54Mbps & Pout=19dBm
- Integrated Power Detectors
- On-Chip Input Match
- Simple Output Match
- Minimal External Components
- Small Footprint: 3x3mm2
- Low Profile: 0.9mm

APPLICATIONS/BENEFITS

- FCC U-N11 Wireless
- IEEE 802.11a
- HiperLAN2

PRODUCT HIGHLIGHT



PACKAGE ORDER INFO

T_J (°C)	LQ Plastic MLPQ 16-Pin
0 to 70	LX5506E-LQ

Note: Available in Tape & Reel.
Append the letter "T" to the part number.
(i.e. LX5506E-LQT)

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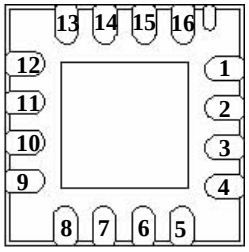
ABSOLUTE MAXIMUM RATINGS

DC Supply Voltage, RF Off.....6V
Collector Current 500mA
Total Power Dissipation.....3W
RF Input Power.....10dBm
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 DC-shorted to GND but AC-coupled to the transistor base of the first stage.
VCC	4	Supply voltage for the bias reference and control circuits. This pin can be combined with VC1, VC2 and VC3 pins, resulting in a single supply voltage (referred to as Vc).
VB1 VB2 VB3	5 6 7	Bias control voltage for the first stage. Bias control voltage for the second stage. Bias control voltage for the third stage.
DET REF	9 8	Detector output voltage for the third stage PA output power. Detector output voltage for the reference power detector.
RF OUT	10, 11	RF output for the power amplifier. This pin is AC-coupled and does not require a DC-blocking capacitor.
VC1 VC2 VC3	16 15 14	DC supply voltage for the first stage amplifier. DC supply voltage for the second stage amplifier. DC supply voltage for the third stage amplifier.
GND	Center Metal	The center metal base of the MLP package provides both DC/RF ground as well as heat sink for the power amplifier.
NC	1,12,13	These pins are unused and not connected to the device inside the package. They can be treated either as open pins, or connected to ground for better heat dissipation.

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ELECTRICAL CHARACTERISTICS

Unless otherwise specified, the following specifications apply over the following test conditions: Vc = 3.3V, Icq = 100mA, T_A = 25°C

PARAMETER	CONDITION	SYMBOL	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	UNIT
Frequency Range		f	5.15		5.35	5.7		5.85	GHz
Output Power at 1dB Compression		Pout	25	27		25	27		dBm
Power Gain at Pout=19dBm		Gp		23			21		dB
EVM at Pout=19dBm	64QAM/54Mbps			3			3.5		%
Total Current at Pout=19dBm		Ic_total		200			210		mA
Quiescent Current		Icq		100			100		mA
Bias Control Reference Current	For Icq=100mA	Iref		2			2		mA
Small-Signal Gain		S21		22			20		dB
Gain Flatness	Over 200MHz	ΔS21		+/-0.5			+/-0.5		dB
Gain Variation Over Temperature	-20 to +85°C	ΔS21		+/-1			+/-1		dB
Input Return Loss		S11		-20	-10		-12	-10	dB
Output Return Loss		S22		-10			-10		dB
Reverse Isolation		S12		-40			-40		dB
Second Harmonic	Pout = 19dBm			-40			-40		dBc
Third Harmonic	Pout = 19dBm			-40			-40		dBc
Detector Response	Pout = 19dBm	DET		1.7			1.2		V
Ramp-On Time	10~90%	t_{ON}		100			100		ns

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

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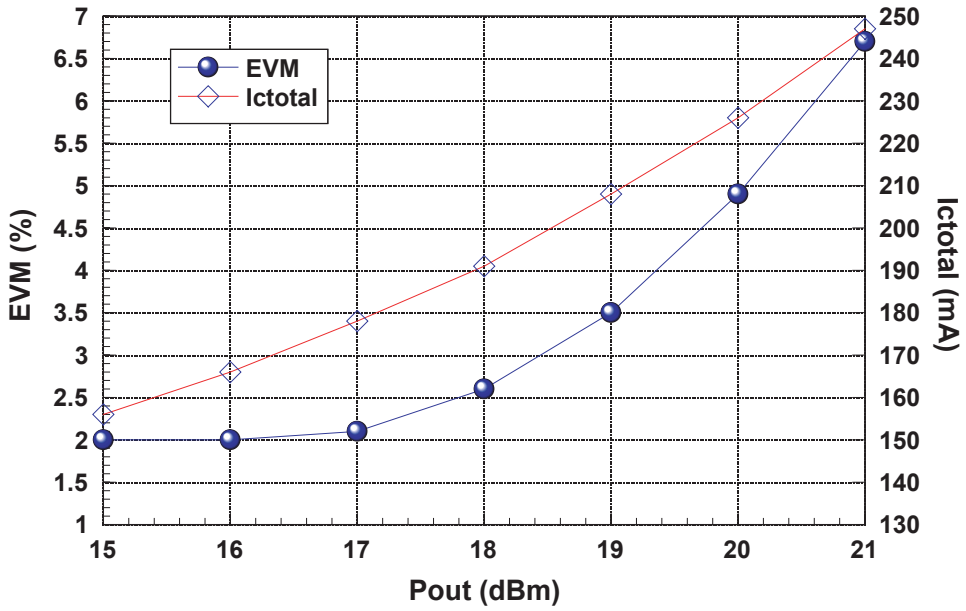
CHARACTERISTIC CURVES

Typical EVM and Total Current vs. Pout

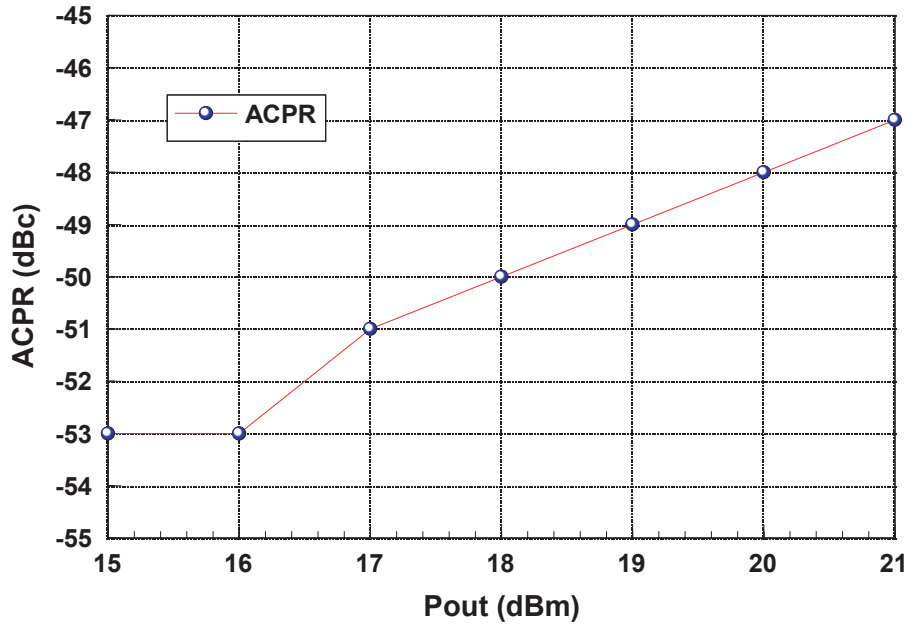
(Vc=3.3V, Vref=2.9V, Icq=95mA, Freq=5.25GHz, 64QAM/54Mbps)



Note: EVM is actual measured data without de-embedding. Test system EVM floor is 1.4~1.6% for input power levels in test.

Typical ACPR vs. Pout

(Vc=3.3V, Vref=2.9V, Icq=95mA, Freq=5.25GHz, 64QAM/54Mbps, 30MHz Offset)



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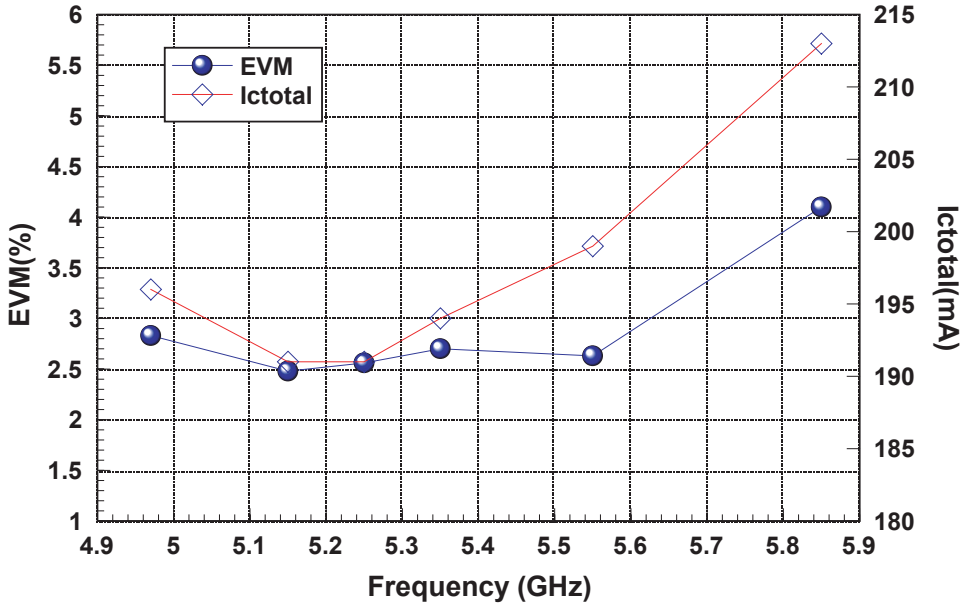
CHARACTERISTIC CURVES

EVM and Total Current vs. Frequency

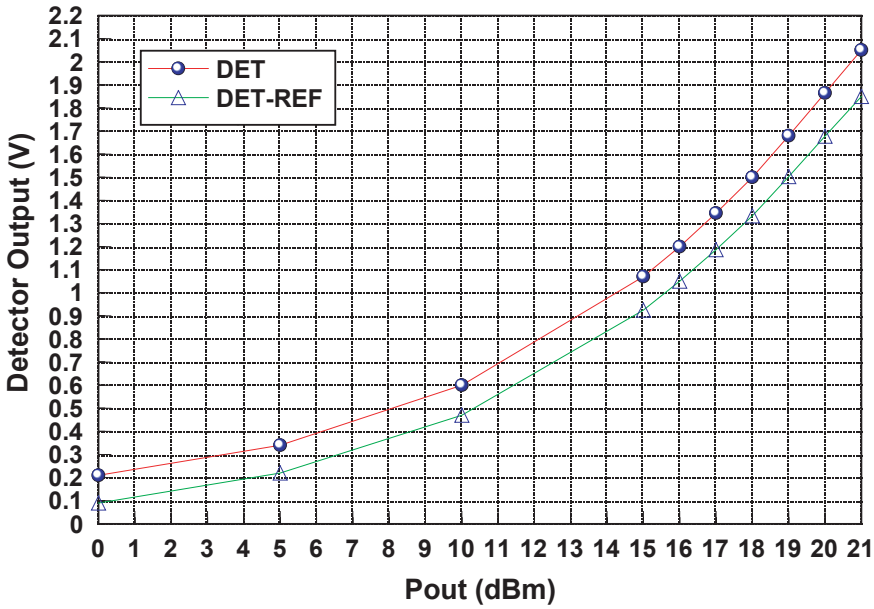
(Vc=3.3V, Vref=2.9V, Icq=95mA, Pout=18dBm, 64QAM/54Mbps)



Note: EVM is actual measured data without de-embedding. Yokogawa VG6000 system EVM floor is 1.4~1.6% for input power levels in test.

Typical Power Detector Response

(Vc=3.3V, Vref=2.9V, Icq=95mA, Freq=5.25GHz, 64QAM/54Mbps)



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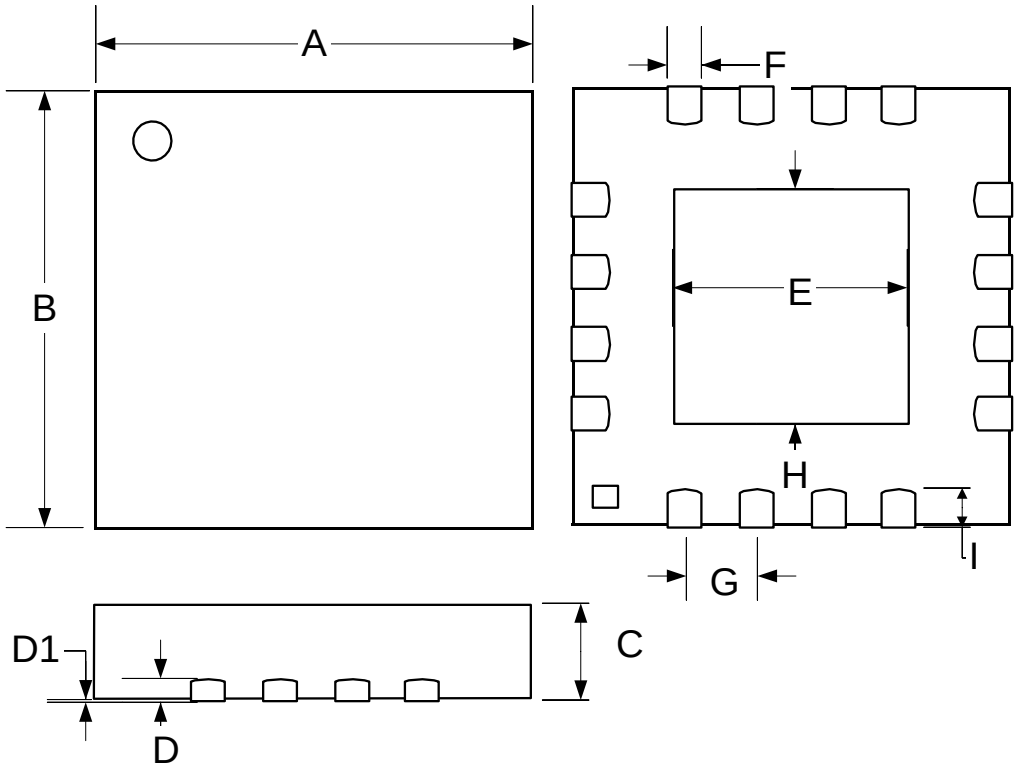
PACKAGE DIMENSIONS

LQ 16-Pin MLPQ Plastic (3mmx3mm 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