

**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. It also features a pair of on-chip differential output power detectors to help reduce BOM cost and PCB board space for system implementations. The device is manufactured with an InGaP/GaAs Heterojunction Bipolar Transistor (HBT) IC process (MOCVD).

It operates with a single positive voltage supply of 3.3V (nominal), with +26dBm of P1dB and up to 23dB power gain in the 5.15 - 5.85GHz frequency range with a simple output matching capacitor pair.

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
- Single-Polarity Voltage Supply
- EVM ~ 2.5% at Pout=18dBm for 64QAM/ 54Mbps OFDM (3.3V)
- Power Gain ~ 23dB at 5.25GHz & Pout=18dBm
- Power Gain ~ 20dB at 5.85GHz & Pout=18dBm
- P1dB ~ +26dBm across 5.15 – 5.85 GHz
- Total Current ~ 200mA for Pout=18dBm at 5.25GHz
- ACPR ~ -48dBc at 30MHz Offset at Pout=18dBm
- Integrated Power Detectors
- Complete On-Chip Input Match
- Simple Output Capacitor Match
- Small Footprint: 3x3mm<sup>2</sup>
- Low Profile: 0.9mm

**APPLICATIONS**

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

**PRODUCT HIGHLIGHT**

**PACKAGE ORDER INFO**

<b>LQ</b>	<b>Plastic MLPQ</b>
	<b>16-Pin</b>
Ro HS Compliant / Pb-free Transition D/C: 0418	
<b>LX5506ELQ</b>	

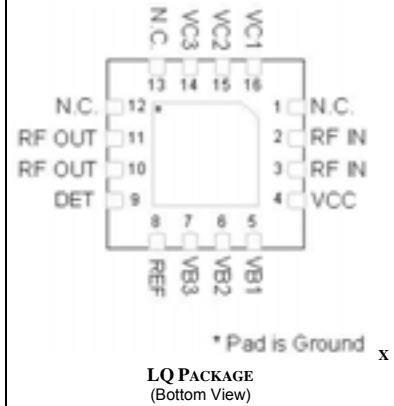
Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX5506ELQ-TR)

This device is classified as ESD Level 0 in accordance with JESD22-A114-B, (HBM) testing. Appropriate ESD procedures should be observed when handling this device.

**ABSOLUTE MAXIMUM RATINGS**

DC Supply Voltage, RF Off.....	6V
Collector Current .....	600mA
Total Power Dissipation.....	3W
RF Input Power .....	15dBm
Thermal Resistance (Junction-to-Case, $\theta_{JC}$ ).....	6°C/W
Maximum Junction Temperature ( $T_J$ max) .....	150°C
Operation Ambient Temperature .....	-40 to +85°C
Storage Temperature.....	-65 to 150°C
Peak Temperature for solder Reflow (40 second max).....	260°C (+0, -5)

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**


RoHS / Pb-free 100% Matte Tin Lead Finish

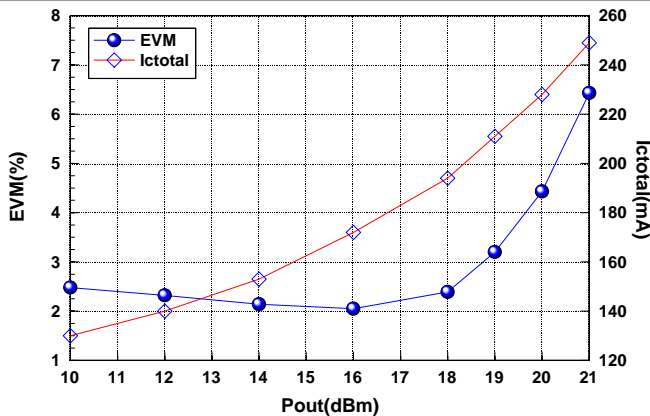
**FUNCTIONAL PIN DESCRIPTION**

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	5	Bias control voltage for the first stage.
VB2	6	Bias control voltage for the second stage.
VB3	7	Bias control voltage for the third stage.
DET	9	Detector output voltage for the third stage PA output power.
REF	8	Detector output voltage for the reference power detector.
RF OUT	10, 11	RF output for the power amplifier. This pin is DC-blocked from the collector of the output stage.
VC1	16	DC supply voltage for the first stage amplifier.
VC2	15	DC supply voltage for the second stage amplifier.
VC3	14	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 metal.

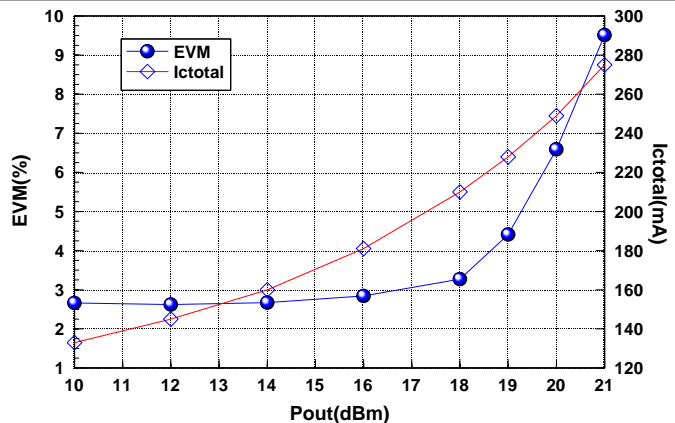
**ELECTRICAL CHARACTERISTICS**

Unless otherwise specified, the following specifications apply over following test conditions:  $V_c = 3.3V$ ,  $V_{ref} = 2.9V$ ,  $I_{cq} = 105mA$ ,  $T_A = 25^\circ C$

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	26		25	26		dBm
Power Gain at Pout=18dBm		Gp		23			20		dB
EVM at Pout=18dBm	64QAM/54Mbps			2.5			3		%
Total Current at Pout=18dBm		Ic_total		200			210		mA
Quiescent Current		Icq		105			105		mA
Bias Control Reference Current	For Icq=105mA	Iref		2.3			2.3		mA
Small-Signal Gain		S21		22			19		dB
Gain Flatness	Over 200MHz	$\Delta S_{21}$		+/-0.5			+/-0.5		dB
Gain Variation Over Temperature	-20 to +85°C	$\Delta S_{21}$		+/-2			+/-1		dB
Input Return Loss		S11		-12			-10		dB
Output Return Loss		S22		-7			-10		dB
Reverse Isolation		S12		-40			-40		dB
Second Harmonic	Pout = 18dBm			-40			-40		dBc
Third Harmonic	Pout = 18dBm			-40			-40		dBc
Detector Response	Pout = 18dBm	DET		2			3		V
Ramp-On Time	10~90%	t <sub>ON</sub>		100			100		ns

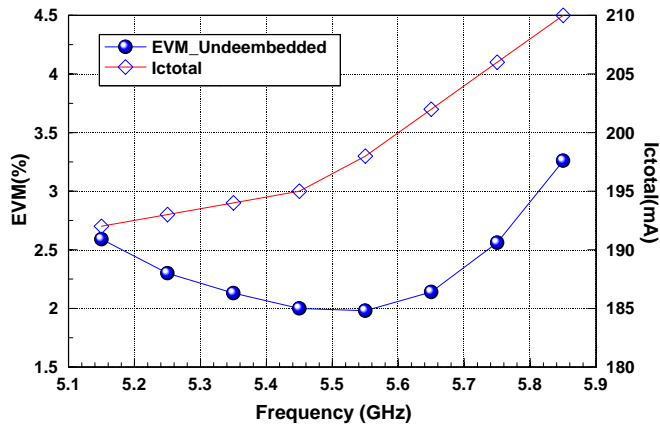
**EVM & CURRENT VS POUT**


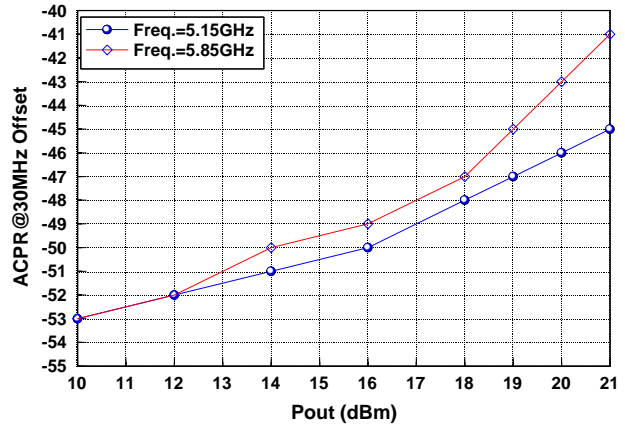
Typical EVM and Total Current vs. POUT @ 5.15GHz  
 (VC = 3.3V, FREQ = 2.9V, ICQ = 105mA, Freq = 5.15GHz, 64QAM / 54Mbps)

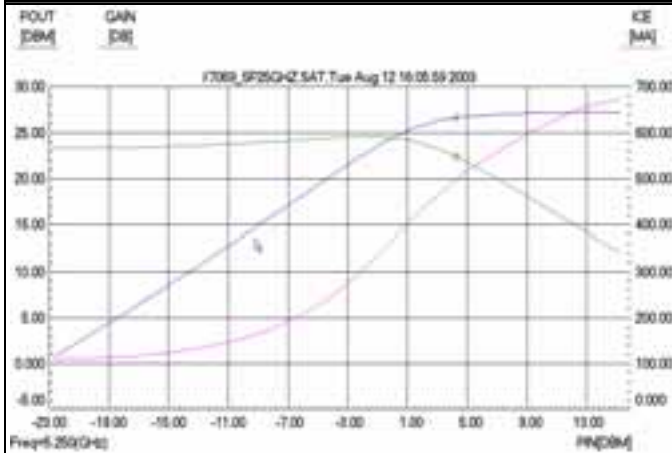
**EVM & CURRENT VS. POUT**


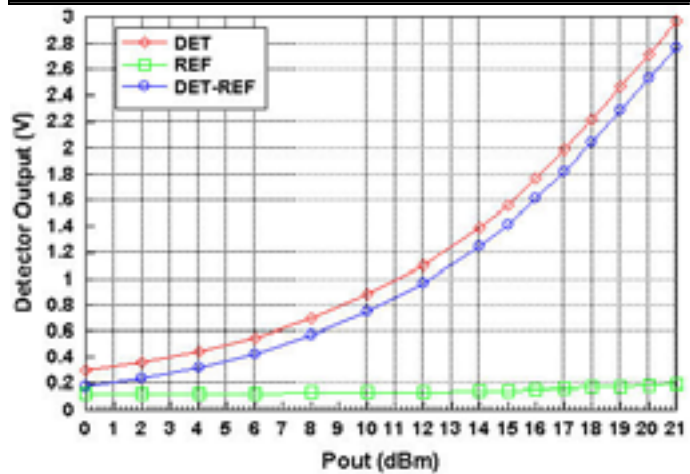
Typical EVM and Total Current vs. POUT @ 5.85GHz  
 (VC = 3.3V, VREF = 2.9V, ICQ = 105mA, Freq = 5.85GHz, 64QAM / 54Mbps)

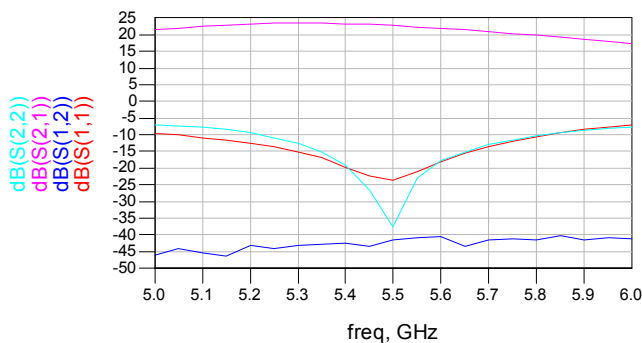
Notes: All EVM data are for OFDM signal of 64QAM/54Mbps from Yokogawa VG6000, and are actual measured data without any de-embedding. Source EVM is 1.4 - 1.8% for input power levels for test.

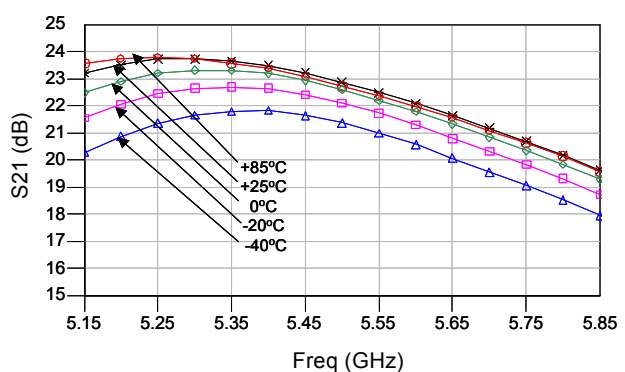
**EVM & CURRENT VS FREQUENCY**

 Typical EVM and Total Current vs. Frequency  
 (VC = 3.3V, FREQ = 2.9V, ICQ = 105mA, POUT = 18dBm, 64QAM / 54Mbps)

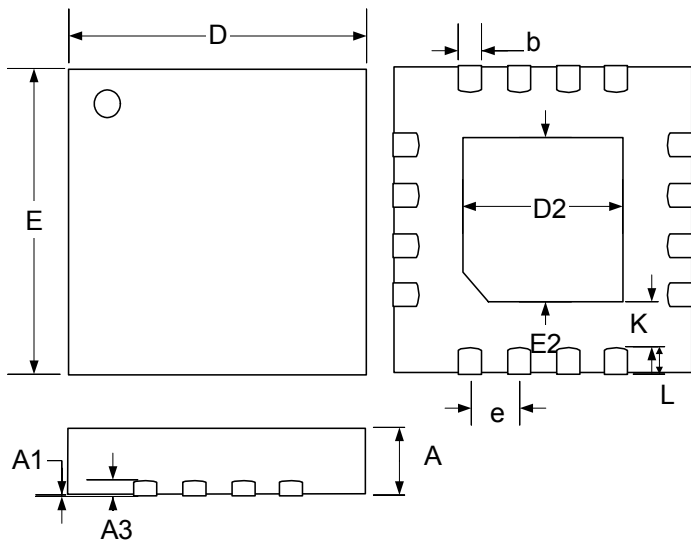
**TYPICAL ACPR VS POUT**

 Typical ACPR vs POUT  
 (VC = 3.3V, VREF = 2.9V, ICQ = 105mA, 64QAM / 54Mbps, 30MHz Offset)

**TYPICAL POWER SWEEP @ 5.25GHZ**

 Typical Power Sweep Data @ 5.25GHz  
 (VC = 3.3V, FREQ = 2.9V, ICQ = 105mA, Freq = 5.25GHz, CW Input)

**POWER DETECTOR RESPONSE**

 Typical Power Detector Response  
 (VC = 3.3V, VREF = 2.9V, ICQ = 105mA, Freq = 5.25GHz, 64QAM / 54Mbps)

**S PARAMETER**

 Typical S Parameter Data at Room Temperature  
 (VC = 3.3V, FREQ = 2.9V, ICQ = 105mA)

**SMALL SIGNAL GAIN OVER TEMP**

 Typical Small Signal Gain Variation Over Temperature  
 (VC = 3.3V, VREF = 2.9V, ICQ = 105mA at Room Temperature)

**PACKAGE DIMENSIONS**
**LQ** 16-Pin MLPQ 3x3 (75 x 75 mil DAP)


Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.80	1.00	0.031	0.039
A1	0	0.05	0	0.002
A3	0.20 REF		0.008 REF	
b	0.18	0.30	0.007	0.012
D	3.00 BSC		0.118 BSC	
E	3.00 BSC		0.118 BSC	
e	0.50 BSC		0.020 BSC	
D2	1.55	1.80	0.061	0.071
E2	1.55	1.80	0.061	0.071
K	0.2	-	0.008	-
L	0.35	0.50	0.012	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.



**Microsemi**<sup>®</sup>

**LX5506E**

**InGaP HBT 4 – 6 GHz Power Amplifier**

**PRODUCTION DATA SHEET**

**NOTES**

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