

Features

- 0.8GHz to 1GHz
- 28.0dBm P1dB
- High Linearity: 44dBm OIP3
- High Efficiency: PAE > 50%
- 17dB Linear Gain
- High Reliability
- Class A or AB operation

Applications

- Basestations and Repeaters
- CDMA/GSM/TDMA/EDGE
 - Multi-carrier systems

Packages Available

- QFN-16 (4x4mm)
- SOIC-8

Description

The ECP052 is a single stage, .5W power amplifier that offers excellent linearity and efficiency. This device was developed using EiC's proprietary InGaP Heterojunction Bipolar Transistor (HBT) process. The devices have a 50 ohm input impedance and pre-matched output. It is optimized for multicarrier applications and allows customers to use class A or AB operations. The devices can be easily matched to obtain optimum power, linearity and efficiency. The product is targeted for use as driver amplifier for wireless infrastructure applications. It is available in two surface mount plastic packages: QFN -16 (4x4mm) and SOIC-8 slug. Please refer to page 2 for important mounting information.

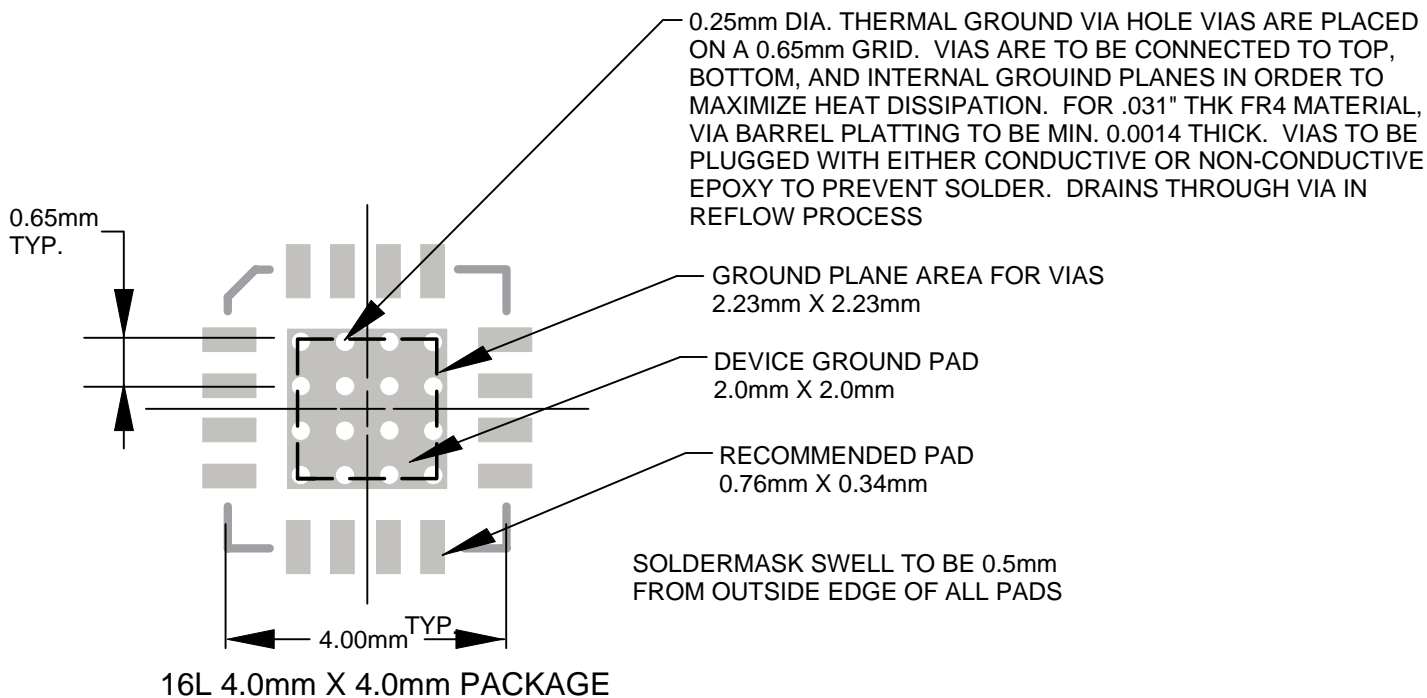
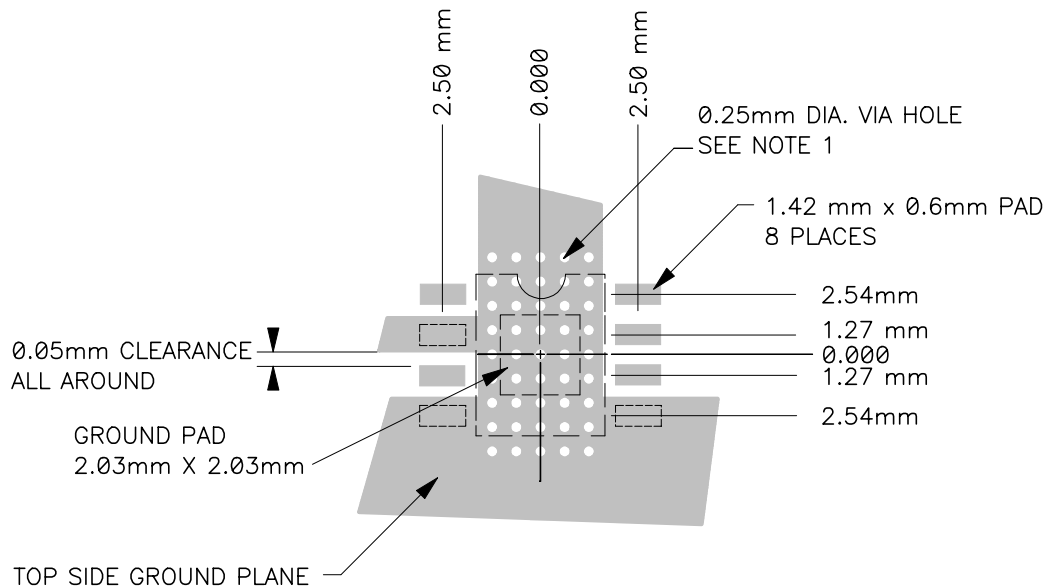
Electrical Specifications

Test Conditions: $T_a = 25^{\circ}\text{C}$, $V_{CC} = +5\text{V}$ $V_{ref} = +5\text{V}$ $I_{cq} = 250\text{mA}$ (Class A)

SYMBOL	PARAMETER		LIMITS			UNIT	TEST CONDITION
			MIN.	TYP.	MAX.		
F	Frequency		800.0		1000	MHz	
G	Gain (Small Signal)	f = 850MHz	15.5	17.0		dB	
		f = 950MHz	15.5	17.0			
P1dB	Output Power @ 1dB Compression	f = 850MHz	27.0	28.0		dBm	
		f = 950MHz	27.0	28.0			
OIP3	Output Third Order Intercept	f = 850MHz	42.5	44.0		dBm	Note 1
		f = 950MHz	42.5	44.0			
ACPR1	Pout = 22.5dBm (IS-95)	f = 900MHz		-45		dBc	
	Gain Flatness (100MHz Band)	f = 900MHz		±0.3		dB	
RL in	Input Return Loss, 50 Ohm	f = 900MHz	10.0	15.0		dB	
RL out	Output Return Loss, 50 Ohm	f = 900MHz	8.0	10.0		dB	
I _{cop}	Operational Current @ P1dB			325		mA	
V _{de}	Device Voltage			5.0		Vdc	
θ _{jc}	Thermal Resistance			60		°C/W	Note 2
Note 1: OIP3 = Pout (by power meter, total 2-tone power) + (IM3(dB))/2) - 3dB							
Note 2: θ _{jc} is measured between the device junction and the exposed die attach pad.							
Note 3: For the recommended mounting solution please refer to APNOTE AP-000556-000.							



CAUTION!
SENSITIVE ELECTRONIC DEVICE

Important Mounting Information**RECOMMENDED PCB LAND PATTERN**

Absolute Maximum Ratings

PARAMETER	RATING	UNIT
Supply Voltage	8	Volts
Supply Current	400	mA
RF Power Input	+20	dBm
Storage Temperature	-65 to +150	°C
Ambient Operating Temperature	-40 to +85	°C
Absolute Maximum DC Power	2	Watts

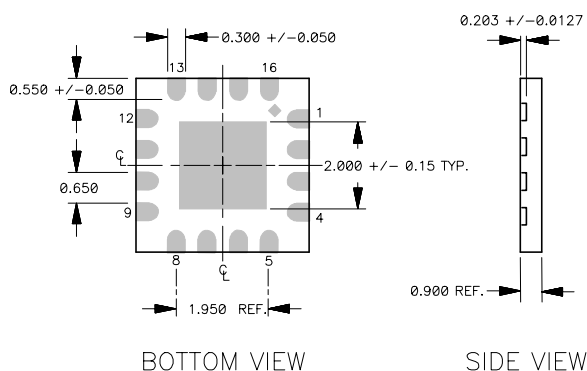
Note: Exceeding any of the absolute maximum ratings may cause permanent damage to the device.

Note: Do not exceed more than one parameter at the same time.

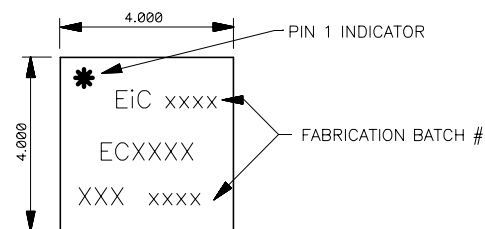
QFN-16 (4x4mm) Package Outline

Package

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS

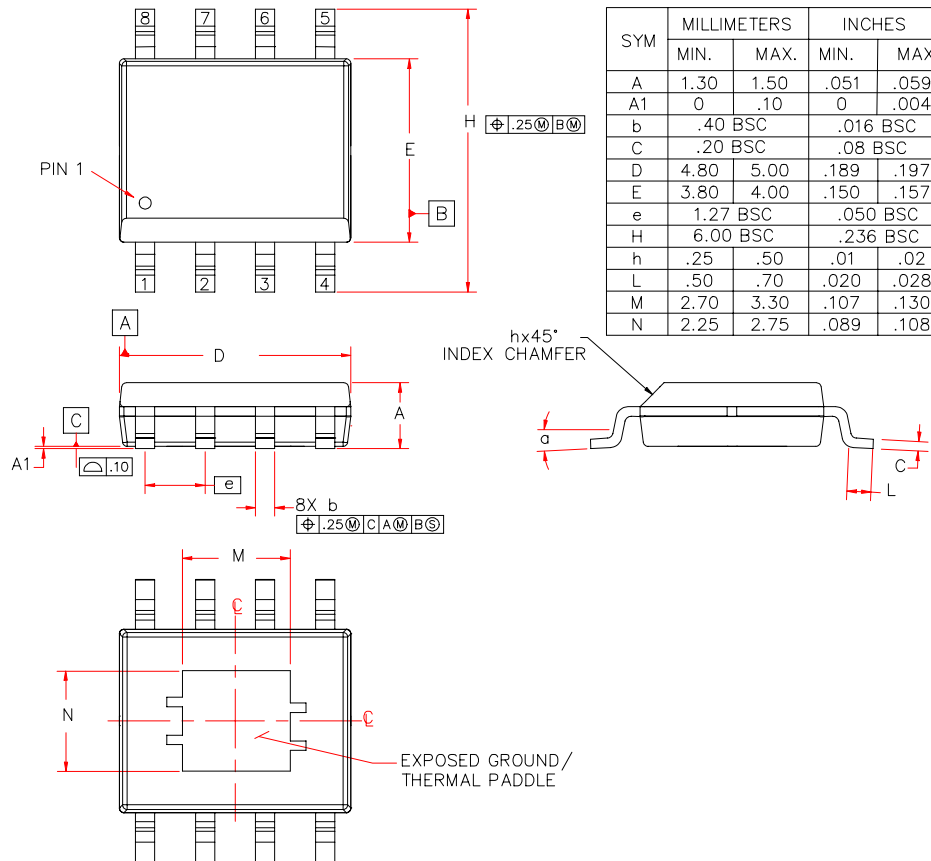


DEVICE MARKING



Pin Definitions

PIN	FUNCTION	DEFINITION
1	Vref/pd	This pin sets the reference / quiescent current.
2,4-5, 9, 12-15	N/C	These pins are not connected but should be grounded.
3	RF in	This pin connects to the input of the amplifier. It will have a dc voltage around 1.25 to 1.3 VDC. External circuit should provide DC blocking.
10,11	RF out	These are the output pins, which connects to the collector of the transistor. On the PCB, the two pins should also be tied together. Vcc connects to these through an inductor. A DC blocking capacitor is required.
16	Vbias	This pin provides current to the bias circuit , typically Vbias = Vcc. Bypass capacitors should be placed as close as practically possible to this pin.

SOIC-8 Package Outline


1. MOLD FLASH, PROTRUSIONS AND GATE BURRS AT THE END OF THE PACKAGE BODY SHALL NOT EXCEED 0.0006" PER SIDE.

2. UNIT = INCH

NOTES: UNLESS OTHERWISE SPECIFIED

Pin Definitions

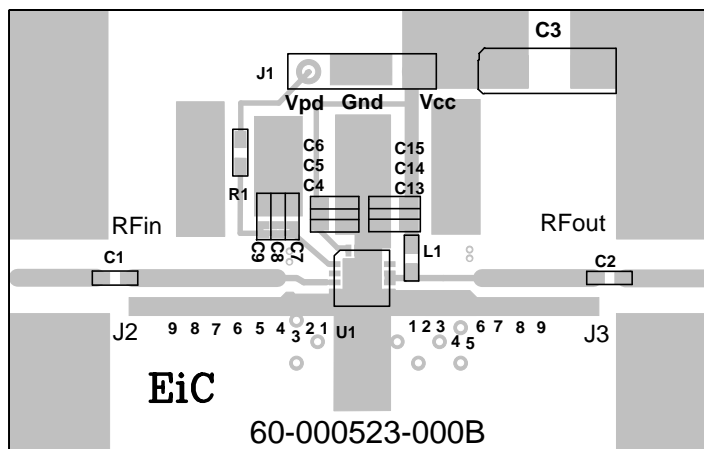
PIN	FUNCTION	DEFINITION
1	Vref/pd	This pin sets the reference / quiescent current.
2,4,5	N/C	These pins are not connected but should be grounded.
3	RF in	This pin connects to the input of the amplifier. It will have a dc voltage around 1.25 to 1.3 VDC. External circuit should provide DC blocking.
6,7	RF out	These are the output pins, which connects to the collector of the transistor. On the PCB, the two pins should also be tied together. Vcc connects to these through an inductor. A DC blocking capacitor is required.
8	Vbias	This pin provides current to the bias circuit , typically Vbias = Vcc. Bypass capacitors should be placed as close as practically possible to this pin.

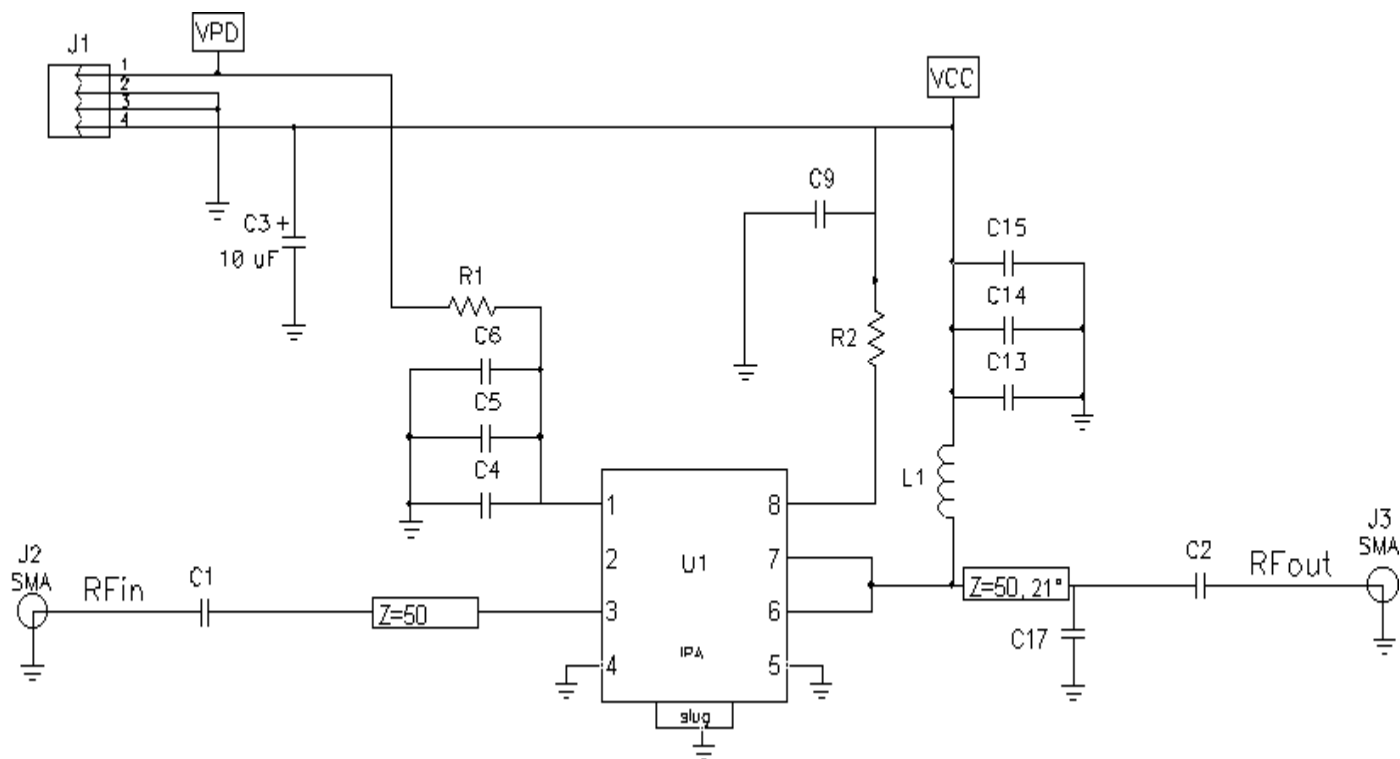
Evaluation Board Materials (4x4)

850-950MHz	POSITION	DESIG.	VALUE	DESCRIPTION	MANUFACTURER & P/N	
1		C1	10pF	CAPACITOR, 0603	ROHM MCH185A100DK	NOTE 1
1		C2	100pF	CAPACITOR, 0603	ROHM MCH185A101JK	NOTE 1
1		C3	10.0uF	CAPACITOR, 2512	PANASONIC ECS-H1CC106R	NOTE 1
3		C4, C7, C13	18pF	CAPACITOR, 0603	ROHM MCH185A180JK	NOTE 1
3		C5, C8, C14	1000pF	CAPACITOR, 0603	ROHM MCH185C102KK	NOTE 1
3		C9, C6, C15	1.0uF	CAPACITOR, 0603	PANASONIC ECJ-1VF1A105Z	NOTE 1
--	TBD	C16	TBD	CAPACITOR, 0603	ROHM MCH185A010CK	NOTE 1
1	TBD	C18	TBD	CAPACITOR, 0603	AVX 06035J0R8BBT	NOTE 1
1		R1	100 Ω	RESISTOR, 0603	ROHM MCR03J101	NOTE 1
1		L1	33 nH	INDUCTOR, 0805	CTL 2012-33N	NOTE 1
2		J2, J3	---	SMA CONNECTOR	EF JOHNSON 142-0701-631	NOTE 1
1		J1	---	RT ANG. CONN.	SULLINS ELEC PZC04SGAN	
1			---	IC, ECP052D (4x4)	EiC Corp	
1			---	PCB (4x4)	EiC Corp 60-000523-000B	

1. EiC RECOMMENDED COMPONENTS ARE SHOWN. EQUIVALENT COMPONENTS MAY BE USED.
NOTES: UNLESS OTHERWISE SPECIFIED

Evaluation Board Layout



Evaluation Board Application Schematic (SOIC-8)**900MHz**

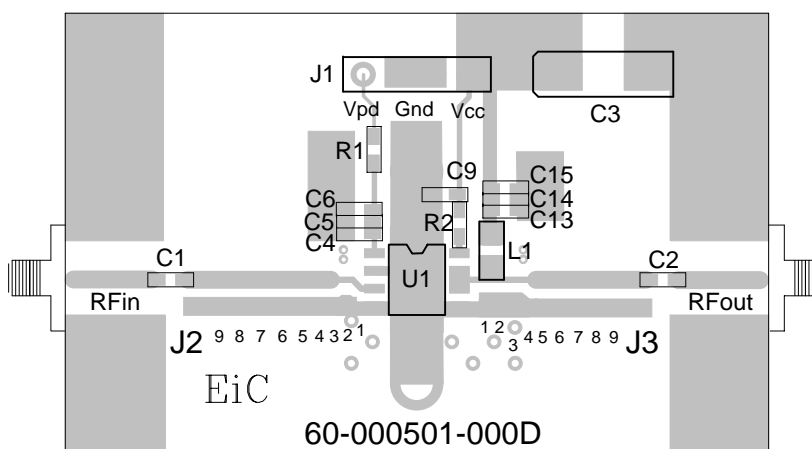
Evaluation Board Bill of Material (SOIC-8)

850-950MHz	POSITION	DESIG.	VALUE	DESCRIPTION	MANUFACTURER & P/N	
1		C1	10pF	CAPACITOR, 0603	ROHM MCH185A100DK	NOTE 1
1		C2	100pF	CAPACITOR, 0603	ROHM MCH185A101JK	NOTE 1
1		C3	10.0uF	CAPACITOR, 2512	PANASONIC ECS-H1CC106R	NOTE 1
2		C4, C13	18pF	CAPACITOR, 0603	ROHM MCH185A180JK	NOTE 1
2		C5, C14	1000pF	CAPACITOR, 0603	ROHM MCH185C102KK	NOTE 1
3		C6, C9, C15	1.0uF	CAPACITOR, 0603	PANASONIC ECJ-1VF1A105Z	NOTE 1
1	Output 9	C18	4.7pF	CAPACITOR, 0603	ROHM MCH185A4R7CK	NOTE 1
1		R1	100 Ω	RESISTOR, 0603	ROHM MCR03J101	NOTE 1
1		R2	20 Ω	RESISTOR, 0603	ROHM MCR03J200	NOTE 1
1		L1	33 nH	INDUCTOR, 0805	CTLL 2012-33N	NOTE 1
2		J2, J3	---	SMA CONNECTOR	EF JOHNSON 142-0701-631	NOTE 1
1		J1	---	RT ANG. CONN.	SULLINS ELEC PZC04SGAN	
1			---	IC, ECP052G	EiC Corp	
1			---	PCB (SOIC8)	EiC Corp 60-000501-000D	

1. EiC RECOMMENDED COMPONENTS ARE SHOWN. EQUIVALENT COMPONENTS MAY BE USED.

NOTES: UNLESS OTHERWISE SPECIFIED

Evaluation Board Layout



**ECP052 @ 25°C CW Pout & PAE
vs. Pin @ 900MHz Class A
5Vcc & 250mA**

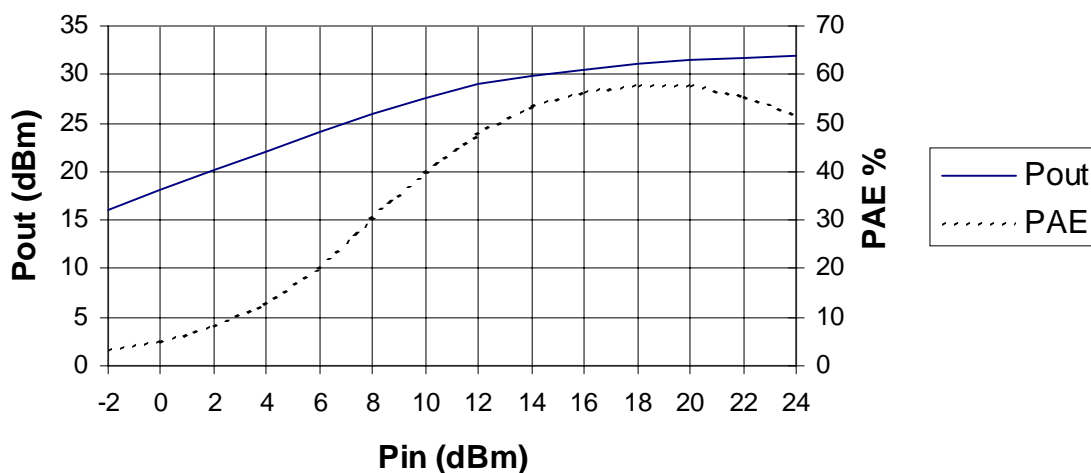


Figure 1

ECP052 @ 25°C CW Pout vs. Frequency vs. Pin

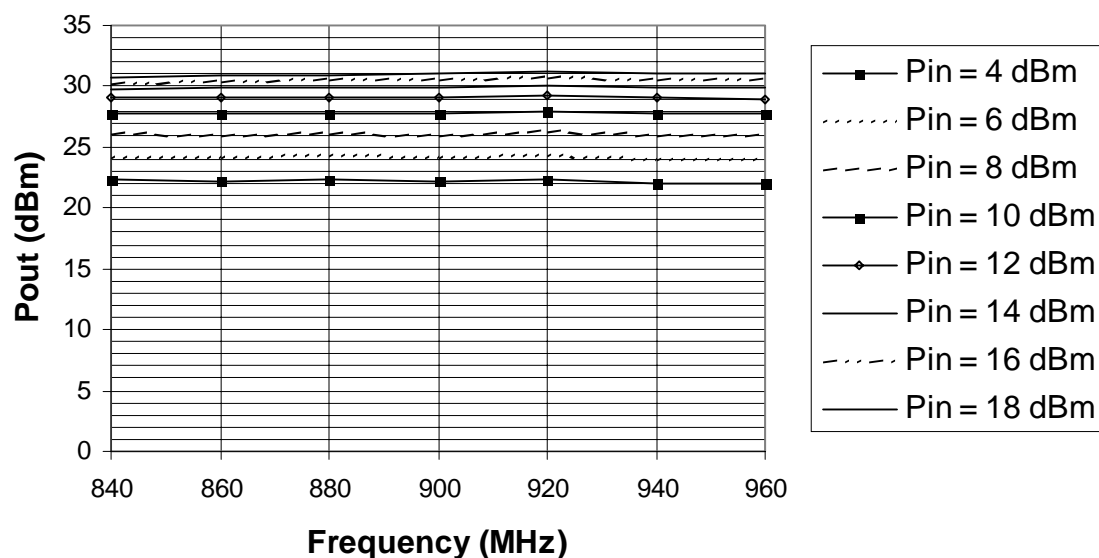


Figure 2

ECP052 @ 25°C IM3 & PAE vs. Pout @ 900MHz
Class A Icq = 250mA Class AB =125mA

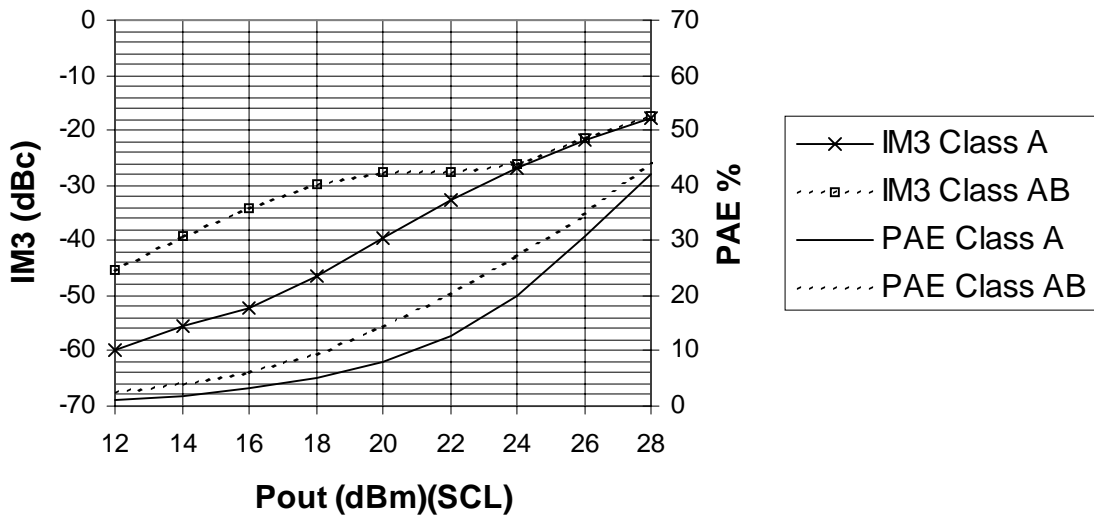


Figure 3

ECP052 @ 900MHz ACPR1 & PAE
vs. Pout @ 25°C Class A 250mA
Class AB 125mA (IS-95)

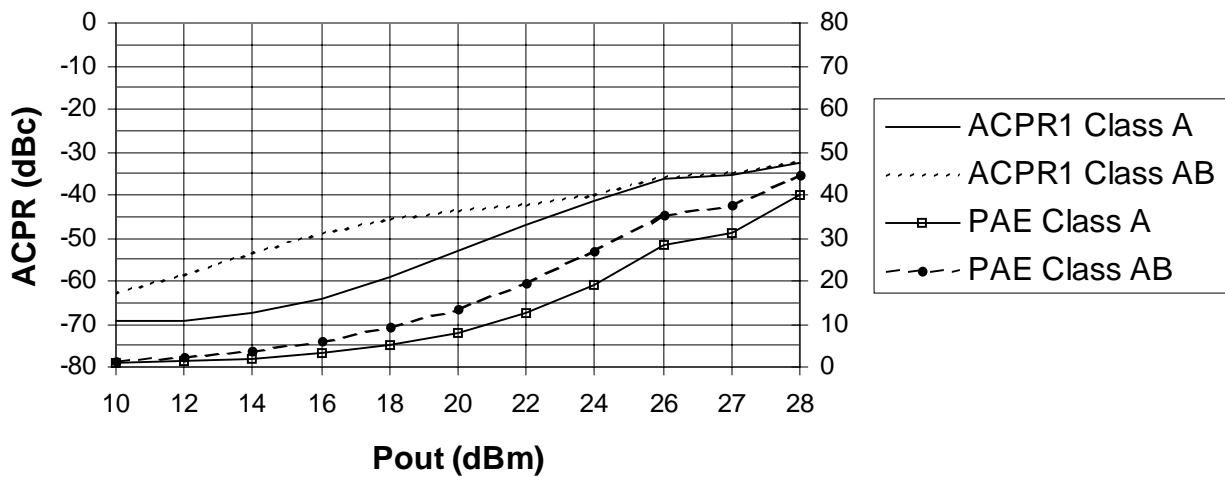


Figure 4

ECP052 OIP3 & PAE vs. Pout vs. Temperature
@ 900MHz Class A 5Vcc & 250mA

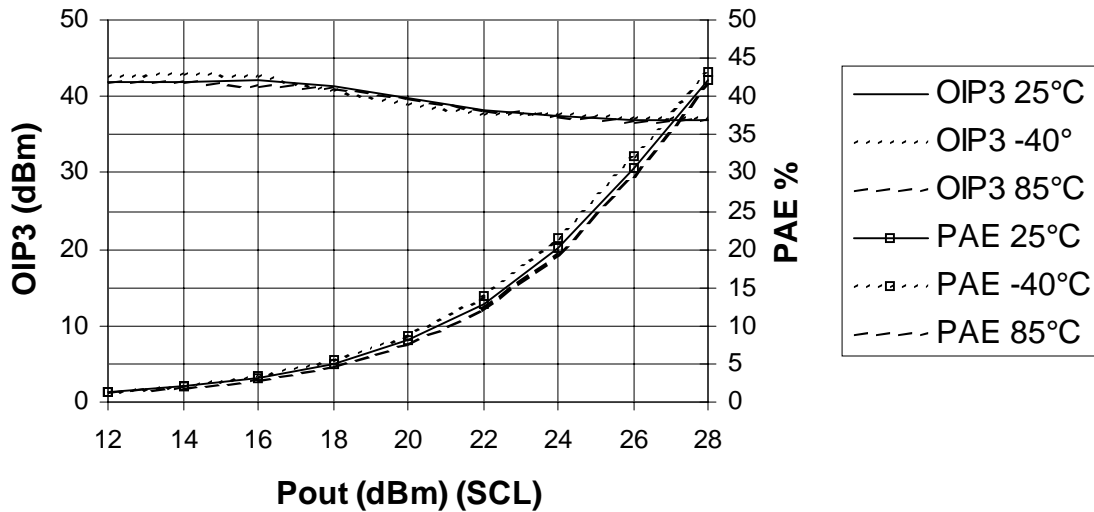


Figure 5

ECP052 ACPR vs. Pout vs. Temperature
@ 900MHz Class A 5Vcc 250mA (IS-95)

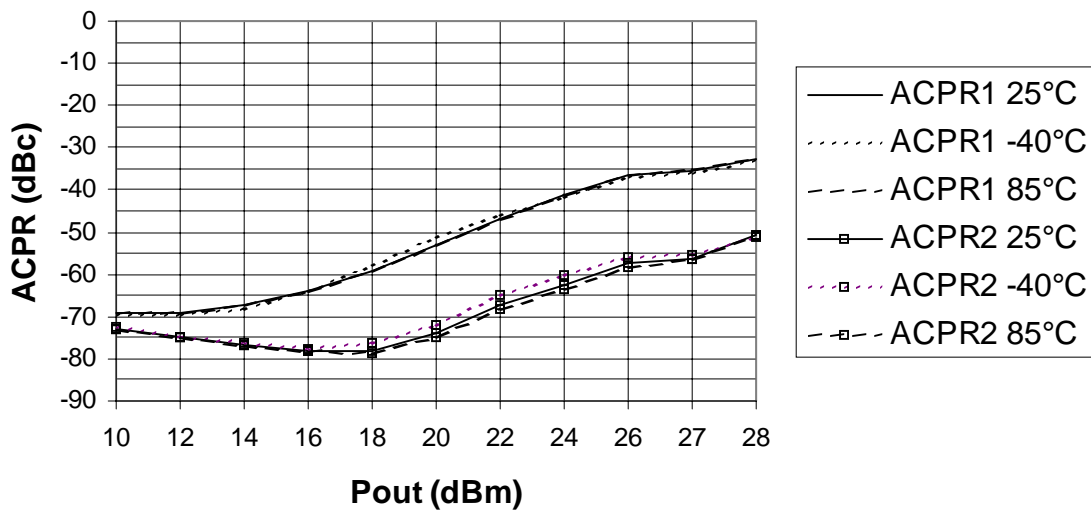
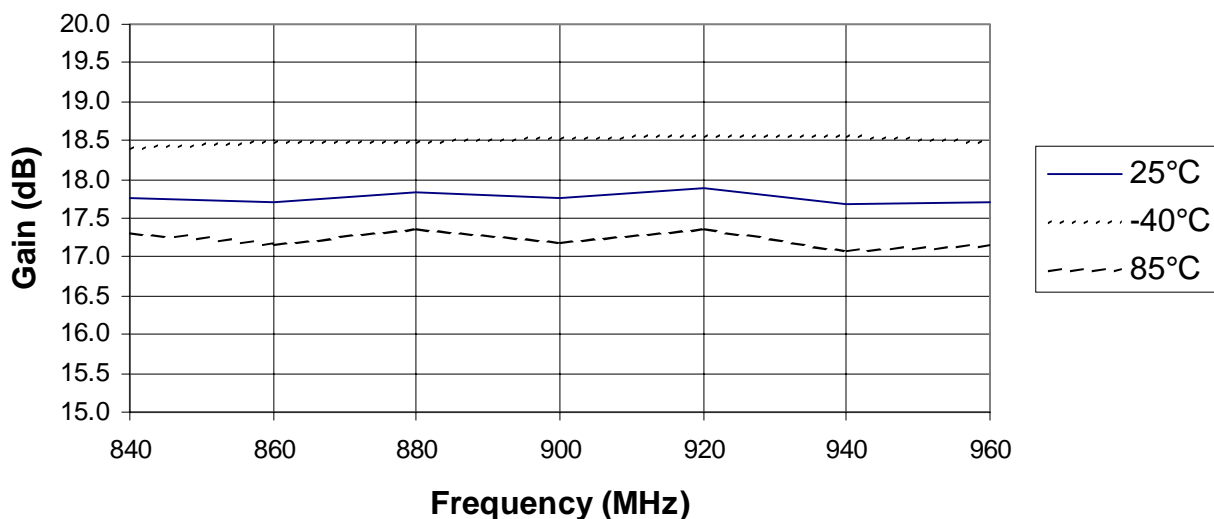


Figure 6

ECP052 Gain vs. Frequency vs. Temperature
Class A 5Vcc Icq = 250mA Pin = 10 dBm**Figure 7****APPLICATION NOTE**

- All of EiCs IPAs use the same evaluation board, bypass and DC blocking capacitors. The values are the same for all the capacitors except for matching.
- Matching circuits are described by the schematics. The values of the components are listed in the bill of material.
- The DC power connector consists of four pins. The two inside pins are for ground.
- The Vref/pd pin of the IC can be used to set the amplifier in class A operation when connected to 5V, or varying degree of Class AB by adjusting the voltage lower (typically >3.0 volts). The bias condition can also be set by varying the value of R1 while keeping the Vref/pd at 5V.
- The Vcc pin can operate up to 7 volts Vcc. The bias current can be adjusted by the reference voltage or R1 value.

ORDERING INFORMATION

	PKG. TYPE	REEL QTY.
ECP052G	SOIC 8	BULK
ECP052G-500	SOIC 8	500
ECP052G-1000	SOIC 8	1000
ECP052D	QFN-16(4X4mm)	BULK
ECP052D-500	QFN-16(4X4mm)	500
ECP052D-1000	QFN-16(4X4mm)	1000