ECP203

2 Watt, High Linearity InGaP HBT Amplifier

The Communications Edge ™

Product Information

Product Features

- 2300 – 2700 MHz
- +32.5 dBm P1dB
- +48 dBm Output IP3
- 10 dB Gain @ 2450 MHz
- 9 dB Gain @ 2600 MHz
- Single Positive Supply (+5V)
- Available in SOIC-8 or 16pin 4mm QFN package

Applications

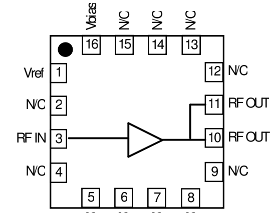
- W-LAN
- RFID
- DMB
- Fixed Wireless

Product Description

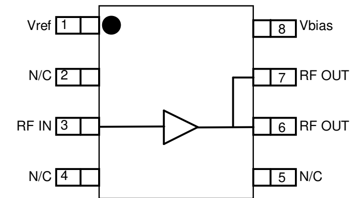
The ECP203 is a high dynamic range driver amplifier in a low-cost surface mount package. The InGaP/GaAs HBT is able to achieve high performance for various narrowband-tuned application circuits with up to +48 dBm OIP3 and +32.5 dBm of compressed 1dB power. It is housed in an industry standard SOIC-8 or 16-pin 4x4mm QFN SMT package. All devices are 100% RF and DC tested.

The ECP203 is targeted for use as a driver amplifier in wireless infrastructure where high linearity and medium power is required. An internal active bias allows the ECP203 to maintain high linearity over temperature and operate directly off a single +5V supply. This combination makes the device an excellent candidate for driver amplifier stages in wireless-LAN, digital multimedia broadcast, or fixed wireless applications. The device can also be used in next generation RFID readers.

Functional Diagram



ECP203D



ECP203G

Specifications (1)

Parameter	Units	Min	Typ	Max
Operational Bandwidth	MHz	2300		2700
Test Frequency	MHz		2450	
Gain	dB		10	
Input Return Loss	dB		20	
Output Return Loss	dB		6.8	
Output P1dB	dBm		+32.5	
Output IP3 (2)	dBm		+48	
Noise Figure	dB		7.7	
Test Frequency	MHz		2600	
Gain	dB		9	
Output P1dB	dBm		+32	
Output IP3 (2)	dBm		+47	
Operating Current Range, Icc (3)	mA	700	800	900
Device Voltage, Vcc	V		+5	

1. Test conditions unless otherwise noted: 25ºC, Vsupply = +5 V in tuned application circuit.
2. 3OIP measured with two tones at an output power of +17 dBm/tone separated by 1 MHz. The suppression on the largest IM3 product is used to calculate the 3OIP using a 2:1 rule.
3. This corresponds to the quiescent current or operating current under small-signal conditions into pins 6, 7, and 8. It is expected that the current can increase by an additional 200 mA at P1dB. Pin 1 is used as a reference voltage for the internal biasing circuitry. It is expected that Pin 1 will pull 22mA of current when used with a series bias resistor of R1=15Ω. (ie. total device current typically will be 822 mA.)

Absolute Maximum Rating

Parameters	Rating
Operating Case Temperature	-40 to +85 °C
Storage Temperature	-65 to +150 °C
RF Input Power (continuous)	+28 dBm
Device Voltage	+8 V
Device Current	1400 mA
Device Power	8 W

Operation of this device above any of these parameters may cause permanent damage.

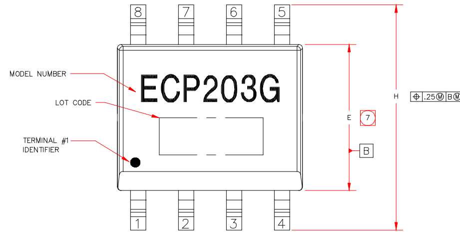
Ordering Information

Part No.	Description
ECP203D	2 Watt InGaP HBT Amplifier (16p 4mm Pkg)
ECP203G	2 Watt InGaP HBT Amplifier (Soic-8 Pkg)
ECP203D-PCB2450	2450 MHz Evaluation Board
ECP203D-PCB2650	2600 MHz Evaluation Board
ECP203G-PCB2450	2450 MHz Evaluation Board
ECP203G-PCB2650	2600 MHz Evaluation Board

Specifications and information are subject to change without notice

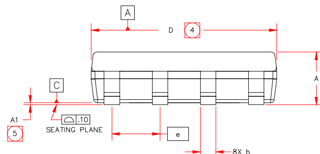
ECP203G (SOIC-8 Package) Mechanical Information

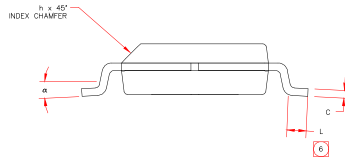
Outline Drawing

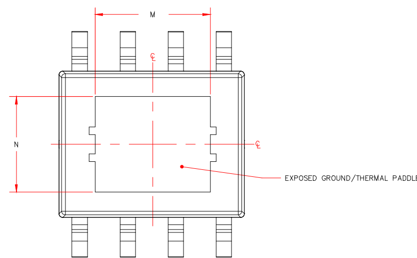


NOTES:

1. EXCEPT WHERE NOTED, THIS PART OUTLINE CONFORMS TO JEDEC STANDARD MS-012, ISSUE C FOR SMALL OUTLINE (SO) PERIPHERAL TERMINALS 3.75mm BODY WIDTH (PLASTIC).
2. DIMENSIONING & TOLERANCING CONFORM TO ASME Y14.4M-1994.
3. ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.
4. DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS, WHICH SHALL NOT EXCEED .15mm(.006in) PER SIDE.
5. DEVIATION FROM JEDEC MS-012 STANDARD.
6. LENGTH OF TERMINAL FOR SOLDERING TO A SUBSTRATE.
7. DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS, WHICH SHALL NOT EXCEED .25mm(.010in) PER SIDE.

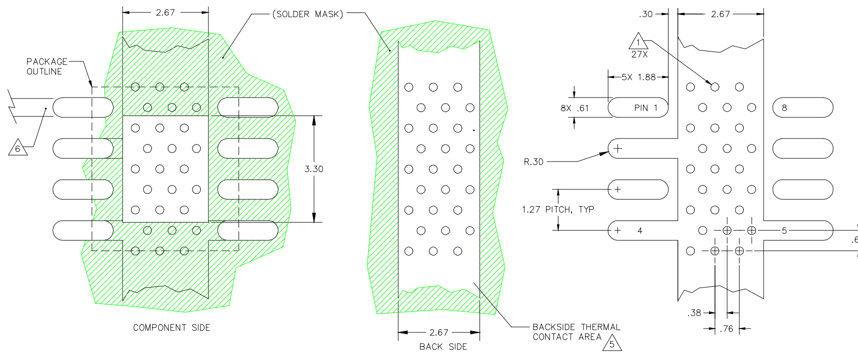






	SYMBOL	MILLIMETERS		INCHES	
		MIN.	MAX.	MIN.	MAX.
5	A	1.30	1.50	.051	.059
5	A1	0	.10	0	.004
5	b	.38	.43	.015	.017
5	C	.18	.23	.007	.009
	D	4.80	5.00	.189	.197
	E	3.80	4.00	.150	.157
	e	1.27 BSC		.050 BSC	
	H	5.80	6.20	.228	.244
	h	.25	.50	.01	.02
	L	.40	1.27	.016	.050
5	M	2.95	3.15	.116	.124
5	N	2.03	2.54	.080	.100
	α	0	8°	0	8°

Land Pattern



Product Marking

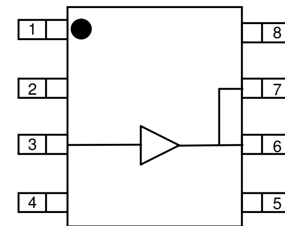
The component will be marked with an "ECP203G" designator with an alphanumeric lot code on the top surface of the package.

Tape and reel specifications for this part are located on the website in the "Application Notes" section.

ESD / MSL Information

ESD Rating:	Class 1B
Value:	Passes between 500 and 1000V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114
MSL Rating:	Level 3 at +235° C convection reflow
Standard:	JEDEC Standard J-STD-020

Functional Diagram



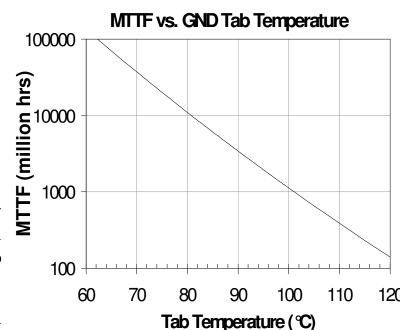
Function	Pin No.
Vref	1
Input	3
Output	6, 7
Vbias	8
GND	Backside Padd
N/C or GND	2, 4, 5

Thermal Specifications

Parameter	Rating
Operating Case Temperature	-40 to +85° C
Thermal Resistance, Rth [(1)]	17.5° C / W
Junction Temperature, Tjc [(2)]	155° C

Notes:

1. The thermal resistance is referenced from the junction-to-case at a case temperature of 85° C. Tjc is a function of the voltage at pins 6 and 7 and the current applied to pins 6, 7, and 8 and can be calculated by:
   $$T_{jc} = T_{case} + R_{th} * V_{cc} * I_{cc}$$
2. This corresponds to the typical biasing condition of +5V, 800 mA at an 85° C case temperature. A minimum MTTF of 1 million hours is achieved for junction temperatures below 247° C.



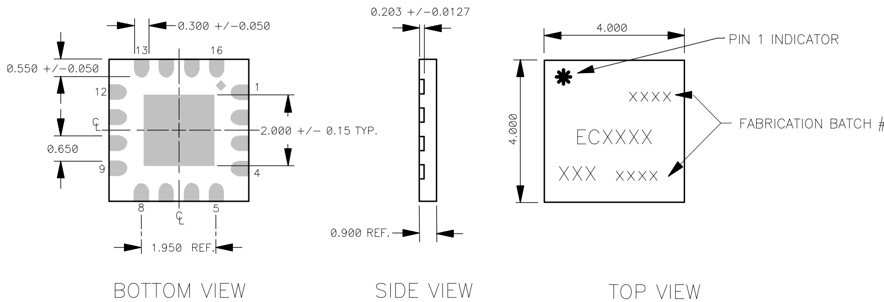
Mounting Config. Notes

1. A heatsink underneath the area of the PCB for the mounted device is strictly required for proper thermal operation. Damage to the device can occur without the use of one.
2. Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25 mm (.010").
3. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
4. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via region contacts the heatsink.
5. Do not put solder mask on the backside of the PC board in the region where the board contacts the heatsink.
6. RF trace width depends upon the PC board material and construction.
7. Use 1 oz. Copper minimum.
8. All dimensions are in millimeters (inches). Angles are in degrees.

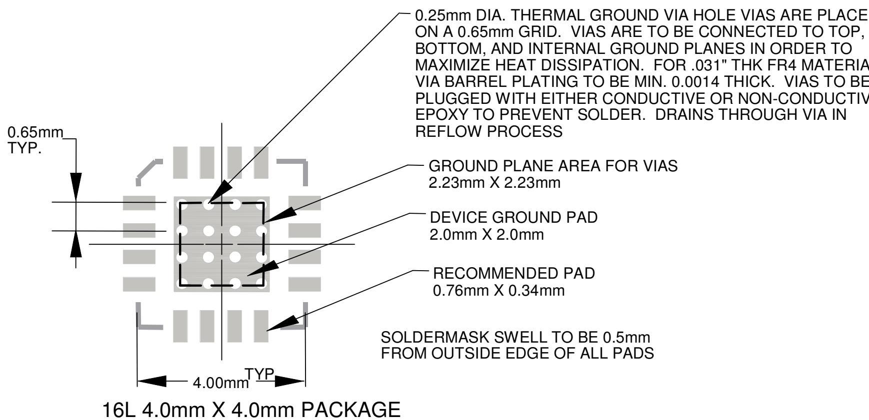
ECP203D (16-pin 4x4mm Package) Mechanical Information

Outline Drawing

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS



Land Pattern



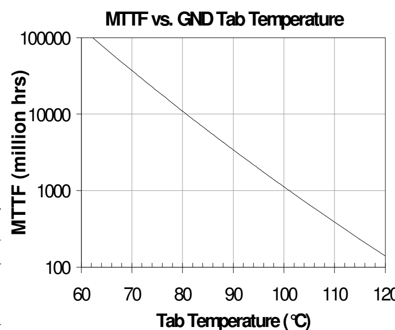
16L 4.0mm X 4.0mm PACKAGE

Thermal Specifications

Parameter	Rating
Operating Case Temperature	-40 to +85° C
Thermal Resistance, Rth (1)	17.5° C / W
Junction Temperature, Tjc (2)	155° C

Notes:

1. The thermal resistance is referenced from the junction-to-case at a case temperature of 85° C. Tjc is a function of the voltage at pins 10 and 11 and the current applied to pins 10, 11, and 16 and can be calculated by:
   Tjc = Tcase + Rth * Vcc * Icc
2. This corresponds to the typical biasing condition of +5V, 800 mA at an 85° C case temperature. A minimum MTTF of 1 million hours is achieved for junction temperatures below 247° C.



Product Marking

The component will be marked with an "ECP203D" designator with an alphanumeric lot code on the top surface of the package.

Tape and reel specifications for this part are located on the website in the "Application Notes" section.

ESD / MSL Information

ESD Rating:	Class 1B
Value:	Passes between 500 and 1000V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114
MSL Rating:	Level 3 at +235° C convection reflow
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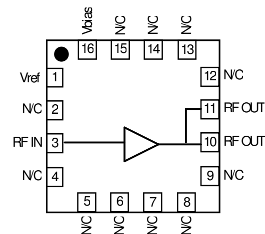
Functional Diagram



Function	Pin No.
Vref	1
RF Input	3
RF Output	10, 11
Vbias	16
GND	Backside Paddle
N/C or GND	2, 4-9, 12-15

Mounting Config. Notes

1. A heatsink underneath the area of the PCB for the mounted device is strictly required for proper thermal operation. Damage to the device can occur without the use of one.
2. Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25 mm (.010").
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6. RF trace width depends upon the PC board material and construction.
7. Use 1 oz. Copper minimum.
8. All dimensions are in millimeters (inches). Angles are in degrees.