



# NEC's 1.5W GaAs MMIC POWER AMPLIFIER

## UPG2118K

### FEATURES

- **E-MODE HJ-FET TECHNOLOGY**
- **SINGLE +3.2V POWER SUPPLY**
- **HIGH EFFICIENCY:** PAE = 42% MIN
- **HIGH SATURATED POWER:** Pout = +31.5 dBm MIN
- **FLEXIBLE FREQUENCY RANGE**
- **20-PIN QFN PACKAGE:**  
(4.15 x 4.15 x 0.9 mm)

### DESCRIPTION

NEC's UPG2118K is a 1.5W, 3 stage power amplifier developed primarily for DCS/PCS1800 applications. With modified external matching the UPG2118K can be tuned from 800 to 2500 MHz.

Use of E-mode FET technology delivers high efficiency and high linearity with a single positive low voltage supply.

### APPLICATIONS

- **1800 MHz DCS/PCS**
- **915 AND 2450 ISM BAND USAGE**
- **AUTOMATIC METER READERS**
- **WIRELESS SECURITY**
- **SATELLITE UPLINK**

### ORDERING INFORMATION

PART NUMBER	MARKING	PACKAGE	SUPPLYING FORM
UPG2118K-E3-A	2118	20-pin QFN	<ul style="list-style-type: none"> <li>• Embossed tape 12mm wide</li> <li>• 4.5 K pcs/reel</li> </ul>

### ABSOLUTE MAXIMUM RATINGS (TA = 25°C, unless otherwise specified)

PARAMETERS	SYMBOL	RATINGS	UNIT
Storage Temperature	T <sub>stg</sub>	-45 to +85	°C
Operating Temperature	T <sub>opt</sub>	-45 to +85	°C
Supply Voltage <sub>1,2,3</sub>	V <sub>D</sub> <sub>1,2,3</sub>	8.0	V
Active Bias Circuit Voltage	V <sub>ABC</sub>	8.0	V
Reference Voltage	V <sub>ref</sub>	5.0	V
Junction Temperature	T <sub>j</sub>	150	°C
Input Power	P <sub>in</sub>	15	dBm
Total Power Dissipation	P <sub>tot</sub>	4.0	W

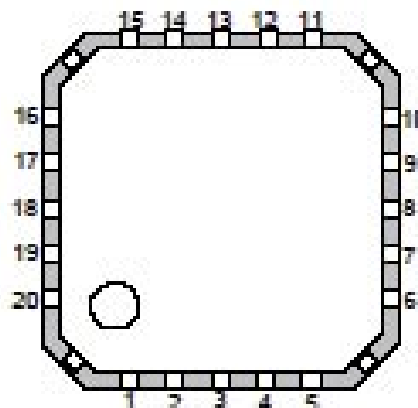
**Caution** This device is ESD sensitive. Please take ESD precautions.

The information contained in this document is being issued in advance of the production cycle for the device. The parameters for the device may change before final production or NEC Corporation, at its own discretion, may withdraw the device prior to its production.

## PIN CONNECTIONS

PIN NO.	CONNECTION	PIN NO.	CONNECTION
1	$V_{G1,2}$	11	GND
2	$V_{ref1,2}$	12	NC
3	$V_{ABC}$	13	NC
4	$V_{ref3}$	14	GND
5	$V_{G3}$	15	$V_{D2}$
6	GND	16	$V_{D1}$
7	$V_{D3}/RF OUT$	17	GND
8	$V_{D3}/RF OUT$	18	GND
9	$V_{D3}/RF OUT$	19	$V_{attn}$
10	$V_{D3}/RF OUT$	20	RF IN

(Top View)



## RECOMMENDED OPERATING CONDITIONS (TA = 25°C)

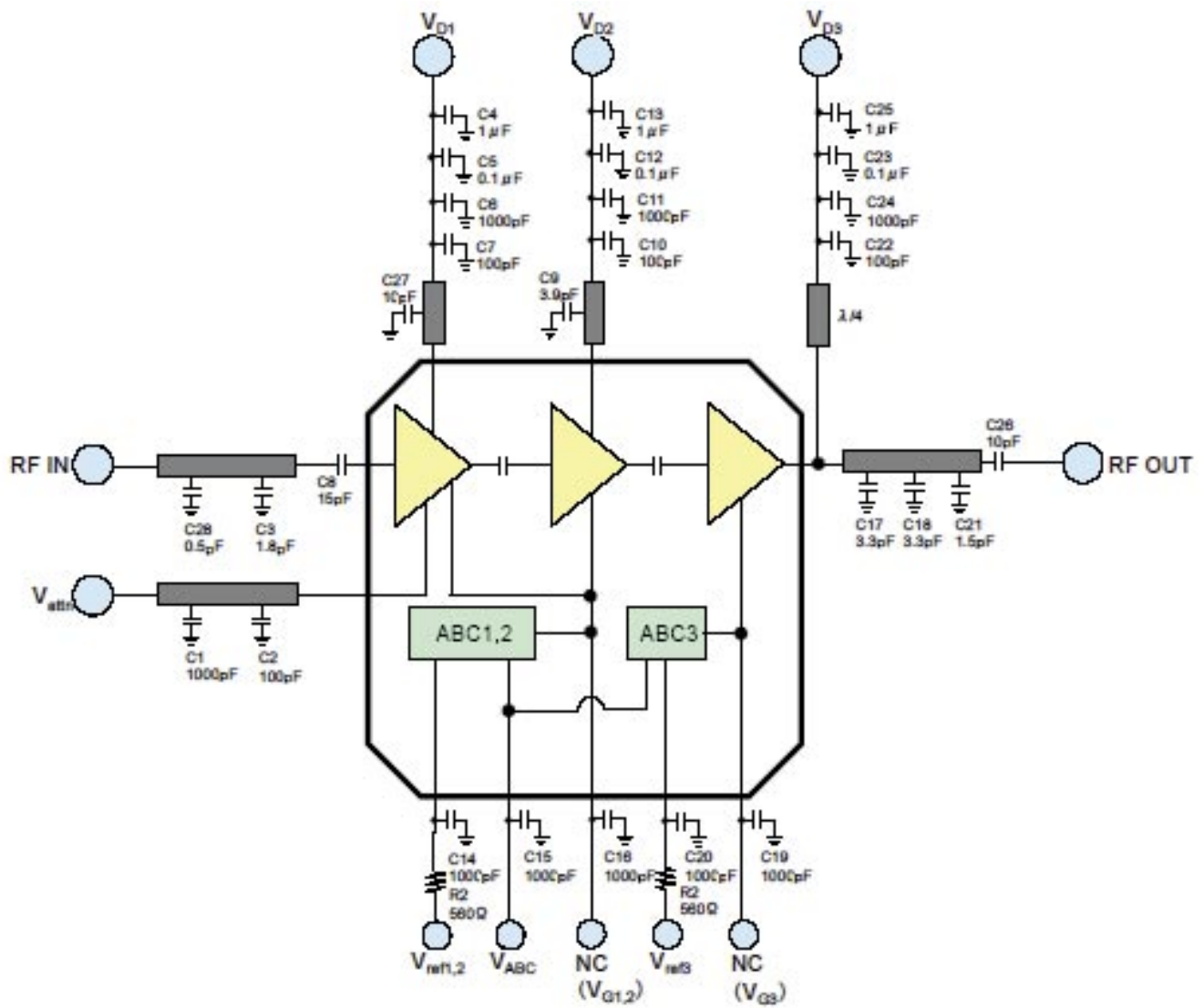
PARAMETERS	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{D1,2,3}$	+2.8	+3.2	+5.5	V
Reference Voltage	$V_{ref}$	+0.04	-	+1.8	V
Active Bias Circuit Voltage	$V_{ABC}$	0	2.6	5.5	V
Input Power	$P_{in}$	5	-	10	dBm

## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, TA = +25°C, f = 1880 MHz,  $V_{D1,2,3} = +3.2V$ ,  $V_{ABC} = +2.6V$ ,  $V_{ref} = V_{attn} = 1.8V$ ,  $P_{in} = +5dBm$ )

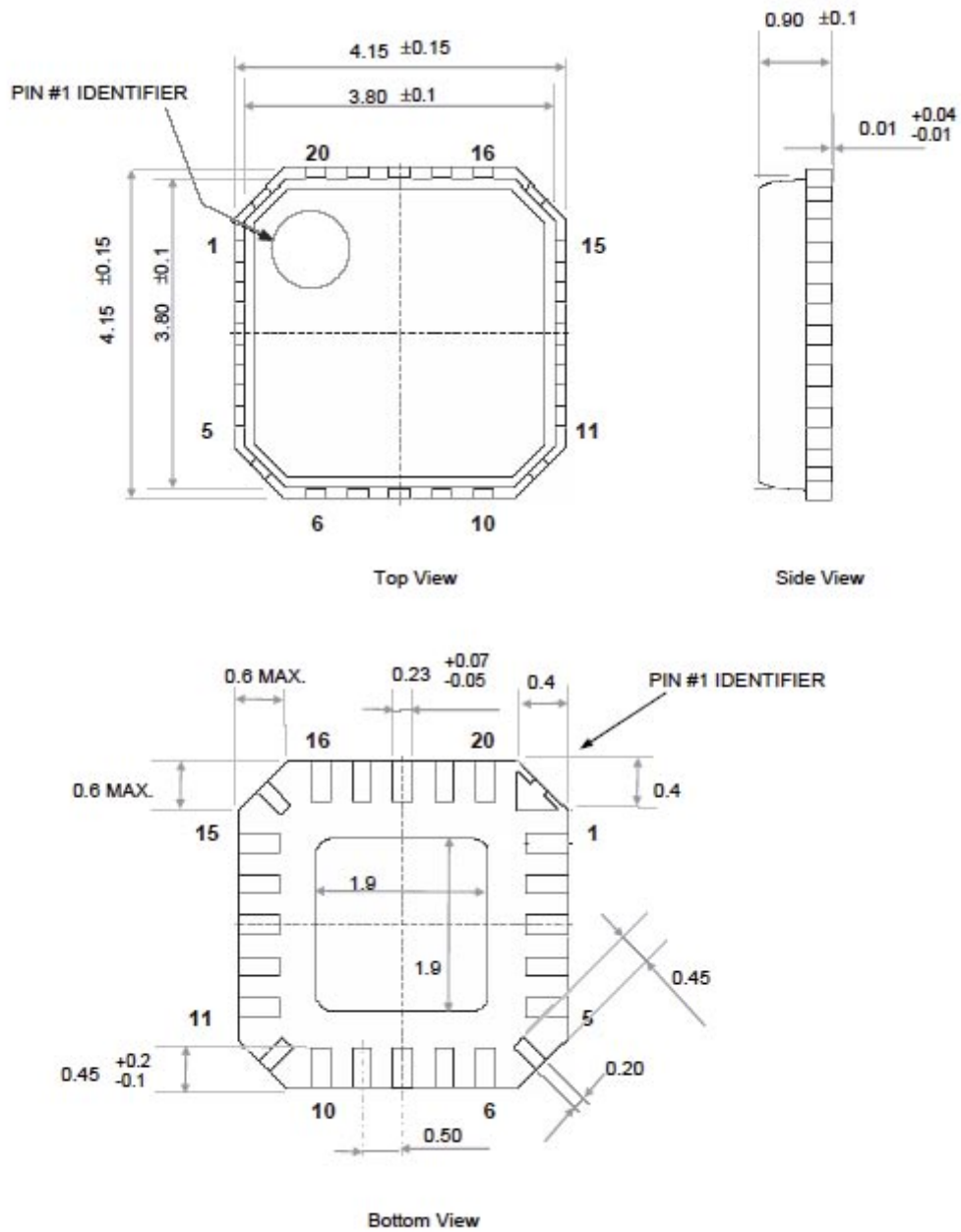
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Active Bias Circuit Current	$I_{ABC}$	$P_{out} = +31.5dBm$ , $V_{ABC} = \text{Arbitrary}$	-	-	30	mA
Reference Current	$I_{ref}$	$V_{ref} = V_{attn} = 0.04 \text{ to } 1.8V$	-	-	10	mA
RF Leakage Current	$I_{leak}$	$V_{ref} = V_{attn} = 0.04 V$ $V_{ABC} = 10K \text{ ohm} + \text{Load}$	-	-	50	mA
Output Power	$P_{out}$		+31.5	-	-	dBm
Power Added Efficiency	PAE		42.0	-	-	%
Power Control Slope	$P_{slope}$	$V_{ref} = V_{attn} = 0.04 V \text{ to } 1.8V$ $\Delta V_{ref} = 0.01V$	-	-	50:1	Vrms/ Vref
Minimum Output Power	$M_{Pout}$	$V_{ref} = V_{attn} = 0.04 V$	-	-	-20	dBc

TEST CIRCUIT



NC (VG1,2 VG3) These pins must be connected to ground via a 1000pF capacitor for stability.

**PACKAGE DIMENSIONS (UNIT: mm)**



**Life Support Applications**

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

**CEL** California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • [www.cel.com](http://www.cel.com)

DATA SUBJECT TO CHANGE WITHOUT NOTICE

02/08/2005

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (\*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL’s understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

**Important Information and Disclaimer:** Information provided by CEL on its website or in other communications concerning the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL’s liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А