



# 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:** P<sub>out</sub> = +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 (T<sub>A</sub> = 25°C, unless otherwise specified)

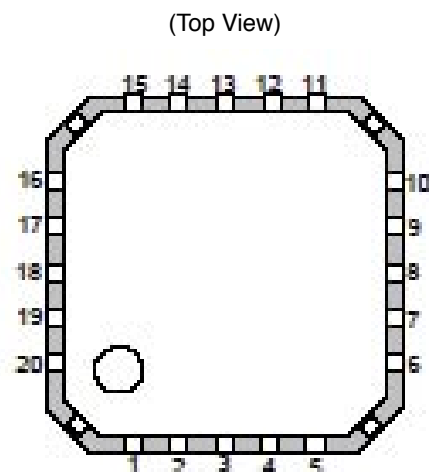
PARAMETERS	SYMBOL	RATINGS	UNIT
Storage Temperature	T <sub>stg</sub>	-45 to +85	°C
Operating Temperature	T <sub>opt</sub>	-45 to +85	°C
Supply Voltage <sup>1,2,3</sup>	V <sub>D1,2,3</sub>	8.0	V
Active Bias Circuit Voltage	V <sub>ABC</sub>	8.0	V
Reference Voltage	V <sub>ref</sub>	5.0	V
Junction Temperature	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



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

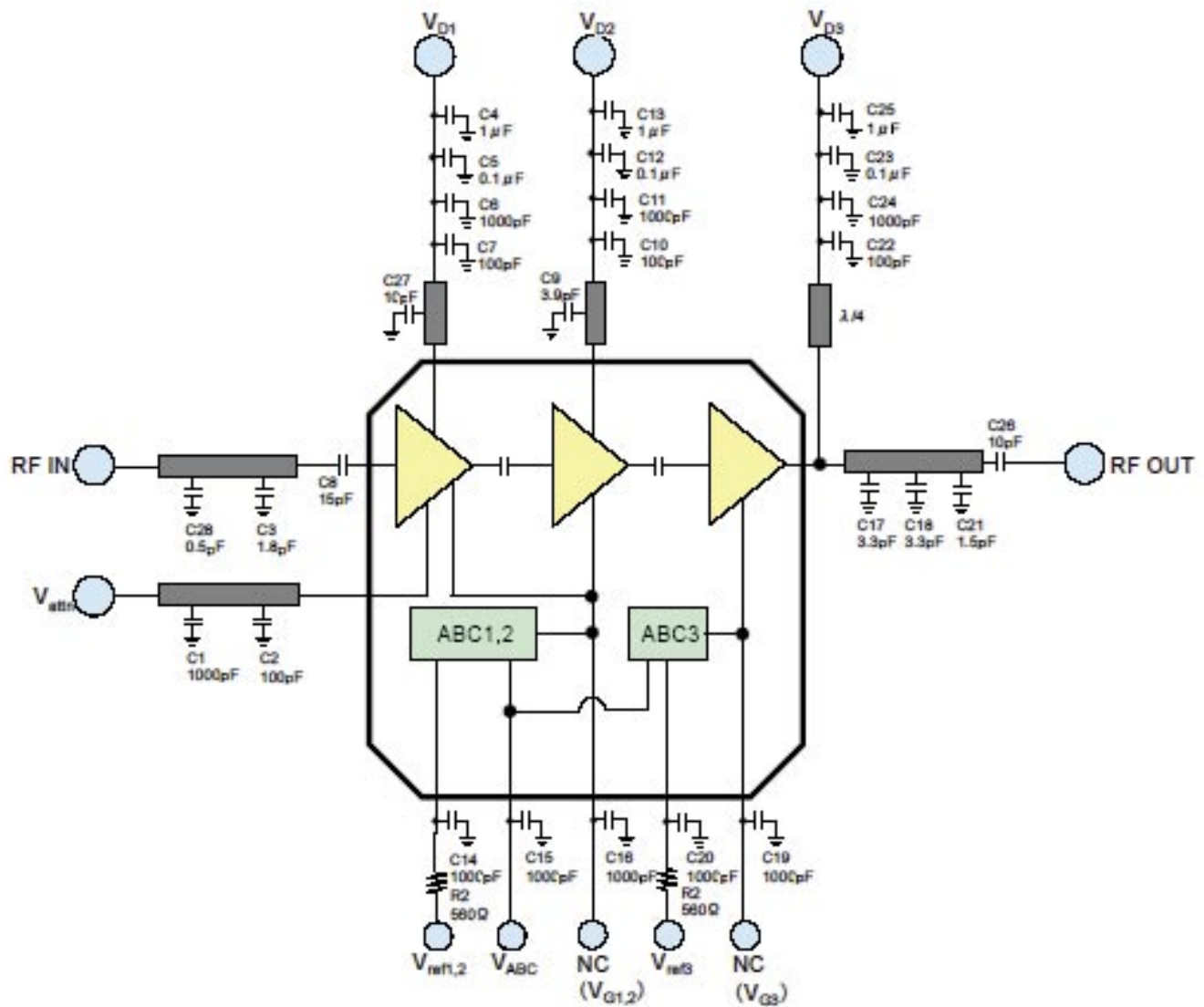
PARAMETERS	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	$V_{D1,2,3}$	+2.8	+3.2	+5.5	V
Reference Voltage	$V_{ref}$	+0.04	-	+1.8	V
Active Bias Circuit Voltage	$V_{ABC}$	0	2.6	5.5	V
Input Power	$P_{in}$	5	-	10	dBm

## ELECTRICAL CHARACTERISTICS

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

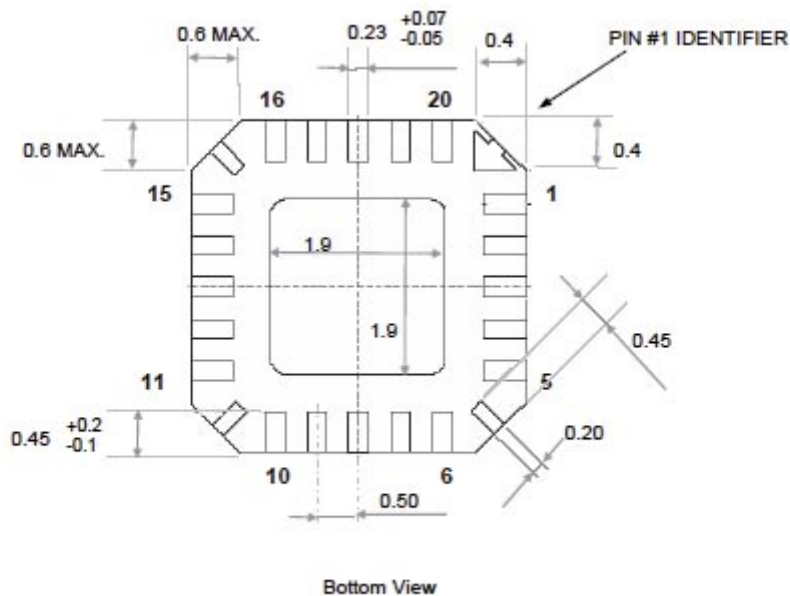
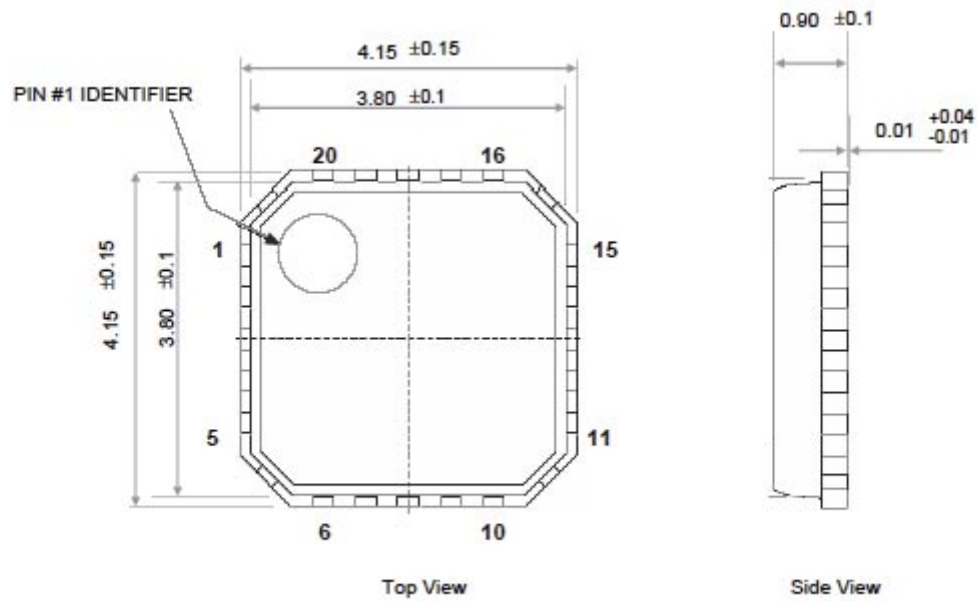
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Active Bias Circuit Current	$I_{ABC}$	$P_{out}$ =+31.5dBm, $V_{ABC}$ =Arbitrary	-	-	30	mA
Reference Current	$I_{ref}$	$V_{ref}$ = $V_{attn}$ =0.04 to 1.8V	-	-	10	mA
RF Leakage Current	$I_{leak}$	$V_{ref}$ = $V_{attn}$ =0.04 V $V_{ABC}$ =10K ohm+Load	-	-	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 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

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**NEC**

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Subject: Compliance with EU Directives

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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	

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