

BIPOLAR ANALOG INTEGRATED CIRCUIT  
 $\mu$ PC1688G

5 V, 1.1 GHz WIDE BAND AND FLAT GAIN AMPLIFIER SILICON MMIC

DESCRIPTION

The  $\mu$ PC1688G is a silicon monolithic integrated circuit especially designed as a flat gain and wide band amplifier covering HF through UHF band.

FEATURES

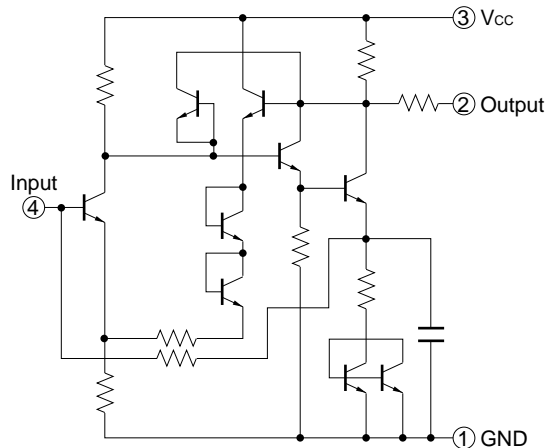
- Flat gain:  $\Delta G_P = \pm 1$  dB<sub>TYP.</sub> @  $f = 0.1$  to  $0.7$  GHz
- Frequency response : 1.1 GHz<sub>TYP.</sub> @ 3dB band width
- Power gain : 21 dB<sub>TYP.</sub> @ 0.5 GHz
- Supply voltage : 5 V  $\pm$  0.5 V
- 4 pin mini mold package

ORDERING INFORMATION

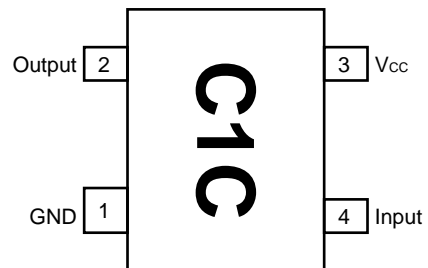
Order Number	Package	Marking	Supplying Form	
$\mu$ PC1688G	4 pin mini mold	C1C	Plastic magazine case	
$\mu$ PC1688G-T1			• Embossed tape 8 mm wide.	Tape perforation side faces pin3, 4.
$\mu$ PC1688G-T2			• QTY 3 kpcs/Reel.	Tape perforation side faces pin1, 2.

**Remarks** To order evaluation samples, please contact your local NEC sales office.

INTERNAL EQUIVALENT CIRCUIT



PIN CONNECTIONS  
(Top View)



Caution Electro-static sensitive devices

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = +25 °C)**

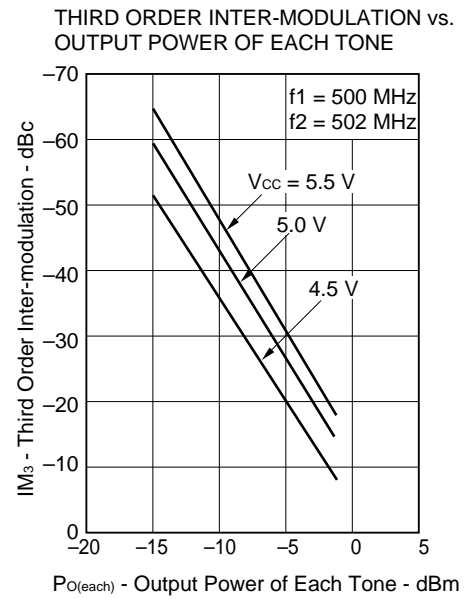
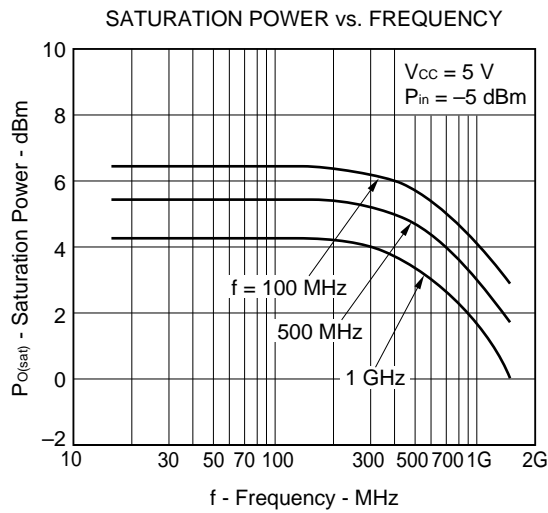
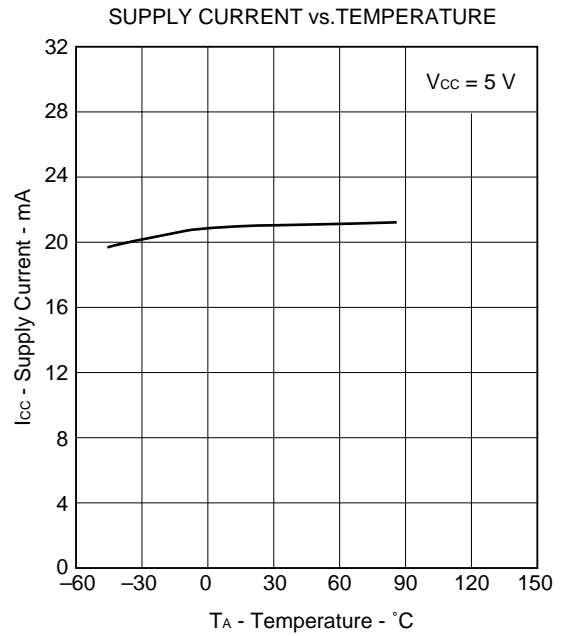
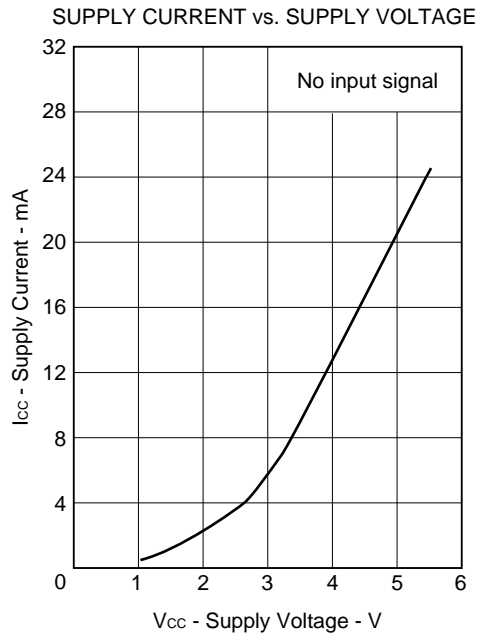
Supply Voltage	V <sub>CC</sub>	6	V
Input Power	P <sub>in</sub>	+10	dBm
Total Power Dissipation	P <sub>T</sub>	200	mW
Operating Temperature	T <sub>opt</sub>	-40 to +85	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

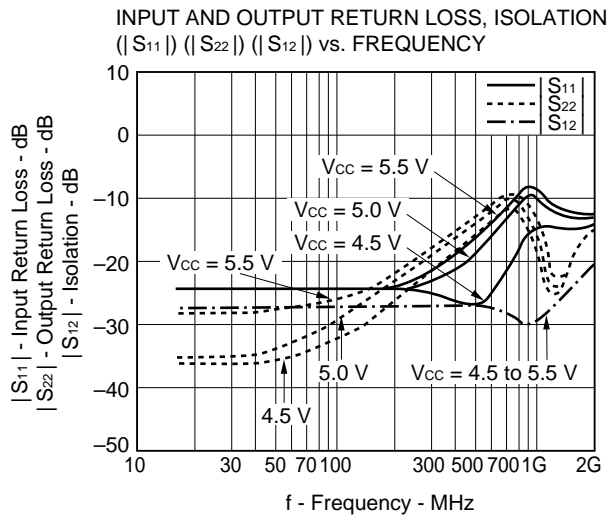
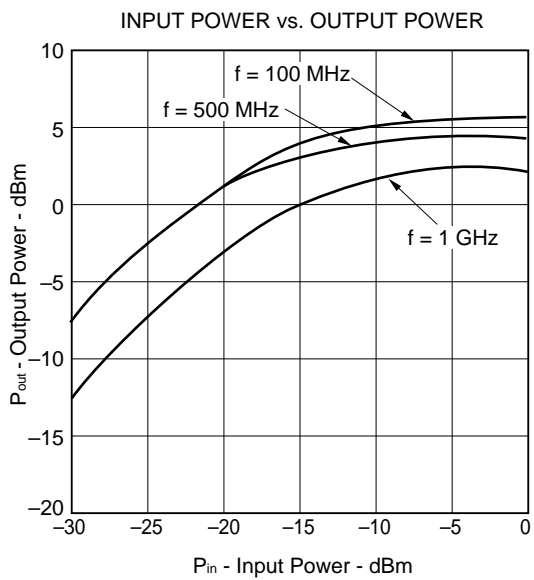
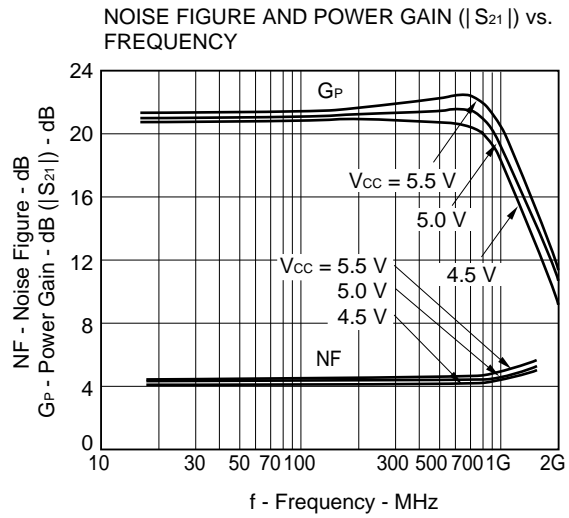
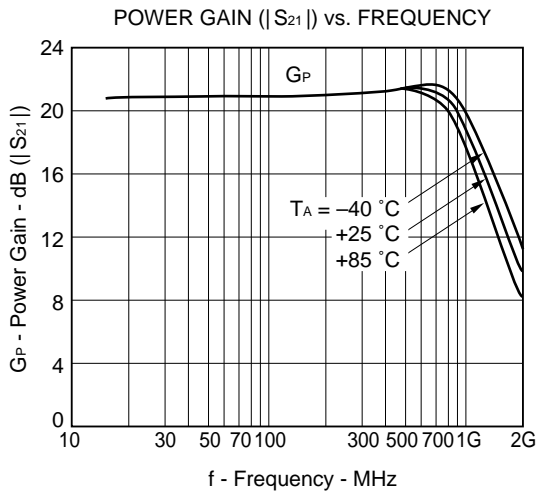
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = +25 °C, V<sub>CC</sub> = 5 V, Z<sub>s</sub> = Z<sub>L</sub> = 50 Ω)**

Characteristic	Symbol	MIN.	TYP.	MAX.	Unit	Test Conditions
Circuit current	I <sub>CC</sub>	14	19	24	mA	No input signal
Power gain	G <sub>P</sub>	18	21	23	dB	f = 0.5 GHz (G <sub>P</sub> =  S <sub>21</sub>  )
Noise figure	NF	—	4.0	5.5	dB	f = 0.5 GHz
Upper limit operating frequency	f <sub>u</sub>	0.9	1.1	—	GHz	3 dB down below 0.1 GHz gain
Isolation	ISL	23	27	—	dB	f = 0.5 GHz (ISL =  S <sub>12</sub>  )
Input return loss	RL <sub>in</sub>	10	13	—	dB	f = 0.5 GHz (RL <sub>in</sub> =  S <sub>11</sub>  )
Output return loss	RL <sub>out</sub>	10	13	—	dB	f = 0.5 GHz (RL <sub>out</sub> =  S <sub>22</sub>  )
Maximum output level	P <sub>O(sat)</sub>	2	4	—	dBm	f = 0.5 GHz, P <sub>in</sub> = -5 dBm

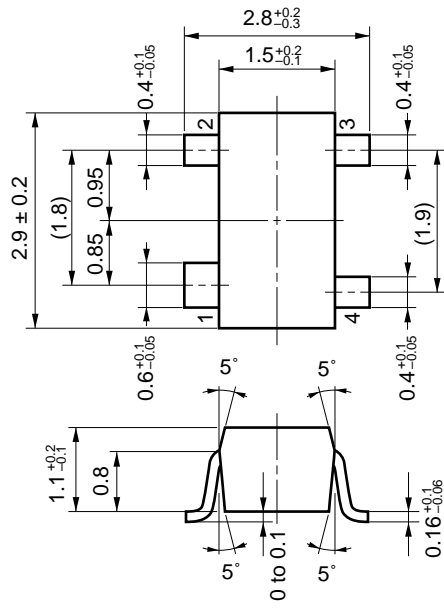
As for test circuit and application circuit, please refer to Application note (Document No. 10964EJ2V0AN00).

TYPICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ , Unless otherwise specified)





PACKAGE DIMENSIONS (Unit: mm)



**NOTE ON CORRECT USE**

- (1) Observe precautions for handling because of electro-static sensitive devices.
- (2) Form a ground pattern as wide as possible to minimize ground impedance (to prevent undesired oscillation).
- (3) Keep the track length of the ground pins as short as possible.
- (4) The bypass capacitor should be attached to the Vcc pin.
- (5) The DC cut capacitor must be each attached to the input and output pins.

**RECOMMENDED SOLDERING CONDITIONS**

This product should be soldered in the following recommended conditions. Other soldering methods and conditions than the recommended conditions are to be consulted with our sales representatives.

**μPC1688G**

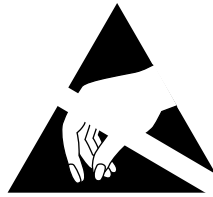
Soldering Method	Soldering Conditions	Recommended Condition Symbol
Infrared ray reflow	Package peak temperature: 235 °C, Hour: within 30 s. (more than 210 °C), Time: 3 times, Limited days: no. <b>Note</b>	IR35-00-3
VPS	Package peak temperature: 215 °C, Hour: within 40 s. (more than 200 °C), Time: 3 times, Limited days: no. <b>Note</b>	VP15-00-3
Wave soldering	Soldering tub temperature: less than 260 °C, Hour: within 10 s. Time: Limited days: no. <b>Note</b>	WS60-00-1
Pin part heating	Pin area temperature: less than 300 °C, Hour: within 3 s/pin. Limited days: no. <b>Note</b>	

**Note** It is the storage days after opening a dry pack, the storage conditions are 25 °C, less than 65 % RH.

**Caution** The combined use of soldering method is to be avoided (However, except the pin area heating method).

For details of recommended soldering conditions for surface mounting, refer to information document **SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535EJ7V0IF00)**.

[MEMO]



## ATTENTION

OBSERVE PRECAUTIONS  
FOR HANDLING  
ELECTROSTATIC  
SENSITIVE  
DEVICES

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Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.