PRELIMINARY PRODUCT INFORMATION

CEL

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC3237TK

LOW NOISE WIDE BAND SILICON GERMANIUM MMIC AMPLIFIER FOR MOBILE COMMUNICATIONS

DESCRIPTION

The μPC3237TK is a silicon germanium (SiGe) monolithic integrated circuit designed as low noise amplifier for the mobile digital TV etc. This device exhibits low noise figure and high power gain characteristics.

The package is 6-pin lead-less minimold, suitable for surface mount.

This IC is manufactured using our UHS2 (Ultra High Speed Process) SiGe bipolar process.

FEATURES

- Supply voltage : V_{CC} = 2.4 to 3.3 V (2.8 V TYP.)
- Low current consumption : I_{CC} = 5 mA TYP. @ V_{CC} = 2.8 V
- Low noise : NF = 1.4 dB TYP. @ f = 470 MHz
  NF = 1.5 dB TYP. @ f = 770 MHz
- Power gain : G_P = 15.3 dB TYP. @ f = 470 MHz
  G_P = 13.5 dB TYP. @ f = 770 MHz
- High-density surface mounting : 6-pin lead-less minimold package (1.5 × 1.1 × 0.55 mm)

APPLICATION

- Low noise amplifier for the mobile digital TV etc.

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Supplying Form
μPC3237TK-E2	μPC3237TK-E2-A	6-pin lead-less minimold (1511 PKG) (Pb-Free)	6N	• 8 mm wide embossed taping • Pin 1, 6 face the perforation side of the tape • Qty 5 kpcs/reel

Remark To order evaluation samples, contact your nearby sales office.
Part number for sample order: μPC3237TK-A

Caution Observe precautions when handling because these devices are sensitive to electrostaic discharge.

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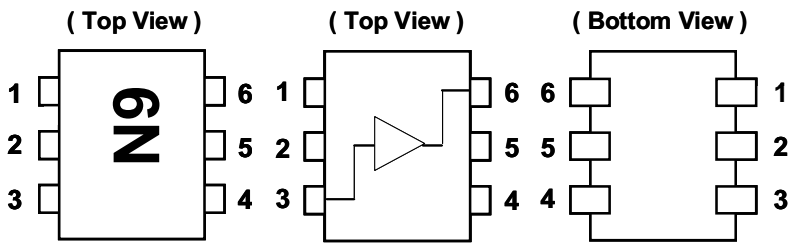
PIN CONNECTIONS



Pin No.	Pin Name
1	NC
2	GND
3	INPUT
4	V_{CC}
5	GND
6	OUTPUT

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Ratings	Unit
Supply Voltage	V_{CC}	T_A = +25°C	3.6	V
Circuit Current	I_{CC}	T_A = +25°C	10	mA
Power Dissipation	P_D	T_A = +85°C **Note**	203	mW
Operating Ambient Temperature	T_A		–40 to +85	°C
Storage Temperature	T_{stg}		–55 to +150	°C
Input Power	P_{in}		+8	dBm

Note Mounted on double-side copper-clad 50 × 50 × 1.6 mm epoxy glass PWB

RECOMMENDED OPERATING RANGE

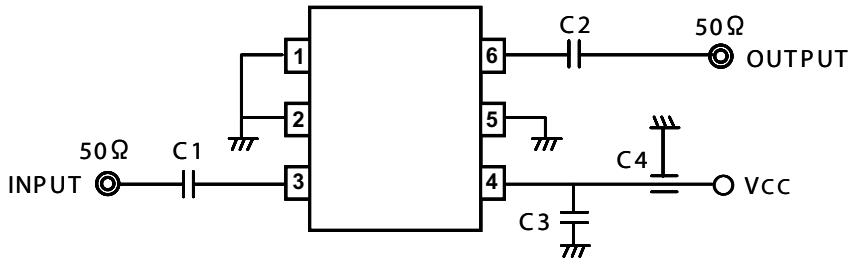
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V_{CC}	2.4	2.8	3.3	V
Operating Ambient Temperature	T_A	–40	+25	+85	°C

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, V_{CC} = 2.8 V, Z_S = Z_L= 50Ω , unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Circuit Current	I_{CC}	No Signal	3.5	5	7	mA
Power Gain	$G_{P}1$	f = 470MHz, P_{in} = −30 dBm	13.0	15.3	17.5	dB
	$G_{P}2$	f = 770MHz, P_{in} = −30 dBm	11.0	13.5	16.0	dB
Noise Figure	NF1	f = 470MHz	—	1.4	1.9	dB
	NF2	f = 770MHz	—	1.5	2.0	dB
Input Return Loss	$RL_{in}1$	f = 470MHz, P_{in} = −30 dBm	6.5	9.5	—	dB
	$RL_{in}2$	f = 770MHz, P_{in} = −30 dBm	5.5	8.5	—	dB
Output Return Loss	$RL_{out}1$	f = 470MHz, P_{in} = −30 dBm	9	14	—	dB
	$RL_{out}2$	f = 770MHz, P_{in} = −30 dBm	10	15	—	dB
Isolation	ISL1	f = 470MHz, P_{in} = −30 dBm	17	22	—	dB
	ISL2	f = 770MHz, P_{in} = −30 dBm	16	21	—	dB
Gain 1 dB Compression Output Power	$P_{O(1\ dB)}1$	f = 470MHz	−8	−5.5	—	dBm
	$P_{O(1\ dB)}2$	f = 770MHz	−8	−5.5	—	dBm

TEST CIRCUIT



COMPONENTS LIST

Symbol	Type	Value
C1, C2	Chip Capacitor	100pF
C3	Chip Capacitor	1000pF
C4	Feed-through Capacitor	1000pF

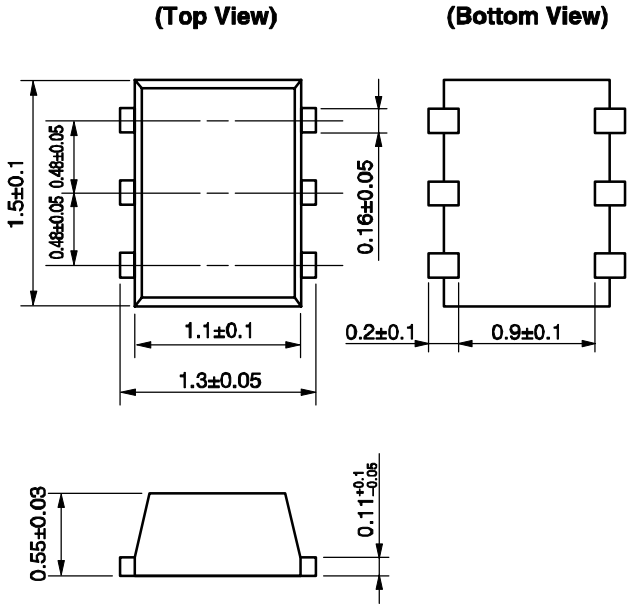
STANDARD CHARACTERISTICS FOR REFERENCE

(T_A = +25°C, V_{CC} = 2.8 V, Z_S = Z_L = 50 Ω, unless otherwise specified)

Parameter	Symbol	Test Conditions	Reference	Unit
Saturated Output Power	$P_{O(sat)}1$	f = 470MHz, P_{in} = 2 dBm	1.3	dBm
	$P_{O(sat)}2$	f = 770MHz, P_{in} = 2 dBm	1.3	dBm
Input 3rd Order Distortion Intercept Point	IIP3 1	f1=470MHz, f2=471MHz	−10.5	dBm
	IIP3 2	f1=770MHz, f2=771MHz	−9.5	dBm
Output 3rd Order Distortion Intercept Point	OIP3 1	f1=470MHz, f2=471MHz	4.8	dBm
	OIP3 2	f1=770MHz, f2=771MHz	4.0	dBm
K factor	K 1	f = 470MHz	1.15	—
	K 2	f = 770MHz	1.20	—

PACKAGE DIMENSIONS

6-PIN LEAD-LESS MINIMOLD (1511 PKG) (UNIT: mm)



NOTES ON CORRECT USE

(1) Observe precautions for handling because of electro-static sensitive devices.

(2) Form a ground pattern as widely as possible to minimize ground impedance (to prevent undesired oscillation). All the ground terminals must be connected together with wide ground pattern to decrease impedance difference.

(3) The bypass capacitor should be attached to V_{CC} line.

(4) The DC cut capacitor should be attached to Input and Output pin.

(5) Pin 1 (NC) should be connected to the ground pattern.

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions		Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature)	: 260°C or below	IR260
	Time at peak temperature	: 10 seconds or less	
	Time at temperature of 220°C or higher	: 60 seconds or less	
	Preheating time at 120 to 180°C	: 120±30 seconds	
	Maximum number of reflow processes	: 3 times	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
Wave Soldering	Peak temperature (molten solder temperature)	: 260°C or below	WS260
	Time at peak temperature	: 10 seconds or less	
	Preheating temperature (package surface temperature)	: 120°C or below	
	Maximum number of flow processes	: 1 time	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	
Partial Heating	Peak temperature (terminal temperature)	: 350°C or below	HS350
	Soldering time (per side of device)	: 3 seconds or less	
	Maximum chlorine content of rosin flux (% mass)	: 0.2%(Wt.) or below	

Caution Do not use different soldering methods together (except for partial heating).

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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	
Lead (Pb)	< 1000 PPM	-A	-AZ
		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.