Preliminary Data Sheet

CEL

Bipolar Analog Integrated Circuit

μPC3230GR

AGC AMPLIFIER + PRE AMPLIFIER IC

DESCRIPTION

The uPC3230GR is silicon bipolar monolithic IC designed for use as Dual path AGC amplifier for digital TV, Digital CATV.

This IC consists of Dual path AGC amplifier for QAM path and analog one to B/B block of STB.

The package is 16-pin SSOP Package suitable for surface mount.

This IC is manufactured using our 30 GHz fmax UHS0 (Ultra High Speed Process) silicon bipolar process.

This process uses silicon nitride passivation film. This material can protect chip surface from external pollution and prevent corrosion /migration. Thus, this IC has excellent performance, uniformly and reliability.

FEATURES

・ f(in):30~100MHz

AGC AMPLIFIERBLOCK

・ ICC :37mA @5.0V

・ Gmax:30dB

・ GCR:40dB

・ IM3:45dBc(min)/53dB(typ)@Output=0.5Vp-p/tone

PRE AMPLIFIER BLOCK

・ ICC :61mA @5.0V

・ Gain :28dB(typ)

・ NF :6.6dB(typ)

・ IM3:58dB(typ)@Output=2.5Vp-p/tone

Package

High-density surface mounting ：16-pin SSOP package（5.2×4.4×1.5mm）

APPLICATIONS

・ Digital CATV

・ Cable modem receivers

ORDERING INFORMATION (PLAN)

Part Number	Package	Supplying Form
μPC3230GR–E1-A	16-pin plastic SSOP (5.72mm(225)) (Pb-Free) Note	Embossed tape 12mm wide. Pin 1 indicates pull-out direction of tape. Qty 2.5kpcs/reel.

Note With regards to terminal solder (the solder contains lead) plated products (conventionally plated), contact your nearby sales office.

Remark To order evaluation samples, please contact your local NEC sales office.
Part number for sample order: μPC3230GR

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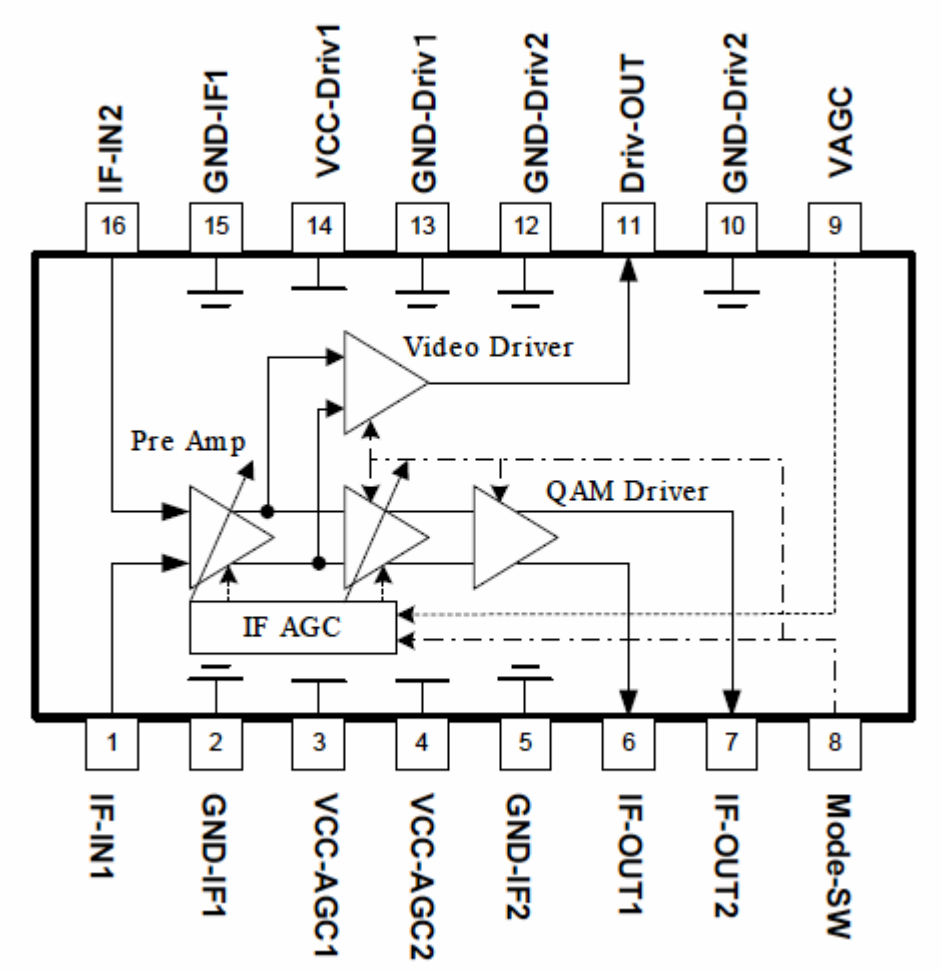
INTERNAL BLOCK DIAGRAM AND PIN CONFIGURATION

(Top View)



Preliminary Data Sheet

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Test Condition	Rating	Unit
Supply Voltage	V_{CC}	T_A=+25°C	6.0	V
Power Dissipation	P_D	T_A=+70°C Note	533	mW
Operating Ambient Temperature	T_A		–20 to +70	°C
Storage Temperature	T_{stg}		–55 to+150	°C

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

RECOMMENDED OPERATING RANGE

Parameter	Symbol	Test Condition	MIN.	TYP.	MAX.	Unit
Supply Voltage	V_{CC}		4.5	5.0	5.5	V
Operating Ambient Temperature	T_A	V_{cc} = 4.5 to 5.5 V	–20	+25	+70	°C
Gain Control Voltage Range	V_{AGC}		0	–	Vcc	V

Preliminary Data Sheet

ELECTRICAL CHARACTERISTICS

(T_A=+25°C, V_{CC} = 5V, f = 45MHz, Z_{in} = 50 Ω, Z_{out} (11pin)= 290 Ω, Z_{out} (6,7pin)= 560 Ω)

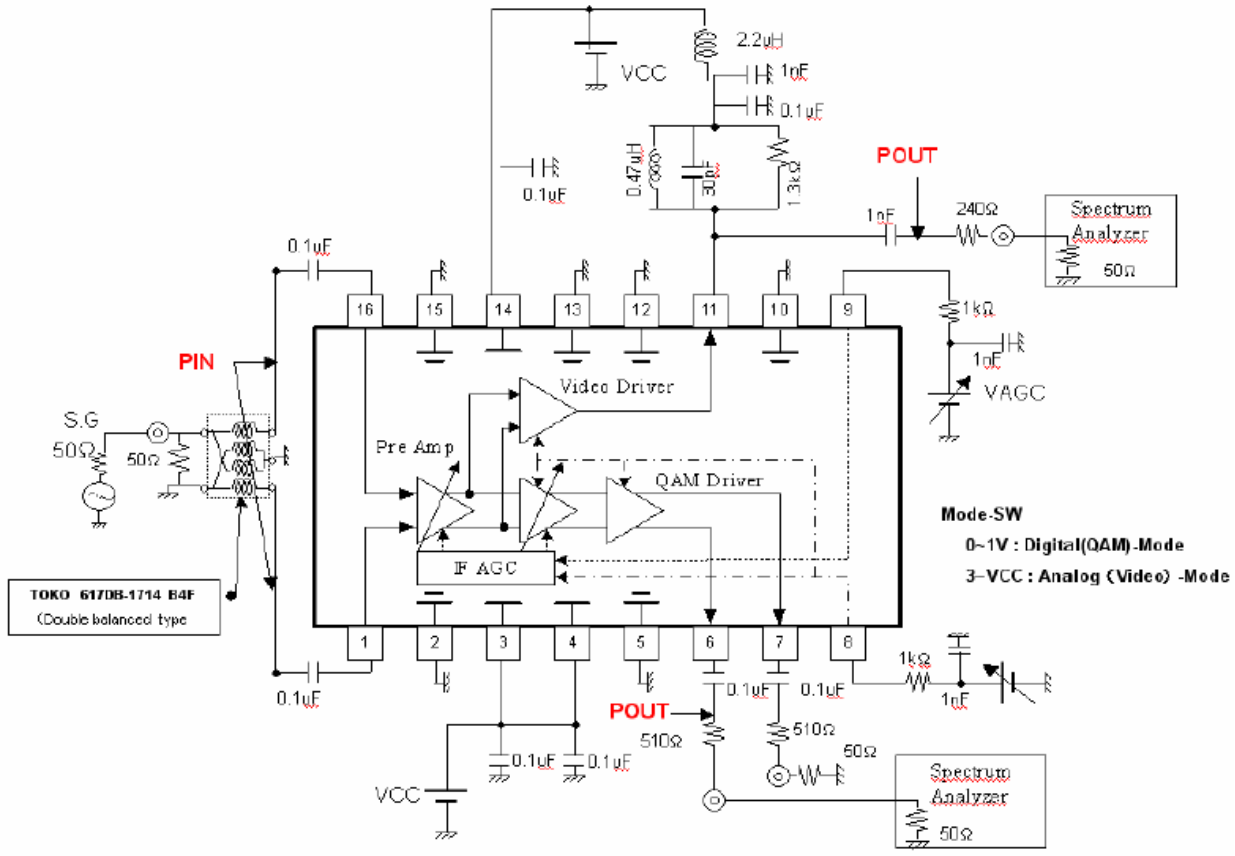
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Input Frequency Range	$f_{(in)}$	f_c =-3dB Note 1	30	–	100	MHz
Mode Switch voltage range	V_{SW1}	Digital (QAM) Mode	0	–	1	V
	V_{SW2}	Analog (Video) Mode	3	–	Vcc	V
Digital (QAM) Mode V_{SW}=1.0V Z_{L1}=560 Ω						
Circuit Current	Icc_1	no input signal Note 1	–	37	48	mA
Maximum Voltage Gain	G_{MAX}	V_{AGC}=2.5V,Dual-IN:V_{ou}=+18dBmV Note 1	27	30	33	dB
Gain Control Range (input prescribe)	GCR_{in}	V_{AGC}=0 to 2.5 V Note 1	35	40	-	dB
3rd Order Inter-modulation Distortion	IM_{31}	f_1 = 44 MHz, f_2 = 45 MHz, V_{in}= +30 dBmV/tone, V_{out}=0.5V_{P-P} /tone Note 1	45	53	-	dBc
Noise Figure	NF_1	V_{AGC}= 2.5 V f=45MHz Note 2	-	6.0	-	dB
Output Voltage	V_{out1}	f=45MHz , 6pin Note 1	-	1.0	-	V_{P-P}
Output Voltage	V_{out2}	f=45MHz , 7pin Note 1	-	1.0	-	V_{P-P}
AGC Voltage High Level	$V_{AGC(H)}$	@ Maximum gain Note 1	2.5	–	Vcc	V
Analog (Video) Mode V_{SW}=3.0V Z_{L2}=290 Ω						
Circuit Current	Icc_2	no input signal Note 1	–	61	79	mA
Pre Amp Voltage Gain	G_V	V_{AGC}=2.5V,Dual-IN:V_{ou}=+18dBmV Note 1	25	28	31	dB
Pre Amp Noise Figure	NF_2	V_{AGC}= 2.5 V, f=45MHz Note 2	-	6.6	-	dB
3rd Order Inter-modulation Distortion	IM_{32}	f_1 = 44 MHz, f_2 = 45 MHz, P_{in}= –22 dBm/tone, V_{out}=2.5V_{P-P} /tone Note 1	44	58	-	dBc
Output Voltage	V_{out3}	Dual-IN:V_{ou}=+27dBmV, 11pin Note 1	1.3	2.0	2.5	V_{P-P}

Notes 1. By measurement circuit 1

2. By measurement circuit 2

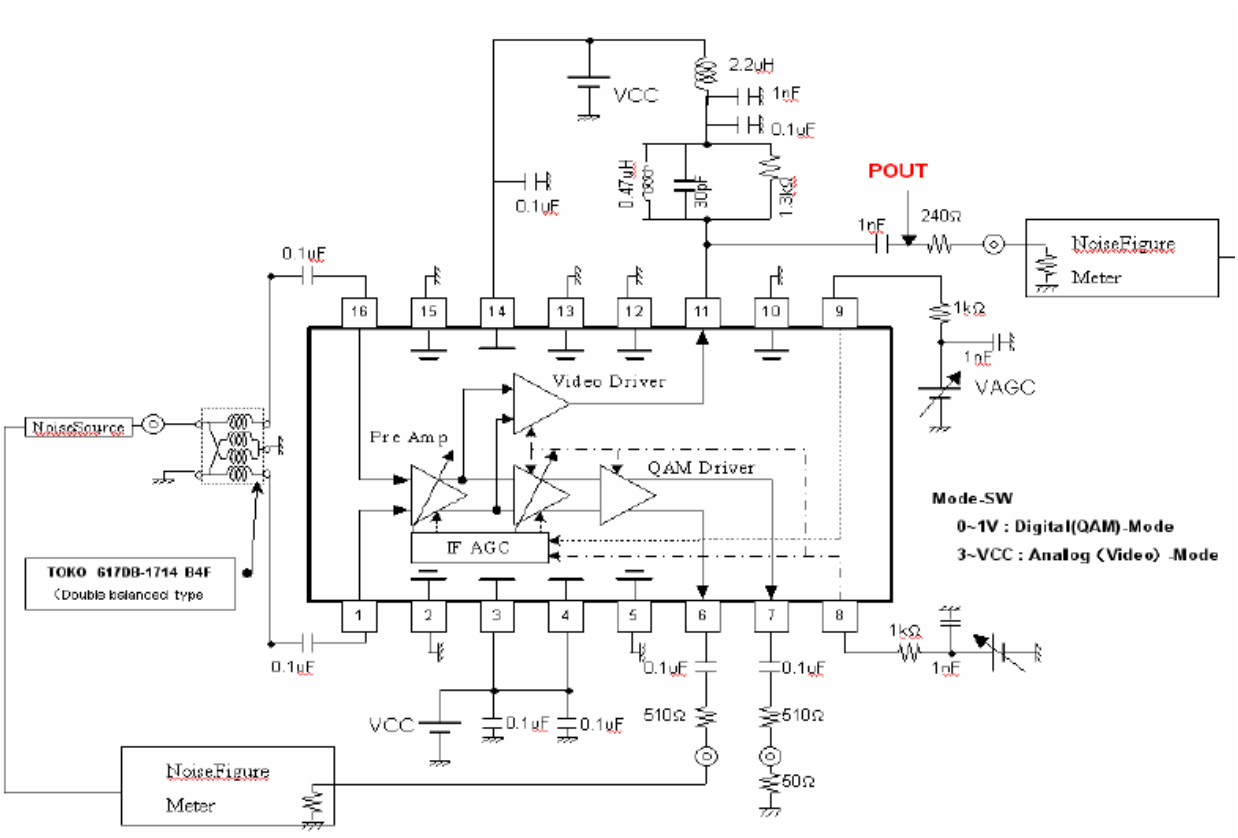
Preliminary Data Sheet

MEASUREMENT CIRCUIT 1



Note Balun Transformer : TOKO 617DB-1714 B4F (Double balanced type)

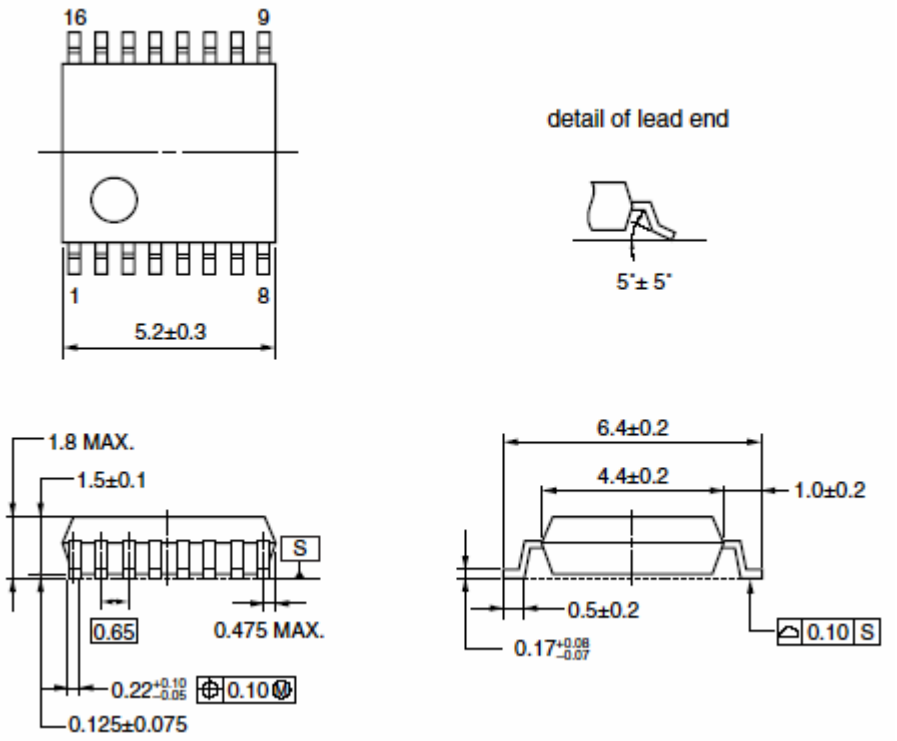
MEASUREMENT CIRCUIT 2



Note Balun Transformer : TOKO 617DB-1714 B4F (Double balanced type)

PACKAGE DIMENSIONS

16 PIN PLASTIC SSOP (5.72mm(225)) (Unit : mm)



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) Time at peak temperature Time at temperature of 220°C or higher Preheating time at 120 to 180°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 60 seconds or less : 120±30 seconds : 3 times : 0.2%(Wt.) or below	IR260
VPS	Peak temperature (package surface temperature) Time at temperature of 200°C or higher Preheating time at 120 to 150°C Maximum number of reflow processes Maximum chlorine content of rosin flux (% mass)	: 215°C or below : 25 to 40 seconds : 30 to 60 seconds : 3 times : 0.2%(Wt.) or below	VP215
Wave Soldering	Peak temperature (molten solder temperature) Time at peak temperature Preheating temperature (package surface temperature) Maximum number of flow processes Maximum chlorine content of rosin flux (% mass)	: 260°C or below : 10 seconds or less : 120°C or below : 1 time : 0.2%(Wt.) or below	WS260
Partial Heating	Peak temperature (pin temperature) Soldering time (per side of device) Maximum chlorine content of rosin flux (% mass)	: 350°C or below : 3 seconds or less : 0.2%(Wt.) or below	HS350

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.