



NXP LNAs BGU703x & BGU704x for TVs/STBs

LNAs with programmable gain & bypass option for improved tuner performance

Designed for high linearity and low noise, these 3.3 and 5 V wideband LNAs support multi-tuner applications in TVs, DVR/PVRs, and STBs operating between 40 MHz and 1 GHz. A unique programmable gain with bypass mode compensates for tuner switch signal loss (important in multi-tuner systems), and improves overall system performance by 7 to 10 dB.

Key features

- ▶ Internally biased
- ▶ Fixed $G_p = 10$ dB: BGU7031 (5 V), BGU7041 (3.3 V), and Fixed $G_p = 14$ dB: BGU7044 (3.3 V)
- ▶ Programmable between $G_p = 10$ dB and bypass: BGU7032 (5 V), BGU7042 (3.3 V), and programmable between $G_p = 14$ dB and bypass: BGU7045 (3.3 V)
- ▶ Programmable between $G_p = 10$ dB, 5 dB and bypass: BGU7033 (5 V)
- ▶ Flat gain between 40 MHz and 1 GHz
- ▶ Output power at 1 dB gain compression ($P_{L(1\text{ dB})}$) ranging from 9 to 14 dBm
- ▶ Noise figure as low as 2.8 dB
- ▶ High linearity with an OIP3 of 29 dBm
- ▶ 75 Ω input and output impedance
- ▶ Power-down during bypass mode
- ▶ ESD protection >2 kV HBM, >1.5 kV CDM on all pins

Key trends

- ▶ Multiple Tuners in TV, DVR/PVR and set top box applications, requiring improved signal handling
- ▶ Use of 3.3 V Si Tuner ICs, perfect match with our 3.3 V LNAs (BGU704x)

Applications

- ▶ Terrestrial and cable set-top boxes (STBs)
- ▶ Silicon and can tuners
- ▶ Personal and digital video recorders (PVRs and DVRs)
- ▶ Home networking and in-house signal distribution

NXP's BGU703x and BGU704x low-noise amplifiers (LNAs) upgrade overall picture quality with improved signal handling (NF, dynamic range), while reducing the number of external components.

Produced in NXP's own QUBiC4+ Si BiCMOS process, they improve signal handling by compensating for the signal loss at the tuner switch. This can improve system performance by as much as 7 to 10 dB.

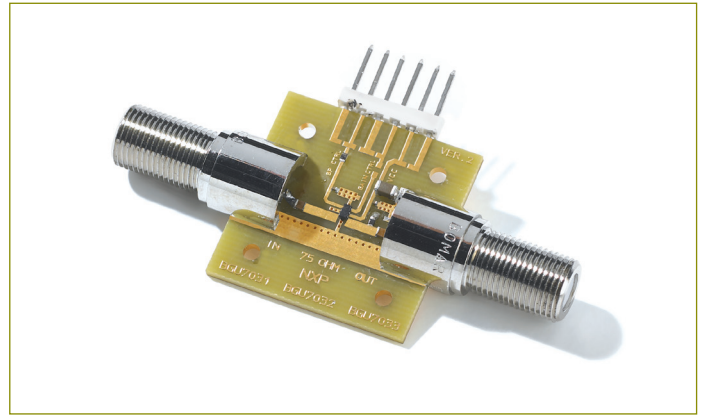
The BGU7031, BGU7041, and BGU7044 are LNAs with fixed gain. The BGU7032, BGU7042, and BGU7045 have an additional bypass mode, and the BGU7033 adds two gain levels along with the bypass mode. In bypass mode, the devices consume



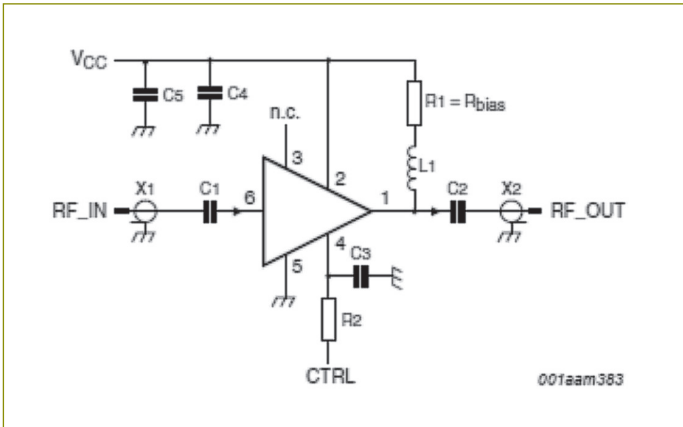
less than 5 mA of current. Integrated biasing and 75 Ω matching reduces footprint by eliminating as many as 15 components compared to discrete solutions.

All the devices can be used with discrete or Si can tuners, as well as with on-board tuners. They deliver more robust ESD performance compared to GaAs solutions, withstanding >2 kV human body model (HBM) and >1.5 kV charged device model (CDM).

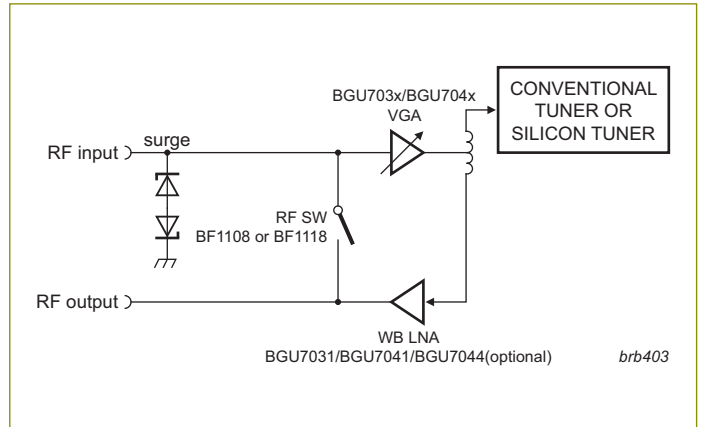
Reference board



Block diagram



Application diagram of an active splitter with passive loop-through



LNAs for set-up boxes (75 Ω)

Type	Package	Frequency range (MHz)	Mode	@		Gain ⁽¹⁾ (dB)	NF (dB)	P _L (1dB) (dBm)	OIP3 (dBm)	FL ⁽²⁾ (dB)	RL _{out} (dB)	RL _{in} (dB)
				V _{CC} (V)	I _{CC} (mA)							
BGU7031	SOT363	40 - 1000	G _p 10 dB	5	43	10	4.5	14	29	-0.2	12	18
BGU7032	SOT363	40 - 1000	G _p 10 dB	5	43	10	4.5	14	29	-0.2	12	18
			Bypass	5	4	-2	2.5	-	29	-0.2	8	8
BGU7033	SOT363	40 - 1000	G _p 10 dB	5	43	10	4.5	14	29	-0.2	12	18
			G _p 5 dB	5	43	5	6	9	29	-0.2	12	17
			Bypass	5	4	-2	2.5	-	29	-0.2	8	8
BGU7041	SOT363	40 - 1000	G _p 10 dB	3.3	38	10	4	12	29	-0.2	12	21
BGU7042	SOT363	40 - 1000	G _p 10 dB	3.3	38	10	4	12	29	-0.2	12	21
			Bypass	3.3	3	-2	2.5	-	29	-0.2	10	10
BGU7044	SOT363	40 - 1000	G _p 14 dB	3.3	34	14	2.8	13	29	-0.2	12	20
BGU7045	SOT363	40 - 1000	G _p 14 dB	3.3	34	14	2.8	13	29	-0.2	12	20
			Bypass	3.3	3	-2	2.5	-	27	-0.2	10	9

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Date of release: January 2012

Document order number: 9397 750 17232

Printed in the Netherlands