

BGY785A

750 MHz, 18.5 dB gain push-pull amplifier

Rev. 6 — 29 September 2010

Product data sheet

1. Product profile

1.1 General description

Hybrid high dynamic range cascode amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC).

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features and benefits

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability

1.3 Applications

- CATV systems operating in the 40 MHz to 750 MHz frequency range

1.4 Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50$ MHz	18	18.5	19	dB
		$f = 750$ MHz	18.5	19.5	-	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	[1] -	225	240	mA

[1] The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.



2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Symbol
1	input		
2	common		
3	common		
5	+V _B		
7	common		
8	common		
9	output		

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BGY785A	-	rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads	SOT115J

4. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _i	RF input voltage		-	65	dBmV
T _{stg}	storage temperature		-40	+100	°C
T _{mb}	mounting base temperature		-20	+100	°C

5. Characteristics

Table 5. Bandwidth 40 MHz to 750 MHz

$V_B = 24\text{ V}$; $T_{case} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G_p	power gain	$f = 50\text{ MHz}$	18	18.5	19	dB	
		$f = 750\text{ MHz}$	18.5	19.5	-	dB	
SL	slope cable equivalent	$f = 40\text{ MHz to }750\text{ MHz}$	0	0.9	2	dB	
FL	flatness of frequency response	$f = 40\text{ MHz to }750\text{ MHz}$	-	± 0.1	± 0.3	dB	
S_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	30	-	dB	
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	29.5	-	dB	
		$f = 160\text{ MHz to }320\text{ MHz}$	17	28	-	dB	
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	26	-	dB	
		$f = 640\text{ MHz to }750\text{ MHz}$	14	21	-	dB	
S_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	29	-	dB	
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	26	-	dB	
		$f = 160\text{ MHz to }320\text{ MHz}$	17	23.5	-	dB	
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	22	-	dB	
		$f = 640\text{ MHz to }750\text{ MHz}$	14	24	-	dB	
CTB	composite triple beat	110 channels flat; $V_o = 44\text{ dBmV}$; measured at 745.25 MHz	-	-54.5	-53	dB	
X_{mod}	cross modulation	110 channels flat; $V_o = 44\text{ dBmV}$; measured at 55.25 MHz	-	-57.5	-56	dB	
CSO	composite second order distortion	110 channels flat; $V_o = 44\text{ dBmV}$; measured at 746.5 MHz	-	-62	-53	dB	
d_2	second order distortion		[1]	-	-77	-65	dB
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2]	59	62	-	dBmV
F	noise figure	$f = 50\text{ MHz}$	-	4.5	5.5	dB	
		$f = 450\text{ MHz}$	-	-	5.5	dB	
		$f = 550\text{ MHz}$	-	-	5.5	dB	
		$f = 600\text{ MHz}$	-	-	6	dB	
		$f = 750\text{ MHz}$	-	6	7	dB	
I_{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] $f_p = 55.25\text{ MHz}$; $V_p = 44\text{ dBmV}$; $f_q = 691.25\text{ MHz}$; $V_q = 44\text{ dBmV}$; measured at $f_p + f_q = 746.5\text{ MHz}$.

[2] Measured according to DIN45004B;

$f_p = 740.25\text{ MHz}$; $V_p = V_o$; $f_q = 747.25\text{ MHz}$; $V_q = V_o - 6\text{ dB}$; $f_r = 749.25\text{ MHz}$; $V_r = V_o - 6\text{ dB}$; measured at $f_p + f_q - f_r = 738.25\text{ MHz}$.

[3] The module normally operates at $V_B = 24\text{ V}$, but is able to withstand supply transients up to 30 V.

Table 6. Bandwidth 40 MHz to 600 MHz $V_B = 24\text{ V}$; $T_{case} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G _p	power gain	f = 50 MHz	18	18.5	19	dB	
		f = 600 MHz	18.5	-	-	dB	
SL	slope cable equivalent	f = 40 MHz to 600 MHz	0	-	1.5	dB	
FL	flatness of frequency response	f = 40 MHz to 600 MHz	-	-	±0.3	dB	
S ₁₁	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB	
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB	
		f = 160 MHz to 320 MHz	17	28	-	dB	
		f = 320 MHz to 600 MHz	16	26	-	dB	
S ₂₂	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	26	-	dB	
		f = 160 MHz to 320 MHz	17	23.5	-	dB	
		f = 320 MHz to 600 MHz	16	22	-	dB	
CTB	composite triple beat	85 channels flat; V _o = 44 dBmV; measured at 595.25 MHz	-	-	-57	dB	
X _{mod}	cross modulation	85 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	-	-	-59	dB	
CSO	composite second order distortion	85 channels flat; V _o = 44 dBmV; measured at 596.5 MHz	-	-	-58	dB	
d ₂	second order distortion		[1]	-	-	-70	dB
V _o	output voltage	d _{im} = -60 dB	[2]	61	-	-	dBmV
F	noise figure	f = 50 MHz	-	4.5	5.5	dB	
		f = 450 MHz	-	-	5.5	dB	
		f = 550 MHz	-	-	5.5	dB	
		f = 600 MHz	-	-	6	dB	
I _{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 541.25 MHz; V_q = 44 dBmV; measured at f_p + f_q = 596.5 MHz.

[2] Measured according to DIN45004B;

f_p = 590.25 MHz; V_p = V_o; f_q = 597.25 MHz; V_q = V_o - 6 dB; f_r = 599.25 MHz; V_r = V_o - 6 dB; measured at f_p + f_q - f_r = 588.25 MHz.

[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 7. Bandwidth 40 MHz to 550 MHz $V_B = 24\text{ V}$; $T_{\text{case}} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G _p	power gain	f = 50 MHz	18	18.5	19	dB	
		f = 550 MHz	18.5	-	-	dB	
SL	slope cable equivalent	f = 40 MHz to 550 MHz	0	-	1.5	dB	
FL	flatness of frequency response	f = 40 MHz to 550 MHz	-	-	±0.3	dB	
S ₁₁	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB	
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB	
		f = 160 MHz to 320 MHz	17	28	-	dB	
		f = 320 MHz to 550 MHz	16	26	-	dB	
S ₂₂	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	26	-	dB	
		f = 160 MHz to 320 MHz	17	23.5	-	dB	
		f = 320 MHz to 550 MHz	16	22	-	dB	
CTB	composite triple beat	77 channels flat; V _o = 44 dBmV; measured at 547.25 MHz	-	-61	-60	dB	
X _{mod}	cross modulation	77 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	-	-61	-60	dB	
CSO	composite second order distortion	77 channels flat; V _o = 44 dBmV; measured at 548.5 MHz	-	-67.5	-60	dB	
d ₂	second order distortion		[1]	-	-	-72	dB
V _o	output voltage	d _{im} = -60 dB	[2]	62	-	-	dBmV
F	noise figure	f = 50 MHz	-	4.5	5.5	dB	
		f = 450 MHz	-	-	5.5	dB	
		f = 550 MHz	-	-	5.5	dB	
I _{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 493.25 MHz; V_q = 44 dBmV; measured at f_p + f_q = 548.5 MHz.

[2] Measured according to DIN45004B;

f_p = 540.25 MHz; V_p = V_o; f_q = 547.25 MHz; V_q = V_o - 6 dB; f_r = 549.25 MHz; V_r = V_o - 6 dB; measured at f_p + f_q - f_r = 538.25 MHz.

[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 8. Bandwidth 40 MHz to 450 MHz $V_B = 24\text{ V}$; $T_{case} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G _p	power gain	f = 50 MHz	18	18.5	19	dB	
		f = 450 MHz	18.5	-	-	dB	
SL	slope cable equivalent	f = 40 MHz to 450 MHz	0	-	1.5	dB	
FL	flatness of frequency response	f = 40 MHz to 450 MHz	-	-	±0.3	dB	
S ₁₁	input return losses	f = 40 MHz to 80 MHz	20	30	-	dB	
		f = 80 MHz to 160 MHz	18.5	29.5	-	dB	
		f = 160 MHz to 320 MHz	17	28	-	dB	
		f = 320 MHz to 450 MHz	16	26	-	dB	
S ₂₂	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	26	-	dB	
		f = 160 MHz to 320 MHz	17	23.5	-	dB	
		f = 320 MHz to 450 MHz	16	22	-	dB	
CTB	composite triple beat	60 channels flat; V _o = 44 dBmV; measured at 445.25 MHz	-	-	-61	dB	
X _{mod}	cross modulation	60 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	-	-	-60	dB	
CSO	composite second order distortion	60 channels flat; V _o = 44 dBmV; measured at 446.5 MHz	-	-	-61	dB	
d ₂	second order distortion		[1]	-	-	-75	dB
V _o	output voltage	d _{im} = -60 dB	[2]	64	-	-	dBmV
F	noise figure	f = 50 MHz	-	4.5	5.5	dB	
		f = 450 MHz	-	-	5.5	dB	
I _{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] f_p = 55.25 MHz; V_p = 46 dBmV; f_q = 391.25 MHz; V_q = 46 dBmV; measured at f_p + f_q = 446.5 MHz.

[2] Measured according to DIN45004B;

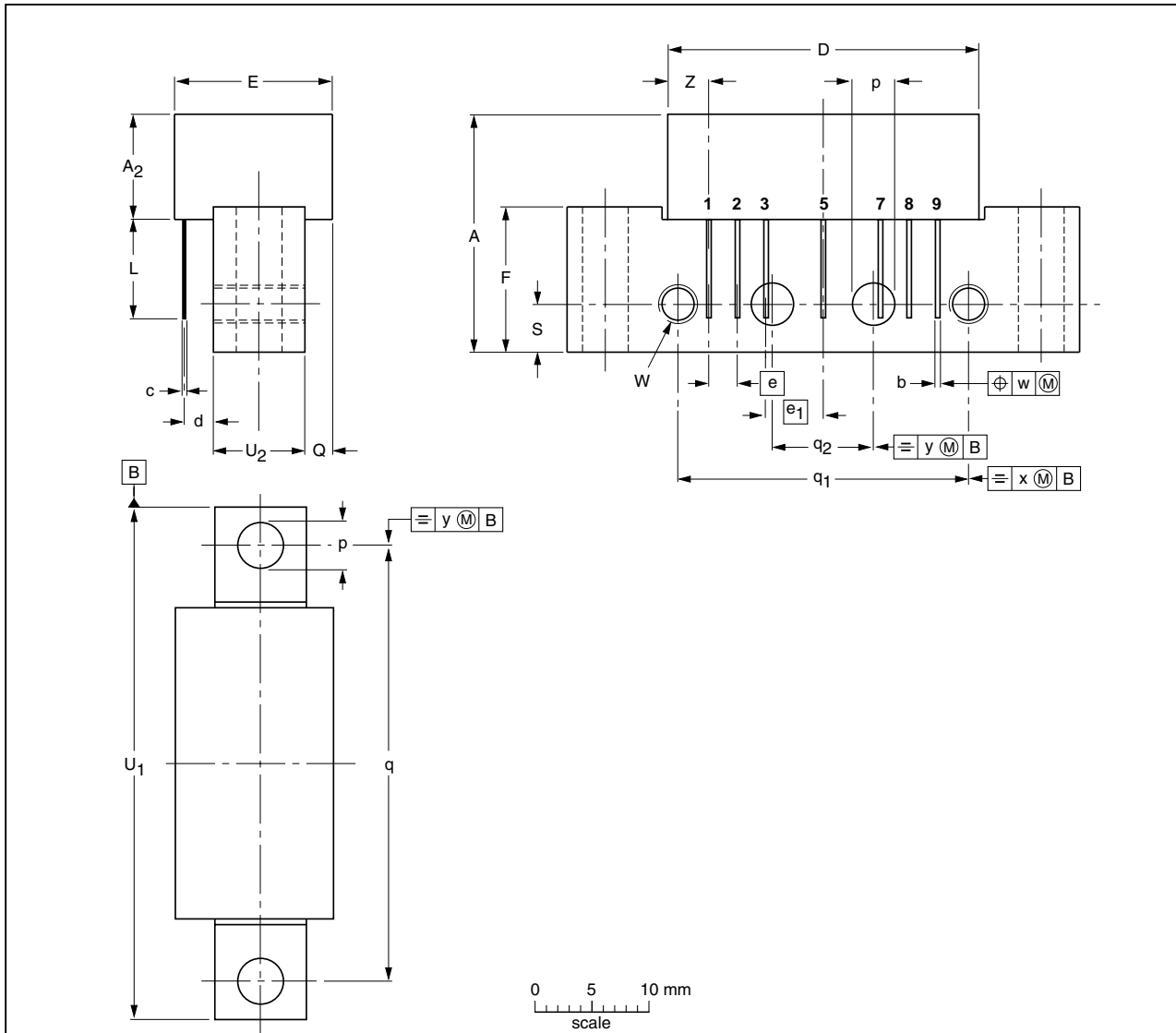
f_p = 440.25 MHz; V_p = V_o; f_q = 447.25 MHz; V_q = V_o - 6 dB; f_r = 449.25 MHz; V_r = V_o - 6 dB; measured at f_p + f_q - f_r = 438.25 MHz.

[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

6. Package outline

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads

SOT115J



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₂ max.	b	c	D max.	d	E max.	e	e ₁	F	L min.	p	Q max.	q	q ₁	q ₂	S	U ₁	U ₂	W	w	x	y	Z max.
mm	20.8	9.5	0.51 0.38	0.25	27.2	2.04 2.54	13.75	2.54	5.08	12.7	8.8	4.15 3.85	2.4	38.1	25.4	10.2	4.2	44.75 44.25	8.2 7.8	6-32 UNC	0.25	0.7	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT115J						04-02-04- 10-06-18

Fig 1. Package outline SOT115J

7. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BGY785A v.6	20100929	Product data sheet	-	BGY785A v.5
Modifications:		<ul style="list-style-type: none">• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.• Legal texts have been adapted to the new company name where appropriate.• Package outline drawings have been updated to the latest version.		
BGY785A v.5 (9397 750 14772)	20050322	Product data sheet	-	BGY785A v.4
BGY785A v.4 (9397 750 08808)	20011115	Product specification	-	BGY785A v.3
BGY785A v.3 (9397 750 05443)	19990330	Product specification	-	BGY785A v.2
BGY785A v.2 (9397 750 02142)	19970410	Product specification	-	n.a.

8. Legal information

8.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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