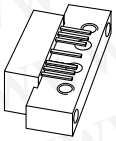


BGY785A

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

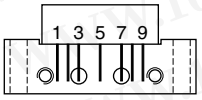
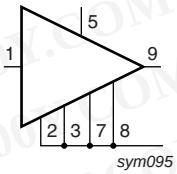
Table 1. Quick reference data

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 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω; unless otherwise specified.

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
SL	slope cable equivalent	f = 40 MHz to 750 MHz		0	0.9	2	dB
FL	flatness of frequency response	f = 40 MHz to 750 MHz		-	±0.1	±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 640 MHz		15.5	26	-	dB
		f = 640 MHz to 750 MHz		14	21	-	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 640 MHz		15.5	22	-	dB
		f = 640 MHz to 750 MHz		14	24	-	dB
CTB	composite triple beat	110 channels flat; V_o = 44 dBmV; measured at 745.25 MHz		-	–54.5	–53	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz		-	–57.5	–56	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 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 dB	[2]	59	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
		f = 600 MHz		-	-	6	dB
		f = 750 MHz		-	6	7	dB
I_{tot}	total current consumption (DC)		[3]	-	225	240	mA

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

[2] Measured according to DIN45004B;
f_p = 740.25 MHz; $V_p = V_o$; f_q = 747.25 MHz; $V_q = V_o$ – 6 dB; f_r = 749.25 MHz; $V_r = V_o$ – 6 dB; measured at $f_p + f_q - f_r$ = 738.25 MHz.

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

Table 6. Bandwidth 40 MHz to 600 MHz

V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω; 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 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω; 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 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω; 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

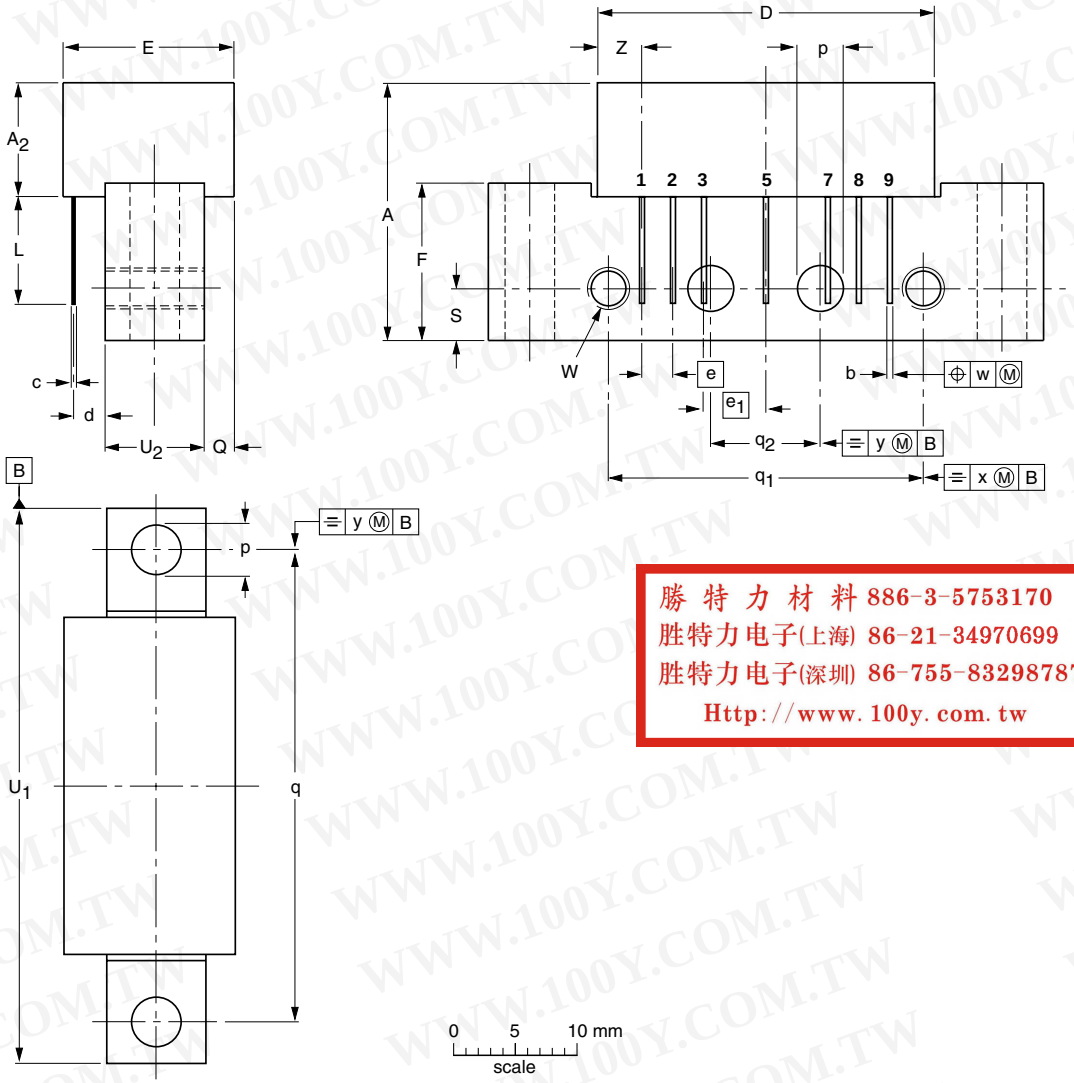
[1] f_p = 55.25 MHz; V_p = 46 dBmV; f_q = 391.25 MHz; V_q = 46 dBmV; measured at $f_p + f_q$ = 446.5 MHz.

[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:	• 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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10. Contents

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