

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

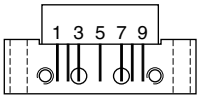
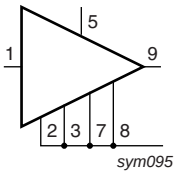
Table 1. Quick reference data

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

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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.

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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.

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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.

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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.

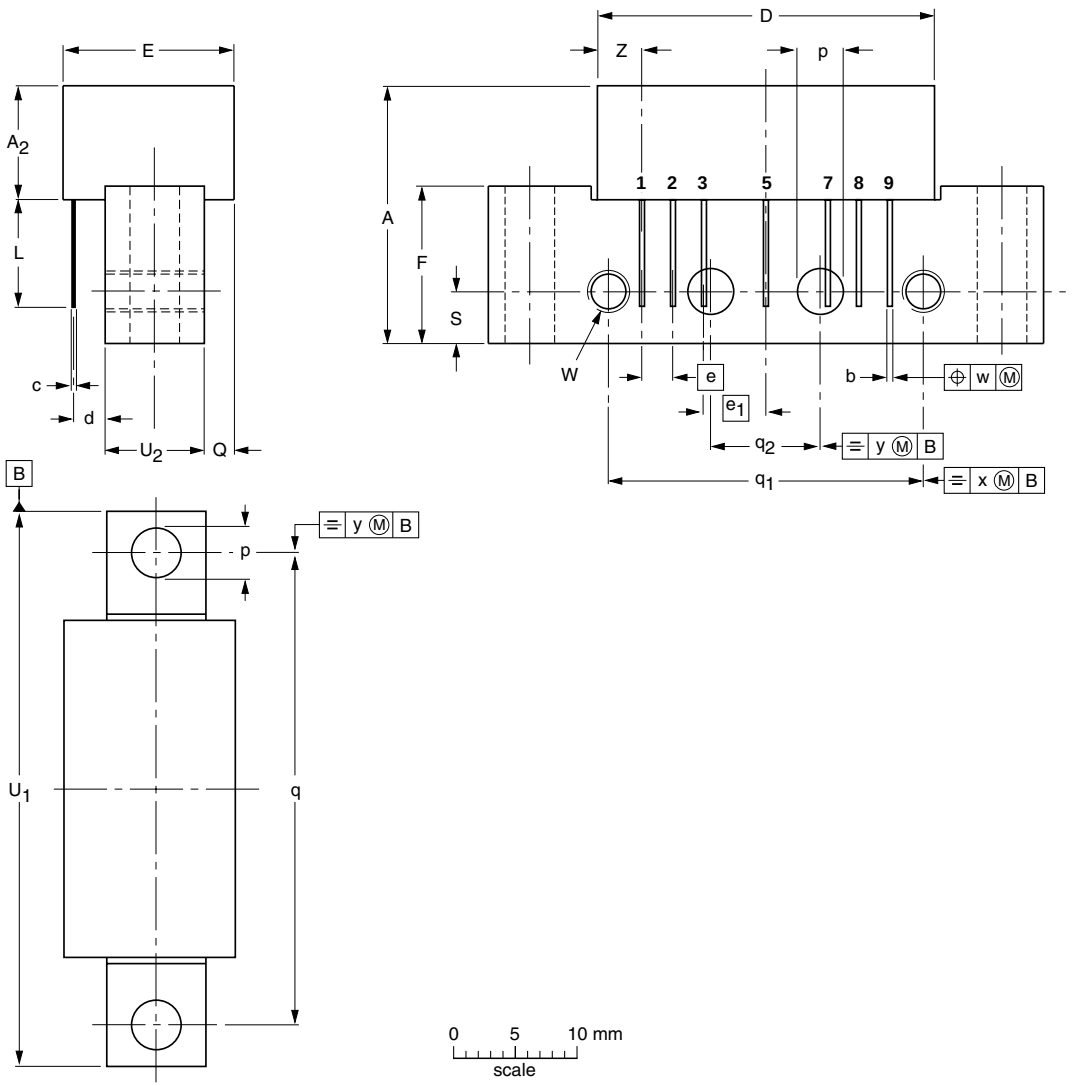
[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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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

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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.

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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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