

# 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

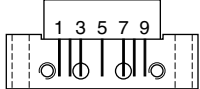
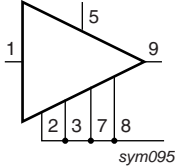
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$f = 50 \text{ MHz}$	18	18.5	19	dB
		$f = 750 \text{ MHz}$	18.5	19.5	-	dB
$I_{\text{tot}}$	total current consumption (DC)	$V_B = 24 \text{ V}$	<sup>[1]</sup> -	225	240	mA

[1] The module normally operates at  $V_B = 24 \text{ V}$ , 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 <sub>B</sub>		
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 <sub>i</sub>	RF input voltage		-	65	dBmV
T <sub>stg</sub>	storage temperature		-40	+100	°C
T <sub>mb</sub>	mounting base temperature		-20	+100	°C

## 5. Characteristics

**Table 5. Bandwidth 40 MHz to 750 MHz**

$V_B = 24\text{ V}$ ;  $T_{case} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ ; 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	$f = 40\text{ MHz to }750\text{ MHz}$	-	$\pm 0.1$	$\pm 0.3$	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** $V_B = 24\text{ V}$ ;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$f = 50\text{ MHz}$	18	18.5	19	dB
		$f = 600\text{ MHz}$	18.5	-	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }600\text{ MHz}$	0	-	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }600\text{ MHz}$	-	-	$\pm 0.3$	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
		$f = 320\text{ MHz to }600\text{ MHz}$	16	26	-	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
		$f = 320\text{ MHz to }600\text{ MHz}$	16	22	-	dB
CTB	composite triple beat	85 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 595.25 MHz	-	-	-57	dB
$X_{\text{mod}}$	cross modulation	85 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 55.25 MHz	-	-	-59	dB
CSO	composite second order distortion	85 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 596.5 MHz	-	-	-58	dB
$d_2$	second order distortion		[1] -	-	-70	dB
$V_o$	output voltage	$d_{\text{im}} = -60\text{ dB}$	[2] 61	-	-	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
$I_{\text{tot}}$	total current consumption (DC)		[3] -	225	240	mA

[1]  $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  $f_q = 541.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ; measured at  $f_p + f_q = 596.5\text{ MHz}$ .

[2] Measured according to DIN45004B;

 $f_p = 590.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 597.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  $f_r = 599.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 588.25\text{ MHz}$ .[3] The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$f = 50\text{ MHz}$	18	18.5	19	dB
		$f = 550\text{ MHz}$	18.5	-	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to } 550\text{ MHz}$	0	-	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to } 550\text{ MHz}$	-	-	$\pm 0.3$	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
		$f = 320\text{ MHz to } 550\text{ MHz}$	16	26	-	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
		$f = 320\text{ MHz to } 550\text{ MHz}$	16	22	-	dB
CTB	composite triple beat	77 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 547.25 MHz	-	-61	-60	dB
$X_{\text{mod}}$	cross modulation	77 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 55.25 MHz	-	-61	-60	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 548.5 MHz	-	-67.5	-60	dB
$d_2$	second order distortion		[1] -	-	-72	dB
$V_o$	output voltage	$d_{\text{im}} = -60\text{ dB}$	[2] 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
$I_{\text{tot}}$	total current consumption (DC)		[3] -	225	240	mA

[1]  $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ; measured at  $f_p + f_q = 548.5\text{ MHz}$ .

[2] Measured according to DIN45004B;

 $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .[3] The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$G_p$	power gain	$f = 50\text{ MHz}$	18	18.5	19	dB
		$f = 450\text{ MHz}$	18.5	-	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }450\text{ MHz}$	0	-	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }450\text{ MHz}$	-	-	$\pm 0.3$	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
		$f = 320\text{ MHz to }450\text{ MHz}$	16	26	-	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
		$f = 320\text{ MHz to }450\text{ MHz}$	16	22	-	dB
CTB	composite triple beat	60 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 445.25 MHz	-	-	-61	dB
$X_{\text{mod}}$	cross modulation	60 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 55.25 MHz	-	-	-60	dB
CSO	composite second order distortion	60 channels flat; $V_o = 44\text{ dBmV}$ ; measured at 446.5 MHz	-	-	-61	dB
$d_2$	second order distortion		[1] -	-	-75	dB
$V_o$	output voltage	$d_{\text{im}} = -60\text{ dB}$	[2] 64	-	-	dBmV
F	noise figure	$f = 50\text{ MHz}$	-	4.5	5.5	dB
		$f = 450\text{ MHz}$	-	-	5.5	dB
$I_{\text{tot}}$	total current consumption (DC)		[3] -	225	240	mA

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

[2] Measured according to DIN45004B;

 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .[3] The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

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

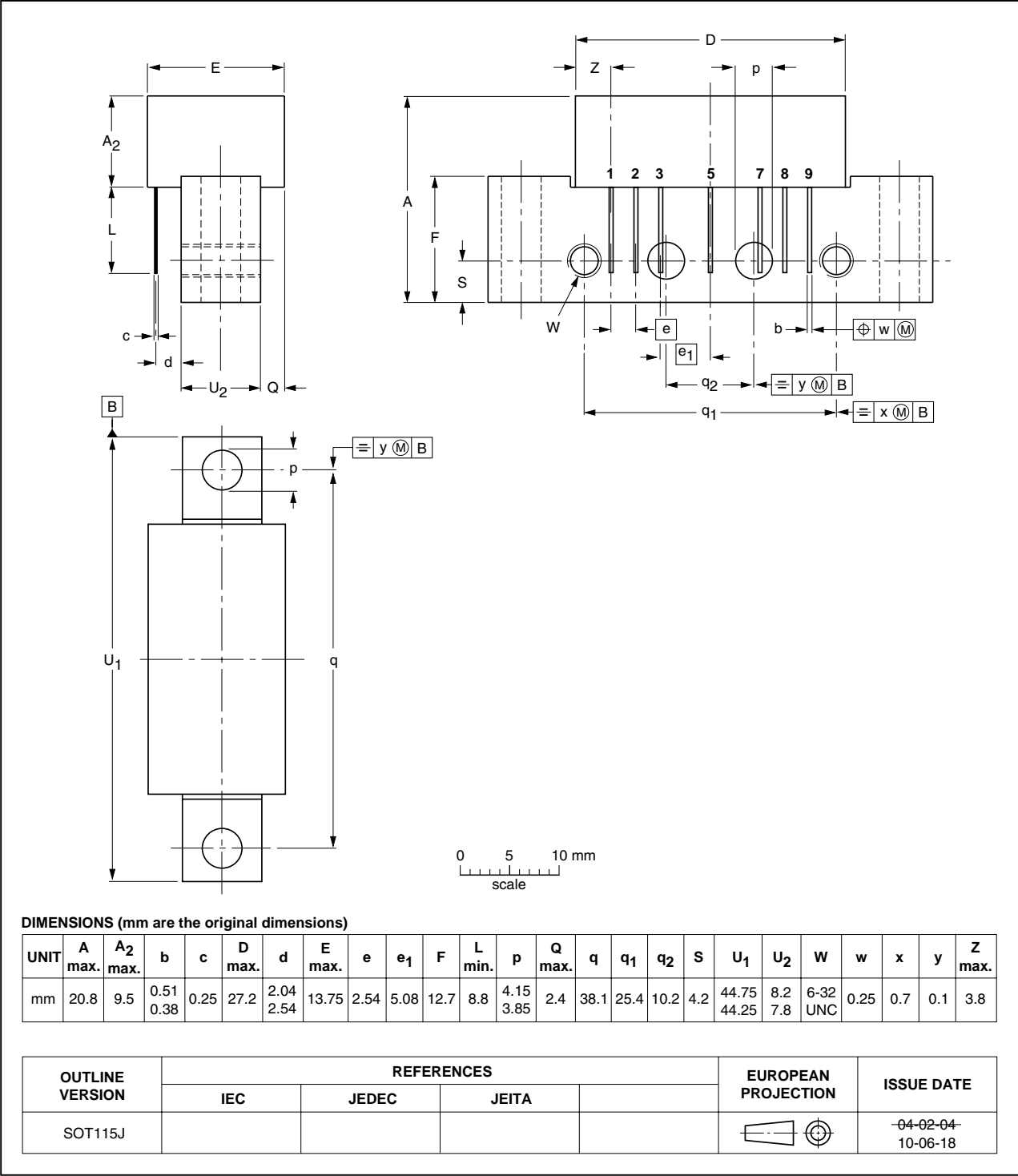


Fig 1. Package outline SOT115J

## 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"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>• Legal texts have been adapted to the new company name where appropriate.</li><li>• Package outline drawings have been updated to the latest version.</li></ul>			
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 <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

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