

BGY787

750 MHz, 21.5 dB gain push-pull

Rev. 08 — 1 April 2005

Product data sheet

1. Product profile

1.1 General description

Hybrid 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

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

1.3 Applications

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

1.4 Quick reference data

Table 1: Quick reference data

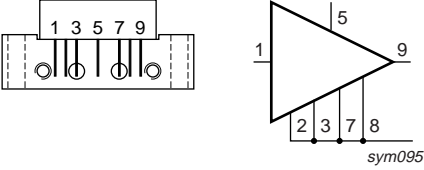
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50 \text{ MHz}$	21	21.5	22	dB
		$f = 750 \text{ MHz}$	21.5	22.5	-	dB
I_{tot}	total current consumption (DC)	$V_B = 24 \text{ V}$	[1] -	220	240	mA

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

PHILIPS

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
BGY787	-	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		-	60	dBmV
T _{stg}	storage temperature		-40	+100	°C
T _{mb}	mounting base temperature		-20	+100	°C

5. Characteristics

Table 5: Characteristics at bandwidth 40 MHz to 750 MHz

$V_B = 24\text{ V}$; $T_{case} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\text{ }\Omega$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	21	21.5	22	dB
		$f = 750\text{ MHz}$	21.5	22.5	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }750\text{ MHz}$	0	1	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }750\text{ MHz}$	-	± 0.2	± 0.5	dB
S_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	33	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	30	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	22	-	dB
		$f = 640\text{ MHz to }750\text{ MHz}$	14	20.5	-	dB
S_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	28.5	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	27.5	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	22	-	dB
		$f = 640\text{ MHz to }750\text{ MHz}$	14	20	-	dB
ϕ_{S21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg
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	-	-54	-52	dB
CSO	composite second order distortion	110 channels flat; $V_o = 44\text{ dBmV}$; measured at 746.5 MHz	-	-57.5	-53	dB
d_2	second order distortion		[1] -	-75	-63	dB
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2] 61	63	-	dBmV
F	noise figure	$f = 50\text{ MHz}$	-	4	5	dB
		$f = 450\text{ MHz}$	-	-	5.5	dB
		$f = 550\text{ MHz}$	-	-	5.5	dB
		$f = 600\text{ MHz}$	-	-	6	dB
		$f = 750\text{ MHz}$	-	5	6.5	dB
I_{tot}	total current consumption (DC)		[3] -	220	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] Measure 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: Characteristics at bandwidth 40 MHz to 770 MHz $V_B = 24\text{ V}$; $T_{case} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\text{ }\Omega$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	21	21.5	22	dB
		$f = 770\text{ MHz}$	21.5	22.5	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }770\text{ MHz}$	0	1	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }770\text{ MHz}$	-	± 0.2	± 0.5	dB
s_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	33	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	30	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	22.5	-	dB
		$f = 640\text{ MHz to }770\text{ MHz}$	14	20.5	-	dB
s_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	28.5	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	27.5	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	22	-	dB
		$f = 640\text{ MHz to }770\text{ MHz}$	14	20	-	dB
ϕ_{S21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg
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	-	-54	-52	dB
CSO	composite second order distortion	110 channels flat; $V_o = 44\text{ dBmV}$; measured at 746.5 MHz	-	-57.5	-53	dB
d_2	second order distortion		[1] -	-75	-63	dB
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2] 61	63	-	dBmV
F	noise figure	$f = 50\text{ MHz}$	-	4	5	dB
		$f = 450\text{ MHz}$	-	-	5.5	dB
		$f = 550\text{ MHz}$	-	-	5.5	dB
		$f = 600\text{ MHz}$	-	-	6	dB
		$f = 770\text{ MHz}$	-	5	6.5	dB
I_{tot}	total current consumption (DC)		[3] -	220	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] Measure 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 7: Characteristics at bandwidth 40 MHz to 600 MHz $V_B = 24\text{ V}$; $T_{case} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\text{ }\Omega$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	21	21.5	22	dB
		$f = 600\text{ MHz}$	21.5	-	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }600\text{ MHz}$	0	-	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }600\text{ MHz}$	-	-	± 0.3	dB
s_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	33	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	30	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }600\text{ MHz}$	16	22.5	-	dB
s_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$;	20	28.5	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	27.5	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }600\text{ MHz}$	16	22	-	dB
ϕ_{S21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg
CTB	composite triple beat	85 channels flat; $V_o = 44\text{ dBmV}$; measured at 595.25 MHz	-	-59.5	-58	dB
X_{mod}	cross modulation	85 channels flat; $V_o = 44\text{ dBmV}$; measured at 55.25 MHz	-	-55.5	-53	dB
CSO	composite second order distortion	85 channels flat; $V_o = 44\text{ dBmV}$; measured at 596.5 MHz	-	-64	-56	dB
d_2	second order distortion		[1] -	-	-68	dB
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2] 62.5	-	-	dBmV
F	noise figure	see Table 5	-	-	-	dB
I_{tot}	total current consumption (DC)		[3] -	220	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] Measure 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 8: Characteristics at bandwidth 40 MHz to 550 MHz $V_B = 24\text{ V}$; $T_{case} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\text{ }\Omega$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	21	21.5	22	dB
		$f = 550\text{ MHz}$	21.5	-	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to } 550\text{ MHz}$	0	-	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to } 550\text{ MHz}$	-	-	± 0.3	dB
s_{11}	input return losses	$f = 40\text{ MHz to } 80\text{ MHz}$	20	33	-	dB
		$f = 80\text{ MHz to } 160\text{ MHz}$	18.5	30	-	dB
		$f = 160\text{ MHz to } 320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to } 550\text{ MHz}$	16	22.5	-	dB
s_{22}	output return losses	$f = 40\text{ MHz to } 80\text{ MHz}$	20	28.5	-	dB
		$f = 80\text{ MHz to } 160\text{ MHz}$	18.5	27.5	-	dB
		$f = 160\text{ MHz to } 320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to } 550\text{ MHz}$	16	22	-	dB
ϕ_{S21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg
CTB	composite triple beat	77 channels flat; $V_o = 44\text{ dBmV}$; measured at 547.25 MHz	-	-61	-60	dB
X_{mod}	cross modulation	77 channels flat; $V_o = 44\text{ dBmV}$; measured at 55.25 MHz	-	-56.5	-55	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44\text{ dBmV}$; measured at 548.5 MHz	-	-65.5	-58	dB
d_2	second order distortion		[1] -	-	-70	dB
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2] 63	-	-	dBmV
F	noise figure	see Table 5	-	-	-	dB
I_{tot}	total current consumption (DC)		[3] -	220	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] Measure 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 9: Characteristics at bandwidth 40 MHz to 450 MHz $V_B = 24\text{ V}$; $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$; $Z_S = Z_L = 75\text{ }\Omega$.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	21	21.5	22	dB
		$f = 450\text{ MHz}$	21.5	-	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }450\text{ MHz}$	0	-	1.5	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }450\text{ MHz}$	-	-	± 0.3	dB
s_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	33	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	30	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }450\text{ MHz}$	16	22.5	-	dB
s_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	28.5	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	27.5	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	25	-	dB
		$f = 320\text{ MHz to }450\text{ MHz}$	16	22	-	dB
ϕ_{S21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg
CTB	composite triple beat	60 channels flat; $V_o = 46\text{ dBmV}$; measured at 445.25 MHz	-	-	-59	dB
X_{mod}	cross modulation	60 channels flat; $V_o = 46\text{ dBmV}$; measured at 55.25 MHz	-	-	-54	dB
CSO	composite second order distortion	60 channels flat; $V_o = 46\text{ dBmV}$; measured at 446.5 MHz	-	-	-60	dB
d_2	second order distortion	[1]	-	-	-73	dB
V_o	output voltage	$d_{\text{im}} = -60\text{ dB}$	[2]	64	-	dBmV
F	noise figure	see Table 5	-	-	-	dB
I_{tot}	total current consumption (DC)	[3]	-	220	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] Measure 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

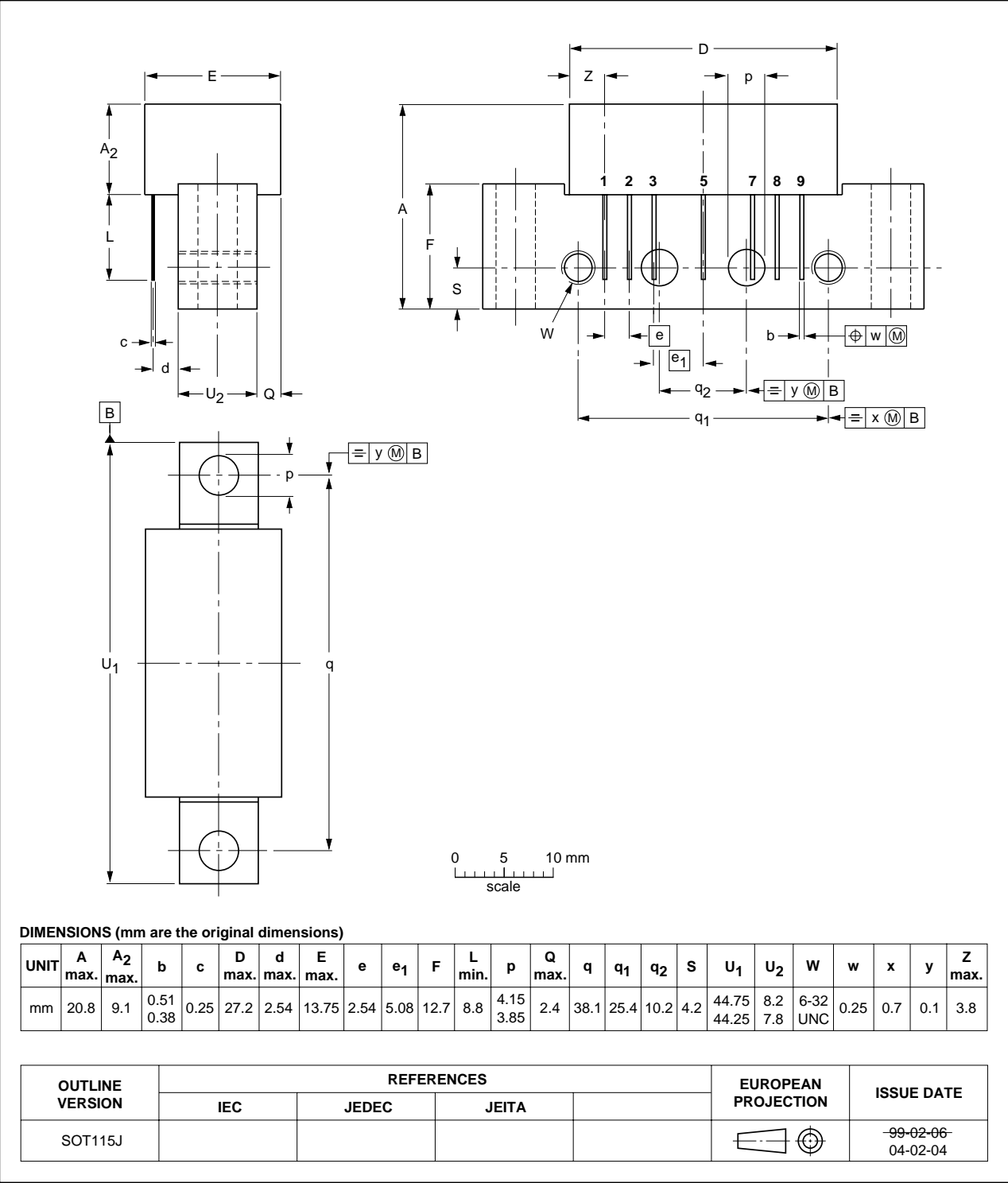


Fig 1. Package outline SOT115J

7. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BGY787_8	20050401	Product data sheet	-	9397 750 14773	BGY787_7
Modifications:	<ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the new presentation and information standard of Philips Semiconductors.				
BGY787_7	20030516	Product specification	-	9397 750 11198	BGY787_6
BGY787_6	20011031	Product specification	-	9397 750 08811	BGY787_5
BGY787_5	19990330	Product specification	-	9397 750 05455	BGY787_4
BGY787_4	19971124	Product specification	-	9397 750 02951	BGY787_3
BGY787_3	19970414	Product specification	-	9397 750 02155	-

8. Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2] [3]}	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

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

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

9. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

10. Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

11. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com



12. Contents

1	Product profile	1
1.1	General description.	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data.	1
2	Pinning information.	2
3	Ordering information.	2
4	Limiting values.	2
5	Characteristics.	3
6	Package outline	8
7	Revision history.	9
8	Data sheet status	10
9	Definitions	10
10	Disclaimers.	10
11	Contact information	10

