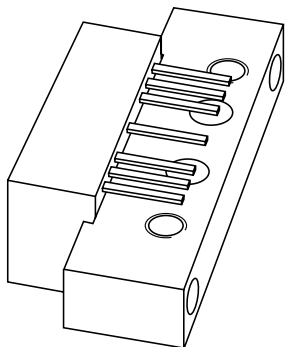


DATA SHEET



CGD914 CATV amplifier module

Product specification
Supersedes data of 2000 Mar 02

2000 Apr 20

CATV amplifier module

CGD914

FEATURES

- Excellent linearity
- Extremely low noise
- Excellent return loss properties
- Rugged construction
- Gold metallization ensures excellent reliability.

APPLICATIONS

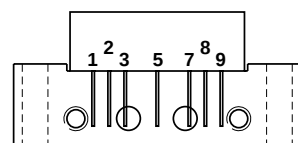
- CATV systems operating in the 40 to 870 MHz frequency range.

DESCRIPTION

Hybrid amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC), employing both GaAs and Si dies.

PINNING - SOT115J

Pin	DESCRIPTION
1	input
2 and 3	common
5	+V _B
7 and 8	common
9	output



Side view

MSA319

Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G _p	power gain	f = 45 MHz	19.75	20.25	dB
		f = 870 MHz	20.2	21.5	dB
I _{tot}	total current consumption (DC)	V _B = 24 V	345	375	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _B	supply voltage	–	30	V
V _i	RF input voltage	–	–	
	single tone	–	70	dBmV
	132 channels flat	–	45	dBmV
T _{stg}	storage temperature	–40	+100	°C
T _{mb}	operating mounting base temperature	–20	+100	°C

CATV amplifier module

CGD914

CHARACTERISTICS

Bandwidth 45 to 870 MHz; $V_B = 24$ V; $T_{mb} = 35$ °C; $Z_S = Z_L = 75$ Ω .

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 45 MHz	19.75	20	20.25	dB
		f = 870 MHz	20.2	21	21.5	dB
SL	slope straight line	f = 45 to 870 MHz	0.2	1	1.5	dB
FL	flatness straight line	f = 45 to 100 MHz	-0.25	–	+0.25	dB
		f = 100 to 800 MHz	-0.6	–	+0.4	dB
		f = 800 to 870 MHz	-0.45	–	+0.2	dB
	flatness narrow band	in each 6 MHz segment	–	–	±0.1	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	–	–	dB
		f = 80 to 160 MHz	20	–	–	dB
		f = 160 to 320 MHz	18	–	–	dB
		f = 320 to 550 MHz	16	–	–	dB
		f = 550 to 650 MHz	15	–	–	dB
		f = 650 to 750 MHz	14	–	–	dB
		f = 750 to 870 MHz	14	–	–	dB
		f = 870 to 914 MHz	10	–	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	21	–	–	dB
		f = 80 to 160 MHz	21	–	–	dB
		f = 160 to 320 MHz	20	–	–	dB
		f = 320 to 550 MHz	19	–	–	dB
		f = 550 to 650 MHz	18	–	–	dB
		f = 650 to 750 MHz	17	–	–	dB
		f = 750 to 870 MHz	16	–	–	dB
		f = 870 to 914 MHz	14	–	–	dB
S ₂₁	phase response	f = 50 MHz	-45	–	+45	deg
S ₁₂	reverse isolation	RF _{out} to RF _{in}	–	–	22	dB
CTB	composite triple beat	79 chs; f _m = 445.25 MHz; note 1	–	–	-76	dB
		112 chs; f _m = 649.25 MHz; note 2	–	–	-64	dB
		132 chs; f _m = 745.25 MHz; note 3	–	–	-55	dB
		79 chs flat; V _o = 44 dBmV; f _m = 547.25 MHz	–	–	-73	dB
		112 chs flat; V _o = 44 dBmV; f _m = 745.25 MHz	–	–	-64	dB
		132 chs flat; V _o = 44 dBmV; f _m = 745.25 MHz	–	–	-60	dB
X _{mod}	cross modulation	79 chs; f _m = 55.25 MHz; note 1	–	–	-70	dB
		112 chs; f _m = 55.25 MHz; note 2	–	–	-62	dB
		132 chs; f _m = 55.25 MHz; note 3	–	–	-57	dB
		79 chs flat; V _o = 44 dBmV; f _m = 55.25 MHz	–	–	-69	dB
		112 chs flat; V _o = 44 dBmV; f _m = 55.25 MHz	–	–	-65	dB
		132 chs flat; V _o = 44 dBmV; f _m = 55.25 MHz	–	–	-63	dB

CATV amplifier module

CGD914

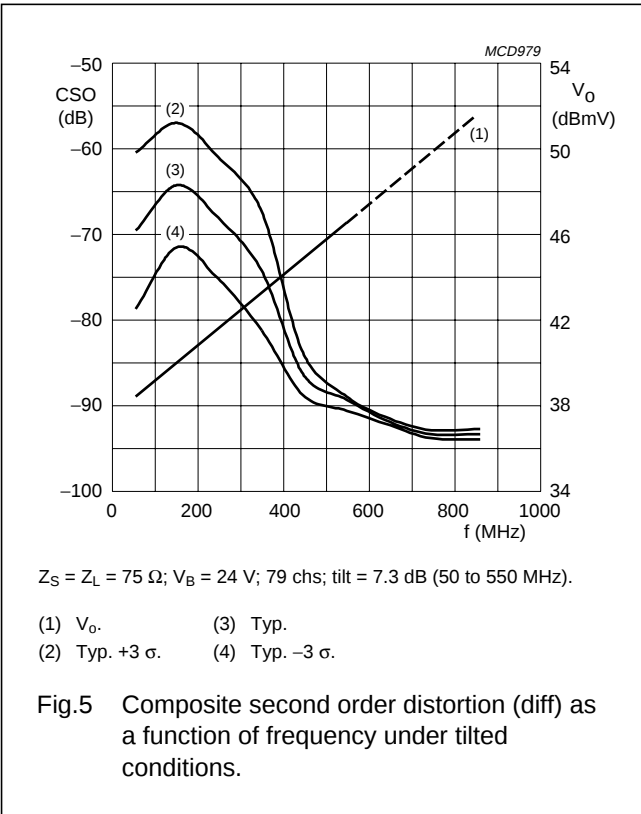
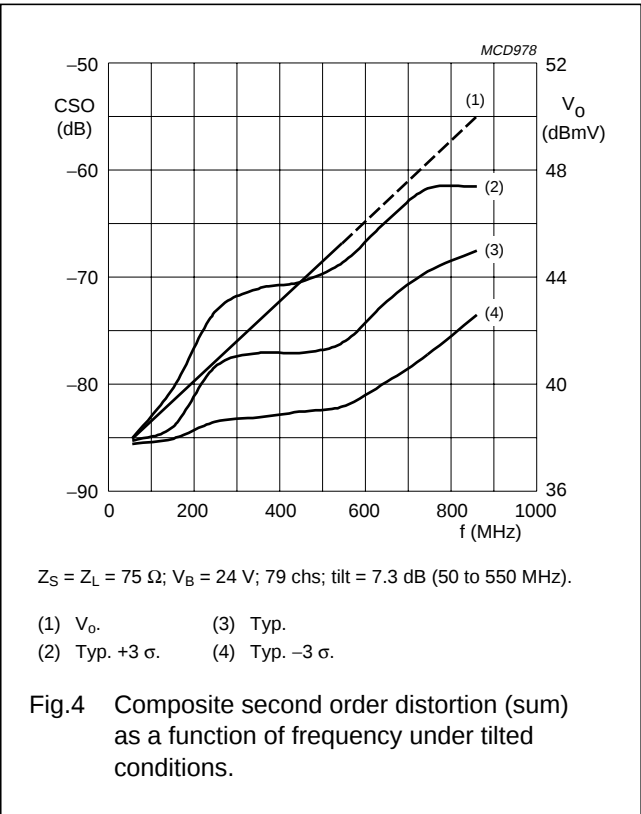
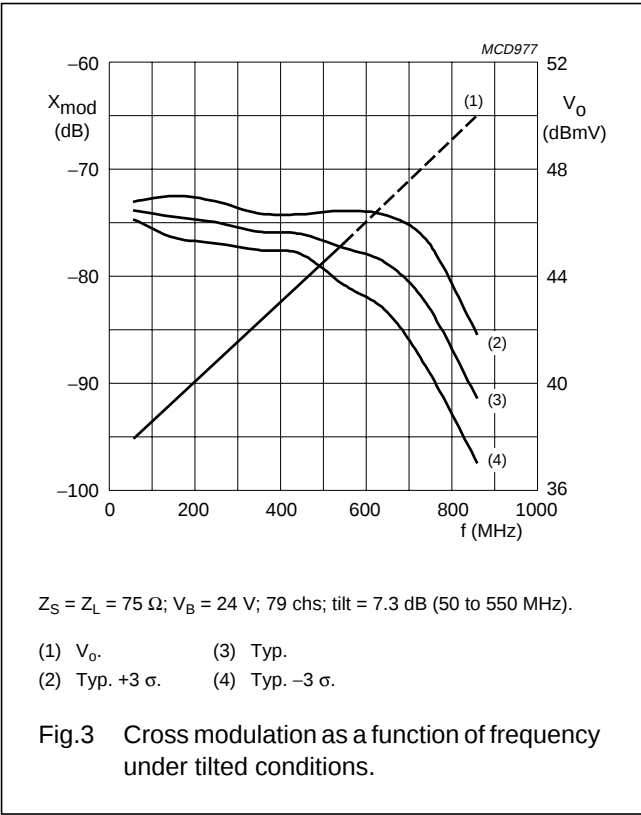
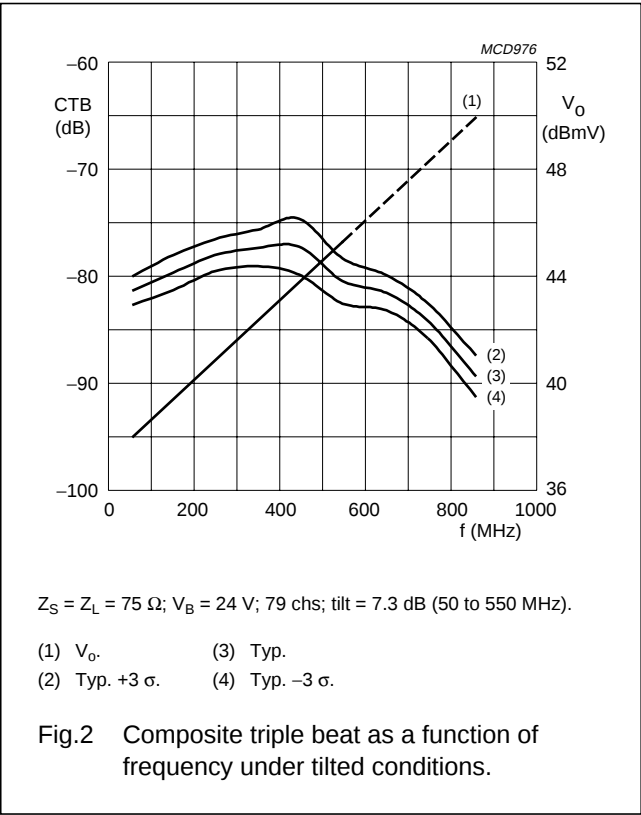
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO Sum	composite second order distortion (sum)	79 chs; $f_m = 446.5$ MHz; note 1	–	–	–71	dB
		112 chs; $f_m = 746.5$ MHz; note 2	–	–	–60	dB
		132 chs; $f_m = 860.5$ MHz; note 3	–	–	–56	dB
		79 chs flat; $V_o = 44$ dBmV; $f_m = 548.5$ MHz	–	–	–63	dB
		112 chs flat; $V_o = 44$ dBmV; $f_m = 746.5$ MHz	–	–	–54	dB
		132 chs flat; $V_o = 44$ dBmV; $f_m = 860.5$ MHz	–	–	–49	dB
CSO Diff	composite second order distortion (diff)	79 chs; $f_m = 150$ MHz; note 1	–	–	–59	dB
		112 chs; $f_m = 150$ MHz; note 2	–	–	–53	dB
		132 chs; $f_m = 150$ MHz; note 3	–	–	–48	dB
		79 chs flat; $V_o = 44$ dBmV; $f_m = 150$ MHz	–	–	–60	dB
		112 chs flat; $V_o = 44$ dBmV; $f_m = 150$ MHz	–	–	–59	dB
		132 chs flat; $V_o = 44$ dBmV; $f_m = 150$ MHz	–	–	–57	dB
NF	noise figure	$f = 50$ MHz	–	2.5	3	dB
		$f = 550$ MHz	–	2.5	3	dB
		$f = 750$ MHz	–	2.6	3.5	dB
		$f = 870$ MHz	–	3	3.5	dB
d_2	second order distortion	note 4	–	–	–60	dB
		note 5	–	–	–54	dB
		note 6	–	–	–50	dB
V_o	output voltage	$d_{im} = -60$ dB; note 7	69	–	–	dBmV
		$d_{im} = -60$ dB; note 8	66	–	–	dBmV
		$d_{im} = -60$ dB; note 9	63	–	–	dBmV
I_{tot}	total current consumption (DC)	note 10	345	360	375	mA

Notes

- $V_o = 38$ dBmV at 54 MHz; Tilt = 7.3 dB (55 to 547 MHz) extrapolated to 12 dB at 870 MHz.
- $V_o = 38$ dBmV at 54 MHz; Tilt = 10.2 dB (55 to 745 MHz) extrapolated to 12 dB at 870 MHz.
- $V_o = 38$ dBmV at 54 MHz; Tilt = 12 dB (55 to 865 MHz).
- $f_p = 55.25$ MHz; $V_p = 60$ dBmV; $f_q = 493.25$ MHz; $V_q = 60$ dBmV; measured at $f_p + f_q = 548.5$ MHz.
- $f_p = 55.25$ MHz; $V_p = 60$ dBmV; $f_q = 691.25$ MHz; $V_q = 60$ dBmV; measured at $f_p + f_q = 746.5$ MHz.
- $f_p = 55.25$ MHz; $V_p = 60$ dBmV; $f_q = 805.25$ MHz; $V_q = 60$ dBmV; measured at $f_p + f_q = 860.5$ MHz.
- 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.
- 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.
- Measured according to DIN45004B: $f_p = 851.25$ MHz; $V_p = V_o$; $f_q = 858.25$ MHz; $V_q = V_o - 6$ dB; $f_r = 860.25$ MHz; $V_r = V_o - 6$ dB; measured at $f_p + f_q - f_r = 849.25$ MHz.
- The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

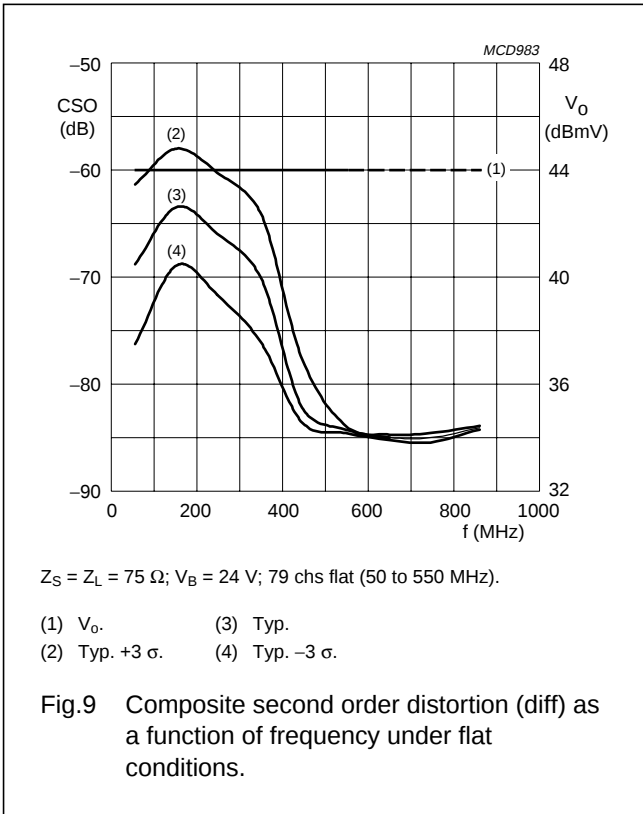
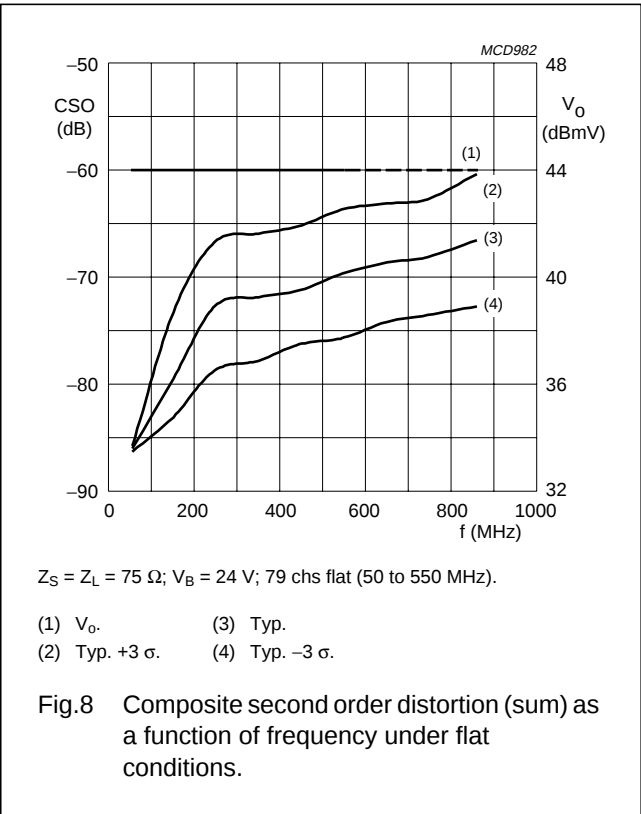
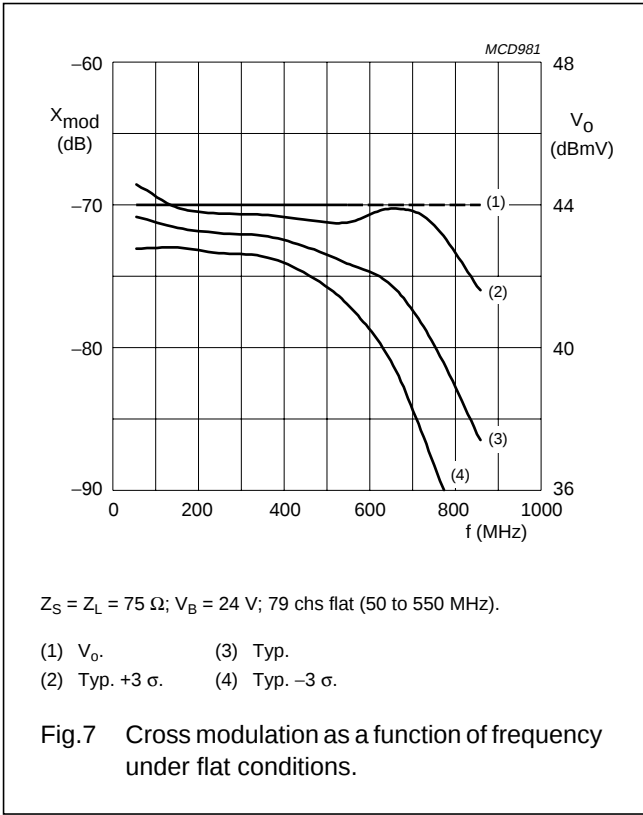
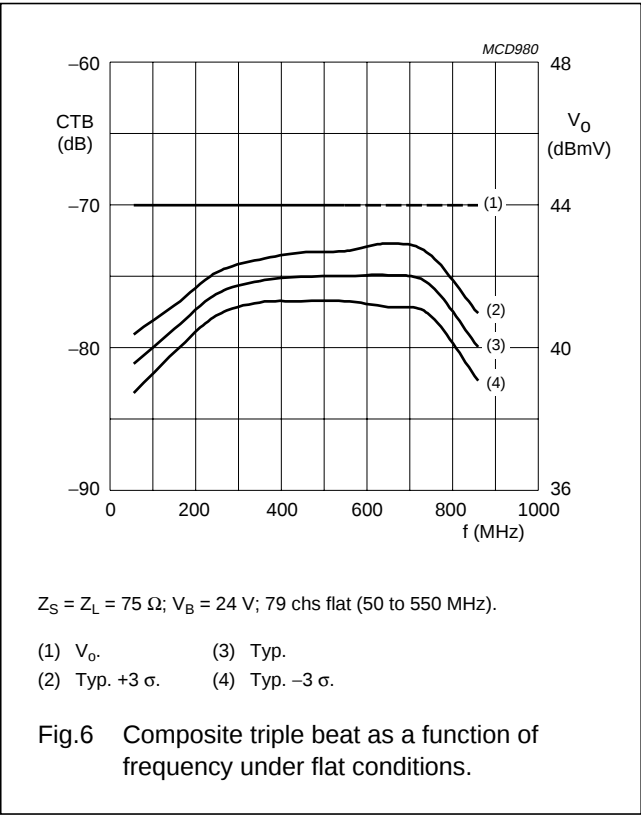
CATV amplifier module

CGD914



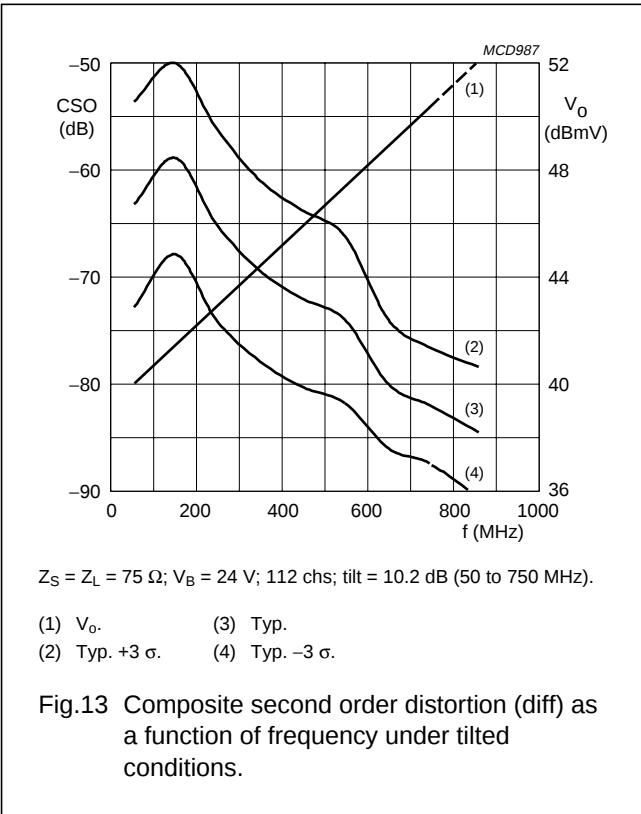
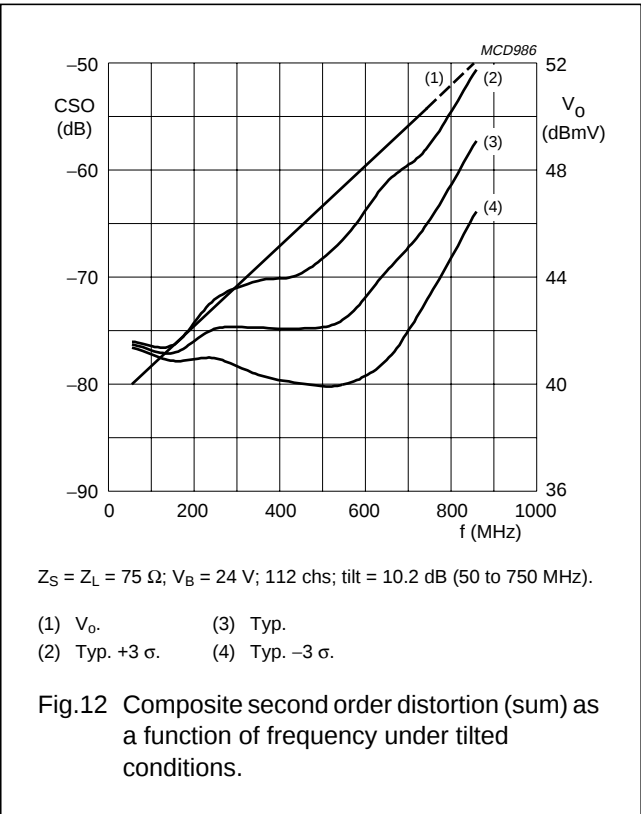
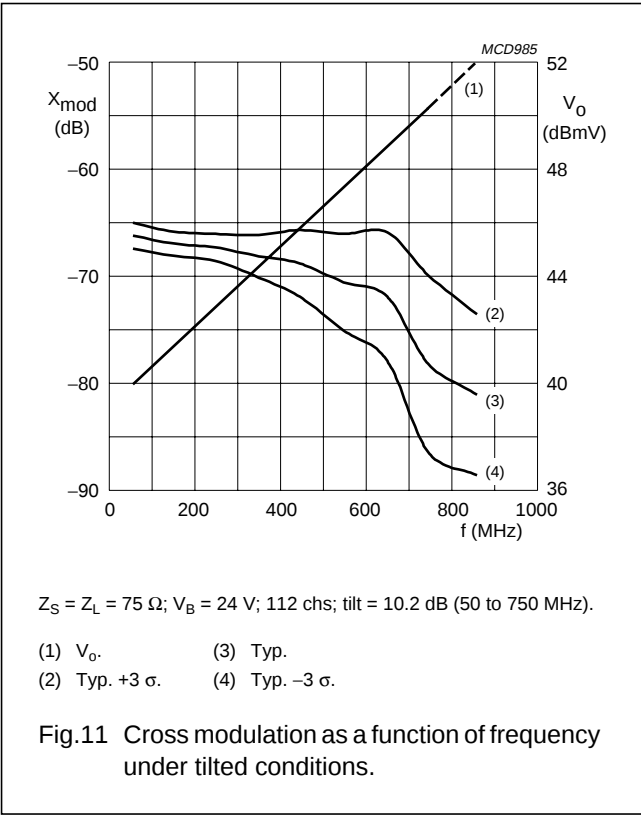
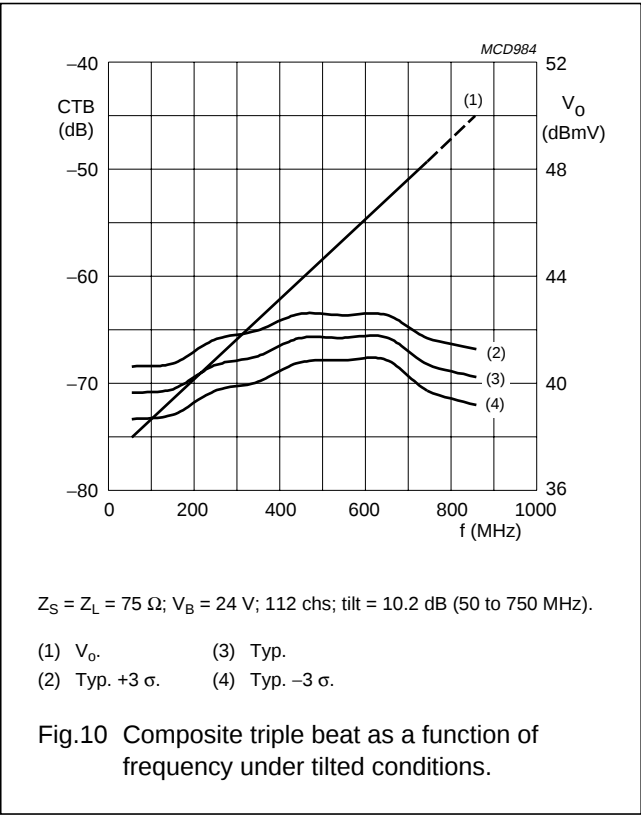
CATV amplifier module

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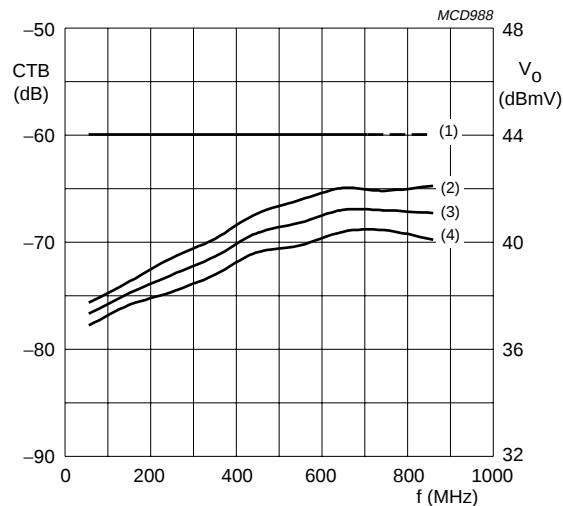
CATV amplifier module

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CATV amplifier module

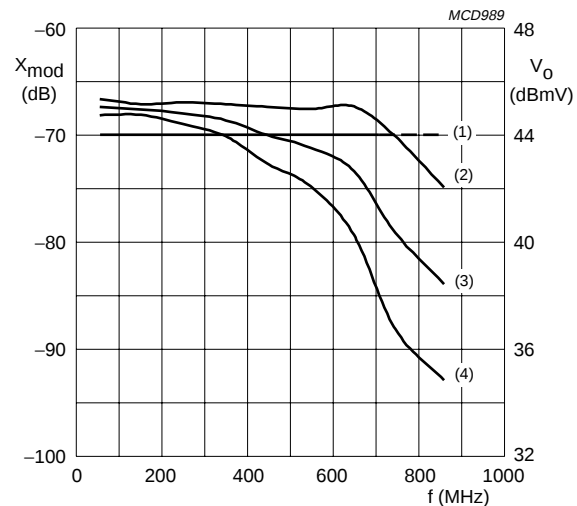
CGD914



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs flat (50 to 750 MHz).

- (1) V_0 . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

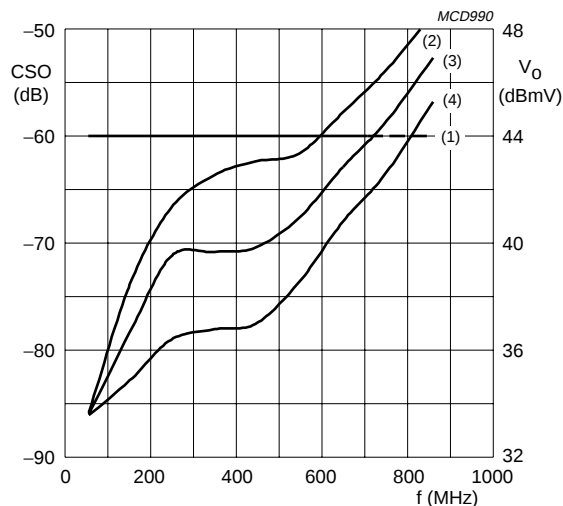
Fig.14 Composite triple beat as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs flat (50 to 750 MHz).

- (1) V_0 . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

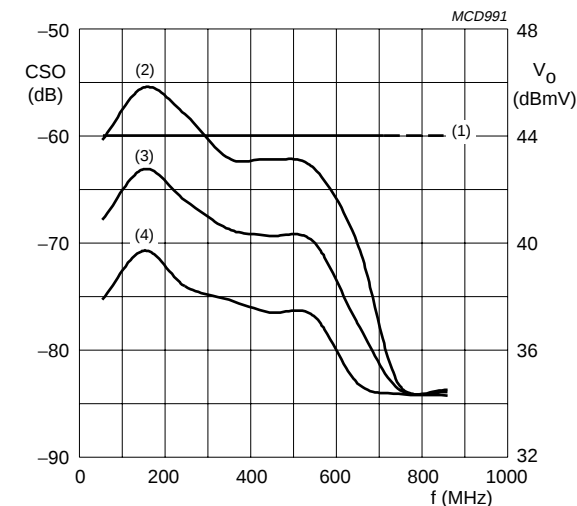
Fig.15 Cross modulation as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs flat (50 to 750 MHz).

- (1) V_0 . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

Fig.16 Composite second order distortion (sum) as a function of frequency under flat conditions.



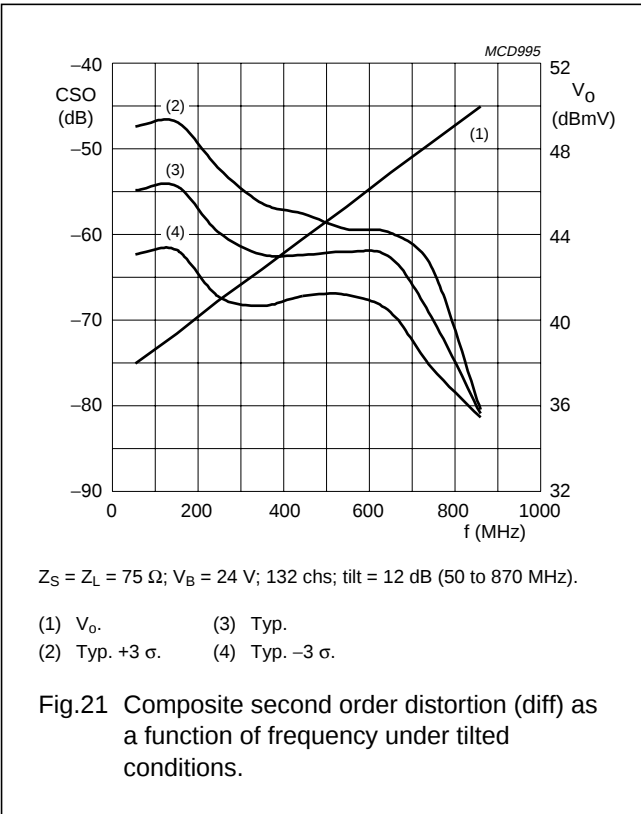
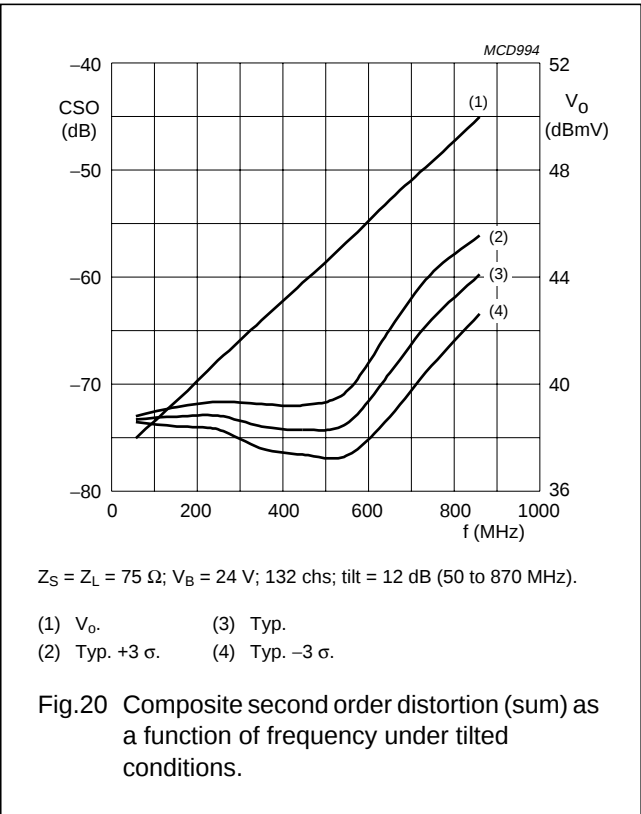
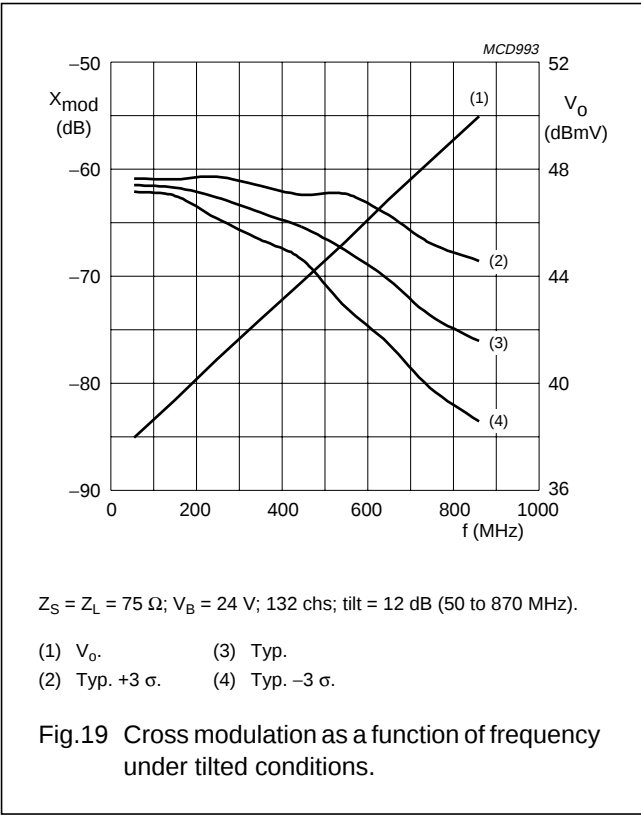
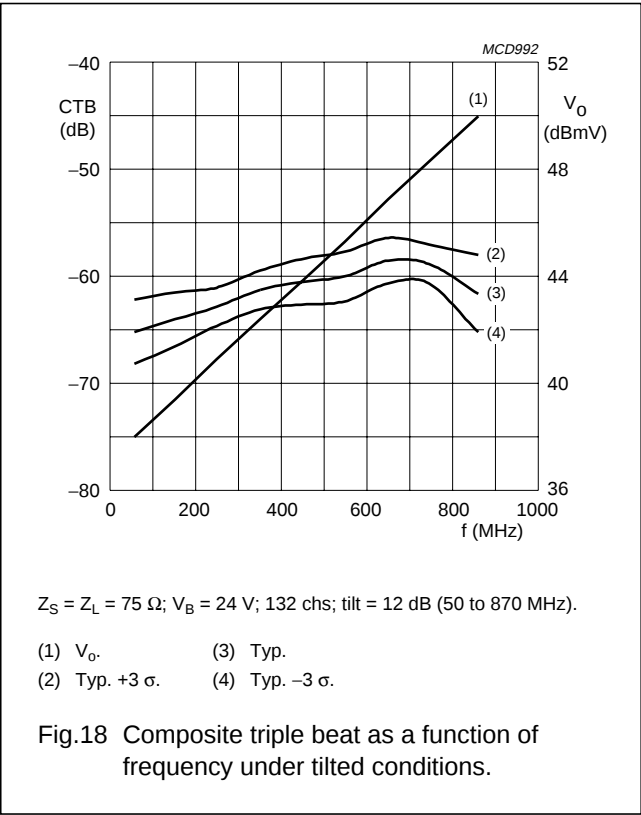
$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs; flat (50 to 750 MHz).

- (1) V_0 . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

Fig.17 Composite second order distortion (diff) as a function of frequency under flat conditions.

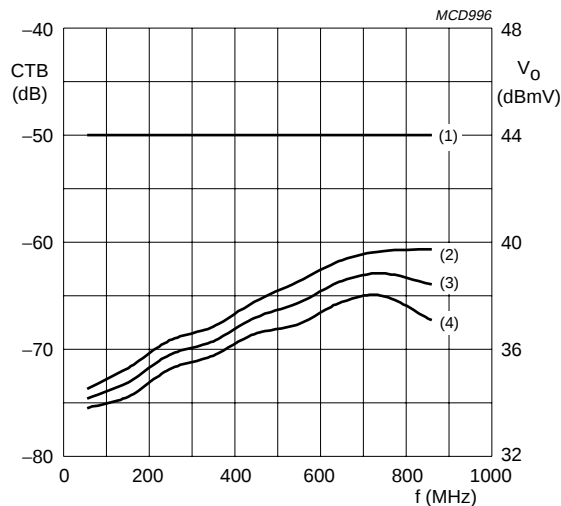
CATV amplifier module

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CATV amplifier module

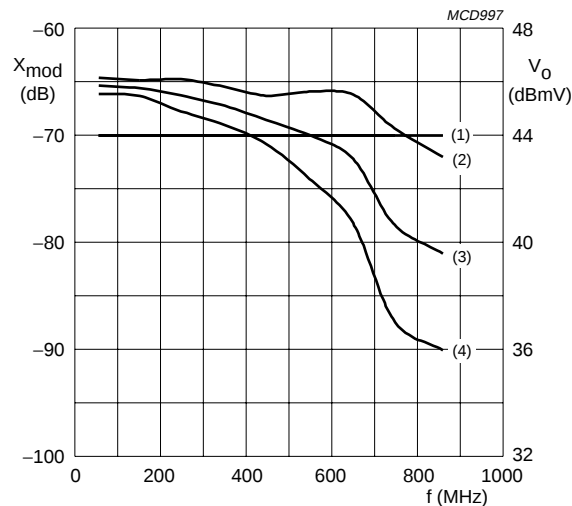
CGD914



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 132 chs flat (50 to 870 MHz).

- (1) V_O . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

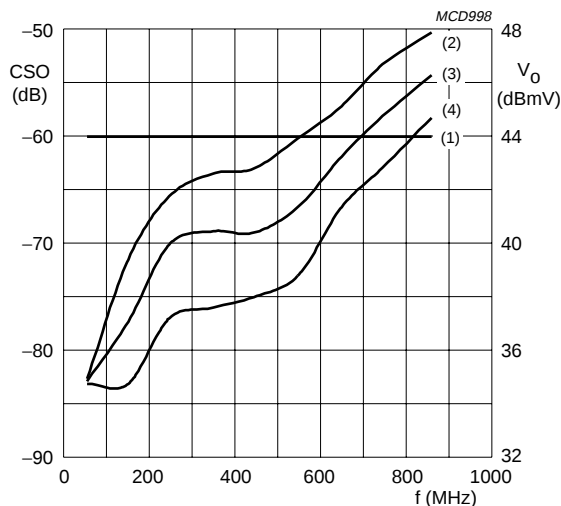
Fig.22 Composite triple beat as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 132 chs flat (50 to 870 MHz).

- (1) V_O . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

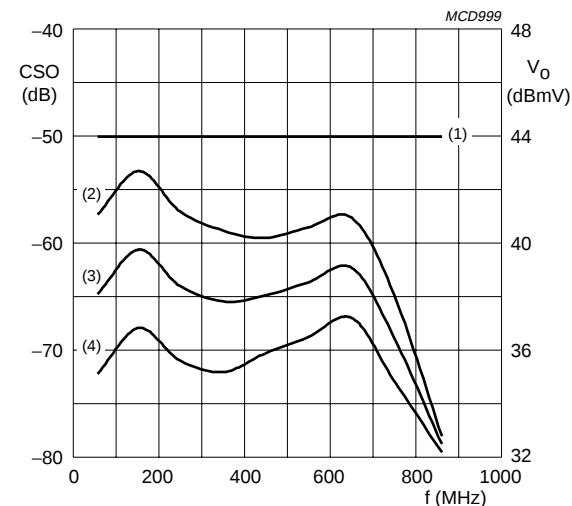
Fig.23 Cross modulation as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 132 chs flat (50 to 870 MHz).

- (1) V_O . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

Fig.24 Composite second order distortion (sum) as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 132 chs flat (50 to 870 MHz).

- (1) V_O . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

Fig.25 Composite second order distortion (diff) as a function of frequency under flat conditions.

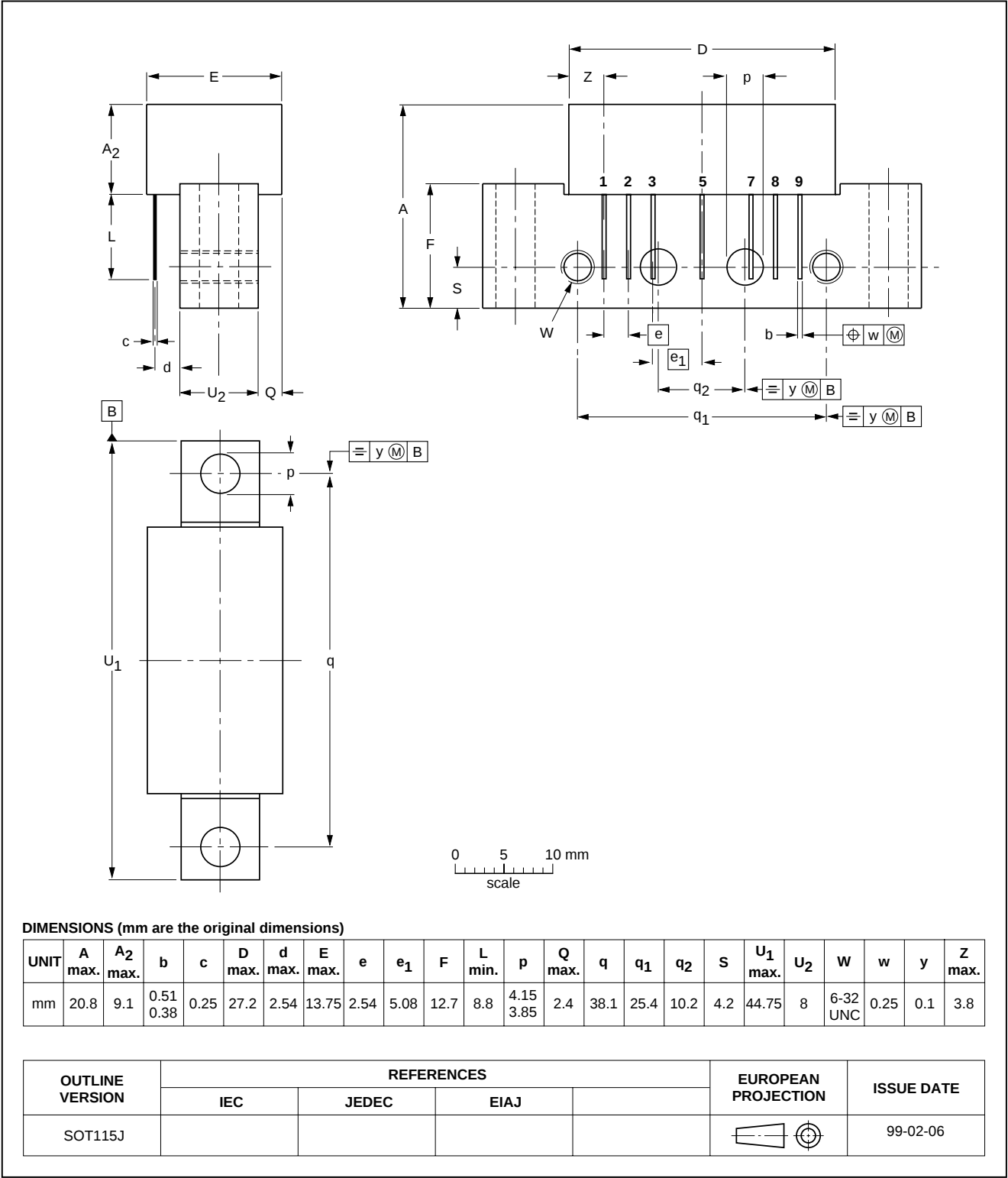
CATV amplifier module

CGD914

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



CATV amplifier module

CGD914

DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS ⁽¹⁾
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

Note

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

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.

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CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A, and SNW-FQ-302B.

CATV amplifier module

CGD914

NOTES

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NOTES

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NOTES

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