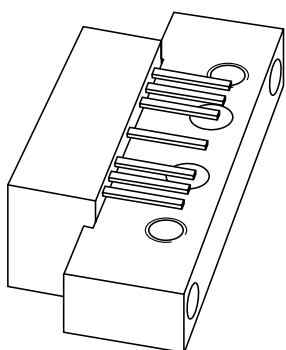


DATA SHEET



CGD914; CGD914MI 860 MHz, 20 dB gain power doubler amplifier

Product specification
Supersedes data of 2000 Jul 25

2001 Nov 01

860 MHz, 20 dB gain power doubler amplifier**CGD914; CGD914MI****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 at a voltage supply of 24 V (DC), employing both GaAs and Si dies. Both modules are electrically identical, only the pinning is different.

PINNING - SOT115J

PIN	DESCRIPTION	
	CGD914	CGD914MI
1	input	output
2 and 3	common	common
5	+V _B	+V _B
7 and 8	common	common
9	output	input

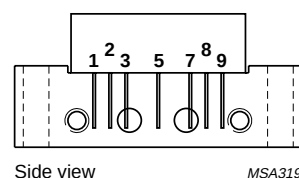


Fig.1 Simplified outline.

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

860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI

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

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

860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI

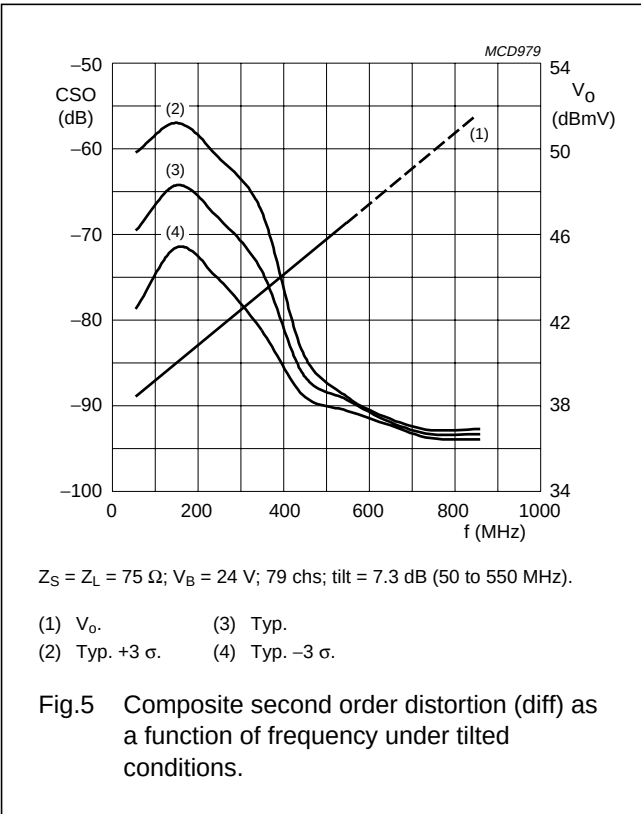
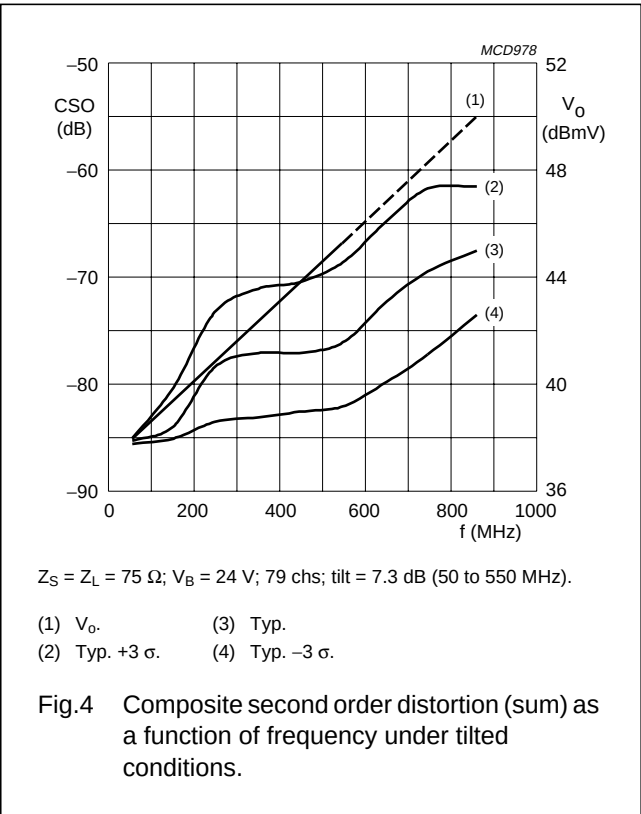
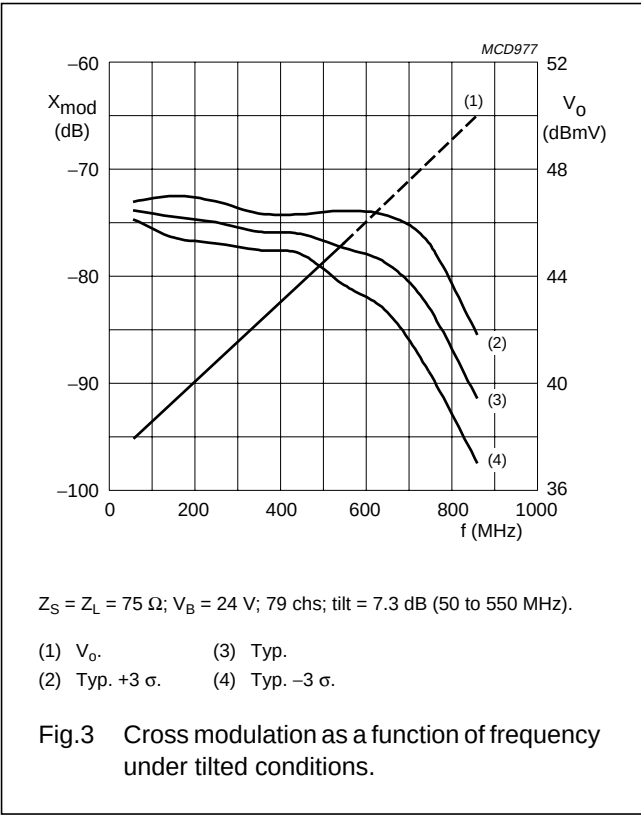
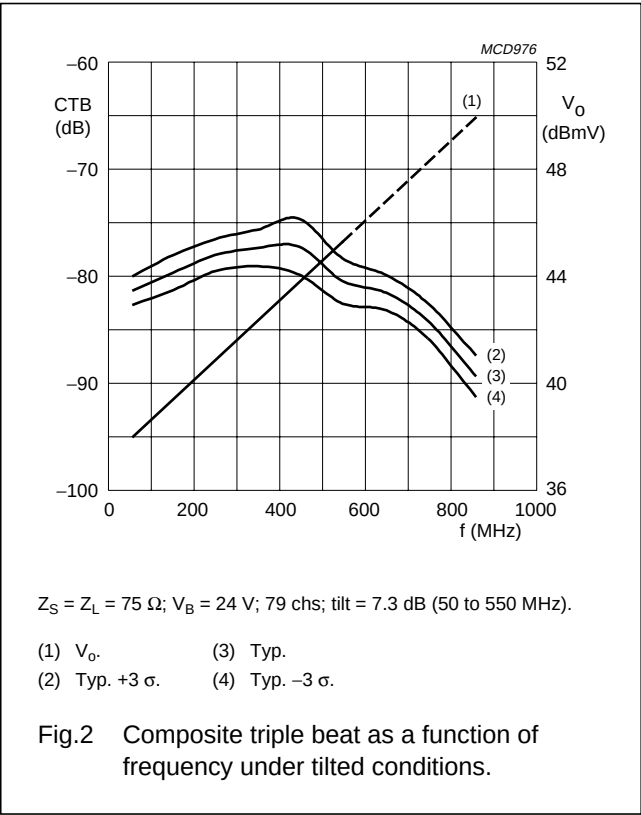
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO Sum	composite second order distortion (sum)	79 chs; $f_m = 446.5$ MHz; note 1	–	–	–71	dB
		112 chs; $f_m = 746.5$ MHz; note 2	–	–	–60	dB
		132 chs; $f_m = 860.5$ MHz; note 3	–	–	–56	dB
		79 chs flat; $V_o = 44$ dBmV; $f_m = 548.5$ MHz	–	–	–63	dB
		112 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.

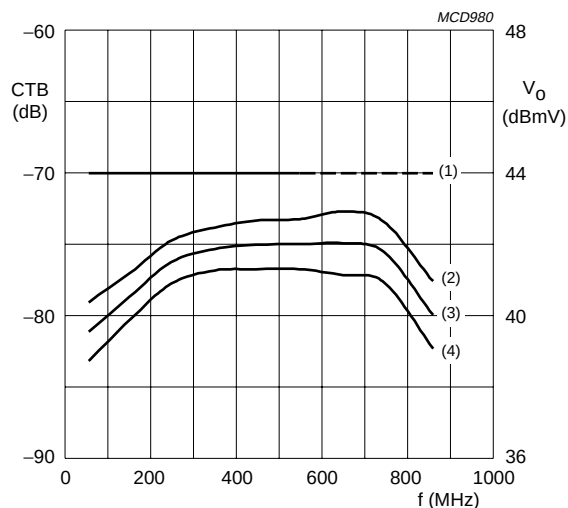
860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI



860 MHz, 20 dB gain power doubler amplifier

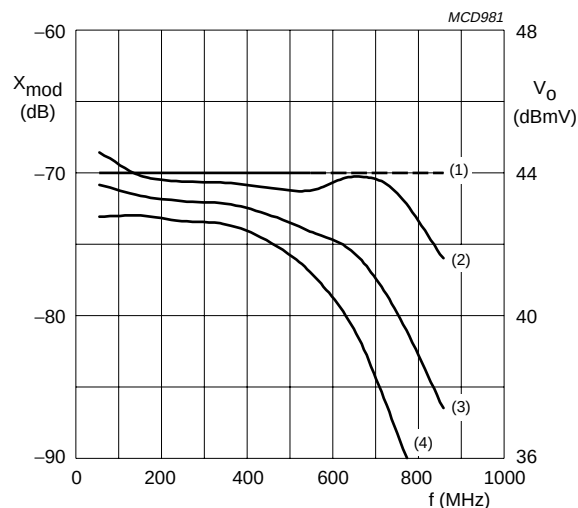
CGD914; CGD914MI



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 79 chs flat (50 to 550 MHz).

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

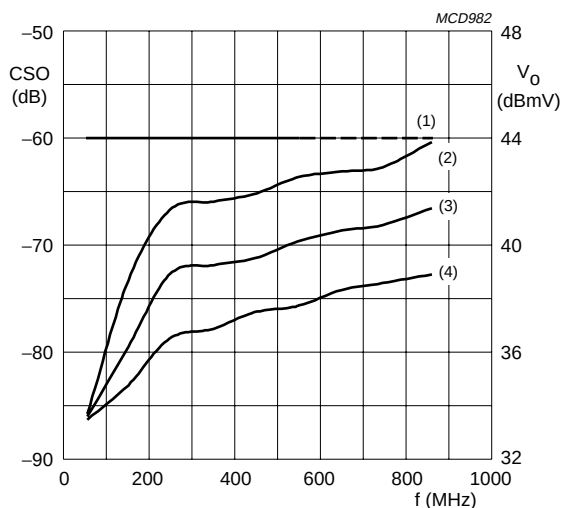
Fig.6 Composite triple beat as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 79 chs flat (50 to 550 MHz).

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

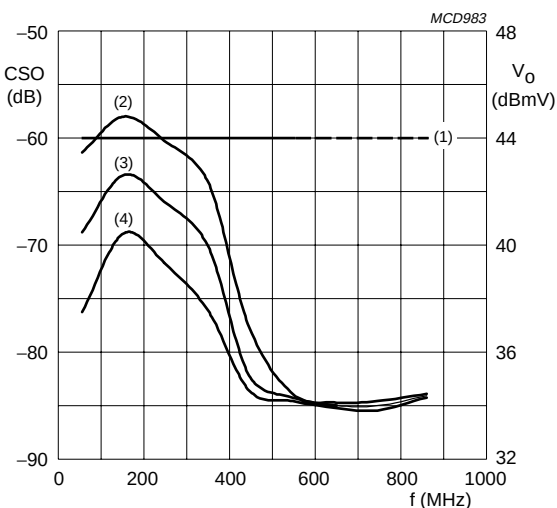
Fig.7 Cross modulation as a function of frequency under flat conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 79 chs flat (50 to 550 MHz).

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

Fig.8 Composite second order distortion (sum) as a function of frequency under flat conditions.



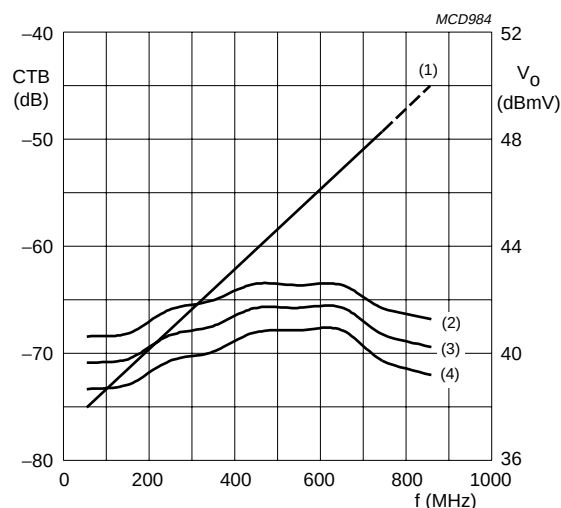
$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 79 chs flat (50 to 550 MHz).

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

Fig.9 Composite second order distortion (diff) as a function of frequency under flat conditions.

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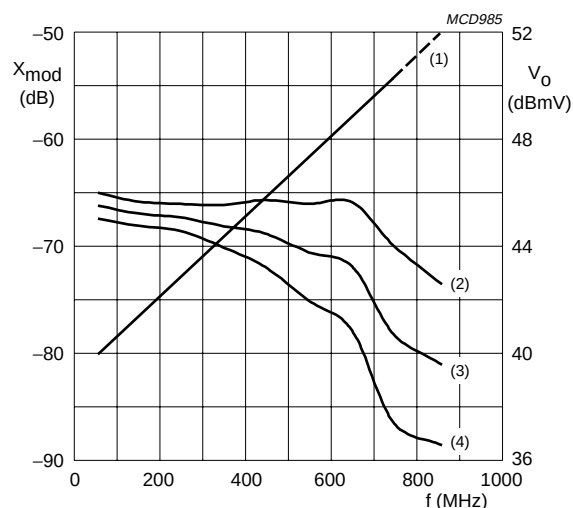
CGD914; CGD914MI



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs; tilt = 10.2 dB (50 to 750 MHz).

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

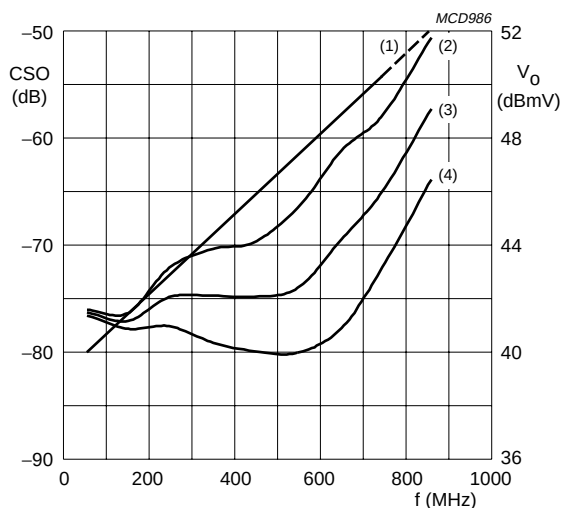
Fig.10 Composite triple beat as a function of frequency under tilted conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs; tilt = 10.2 dB (50 to 750 MHz).

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

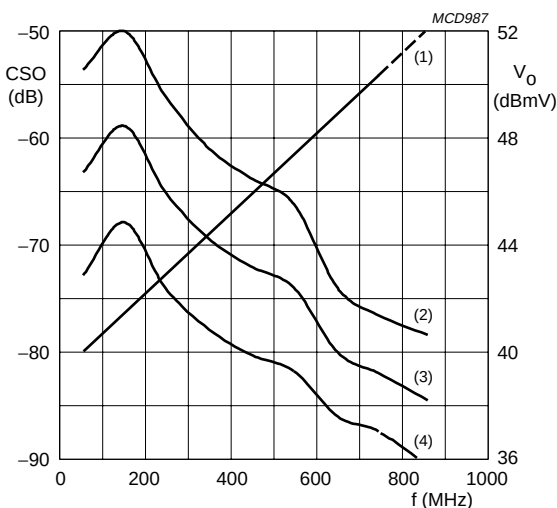
Fig.11 Cross modulation as a function of frequency under tilted conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs; tilt = 10.2 dB (50 to 750 MHz).

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

Fig.12 Composite second order distortion (sum) as a function of frequency under tilted conditions.



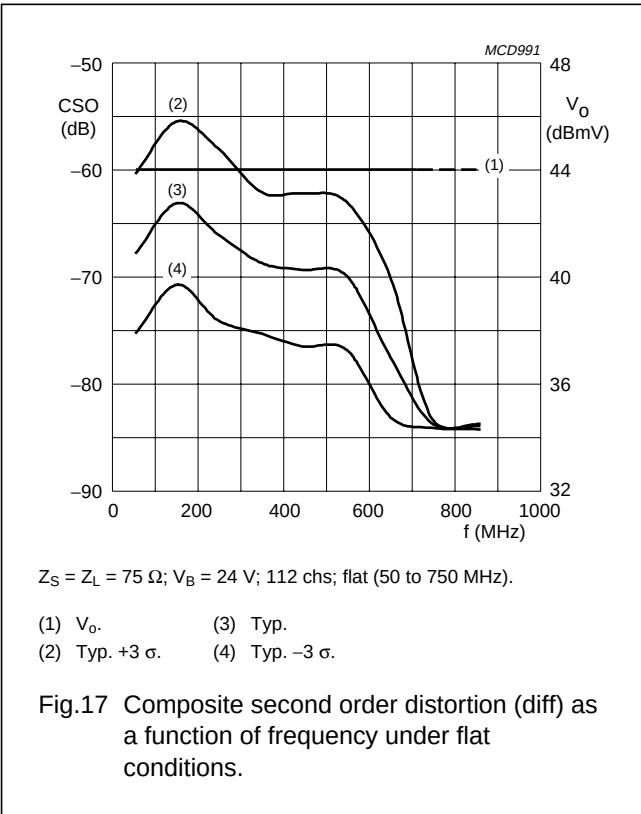
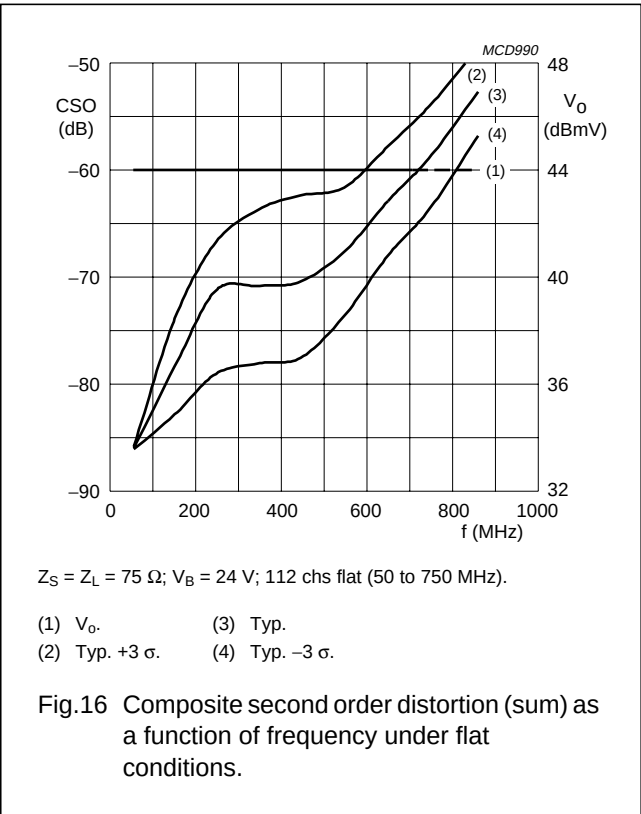
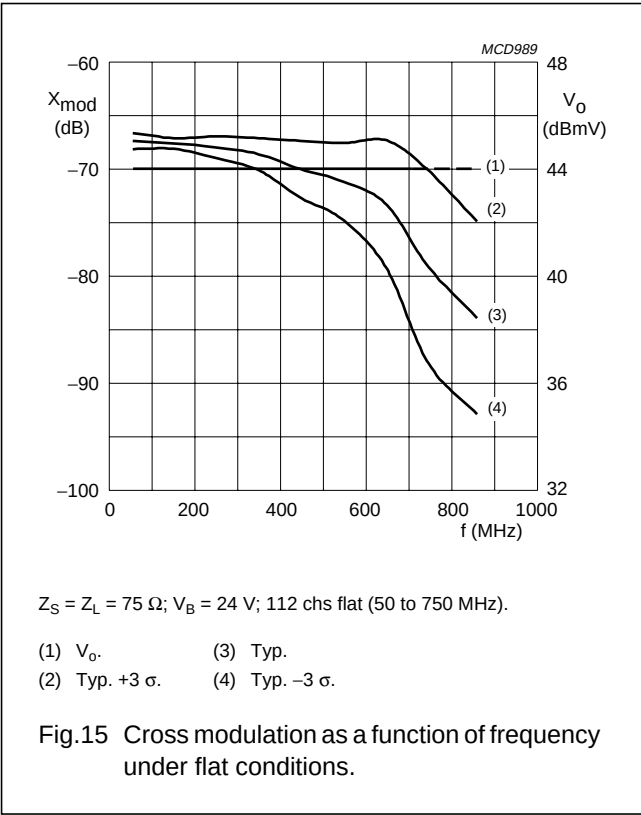
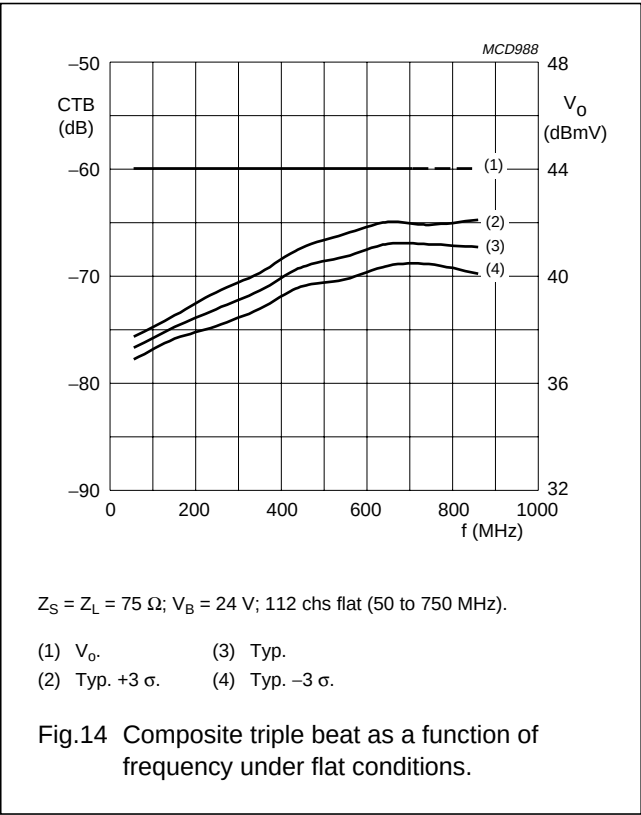
$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 112 chs; tilt = 10.2 dB (50 to 750 MHz).

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

Fig.13 Composite second order distortion (diff) as a function of frequency under tilted conditions.

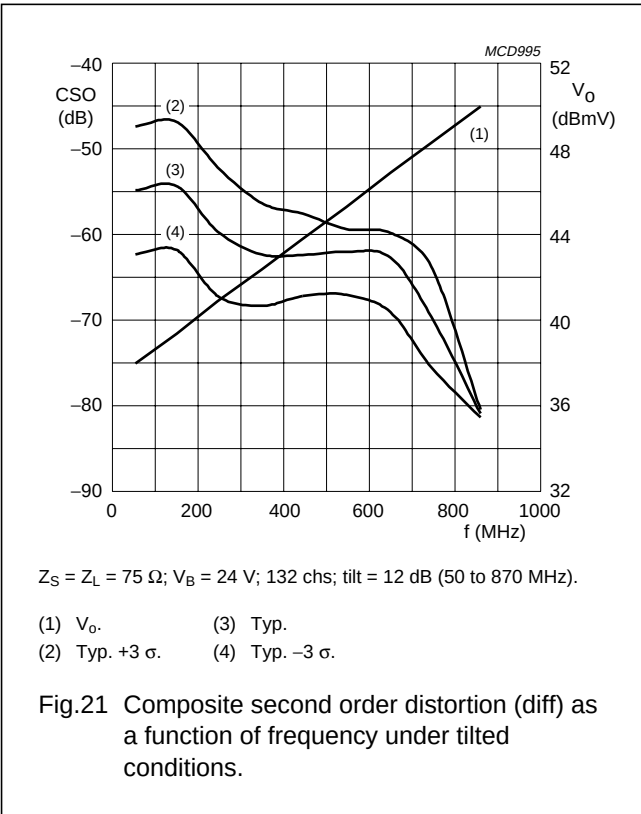
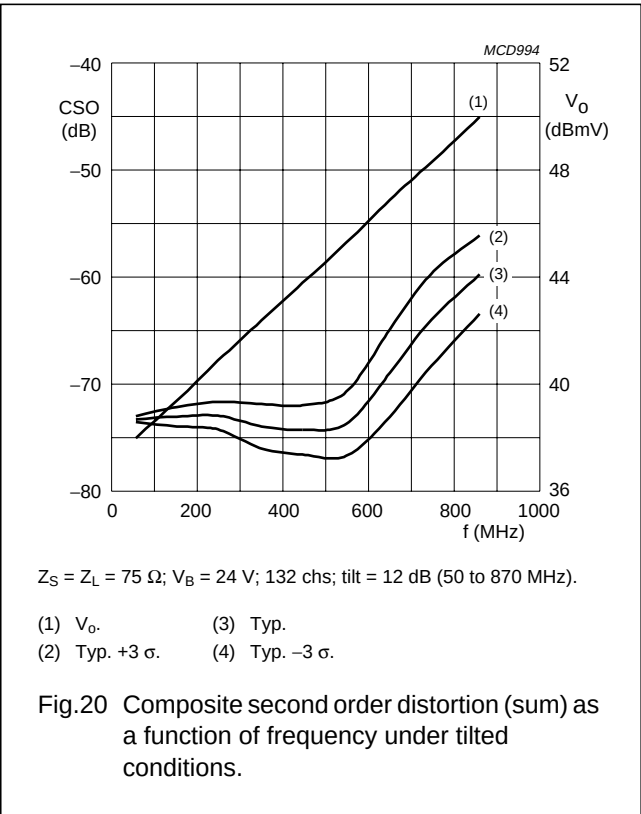
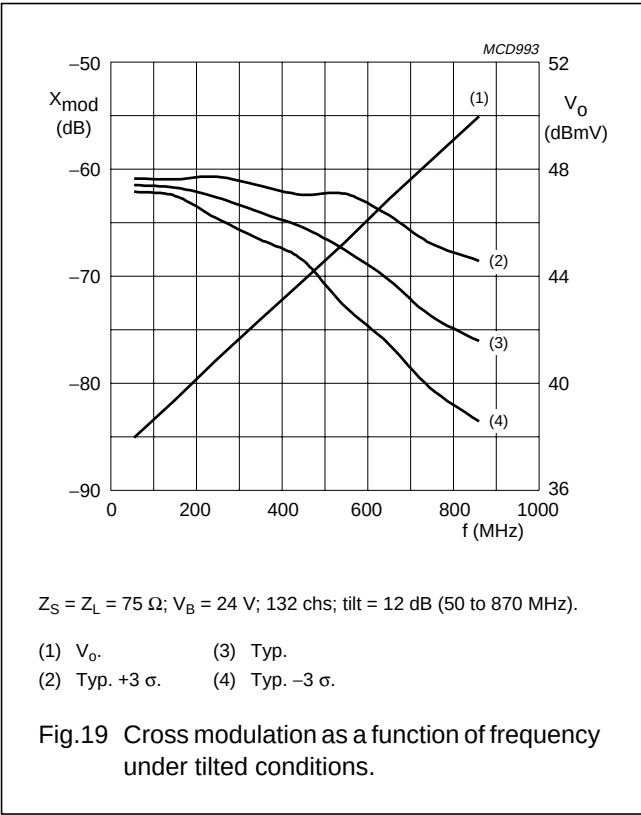
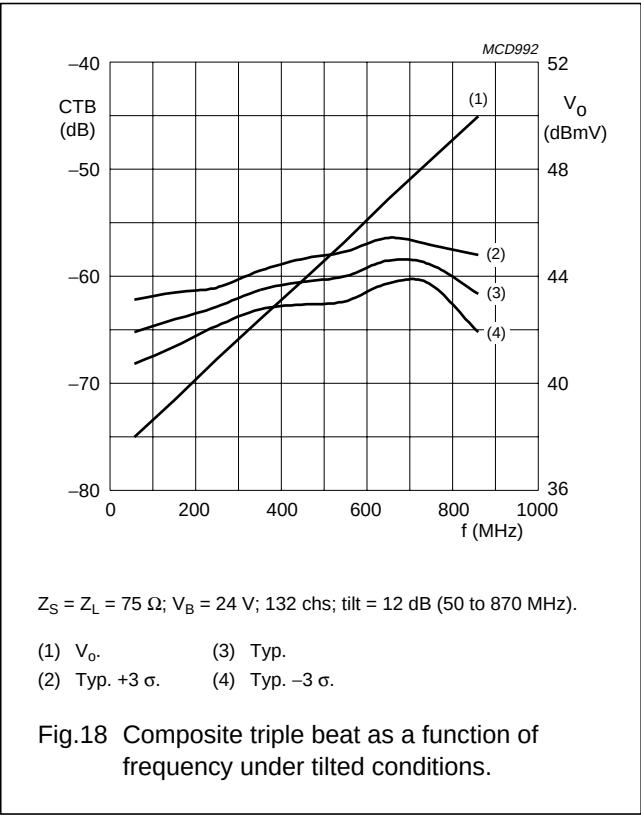
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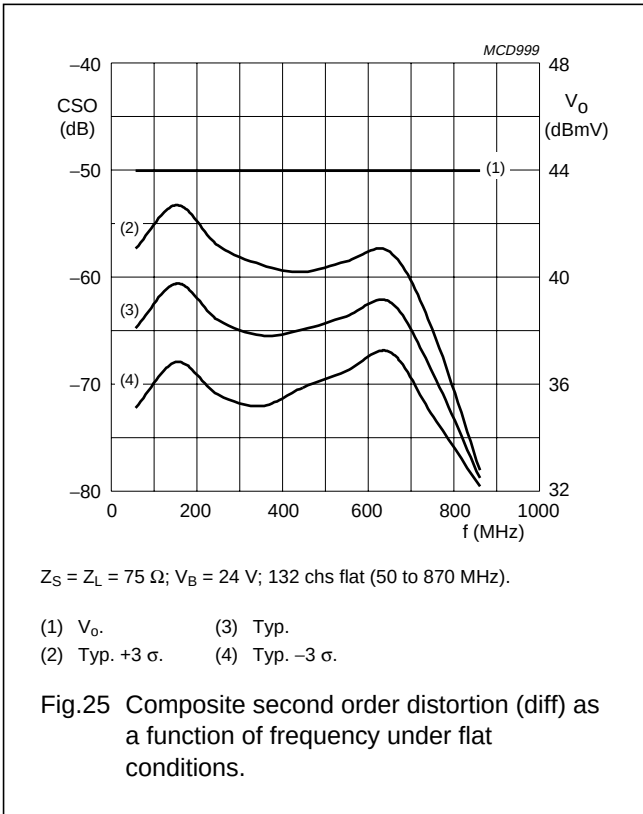
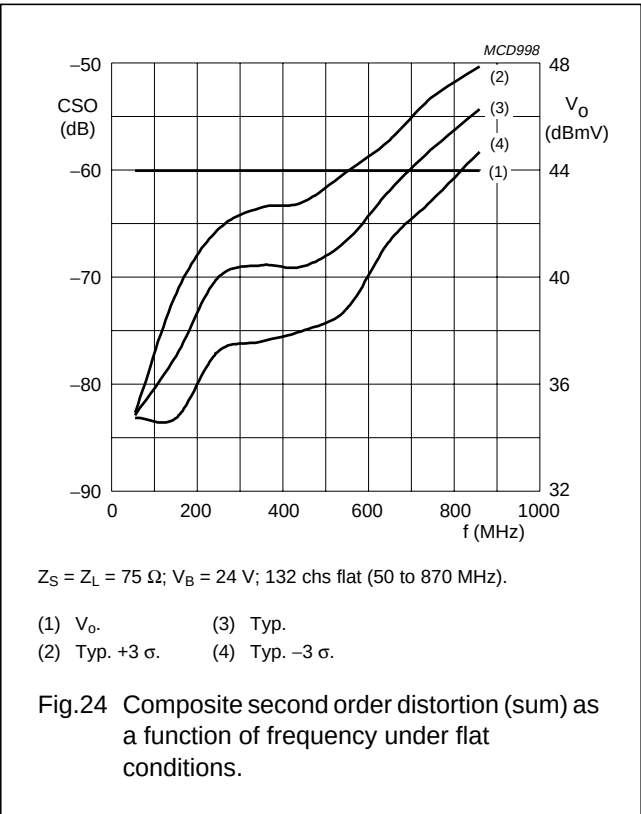
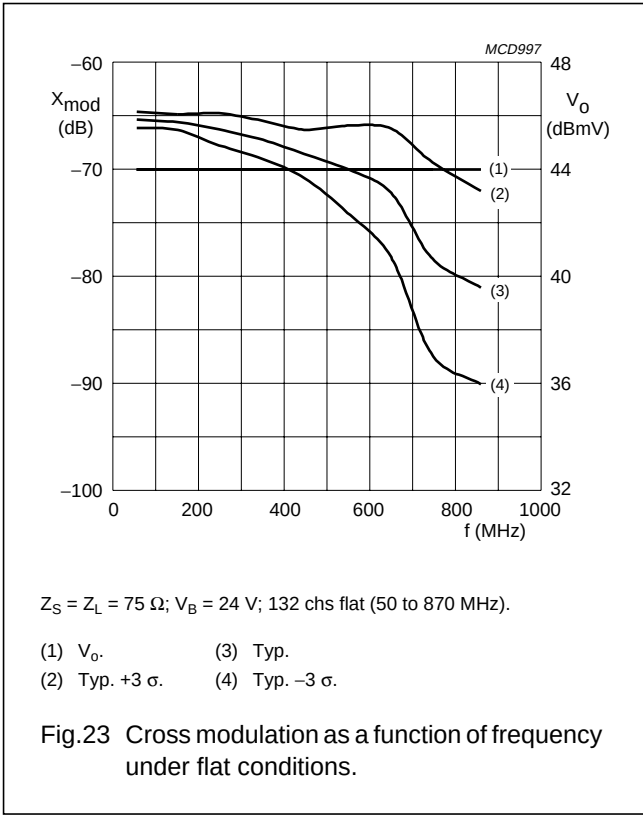
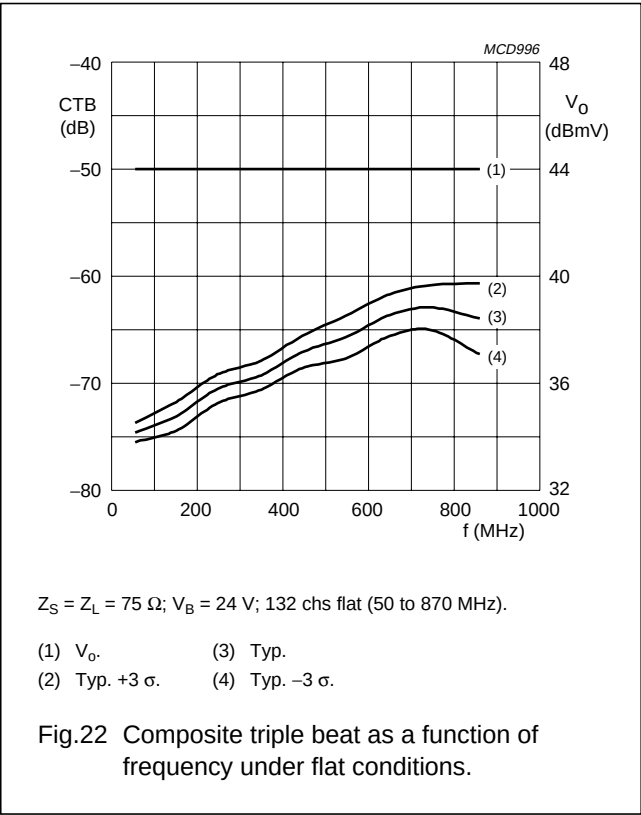
860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI



860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI



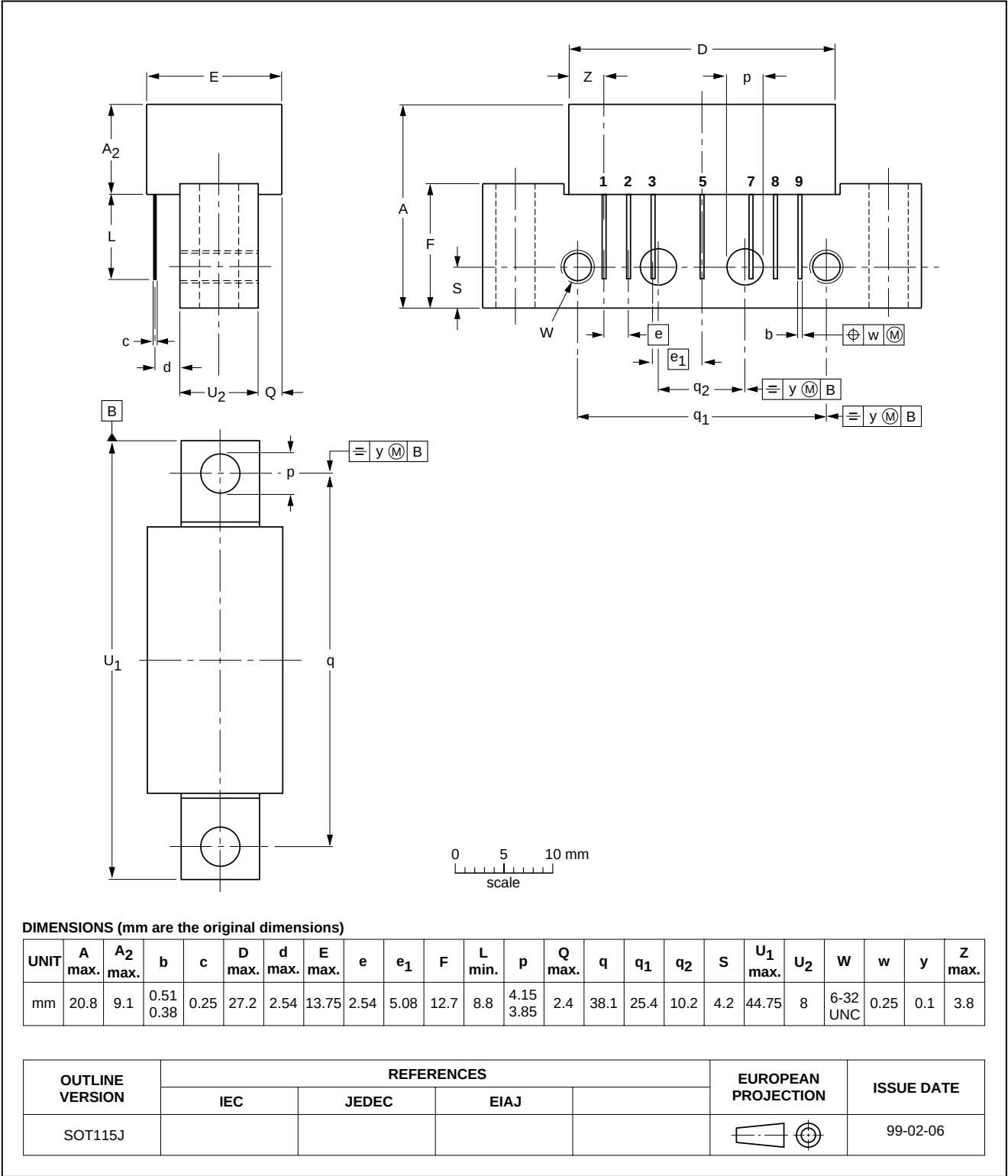
860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI

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



860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI

DATA SHEET STATUS

DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITIONS
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.
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.
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. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A.

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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.

860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI

NOTES

860 MHz, 20 dB gain power doubler amplifierCGD914; CGD914MI

NOTES

860 MHz, 20 dB gain power doubler amplifier

CGD914; CGD914MI

NOTES

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