

INCH-POUND

MIL-DTL-28837/9A

25 October 2006

SUPERSEDING

MIL-M-28837/9

7 February 1985

## DETAIL SPECIFICATION SHEET

## MIXER STAGES, RADIO FREQUENCY, DOUBLE BALANCED, TO CONFIGURATION

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-28837.

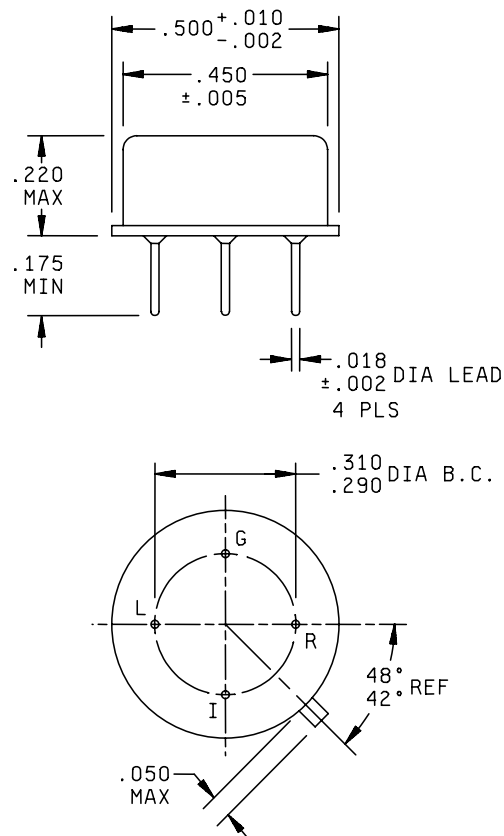


FIGURE 1. Outline drawing for mixers PIN M28837/9-01 through M28837/9-04.

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Ltr	Inches		millimeters	
	Max	Min	Max	Min
A	.510	.498	12.95	12.65
B	.455	.445	11.56	11.30
C	.220	---	5.59	---
D	---	.175	---	4.44
E	.020	.016	0.51	0.41
F	.310 DIA B.C.	.290 DIA B.C.	7.87 DIA B.C.	7.37 DIA B.C.
G	.050	---	1.3	---
H	48° Ref	42° Ref	48° Ref	42° Ref

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents (in millimeters) are given for general information only.
3. Dimensions are in accordance with ASME Y14.5M.

FIGURE 1. Outline drawing for mixers PIN M38837/9-01 through M28837/9-04 - Continued.

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Part or Identifying Number (PIN): M28837/9- (dash number from table I).

REQUIREMENTS:

Design and construction:

Dimensions and configuration: See figure 1.

Electrical characteristics:

Operating frequency range: See table I.

LO drive power: See table I.

Conversion loss (max): See table I.

Noise figure (SSB): See table I.

Isolation (minimum): See table I.

Maximum input power: See table I.

Conversion compression: See table I.

Desensitization (max): See table I.

DC relative polarity: See table I.

VSWR: See table I.

Third order two tone intermodulation: See table I.

Impedance: 50 ohms.

Physical and environmental characteristics:

Weight: .07 ounce (2 grams) maximum.

Temperature:

Operating: -54°C to +100°C.

Non-operating: -65°C to +100°C.

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Shock: Test condition C, MIL-STD-202.

Life: 100,000 hours minimum.

Seal: Hermetic.

Qualification: Not applicable (see note below):

NOTE: When there are no products listed or approved for listing on the qualified products list (QPL) for this specification sheet, acquiring activities shall invoke first article inspection, consisting of meeting all qualification test requirements of MIL-DTL-28837. Acquiring activities may require contractors to furnish first article samples of those mixers that they propose to supply for Government inspection and contractual approval. First article approval is valid only on the contract under which it is granted, unless extended by the Government to another contract. First article inspection is performed by the contractor after award of contract and prior to production.

TABLE I. Electrical characteristics.

Dash no.	Operating frequency range (MHz)	LO input drive power in dBm $\frac{1}{1}$	Maximum conversion loss (SSB) dB (MHz)	Noise figure (SSB) dB (MHz)	Isolation			
					Minimum			Frequency (MHz)
					LO-RF	LO-IF	RF-IF	
					dB	dB	dB	
01N 01S	RF 10-1,000 LO 10-1,000 IF DC-1,200	minimum -3 TV 0 maximum +5	8.5 at $f_L$ and $f_R$ 10-1,000 $f_i$ DC-1,200	Within 1 dB of conversion loss	40	35	30	10-50
					20	25	15	50-750
					15	17	10	750-1,000
02N 02S	RF 10-1,000 LO 10-1,000 IF DC-600	Minimum +17 TV +20 maximum +24	7.5 at $f_L$ and $f_R$ 10-300 $f_i$ 10-200	7.5 at $f_L$ and $f_R$ 10-300 $f_i$ 10-200	35	35		10-100
			9.0 at $f_L$ and $f_R$ 10-300 $f_i$ 1-600	9.0 at $f_L$ and $f_R$ 10-300 $f_i$ 2-600	25	25		100-400
			10 at $f_L$ and $f_R$ 10-1,000 $f_i$ 1-500	10 at $f_L$ and $f_R$ 10-1,000 $f_i$ 2-500			12	400-1,000
								10-1,000
03N 03S	RF 10-1,500 LO 10-1,500 IF DC-800	minimum +7 TV +7 maximum +13	7.2 at $f_R$ 20-600 $f_L$ 10-800 $f_i$ 1-200	7.2 at $f_R$ 20-600 $f_L$ 10-800 $f_i$ 1-200	35	30		10-500
			9.0 at $f_L$ and $f_R$ 10-1,500 $f_i$ 1-800	9.0 at $f_L$ and $f_R$ 10-1,500 $f_i$ 1-800	28	20		500-1200
					25	18		1200-1500

See footnotes at end of table.

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TABLE I. Electrical characteristics - Continued.

Dash no.	RF and LO <u>2/</u> maximum power input (rms)	Conversion compression (maximum)	Desensitization (maximum)	Relative dc polarity <u>3/</u>	VSWR (maximum)			Third order, two tone intermodulation	
					LO	IF	RF	dBm	Frequencies
01N 01S	200 mW	1.0 dB @ P <sub>R</sub> -8 dBm	1.0 dB @ P <sub>R2</sub> -10 dBm	Positive	2.0:1	---	2.0:1	+7 <u>4/</u>	f <sub>L0</sub> : 600 MHz f <sub>R1</sub> : 500 MHz @ -20 dBm f <sub>R2</sub> : 505 MHz @ -20 dBm
02N 02S	500 mW	1.0 dB @ P <sub>R</sub> +20 dBm	1.0 dB @ P <sub>R2</sub> +18 dBm	Negative	2.5:1	2.0:1	3.5:1	+25 <u>4/</u>	f <sub>L0</sub> : 15 MHz @ +23 dBm f <sub>R1</sub> : 10 MHz @ 0 dBm f <sub>R2</sub> : 11 MHz @ 0 dBm
								+23	f <sub>L0</sub> : 400 MHz @ +23 dBm f <sub>R1</sub> : 1000 MHz @ 0 dBm f <sub>R2</sub> : 900 MHz @ 0 dBm
03N 03S	200 mW	1.0 dB @ P <sub>R</sub> 0 dBm	1.0 dB @ P <sub>R2</sub> -2 dBm	Positive	2.1:1	2.8:1	3.0:1	+12 <u>4/</u>  +10	f <sub>L0</sub> : 15 MHz f <sub>R1</sub> : 10 MHz @ -10 dBm f <sub>R2</sub> : 11 MHz @ -10 dBm  f <sub>L0</sub> : 1500 MHz f <sub>R1</sub> : 1400 MHz @ -10 dBm f <sub>R2</sub> : 1410 MHz @ -10 dBm

See footnotes at end of table.

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TABLE I. Electrical characteristics - Continued.

Dash no.	Operating frequency range (MHz)	LO input drive power in dBm <u>1/</u>	Maximum conversion loss (SSB)  dB (MHz)	Noise figure (SSB)  dB (MHz)	Isolation			
					Minimum			Frequency (MHz)
					LO-RF	LO-IF	RF-IF	
					dB	dB	dB	
04N 04S	RF 10-1,600 LO 10-1,600 IF DC-800	Minimum +11 TV +13 Maximum +17	7.5 at $f_L$ 10-800 $f_R$ 20-600 $f_i$ 0.4-200	7.5 at $f_L$ 10-800 $f_R$ 20-600 $f_i$ 0.4-200	35	28		10-500
					28	20		500-1,000
			8.5 at $f_L$ and $f_R$ 10-1,600 $f_i$ 0.4-800	8.5 at $f_L$ and $f_R$ 10-1,600 $f_i$ 0.4-800	25	15		1000-1,600

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See footnotes at end of table.

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TABLE I. Electrical characteristics - Continued.

Dash no.	RF and LO <u>2/</u> maximum power input (rms)	Conversion compression (maximum)	Desensitization (maximum)	Relative dc polarity <u>3/</u>	VSWR (maximum)			Third order, two tone intermodulation	
					LO	IF	RF	dBm	Frequencies
04N 04S	200 mW	1.0 dB @ P <sub>R</sub> +7 dBm	1.0 dB @ P <sub>R2</sub> +5 dBm	Positive	2.8:1	3.0:1	3.0:1	+18	f <sub>LO</sub> : 1,150 MHz f <sub>R1</sub> : 500 MHz @ -5 dBm f <sub>R2</sub> : 505 MHz @ -5 dBm

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1/ Unless otherwise specified, TV is the test value of the LO power for the electrical characteristics.

2/ These values are for +25°C and are derated linearly to +100°C.

3/ With two in-phase signals applied to the LO and RF ports.

4/ Input intercept points.

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Referenced documents. In addition to MIL-DTL-28837, this document references the following: MIL-STD-202 and ASME Y14.5M.

Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:

Army - CR  
Navy - EC  
Air Force - 11  
DLA - CC

Preparing activity:

DLA - CC

(Project 5895-2006-001)

Review activities:

Army - AR, MI  
Navy - AS, CG, MC, OS  
Air Force -19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.