

# FREQUENCY MIXERS

Miniature Ceramic

## High IP3, BROAD BAND (up to 32 dBm) 500 to 5000 MHz

**NEW!**

BLUE CELL™



MCA

MODEL NO.	LO LEVEL (dBm)	RF @ 1dB Comp. Typ. (dBm)	FREQUENCY MHz		CONVERSION LOSS dB			LO-RF ISOLATION dB		LO-IF ISOLATION dB		IP3@ center band Typ. (dBm)	E f a c t o r	CASE STYLE	CONNECTION	PCB Lay-out PL	PRICE \$ ea. Qty. (10-49)
			LO/Rf f <sub>l</sub> -f <sub>u</sub>	IF	-x	σ	Max.	Typ.	Min.	Typ.	Min.						
MCA-35LH*	+10	+6	500-3500	10-1500	6.9	0.1	8.9							DZ883	Id	045	7.95
			500-800	10-300	6.3	0.1	7.7	18	11	32	25	16	0.6				
			800-1000	10-200	7.1	0.1	8.6	24	17	30	23	18	0.8				
			1000-1800	10-800	7.3	0.1	8.9	29	20	28	20	16	0.6				
			1800-2000	10-200	6.3	0.1	8.2	32	25	30	23	16	0.6				
			1800-2500	10-700	5.8	0.1	8.2	32	22	30	21	16	0.6				
MCA-50LH*	+10	+6	1000-5000	10-1500	7.3	0.2	9.9							DZ883	Id	045	8.95
			1000-1400	10-400	6.8	0.1	8.5	20	11	32	25	17	0.7				
			1400-2000	10-600	6.6	0.1	7.7	25	20	32	25	17	0.7				
			2000-2600	10-600	7.8	0.2	9.9	25	18	30	24	18	0.8				
			2600-4500	10-1500	7.8	0.1	8.6	35	20	25	15	15	0.5				
			4500-5000	50-500	8.0	0.2	9.9	35	22	25	15	16	0.6				
MCA-35MH*	+13	+9	500-3500	10-1500	6.9	0.1	8.7							DZ883	Id	045	7.95
			500-800	10-300	6.3	0.1	7.7	18	11	29	23	19	0.6				
			800-1000	10-200	6.5	0.1	7.7	24	17	28	20	22	0.9				
			1000-1800	10-800	6.6	0.1	8.7	29	20	28	20	20	0.7				
			1800-2000	10-200	6.3	0.1	7.7	32	25	29	23	19	0.6				
			1800-2500	10-700	5.8	0.1	7.9	32	22	27	20	19	0.6				
MCA-50MH*	+13	+9	1000-5000	10-1500	7.3	0.2	9.9							DZ883	Id	045	8.95
			1000-1400	10-400	6.2	0.1	7.8	20	11	32	25	20	0.7				
			1400-2000	10-600	6.0	0.1	7.7	34	20	28	20	21	0.8				
			2000-2600	10-600	7.8	0.1	9.9	25	18	28	20	21	0.8				
			2600-4500	10-1500	6.6	0.1	8.6	39	22	30	20	18	0.5				
			4500-5000	50-500	7.3	0.2	8.9	35	22	30	20	21	0.8				
MCA-35H*	+17	+14	500-3500	10-1500	6.9	0.1	8.9							DZ883	Id	045	8.95
			500-800	10-300	6.3	0.1	7.7	18	11	32	20	26	0.9				
			800-1000	10-200	6.4	0.1	7.6	24	17	27	20	26	0.9				
			1000-1800	10-800	6.6	0.1	8.6	29	20	26	20	24	0.7				
			1800-2000	10-200	6.0	0.1	7.6	30	22	26	20	24	0.7				
			1800-2500	10-700	5.8	0.1	7.6	30	22	27	19	22	0.5				
MCA-50H*	+17	+14	1000-5000	10-1500	7.3	0.2	10.2							DZ883	Id	045	9.95
			1000-1400	10-400	6.8	0.1	8.5	25	12	32	20	22	0.5				
			1400-2000	10-600	6.6	0.1	7.7	25	20	32	20	25	0.8				
			2000-2700	10-600	7.8	0.2	9.9	25	15	25	18	23	0.6				
			2700-4500	10-1500	7.8	0.1	8.8	35	20	30	18	23	0.6				
			4500-5000	50-500	8.0	0.2	10.2	30	18	35	18	21	0.4				

E = [IP3(dBm)-LO Power(dBm)]/10

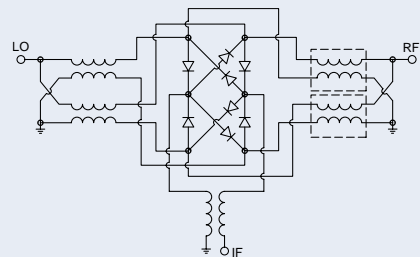
### features

- wide bandwidth, 500 to 5000 MHz
- excellent isolation, up to 35 dB typ.
- small size 0.25"x0.3"x0.2"
- LTCC triple balanced mixer
- MCA mixers protected under US Patent 6,917,796

### applications

- cellular
- PCN
- PDC
- DECT
- PHS
- satellite
- line of sight links

triple balanced mixer schematic



# Miniature Plastic Metal



ADE



SYM



TUF-SM

MODEL NO.	LO LEVEL (dBm)	RF @ 1dB Comp. Typ. (dBm)	FREQUENCY MHz		CONVERSION LOSS dB				LO-RF ISOLATION dB		LO-IF ISOLATION dB			IP3@ center band Typ. (dBm)	E f a c t o r	CASE STYLE	C O N N E C T I O N	PCB Lay-out PL	PRICE \$ ea. Qty. (10-49)							
			LO/RF f <sub>L</sub> -f <sub>U</sub>	IF	Mid-Band m	Total Range Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.							Min.						
◆ ADE-10H**	+17	+14	400-1000	DC-500	7.0	.10	—	8.5	39	29	25	17	30	1.3	CD542	jw	051	7.95								
◆ ADE-12H**	+17	+14	500-1200	DC-250	6.7	.20	—	8.2	34	25	28	20	28	1.1	CD542	ju	051	8.95								
SYM-10DH	+17	+14	800-1000	20-200	7.6	—	—	9.3	45	34	29	20	31	1.4	TTT167	x	079	9.95								
SYM-14H	+17	+14	100-1370	10-1000	6.5	.20	7.4	8.9	36	28	30	24	30	1.3	TTT167	x	079	9.95								
SYM-20DH	+17	+14	1700-2000	10-300	6.7	.16	—	8.2	35	22	34	22	32	1.5	TTT167	x	079	9.95								
SYM-22H	+17	+14	1500-2200	DC-200	5.6	.30	—	8.8	33	22	38	22	30	1.3	TTT167	x	079	9.95								
SYM-24DH	+17	+14	1400-2400	10-250	7.0	.20	—	9.3	32	22	36	23	29	1.2	TTT167	x	079	9.95								
TUF-18DHSM	+17	+10	100-1800	50-750	7.3	.15	8.5	9.0	41	23	33	20	27	1.0	NNN150	z	081	23.95*								
SYM-18H	+17	+14	5-1800	10-1500†	5.75	.10	7.6	8.9	50	28	45	35	40	24	39	22	50	30	30	22	30	1.3	TTT167	x	079	9.95
SYM-20DHW	+17	+14	10-2000	10-1800	6.2	.10	7.5	8.8	33	20	40	25	37	22	44	30	42	28	34	22	27	1.0	TTT167	x	079	17.95*
SYM-25DHW	+17	+14	80-2500	DC-1000†	6.4	.10	8.0	8.6	46	29	37	25	35	20	38	26	33	24	36	20	30	1.3	TTT167	x	079	9.95
NEWSYM-30DHW	+17	+14	5-3000	5-1500	6.5	.10	8.3	9.1	36	24	40	30	40	25	42	28	44	36	48	33	29	1.2	TTT167	x	079	10.95

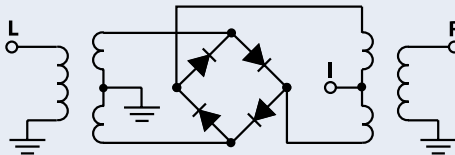
E= [(IP3(dBm)-LO Power(dBm)]/10

L = low range [f<sub>L</sub> to 10 f<sub>L</sub>]

M = mid range [10 f<sub>L</sub> to f<sub>U</sub>/2]  
m = mid band [2f<sub>L</sub> to f<sub>U</sub>/2]

U = upper range [f<sub>U</sub>/2 to f<sub>U</sub>]

### double balanced mixer schematic



### NOTES:

- ⌘ Average of conversion loss at center of mid-band frequency (f<sub>L</sub>+f<sub>U</sub>)/4
- σ Standard deviation
- ◆ Aqueous washable
- ‡ Conversion loss increases up to 6 dB higher as IF frequency decreases from 5 MHz to DC.
- ‡ Conversion loss measured at IF frequency between 10 and 1300 MHz.
- \* Price 1-9
- \* Patent pending
- \*\* Protected under U.S. Patent 6133525
- A. Environmental specifications and re-flow soldering information available in General Information Section.
- B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
- 1. Absolute maximum power, voltage and current ratings:
  - 1a. RF power, 200 mW (LO levels 13&17); 50mW (level 10)
  - 1b. Peak IF current, 40 mA

### NSN GUIDE

MCL NO. NSN  
SYM-18H 5895-01-483-0503

### pin connections

see case style outline drawings

PORT	jv	jw	ld	x	z
LO	6	4	10	2	4
RF	4	6	5	1	1
IF	3	3	3	3	2
GND EXT.	1,2,5	1,2,5	all others	4,5,6	3
CASE GND	—	—	—	—	3
DEMO BOARD	TB-02	TB-02	TB-144	TB-12	TB-201