

MIXERS

DOUBLE -BALANCED

$LO = +7 \text{ dBm}$

LOW POWER CONSUMPTION

SURFACE MOUNT



FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			PACKAGE	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
0.5-500	DC-500	5.5/7	6/8.5	55/50	35/25	30/20	55/45	30/25	25/20	159	1	SLD-K1*
0.5-500	DC-500	5.5/7	6/8.5	55/50	35/25	30/20	55/45	30/25	25/20	134	1	SMD-K1*
0.5-500	DC-500	5.5/7	6/8.5	55/50	35/25	30/20	55/45	30/25	25/20	134J	1	SMZ-K1*
2-750	DC-750	6/7.5	6/8.5	70/45	45/28	38/22	60/45	40/25	30/20	159	1	SLD-K1W*
2-750	DC-750	6/7.5	6/8.5	70/45	45/28	38/22	60/45	40/25	30/20	134	1	SMD-K1W*
2-750	DC-750	6/7.5	6/8.5	70/45	45/28	38/22	60/45	40/25	30/20	134J	1	SMZ-K1W*
5-1000	DC-1000	6.5/8	7/9	60/40	40/20	25/20	55/30	30/20	20/12	159	1	SLD-K2*
5-1000	DC-1000	6.5/8	7/9	60/40	40/20	25/20	55/30	30/20	20/12	134	1	SMD-K2*
5-1000	DC-1000	6.5/8	7/9	60/40	40/20	25/20	55/30	30/20	20/12	134J	1	SMZ-K2*
5-1000	DC-1000	6.5/8	7/9	60/40	40/30	33/22	55/30	40/22	30/20	159	1	SLD-K2D*
5-1000	DC-1000	6.5/8	7/9	60/40	40/30	33/22	55/30	40/22	30/20	134	1	SMD-K2D*
5-1000	DC-1000	6.5/8	7/9	60/40	40/30	33/22	55/30	40/22	30/20	134J	1	SMZ-K2D*
5-1200	DC-500	6.8/8	8/9	60/40	60/30	37/22	60/40	48/20	31/15	134J	1	SMZ-K2W*
10-1000	10-750	6.5/8	8/9.5	55/40	40/30	30/25	55/30	35/25	30/22	159	1	SLD-K2U*
10-1000	10-750	6.5/8	8/9.5	55/40	40/30	30/25	55/30	35/25	30/22	134	1	SMD-K2U*
10-1000	10-750	6.5/8	8/9.5	55/40	40/30	30/25	55/30	35/25	30/22	134J	1	SMZ-K2U*
5-1500	DC-1000	6.5/7.5	7.5/9.5	60/40	40/20	30/18	55/30	30/18	15/8	159	1	SLD-K3*
5-1500	DC-1000	6.5/7.5	7.5/9.5	60/40	40/20	30/18	55/30	30/18	15/8	134	1	SMD-K3*
5-1500	DC-1000	6.5/7.5	7.5/9.5	60/40	40/20	30/18	55/30	30/18	15/8	134J	1	SMZ-K3*

NOTES:

- * Phase Detection, Polarity Positive
- 1. 1dB Compression Point = +1 dBm (Typ)
- 2. IP3 (Input) = +13 dBm (Typ)
- 3. Maximum Input Power without damage = 100 mW ave. cw

PIN-OUT TABLE

	RF	LO	IF	GND
#1	4	1	5	2,3,6

GND = Ground externally
For pin location and package outline drawings, see back pages.

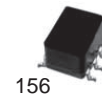
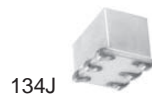
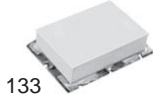
XMB= 2LF to HF/2
FULL BAND = LF to HF
LB= LF to 10LF
MB = 10LF to HF/2
UB= HF/2 to HF

MIXERS

DOUBLE -BALANCED

$LO = +7 \text{ dBm}$

LOW POWER CONSUMPTION



SURFACE MOUNT

FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			PACKAGE	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
5-1900	5-1000	7.2/8.2	8.5/9.8	58/45	35/22	30/20	56/45	37/20	27/20	159	2	SLD-K11X*
5-1900	5-1000	7.2/8.2	8.5/9.8	58/45	35/22	30/20	56/45	37/20	27/20	134	2	SMD-K11X*
5-1900	5-1000	7.2/8.2	8.5/9.8	58/45	35/22	30/20	56/45	37/20	27/20	134J	2	SMZ-K11X*
1500-1900	40-400	--/--	7.8/9	25/17	25/17	25/17	23/15	23/15	23/15	159	2	SLD-K11A*
1500-1900	40-400	--/--	7.8/9	25/17	25/17	25/17	23/15	23/15	23/15	134	2	SMD-K11A*
1500-1900	40-400	--/--	7.8/9	25/17	25/17	25/17	23/15	23/15	23/15	134J	2	SMZ-K11A*
5-2500	3-600	8/9.5	10.5/12	60/35	40/25	35/20	50/35	30/20	25/15	159	1	SLD-K4
5-2500	3-600	8/9.5	10.5/12	60/35	40/25	35/20	50/35	30/20	25/15	134	1	SMD-K4
5-2500	3-600	8/9.5	10.5/12	60/35	40/25	35/20	50/35	30/20	25/15	134J	1	SMZ-K4
200-3000	DC-1000	6.5/9	9/9.8	27/17	27/17	27/17	20/7	20/7	20/7	159	1	SLD-K6*
200-3000	DC-1000	6.5/9	9/9.8	27/17	27/17	27/17	20/7	20/7	20/7	134	1	SMD-K6*
200-3000	DC-1000	6.5/9	9/9.8	27/17	27/17	27/17	20/7	20/7	20/7	134J	1	SMZ-K6*
1-1000	DC-1000	6.5/7.5	7.5/9.5	70/45	45/30	40/25	60/40	35/23	30/15	133	3	SMD-C1
20-1500	DC-1500	7/8.5	8.5/9	50/35	40/25	20/10	40/25	30/18	15/8	133	3	SMD-C2
20-2500	20-600	8/9	9/10.5	45/30	30/23	30/15	40/20	25/15	25/12	133	3	SMD-C3
15-2000	DC-1500	7/9	8/10.5	70/30	30/20	20/13	50/30	20/15	20/10	133	3	SMD-C4♦
1-500	DC-500	5.5/7	6.5/8.5	60/45	45/35	40/25	45/35	40/25	30/20	154	4	SSM-1
5-1000	DC-1000	6.5/8	7/9	60/40	40/20	25/20	55/30	30/20	20/12	154	4	SSM-2
1-600	DC-600	5.5/7	6/8.5	50/30	35/25	30/20	45/35	30/20	20/15	156	1	SM-5
5-1000	DC-1000	6.5/8	7/9	60/40	35/18	26/16	50/30	25/17	15/10	156	1	SM-5E
2-600	DC-600	5.5/7	7/8	60/50	42/30	37/25	60/45	47/30	36/22	106B	5	TOP-1Z
50-1000	DC-1000	6/7	7.8/9	58/45	45/30	38/25	50/35	40/20	35/18	106B	5	TOP-2Z
20-1500	DC-1000	7.5/8	8.5/9	54/40	42/30	39/25	40/25	32/18	23/8	106B	5	TOP-5Z

NOTES:

- 1dB Compression Point = +1 dBm (Typ)
 - IP3 (Input) = +13 dBm (Typ)
 - Maximum Input Power without damage = 100 mW ave. cw
- * Phase Detection, Polarity Positive
♦ Specifications apply when RF > LO

XMB= 2LF to HF/2
FULL BAND = LF to HF
LB= LF to 10LF
MB = 10LF to HF/2
UB= HF/2 to HF

PIN-OUT TABLE

	RF	LO	IF	GND	CASE GND
#1	4	1	5	2,3,6	--
#2	5	1	4	2,3,6	--
#3	1	2	3	All Other	--
#4	1	8	**3,4	2,5,6,7	--
#5	1	4	2	3	3

GND = Ground externally

** Connect pins 3,4 together externally

For pin location and package outline drawings, see back pages.

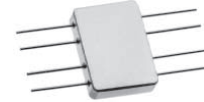
MIXERS

DOUBLE -BALANCED

$LO = +7 \text{ dBm}$

LOW POWER CONSUMPTION

FLAT-PACK



FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			Package	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
0.01-125	DC-125	5.5/6	6/6.5	60/50	50/40	40/35	60/45	50/35	40/30	101	1	CLF-102
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	101	1	CLF-112
0.04-400	DC-400	5.3/7	6/8	60/50	50/35	35/25	45/40	35/25	25/20	101	1	CLF-1R3
0.1-500	DC-500	6/7	7/8	65/40	60/40	50/30	45/30	50/35	35/20	101	1	CLF-101
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	101	1	CLF-103
10-1500	DC-1500	6/7	7/10	55/40	45/35	30/20	50/40	40/25	20/12	101	1	CLF-1A5
20-1500	DC-1000	7.5/8.5	8/9	60/35	40/25	25/20	50/30	40/25	20/12	101	1	CLF-111
10-2000	5-600	7/8.5	7.5/9	60/35	40/25	40/20	50/30	30/20	25/15	101	1	CLF-109
700-2000	DC-300	--/--	6/8	35/20	35/20	35/20	20/12	20/12	20/12	101	1	CLF-1F6
800-2500	DC-400	--/--	6.5/8.5	30/20	30/20	30/20	20/10	20/10	20/10	101	1	CLF-104

NOTES:

- 1dB Compression Point = +1 dBm (Typ)
- IP3 (Input) = +13 dBm (Typ)
- Maximum Input Power without damage = 100 mW ave. cw

XMB= 2LF to HF/2
 FULL BAND = LF to HF
 LB= LF to 10LF
 MB = 10LF to HF/2
 UB= HF/2 to HF

PIN-OUT TABLE

	RF	LO	IF	GND
#1	1	4	5	All Other

GND = Ground externally

For pin location and package outline drawings, see back pages.

MIXERS

DOUBLE -BALANCED

$LO = +7 \text{ dBm}$

LOW POWER CONSUMPTION

THROUGH HOLE (RELAY)



FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			PACKAGE	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
0.0005-10	DC-10	6.5/7.5	7/8.5	60/50	50/40	45/35	60/50	50/40	45/35	102	2	CLP-2D1
0.003-100	DC-100	5.5/7.5	6.5/8.5	60/50	45/30	35/25	60/45	40/25	30/20	102	2	CLP-2C1
0.01-125	DC-125	5.5/6	6/6.5	60/50	50/40	40/35	60/45	50/35	40/30	102	1	CLP-202
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	103	1	CLP-212
0.025-200	DC-200	5.5/7.5	6.5/8.5	60/50	45/35	35/25	45/35	40/30	30/20	102	1	CLP-2C2
0.025-200	DC-200	5.5/7.5	6.5/8.5	55/50	45/30	35/25	45/35	40/30	30/20	120	2	CLP-2B2**
0.1-500	DC-500	6/7	7/8.0	65/40	60/40	50/30	45/30	50/35	35/20	103	1	CLP-201
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	103	1	CLP-203
1-750	DC-750	5.5/7.5	6.5/8.5	50/45	45/30	35/25	45/30	40/25	30/20	102	2	CLP-2D4
1-1000	0.5-500	5.5/7.5	6.5/8.5	45/30	35/20	30/20	45/30	30/20	30/20	102	2	CLP-2F4
5-1000	DC-1000	6/7	6.5/8.5	60/50	35/30	30/25	50/45	30/25	25/20	102	2	CLP-2G4
10-1000	DC-500	6.5/7.5	7/9	50/40	35/25	25/20	40/25	25/18	19/15	120	4	CLP-2C4**
5-1250	0.5-500	5.5/7.5	6.5/8.5	50/40	40/20	30/20	50/40	40/20	30/20	102	3	CLP-2D5
5-1500	10-600	7/8	7.5/8.5	50/45	35/30	30/20	45/40	30/25	25/15	120	5	CLP-2E5
20-1500	DC-1000	7.5/8.5	8/9	60/35	40/25	25/20	50/30	40/25	20/12	102	2	CLP-211
5-2000	10-600	7/8.5	7.5/9	50/45	35/25	30/20	45/40	30/20	25/15	120	5	CLP-2A6
10-2000	5-600	7/8.5	7.5/9	60/35	40/25	40/20	50/30	30/20	25/15	120	5	CLP-209
100-2000	DC-600	6/9.5	7/9.5	37/20	37/20	37/20	30/20	30/20	30/20	120	5	CLP-2C6
800-2500	DC-400	--/--	6.5/8.5	30/20	30/20	30/20	20/10	20/10	20/10	120	4	CLP-204

NOTES:

- 1dB Compression Point = +1 dBm (Typ)
 - IP3 (Input) = +13 dBm (Typ)
 - Maximum Input Power without damage = 100 mW ave. cw
- ** Non-hermetic

XMB= 2LF to HF/2
 FULL BAND = LF to HF
 LB= LF to 10LF
 MB = 10LF to HF/2
 UB= HF/2 to HF

PIN-OUT TABLE

	RF	LO	IF	GND	CASE GND	NO CONN
#1	1	8	*3,4	2,5,6,7	2	--
#2	1	8	*3,4	2,5,6,7	2,5,6,7	--
#3	*3,4	8	1	2,5,6,7	2,5,6,7	--
#4	8	1	3	2,5,6,7	2,5,6,7	4
#5	1	8	3	2,5,6,7	2,5,6,7	4

GND = Ground externally

* Connect pins 3,4 together externally

For pin location and package outline drawings, see back pages.

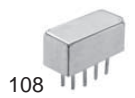
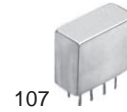
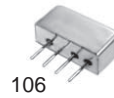
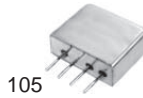
MIXERS

DOUBLE -BALANCED

$LO = +7 \text{ dBm}$

LOW POWER CONSUMPTION

THROUGH HOLE (MINI-RELAY)



FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			PACKAGE	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
0.01-125	DC-125	5.5/6	6/6.5	60/50	50/40	40/35	60/45	50/35	40/30	105	1	CLP-302
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	105	1	CLP-312
0.04-400	DC-400	5.5/7	6/8	60/50	50/35	35/25	55/40	45/30	35/25	106	1	CLP-3P3
0.1-500	DC-500	6/7	7/8	65/40	60/40	50/30	45/30	50/35	35/20	106	1	CLP-301
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	106	1	CLP-303
5-1250	DC-1250	6/7.5	7.5/8.5	50/45	40/30	30/25	45/40	35/25	25/20	106	1	CLP-3M5
5-1500	DC-1000	6.5/8.5	8/9.5	60/45	35/25	30/25	60/40	35/15	25/14	106	1	CLP-3L5
20-1500	DC-1000	7.5/8.5	8/9	60/35	40/25	25/20	50/30	40/25	20/12	106	1	CLP-311
1-2000	5-600	7/8.5	7.5/9	50/45	35/25	25/10	45/40	27/20	25/20	105	1	CLP-3D6
10-2000	5-600	7/8.5	7.5/9	60/35	40/25	40/20	50/30	30/20	25/15	105	1	CLP-309
800-2500	DC-400	--/--	6.5/8.5	30/20	30/20	30/20	20/10	20/10	20/10	106	1	CLP-304
1000-3500	DC-1000	--/--	7.5/9.5	30/17	30/17	30/17	20/8	20/8	20/8	106	1	CLP-307
0.01-125	DC-125	5.5/6	6/6.5	60/50	50/40	40/35	60/45	50/35	40/30	107	2	CLP-402
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	107	2	CLP-412
0.1-500	DC-500	5.5/7	6.5/8.5	60/50	50/35	35/30	50/40	45/30	30/20	107	2	CLP-4A3
0.1-500	DC-500	6/7	7/8	65/40	60/40	50/30	45/30	50/35	35/20	108	2	CLP-401
1-600	DC-600	6/7.5	6.5/8.5	60/45	45/35	35/25	55/45	40/30	35/25	108	2	CLP-4N4
1-600	DC-600	5.5/7	6.5/8.5	55/45	45/30	35/20	50/40	40/25	30/20	107	2	CLP-4A4
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	108	3	CLP-403
1-1000	DC-1000	6/7.5	7/9.5	55/45	40/25	35/20	50/40	40/25	30/25	107	3	CLP-4B4
1-1000	DC-1000	6/7.5	7/10	55/45	40/20	35/18	50/40	40/20	25/18	108	2	CLP-4Q4
5-1250	0.5-1000	6.5/8.5	6.5/8.5	55/40	35/25	30/20	50/40	35/25	30/20	107	4	CLP-4B5
5-1500	0.5-1000	6.5/7.5	6.5/8.5	55/40	35/25	30/20	50/40	35/25	30/20	107	4	CLP-4C5
20-1500	DC-1000	7.5/8.5	8/9	60/35	40/25	25/20	50/30	40/25	20/12	107	3	CLP-411

NOTES:

- 1dB Compression Point = +1 dBm (Typ)
- IP3 (Input) = +13 dBm (Typ)
- Maximum Input Power without damage = 100 mW ave. cw

XMB= 2LF to HF/2
 FULL BAND = LF to HF
 LB= LF to 10LF
 MB = 10LF to HF/2
 UB= HF/2 to HF

PIN-OUT TABLE

	RF	LO	IF	GND	CASE GND
#1	1	4	2	3	3
#2	1	8	*3,4	2,5,6,7	2
#3	1	8	*3,4	2,5,6,7	2,5,6,7
#4	*3,4	8	1	2,5,6,7	2,5,6,7

* Pins must be connected together externally
 GND = Ground externally
 For pin location and package outline drawings, see back pages.

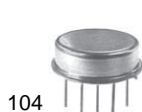
MIXERS

DOUBLE -BALANCED

$LO = +7 \text{ dBm}$

LOW POWER CONSUMPTION

PLUG-IN (TO-CAN)



FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			PACKAGE	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
0.01-125	DC-125	5.5/6	6/6.5	60/50	50/40	40/35	60/45	50/35	40/30	104	1	CLP-502
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	104	1	CLP-512
0.1-500	DC-500	6/7	7/8	65/40	60/40	50/30	45/30	50/35	35/20	104	1	CLP-501
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	104	1	CLP-503
800-2500	DC-400	--/--	6.6/8.5	30/20	30/20	30/20	20/10	20/10	20/10	104	1	CLP-504
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	122	2	CLP-612
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	122	2	CLP-603
20-1500	DC-1000	7.5/8.5	8/9	60/35	40/25	25/20	50/30	40/25	20/12	122	2	CLP-611
10-2000	5-600	7/8.5	7.5/9	60/35	40/25	40/20	50/30	30/20	25/15	122	2	CLP-609
800-2500	DC-400	--/--	6.5/8.5	30/20	30/20	30/20	20/10	20/10	20/10	122	2	CLP-604
0.2-200	DC-200	5.5/6	5.5/6	45/35	40/30	35/25	45/35	40/30	35/25	127	3	CLP-8T3
5-500	DC-500	5.7/6.5	6.5/7	40/35	40/30	35/25	35/30	35/30	30/25	127	3	CLP-8S3
1-1000	DC-1000	6.5/7.5	7/8.5	50/40	40/25	30/20	45/40	35/25	25/20	126	4	CLP-8A4



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FREQUENCY RANGE (MHz)		CONVERSION LOSS (dB)		LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			PACKAGE	PIN OUT	MODEL
RF/LO	IF	XMB TYP/MAX	FULL BAND TYP/MAX	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN	LB TYP/MIN	MB TYP/MIN	UB TYP/MIN			
0.01-125	DC-125	5.5/6	6/6.5	60/50	50/40	40/35	60/45	50/35	40/30	110	5	CLK-702*
0.025-200	DC-200	5.5/6	6/7	65/55	55/45	45/35	60/50	45/35	35/30	110	5	CLK-712*
0.1-500	DC-500	6/7	7/8	65/40	60/40	50/30	45/30	50/35	35/20	110	5	CLK-701*
0.5-1000	DC-1000	5.5/7	7/8.5	70/40	45/35	40/25	60/40	40/30	30/20	110	5	CLK-703*
20-1500	DC-1000	7.5/8.5	8/9	60/35	40/25	25/20	50/30	40/25	20/12	110	5	CLK-711S
10-2000	5-600	7/8.5	7.5/9	60/35	40/25	40/20	50/30	30/20	25/15	110	5	CLK-709S
800-2500	DC-400	--/--	6.5/8.5	30/20	30/20	30/20	20/10	20/10	20/10	110	5	CLK-704S
800-4200	DC-1000	--/--	6.5/10	25/13	25/13	25/13	20/10	20/10	20/10	110	5	CLK-215S

NOTES:

1. 1dB Compression Point = +1 dBm (Typ)
2. IP3 (Input) = +13 dBm (Typ)
3. Maximum Input Power without damage = 100 mW ave. cw

* Connector style: "B" = BNC, "T" = TNC, "N" = Type N, "S" = SMA

PIN-OUT TABLE

	RF	LO	IF	GND	CASE GND
#1	2	5	11	All Others	All Others
#2	1	3	2	4	--
#3	4,1	2	3	5	5
#4	4	2	3	1	1
#5	1	3	2	--	--

GND = Ground externally

For pin location and package outline drawings, see back pages.

XMB= 2LF to HF/2
FULL BAND = LF to HF
LB= LF to 10LF
MB = 10LF to HF/2
UB= HF/2 to HF