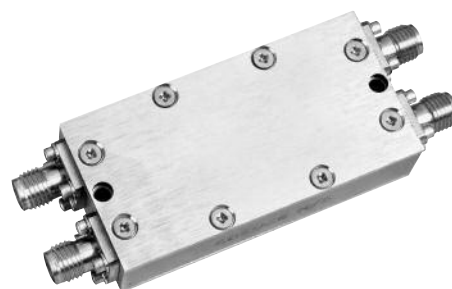


## 2 TO 4 GHz SINGLE-SIDEBAND UPCONVERTER

**MODEL: SSM0204(\*)C2MD(\*\*)**

### FEATURES

- RF output/carrier input ..... 2 to 4 GHz
- IF bandwidth ..... DC to 500 MHz (Q)
- Linear RF input..... Up to +5 dBm
- IF input power..... +10 to +13 dBm
- Sideband suppression..... 24 dB
- Carrier rejection..... 30 dB
- IF options:
  - Single sideband..... A, B and C  
(internal hybrid)
  - Multioctave IFs ..... Q (separate inputs)



All modulators and SSB upconverters require that at least one of the input frequency bands (carrier or IF) has sufficient power to turn on the semiconductors. This model employs IF drive. SSB upconverters employ an internal IF 90° hybrid to yield only one RF sideband output. This is offset above or below the input LO by the IF frequency (test data is recorded for the upper sideband only). Schottky diode (standard) upconverters have the greatest speed and bandwidths, but yield RF output powers of typically less than 0 dBm. PIN diode (optional) designs can only be driven at modulation rates of less than 30 MHz, but will yield output RF powers exceeding +5 dBm. This IF driven unit is used when the RF input has a wide dynamic range, such as for military and commercial Doppler frequency or phase-shift generation. If desired, higher rejection of the undesired sideband is possible with the SME model series.

### ELECTRICAL SPECIFICATIONS

INPUT PARAMETERS	UNITS	MIN.	TYP.	MAX.
RF carrier	GHz	2		4
RF VSWR (RF = -10 dBm, IF modulation = +10 dBm)	Ratio		1.5:1	
RF power at 1 dB compression (IF = +10 dBm)	dBm		+6	
IF modulation frequency range (Note 3)	MHz	DC		500
IF modulation power range (50 ohm input)	dBm	+10		+13
TRANSFER CHARACTERISTICS	UNITS	MIN.	TYP.	MAX.
Conversion loss (Note 1)	dB		6	9
Carrier suppression	dBc	20	30	
Sideband suppression (Note 2)				
Carrier – fundamental IF	dBc	20	24	
Carrier ±2 IF, 4 IF, etc.	dBc		45	
Carrier ±3 IF	dBc		10	
Truth table	SSM0204(+)C2MDQ	<b>PORT</b>	<b>RF &lt; LO</b>	<b>RF &gt; LO</b>
		I	0	-90
		Q	-90	0
OUTPUT PARAMETERS	UNITS	MIN.	TYP.	MAX.
RF frequency range	GHz	2		4
RF VSWR (RF = -10 dBm, IF modulation = +10 dBm)	Ratio		2.5:1	



# SSM0204LC2MDC IF DRIVEN OUTPUT SPECTRUM TABLES

## SSB UPCONVERTER (RF = 0 dBm, IF = +10 dBm total, IF = 100 MHz) (Upper sideband)

Frequency (GHz)	$f_0 + \text{IF}$ (I.L., dB) Note 1	$f_0 - \text{IF}$ (dBc)	$f_0$ (dBc)	$f_0 - 2 \text{ IF}$ (dBc)	$f_0 + 2 \text{ IF}$ (dBc)	$f_0 - 3 \text{ IF}$ (dBc)	$f_0 + 3 \text{ IF}$ (dBc)
2	-6.6	-24.3	-26.3	-40	-38.9	-14.9	-36.6
2.2	-6.3	-28.5	-24.7	-52	-39.3	-13.3	-34
2.4	-6.1	-26.5	-25.3	-54.7	-40.1	-12.5	-32.4
2.6	-6.7	-23.4	-25.3	-50.3	-40.3	-11.3	-29.9
2.9	-7.5	-22.5	-26.3	-51.2	-39.9	-11.4	-28.4
3.1	-7.5	-21.9	-28	-48.4	-41.5	-12.5	-31.5
3.3	-7.7	-21.6	-30.3	-46.9	-42	-12.7	-35.1
3.6	-7.2	-21	-34	-45.4	-43.4	-13	-45.6
3.8	-6.3	-22.2	-33.8	-44.3	-43.7	-13.5	-45.7
4.0	-7.6	-21.4	-28.4	-43.2	-43.2	-12.9	-38.8

## SSB UPCONVERTER (RF = 0 dBm, IF = +10 dBm total, IF = 100 MHz) (Lower sideband)

Frequency (GHz)	$f_0 + \text{IF}$ (dBc)	$f_0 - \text{IF}$ (I.L., dB) Note 1	$f_0$ (dBc)	$f_0 - 2 \text{ IF}$ (dBc)	$f_0 + 2 \text{ IF}$ (dBc)	$f_0 - 3 \text{ IF}$ (dBc)	$f_0 + 3 \text{ IF}$ (dBc)
2	-23.4	-6.6	-24.9	-38	-49.7	-33.4	-14.2
2.2	-30.1	-6.2	-24.8	-40.2	-50.1	-34.7	-13.2
2.4	-48.6	-6	-25.3	-40.7	-47.8	-35.8	-13.4
2.6	-34	-6.2	-26	-40	-49.5	-36.4	-13.2
2.9	-31.3	-7.4	-26.6	-39	-47	-36.1	-12.2
3.1	-30.3	-7.5	-28.8	-39.8	-44.3	-38.6	-12.2
3.3	-28.1	-7.8	-30.7	-41.3	-43	-51.9	-12.3
3.6	-25.9	-6.9	-34	-41.9	-43.5	-45.2	-12.9
3.8	-22.5	-6.8	-33	-41.8	-41.8	-40.3	-12.5
4.0	-22.2	-7.1	-28.9	-42.4	-41.3	-43.7	-12.5

### MAXIMUM RATINGS

Specification temperature..... +25°C  
 Operating temperature ..... -54 to +85°C  
 Storage temperature ..... -65 to +125°C

### GENERAL NOTES

1. Insertion loss relative to 0 dBm RF input. All other outputs, including  $f_0$ , are relative to the desired upper ( $f_0 + f_m$ ) output.
2. Standard SSB units with IF hybrids are aligned for upper sideband operation. For lower sideband or selectable sideband, contact MITEQ.

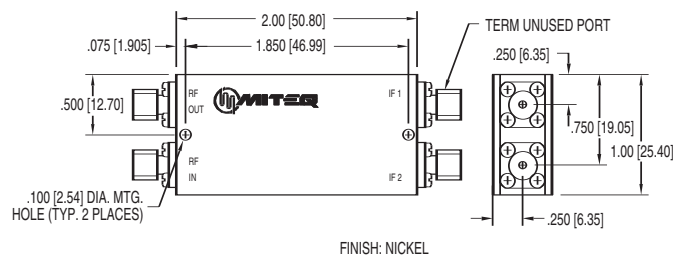
\*3.

(*) Add Letter	LO Power Range (dBm)	P1 (dBm)	(**) Add Letter	IF Frequency (MHz)
L	10-13	+6	A	20-40
M	13-16	+10	B	40-80
H	17-20	+15	C	100-200
			Q	DC-500(I/Q)

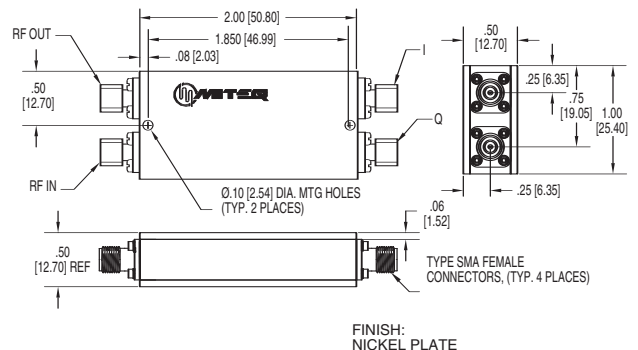
NOTE: Test data supplied at 25°C; per spectrum table.

## OUTLINE DRAWINGS

SSM0204(\*)C2MDA, B and C



SSM0204(\*)C2MDQ



NOTE: All dimensions shown in brackets [ ] are in millimeters.

