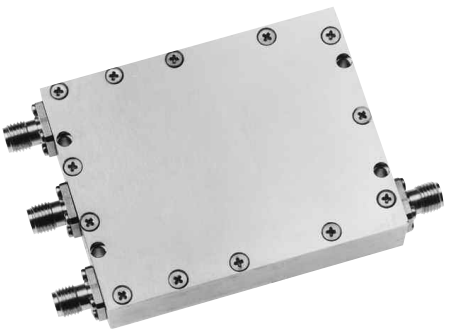
2 TO 8 GHz SINGLE-SIDEBAND UPCONVERTER OR I/Q MODULATOR

MODEL: SDM0208LC1CD_* (Carrier Driven)

FEATURES

- **RF output/carrier input ..... 2 to 8 GHz**
- **Modulation bandwidth ..... DC to 500 MHz (Q)**
- **Linear modulation input ..... Up to +5 dBm**
- **Carrier input power ..... +10 to +13 dBm**
- **Sideband suppression..... 25 dB**
- **Carrier rejection..... 20 dB**
- **Modulation options:**
  Single sideband..... A, B and C (internal hybrid)
  I/Q modulator ..... Q (Separate inputs)



All modulators and SSB upconverters require that at least one of the input frequency bands (carrier or modulation) has sufficient power to turn on the semiconductors. This model employs carrier drive. All modulators yield a frequency spectrum that utilizes both sidebands on either side of the output suppressed carrier. SSB upconverters, however, 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) modulators have the greatest speed and bandwidths, but yield RF output powers of typically less than 0 dBm. Greater output power can be achieved by using higher level diodes with proportional increases in carrier power. This carrier driven unit is used when the modulation input to RF output must be linear (low harmonics). A typical application is for digital QPSK with cosine shaped pulses (for minimum bandwidth). Many SSB upconverters also require input-to-output signal linearity, thus requiring LO drive.

ELECTRICAL SPECIFICATIONS

INPUT PARAMETERS	UNITS	MIN.	TYP.	MAX.
RF carrier input	GHz	2		8
RF VSWR (RF = +13 dBm, IF modulation = 0 dBm)	Ratio		1.5:1	
RF input power (low-level diodes)	dBm	+10		+13
IF modulation frequency range (Note 3)	MHz	DC		500
IF modulation power range (total I/Q)	dBm	Noise		+7
TRANSFER CHARACTERISTICS	**UNITS**	**MIN.**	**TYP.**	**MAX.**
Conversion loss (Note 1)	dB		7	10
Carrier suppression (RF = +13 dBm, IF modulation = +5 dBm)	dBc	15	20	
Sideband suppression (Note 2)				
Carrier – fundamental IF	dBc	15	30	
Carrier ±2 IF, 4 IF, etc.	dBc		45	
Carrier ±3 IF	dBc		40	
Quadrature phase accuracy, I/Q mode (see Graph Key)	Degrees		±10	
Quadrature amplitude accuracy	dB		±1	
OUTPUT PARAMETERS	**UNITS**	**MIN.**	**TYP.**	**MAX.**
RF output frequency range	GHz	2		8
RF output VSWR (RF = +10 dBm, IF modulation = 0 dBm)	Ratio		2.5:1	

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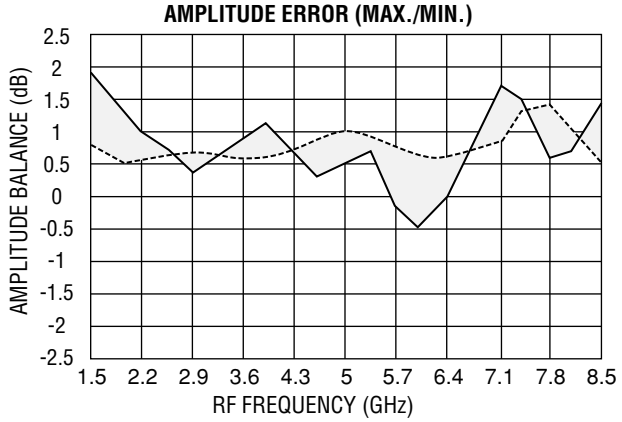
CARRIER DRIVEN TYPICAL TEST DATA

SDM0208LC1CDQ

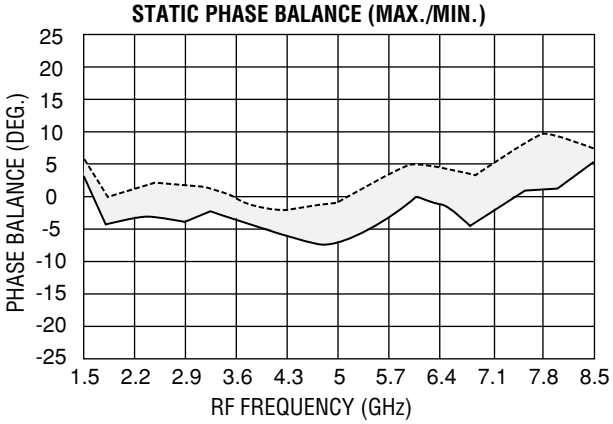
Graph Key				
RF Phase (Deg.)	0	+90	-90	+180
I/Q	+/+	-/+	+/-	-/-

I/Q MODE (RF = +13 dBm, I/Q = 0 dBm each input (0.316 volts peak across 50 ohm load)

AMPLITUDE ERROR (MAX./MIN.)



STATIC PHASE BALANCE (MAX./MIN.)



SDM0208LC1CDC

SSB UPCONVERTER (RF = +13 dBm, IF = +3 dBm total, IF = 100 MHz)

Frequency (GHz)	f_0 + IF (I.L., dB) Note 1	f_0 - IF (dBc)	f_0 (dBc)	f_0 - 2 IF (dBc)	f_0 + 2 IF (dBc)	f_0 - 3 IF (dBc)	f_0 + 3 IF (dBc)
2	-6.7	-30.7	-23.2	-58.3	-54.2	-38	-66.4
2.5	-6.2	-34.2	-22.1	-60.3	-50.5	-46.1	-62.2
3	-8	-30.8	-21.4	-62.1	-50.9	-39.2	-59.4
3.5	-7.7	-46.9	-22.5	-70.6	-63.7	-47.6	-72.7
4	-7	-30.2	-22.4	-61	-58.3	-51	-71
4.5	-7.9	-28.1	-20.9	-70.7	-54.3	-47	-62.3
5	-9	-30.4	-19.8	-72.2	-63.6	-48.1	-73.2
5.5	6.5	-32.9	-20	-59.4	-52	-43.3	-73.7
6	-7.2	-24.5	-20.6	-51.1	-46.3	-33.3	-50.9
6.5	-7.6	-32.1	-21.5	-68.4	-50.5	-37.7	-57.2
7	-7.9	-25.4	-20.8	-63.7	-47.6	-37.7	-73.9
7.5	-10.4	-26.7	-18.5	-62.7	-61.6	-46	-64
8	-8.1	-34.7	-17.9	-65.5	-67.1	-48.8	-68.2

MAXIMUM RATINGS

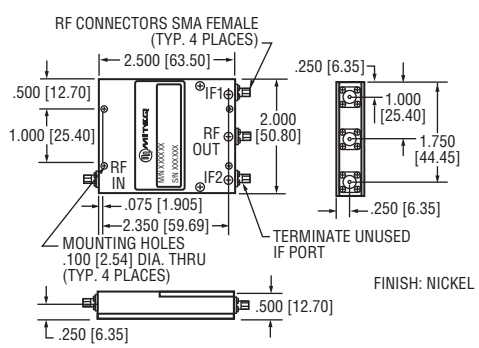
Specification temperature ..... +25°C
Operating temperature ..... -54 to +85°C
Storage temperature ..... -65 to +125°C

GENERAL NOTES

1. Insertion loss relative to +3 dBm IF 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. Available part numbers: SDM0208LC1CD ★
A = 20–40 MHz
B = 40–80 MHz
C = 100–200 MHz
Q = DC–500 MHz

NOTE: Test data supplied at 25°C; phase and amplitude balance per spectrum table.

OUTLINE DRAWING

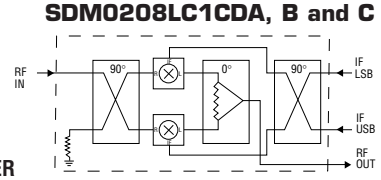


NOTE: All dimensions shown in brackets [ ] are in millimeters.

BLOCK DIAGRAMS

SDM0208LC1CDA, B and C

SSB UPCONVERTER



SDM0208LC1CDQ

I/Q MODULATOR

