

2 TO 6 GHz QPSK/QAM MODULATOR OR SSB UPCONVERTER

MODEL: SMC0206LI1CD * (Carrier Driven)

FEATURES

- RF output/carrier input 2 to 6 GHz
- Linear modulation input Up to +10 dBm
- Carrier input power +15 to +18 dBm
- Sideband suppression..... 30 dB
- Carrier rejection..... 35 dB
- 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.

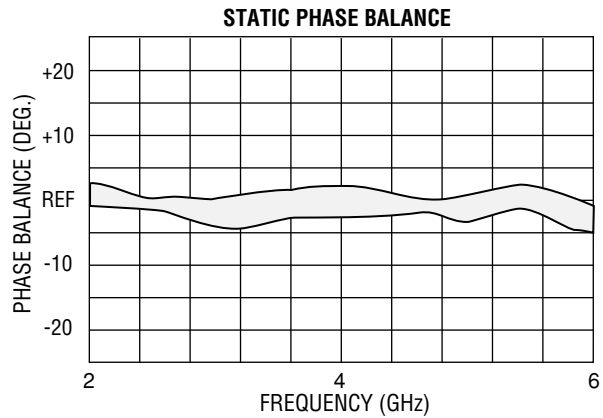
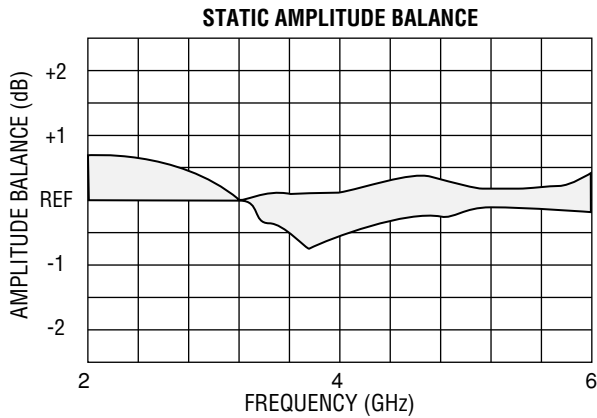
ELECTRICAL SPECIFICATIONS

INPUT PARAMETERS	UNITS	MIN.	TYP.	MAX.
RF carrier	GHz	2		6
RF VSWR (RF = +13 dBm, IF modulation = 0 dBm)	Ratio		1.5:1	
RF power (low-level diodes)	dBm	+15	+16	+18
IF modulation frequency range (Note 3)	MHz	DC		500
IF modulation power range (total I/Q)	dBm	Noise		+13
TRANSFER CHARACTERISTICS	UNITS	MIN.	TYP.	MAX.
Conversion loss (Note 1)	dB		12	15
Carrier suppression (IF = +13 dBm)	dBc	25	35	
Sideband suppression (Note 2)				
Carrier – fundamental IF	dBc	23	30	
Carrier ±2 IF, 4 IF, etc.	dBc		40	
Carrier ±3 IF	dBc		30	
Quadrature phase accuracy, I/Q mode (see Graph Key)	Degrees		±8	
Quadrature amplitude accuracy	dB		±1	
OUTPUT PARAMETERS	UNITS	MIN.	TYP.	MAX.
RF frequency range	GHz	2		6
RF VSWR (RF = +13 dBm, IF modulation = 0 dBm)	Ratio		2.5:1	

SMC0206LI1CDQ CARRIER DRIVEN TYPICAL TEST DATA

RF Phase (Deg.)	Graph Key	0	+90	-90	+180
I/Q (1 V)		+/+	-/+	+/-	-/-

I/Q MODE (RF = +16 dBm, I/Q = +10 dBm each input (1 volt peak across 50 ohm load))



SMC0206LI1CDA CARRIER DRIVEN OUTPUT SPECTRUM TABLE

SSB UPCONVERTER (RF = +16 dBm, IF = +13 dBm total, IF = 20 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	13.8	31	39	64	65	64	65
2.5	13.1	34	56	64	65	49	67
3	13.9	30	38	66	65	61	66
3.5	13.6	30	39	64	64	63	64
4	13.9	31	41	63	63	62	63
4.5	14.4	34	37	62	62	60	63
5	15.1	34	42	61	63	57	62
5.5	14.4	35	44	63	63	58	62
6	13.8	30	35	64	64	55	64

MAXIMUM RATINGS

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

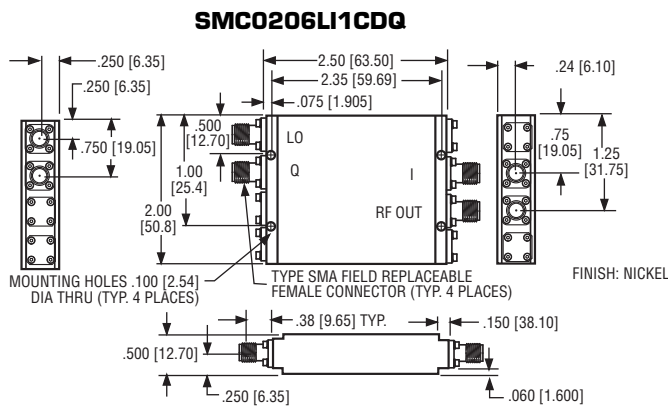
GENERAL NOTES

1. Insertion loss relative to +10 dBm 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: SMC0206LI1CD *

A = 20–40 MHz
 B = 40–80 MHz
 C = 100–200 MHz
 Q = DC–500 MHz

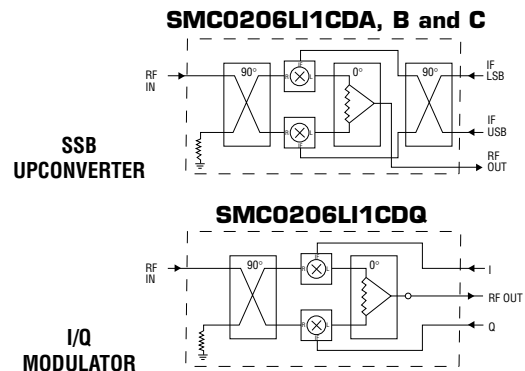
NOTE: Test data supplied at 25°C; insertion loss, phase and amplitude balance per spectrum table.

OUTLINE DRAWING



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

BLOCK DIAGRAMS



Revised: 06/07/13