

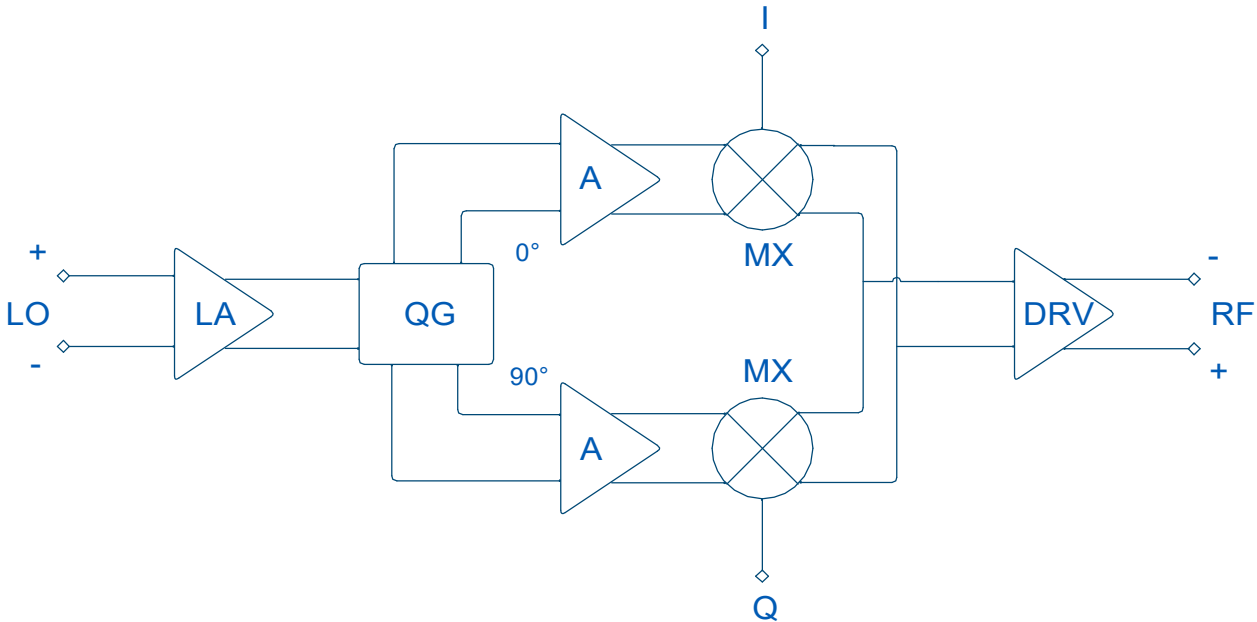
DESCRIPTION:

THE PIQ-1-SMT-EVAL IS AN EVALUATION BOARD FOR PIQ-1-SMT. THE PIQ-1-SMT IS AN INTEGRATED BROADBAND IQ VECTOR MODULATOR WITH FULLY DIFFERENTIAL INPUTS AND OUTPUTS (LO AND RF) PORTS AND SINGLE ENDED ON THE BASEBAND (I AND Q) INPUTS. AN ON-CHIP BROADBAND QUADRATURE GENERATOR NETWORK ALLOWS THE PIQ-1-SMT TO ACHIEVE MULTI-OCTAVE FREQUENCY COVERAGE. THE PIQ-1-SMT OPERATES WITH A SINGLE POSITIVE VCC = 4V @ 250 mA SUPPLY AND IS SUPPLIED IN A QFN PACKAGE. THE EVALUATION BOARD FEATURES FOUR FEMALE 2.92 mm BOARD EDGE MOUNT CONNECTORS (LO+, LO-, RF+, RF-) AND TWO SMA EDGE MOUNT CONNECTORS (I, Q). IT HAS TWO 2 POS HEADER CONNECTORS FOR SUPPLYING POWER (4V) AND GROUND TO THE IQ VECTOR MODULATOR CHIP.

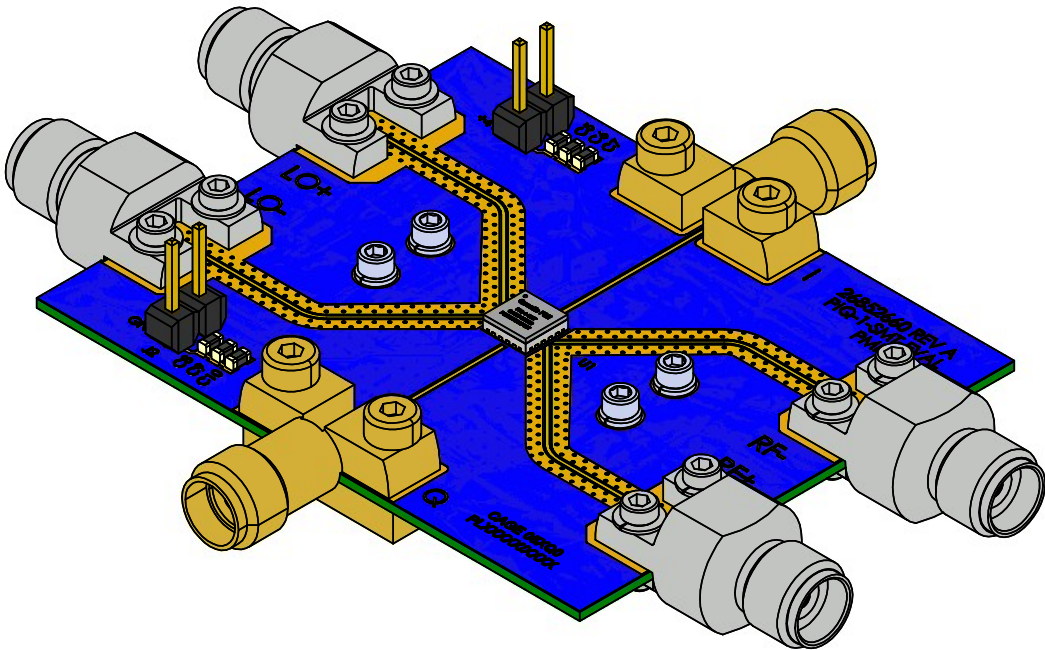
SPECIFICATIONS (PAGE 1):

- INPUTS:.....LO+ (POSITIVE PHASE TERMINAL OF THE LO): 2.92 mm FEMALE
LO- (NEGATIVE PHASE TERMINAL OF THE LO): 2.92 mm FEMALE
LO PORTS ARE 100Ω DIFFERENTIAL
I (IN-PHASE COMPONENT): SMA FEMALE
Q (QUADRATURE-PHASE COMPONENT): SMA FEMALE
I AND Q PORTS ARE 50Ω SINGLE-ENDED
- OUTPUTS:.....RF+ (POSITIVE PHASE TERMINAL OF THE RF): 2.92 mm FEMALE
RF- (NEGATIVE PHASE TERMINAL OF THE RF): 2.92 mm FEMALE
RF PORTS ARE 100Ω DIFFERENTIAL
- LO FREQUENCY RANGE:.....100 MHz TO 20 GHz
- LO INPUT POWER:.....-10 TO 10 dBm
- RF FREQUENCY RANGE:.....100 MHz TO 20 GHz
- RF OUTPUT POWER:.....-12 dBm TYP.
- BASEBAND I/Q BANDWIDTH:.....10 GHz (DC TO 10 GHz)
I AND Q INPUT CAN BE USED DC COUPLED OR AC COUPLED
DC: 0 TO 2.16V. COMMON MODE LEVEL IS 1.08V ± 50 mV
AC: UP TO 10 GHz LINEAR TO 0 dBm IN TOTAL (EQUIVALENT TO -3 dBm AT BOTH I AND Q)
- I/Q COMMON-MODE BIAS:.....1.08V ± 50 mV
- CARRIER (LO) LEAKAGE:.....-42 dBc TYP.
- VOLTAGE CONVERSION GAIN:.....-20 dB TYP.
- I/Q GAIN IMBALANCE:.....0.5 dB TYP.
- QUADRATURE PHASE ERROR:.....1° MAX.
- SIDEBAND SUPPRESSION:.....30 dB TYP. (W/ ARB AT 1 MHz, SIN & COS ON I AND Q)
- VSWR:.....2.5:1 TYP. (LO+, LO-, RF+, RF-)
2.0:1 TYP. (I, Q)
- RF-LO ISOLATION:.....-50 dBc TYP.
- LO-BASEBAND ISOLATION:.....-45 dBc TYP.
- RF-BASEBAND ISOLATION:.....-40 dBc TYP.
- I-Q CROSSTALK:.....-40 dBc TYP.
- P1dB:.....-5 dBm TYP.
- IP3:.....5 dBm TYP.
- IP2:.....45 dBm TYP.
- HARMONIC DISTORTION:.....2nd HARMONIC: -35 dBc TYP.
3rd HARMONIC: -20 dBc TYP.
4th HARMONIC: -50 dBc TYP.
5th HARMONIC: -35 dBc TYP.
- SPURIOUS EMISSIONS:.....-30 dBm TYP.
- SFDR:.....20 dB TYP.

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A1	ORIGINAL RELEASE	8/7/25	
	A2	ECN #26-0022	2/8/26	
	A4	ECN #26-0124	6/3/26	



LO = Local oscillator input
LA = Limiting amplifier
QG = Quadrature generator
MX = Mixer
DRV = Driver
A = Amplifier
RF = RF output
I/Q = Vector modulation inputs



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NOTE: SPECIFICATIONS WILL VARY OVER TEMPERATURE
NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± 0.02 ± .XXX ± 0.01			 PLANAR MONOLITHICS 7309-A GROVE ROAD FREDERICK MARYLAND 21704 USA TEL: (301) 662-5019, FAX: (301) 662-1731 WEB: WWW.QUANTICPMI.COM, EMAIL: SALES@QUANTICPMI.COM ISO 9001 CERTIFIED				
	APPROVALS		DATE		TITLE OUTLINE PIQ-1-SMT-EVAL		
	DRAWN	AL	8/7/2025				
	REDRAWN						
	ISSUED			SIZE	FSCM NO.	DWG NO.	REV.
			B	05XQ0	27052660	A4	
			SCALE 1:1			SHEET 1 OF 3	

SPECIFICATIONS (PAGE 2):

- AM/AM CONVERSION:..... LINEAR UP TO Vp = 1080 mV
- AM/PM CONVERSION:..... ± 3° TYP.
- OUTPUT NOISE SPECTRAL DENSITY:.....-150 dBm/Hz TYP.
- RESIDUAL PHASE NOISE:.....-100 dBm/Hz TYP. @ 1 KHz
-110 dBm/Hz TYP. @ 1 MHz
- RESIDUAL AM NOISE:.....-80 dBm/Hz MAX. (REFERENCED TO LO LEAKAGE CARRIER)
- SNR:.....55 dB TYP. (FOR BW = 1 MHz)
- EVM (RMS):.....3.5% TYP. (NOT IMPAIRED)
1% TYP. (IMPAIRED)
- MER (RMS):.....30 dB (NOT IMPAIRED)
40 dB TYP. (IMPAIRED)
- BER:.....10^-4 TYP. (NOT IMPAIRED)
10^-9 TYP. (IMPAIRED)
- ACPR:.....-40 dBc. TYP.
- IBW:.....400 MHz MIN.
- OBW:.....5.5 MHz TYP. (FOR QAM-64 BW = 6.25 MHz)
- BASEBAND MAGNITUDE FLATNESS:.....± 0.5 dB (OVER 375 MHz BASEBAND BW)
- BASEBAND LINEARITY:.....±1 dB MAX. UP TO 1.08 Vp
- VCC:.....4V ± 5%
POWER HAS TO BE SUPPLIED THROUGH BOTH 2 POS HEADER CONNECTORS
- CURRENT:.....250 mA TYP.
- DC POWER DISSIPATION (W):.....1.2 W MAX.
- BOARD SIZE:.....2.0" X 1.6" X 0.031"
- HEAT SINK SIZE:.....1.2" X 0.8" X 0.25"
- MOUNTING HOLES:.....4X 4-40 UNC-2B
- ADDITIONAL NOTES:.....FOR SINGLE ENDED LO DRIVE OR SINGLE ENDED RF OUTPUT,
USE ONE LO INPUT AND RF OUTPUT WHILE TERMINATING THE
UNUSED LO INPUT AND RF OUTPUT INTO A 50 Ω LOAD.

ENVIRONMENTAL RATINGS:

- TEMPERATURE:.....-55°C TO +85°C (OPERATING)
-64°C TO +125°C (STORAGE)
- HUMIDITY:.....MIL-STD-202, METHOD 103B COND. B
- SHOCK:.....MIL-STD-202, METHOD 213B COND. B
- VIBRATION:.....MIL-STD-202, METHOD 204D COND. B
- ALTITUDE:.....MIL-STD-202, METHOD 105C COND. B
- TEMPERATURE CYCLE:.....MIL-STD-202, METHOD 107D COND. A

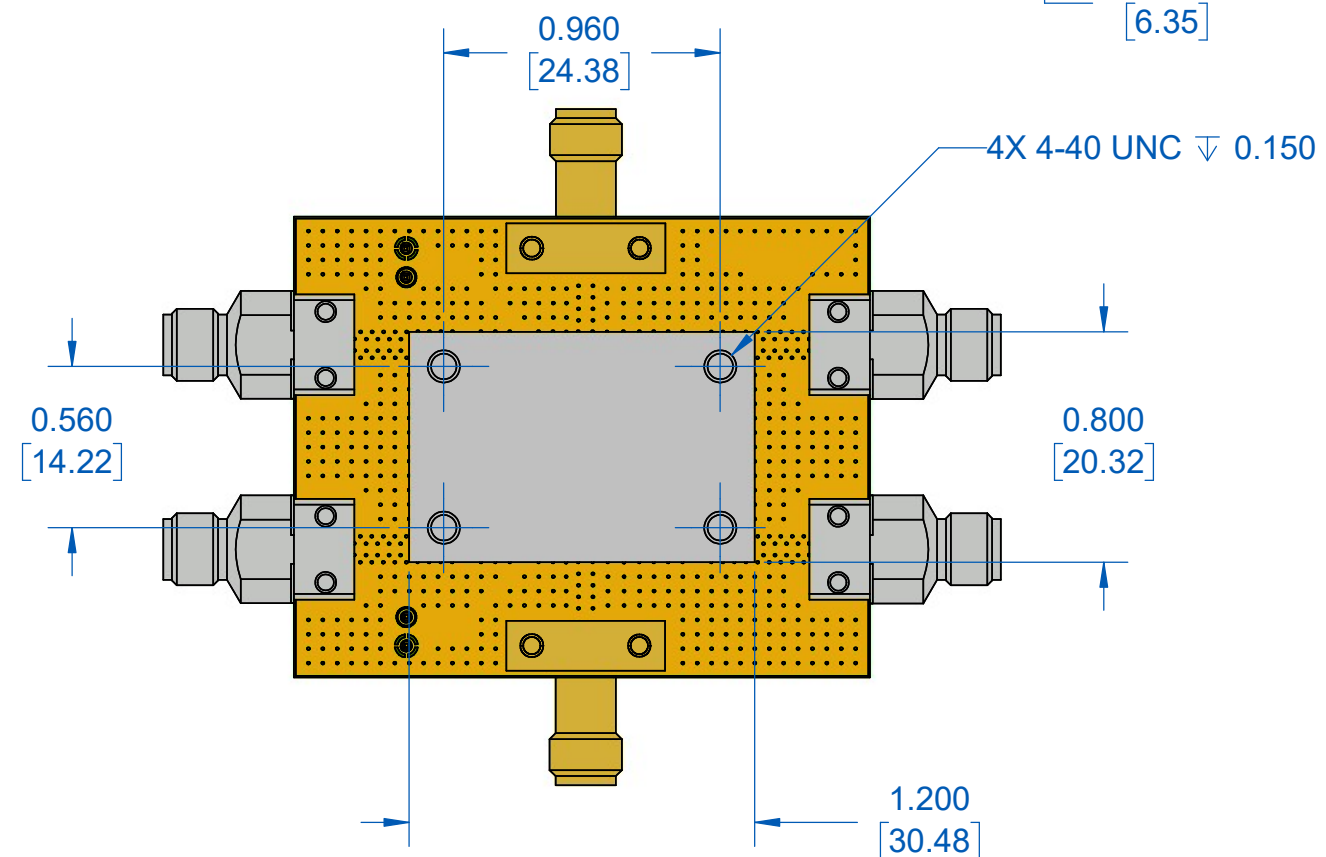
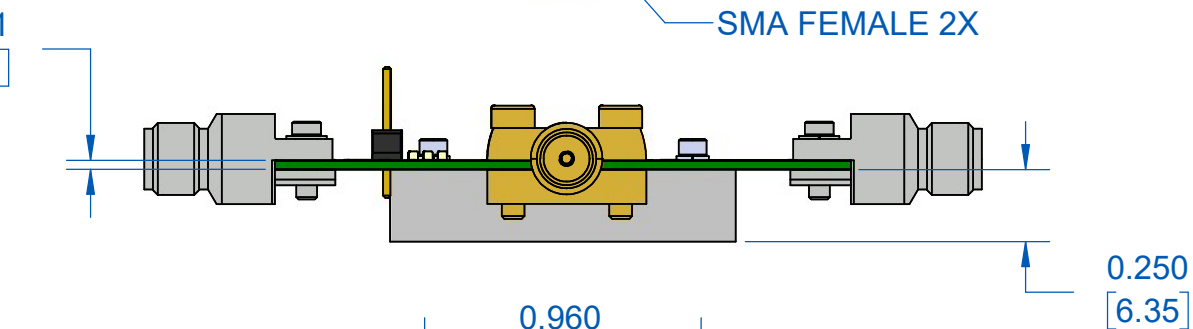
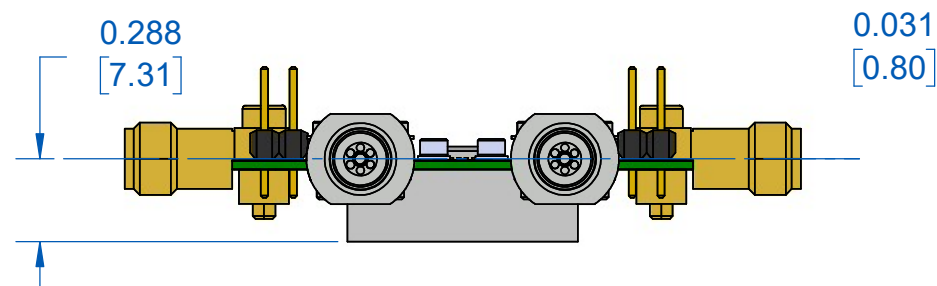
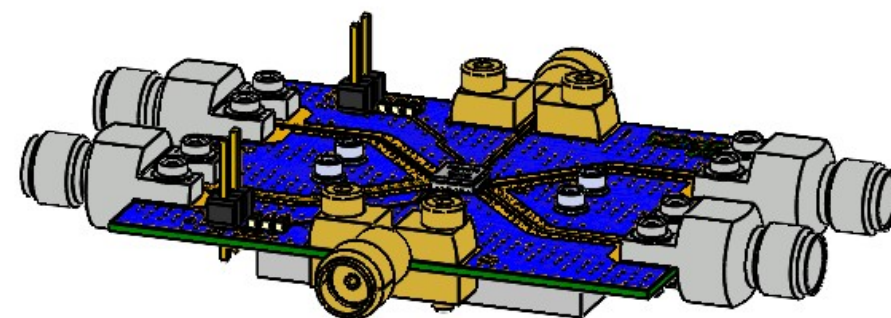
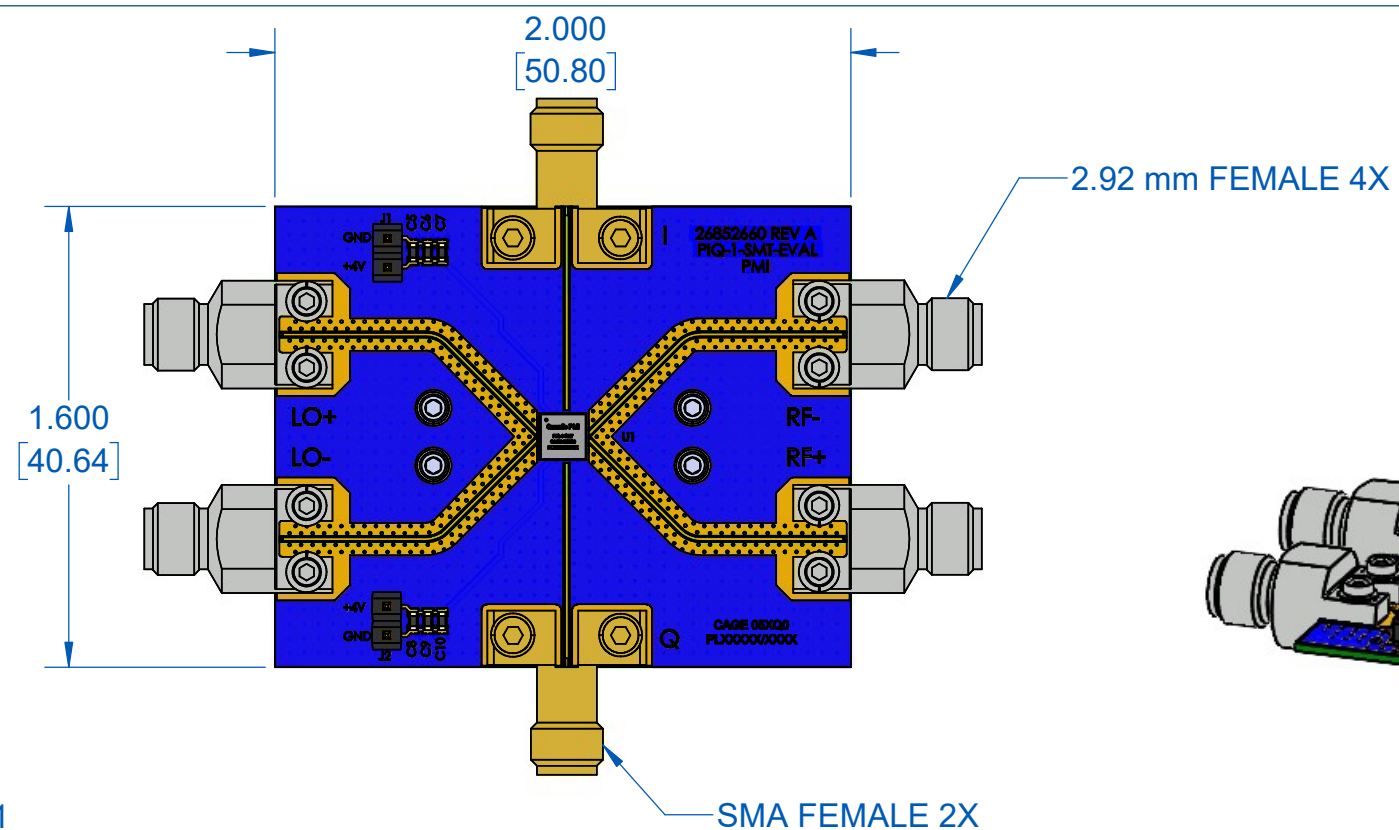
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SCALE 1:1			SHEET 2 OF 3



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SCALE 1.5:1		SHEET 3 OF 3	