



ML485

1.6–3.2 GHz High IP3 Mixer with Integrated LO Amp



Product Features

- High dynamic range mixer with integrated LO driver
- +35 dBm Input IP3
- 8 dB Conversion Loss
- RF: 1600 – 3200 MHz
- LO: 1400 – 3500 MHz
- IF: 50 – 300 MHz
- 5V Supply @ 40 mA
- 0 dBm Drive Level
- RoHS-compliant MSOP8 (14mm²)

Applications

- PCS / 3G Base station / Repeaters
- TD-SCDMA / WCDMA
- WiMAX / WiBro
- ISM / Fixed Wireless
- HPA Feed Back Paths

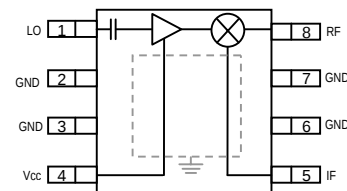
Product Description

The ML485 high linearity converter combines a passive GaAsFET mixer with an integrated LO driver in an ultra-small lead-free/green/RoHS-compliant MSOP-8 package. The High dynamic range mixer is able to operate across a wide 1.6-3.2 GHz frequency range to achieve +35 dBm Input IP3 while drawing a very low 40mA current. The ML485 can be used as an upconverter or downconverter in a low-side or high-side LO configuration.

A LO buffer amplifier is integrated on the chip to allow for operation directly from a synthesizer, requiring only 0 dBm of drive level. The dual-stage LO driver provides a stable input power level into the mixer to allow for consistent performance over a wide range of LO power levels. The converter requires no external baluns and supports a wide range of IF frequencies.

Typical applications include frequency up/down conversion, modulation and demodulation for receivers and transmitters used in 2.5G and 3G mobile infrastructure. Due to the wide frequency range of operation, the converter can also be used for WiMAX, WiBro, ISM, and fixed wireless applications.

Functional Diagram



Function	Pin No.
Vcc	4
RF	8
IF	5
LO	1
GND	2, 3, 6, 7
GND	Backside Paddle

Specifications⁽¹⁾

Parameter	Units	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max
RF Frequency Range	MHz	1700 – 1800			1800 – 2200			2300 – 2400			2500 – 2700		
LO Frequency Range	MHz	1400 – 1750			1500 – 2150			2000 – 2350			2200 – 2650		
IF Frequency Range	MHz	50 – 300			50 – 300			50 – 300			50 – 300		
SSB Conversion Loss	dB		9.4	10.5		8.7	10		8.5			8.5	
Input IP3 ⁽²⁾	dBm	28	+33		30	+34			+37			+38	
LO leakage at RF port	dBm		-5			-2			-1			-1	
LO leakage at IF port	dBm		-11			-18			-25			-15	
RF – IF Isolation	dB		13			16			14			11	
Return Loss: RF Port	dB		13			13			15			16	
Return Loss: IF Port	dB		14			14			14			14	
Return Loss: LO Port	dB		10			10			12			13	
Input P1dB	dBm		20			20			19.5			19.5	
LO Drive Level	dBm	-2 to +4			-2 to +4			-2 to +4			-2 to +4		
Operating Supply Voltage	V	+5			+5			+5			+5		
Operating Current	mA	40			40			40			40		

1. Specifications are shown at 25 °C, 0 dBm LO drive, IF = 200 MHz, Vdd=5V in a downconverting configuration with a low-side LO.
 2. IIP3 is measured with $\Delta f = 1$ MHz with $RF_{in} = 0$ dBm / tone.

Absolute Maximum Rating

Parameter	Rating
Storage Temperature	-65 to +150 °C
Thermal Resistance, Rth	104 °C / W
Junction Temperature, Tj	150 °C
DC Voltage	+7 V
LO Power	+10 dBm
Input RF Power	+27 dBm

Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

Part No.	Description
ML485-G	1.6–3.2 GHz High IP3 Mixer w/ Integrated LO Amp
ML485-PCB	Full Assembled Evaluation Board

Standard T/R size = 1000 pieces on a 7" reel.

Specifications and information are subject to change without notice

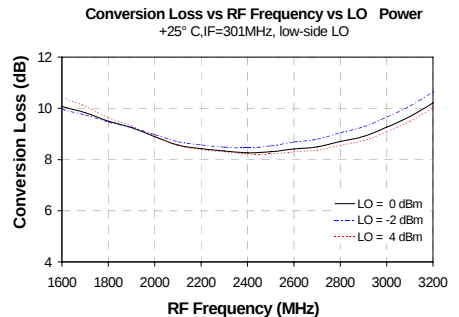
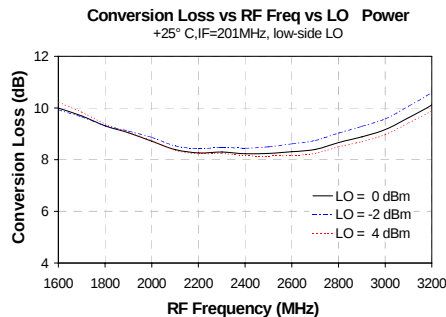
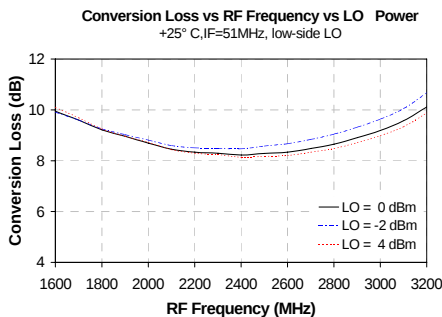
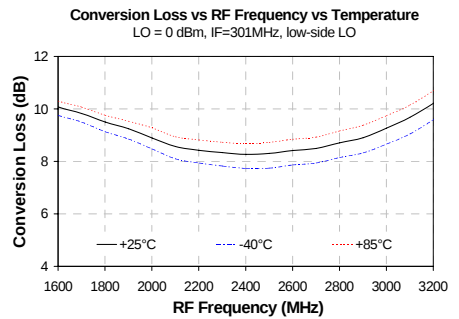
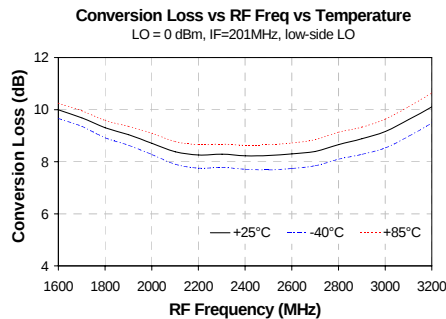
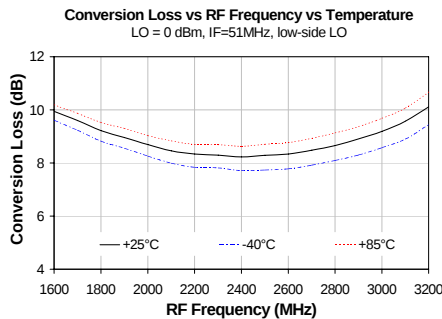
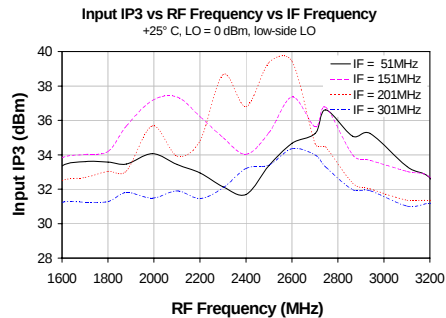
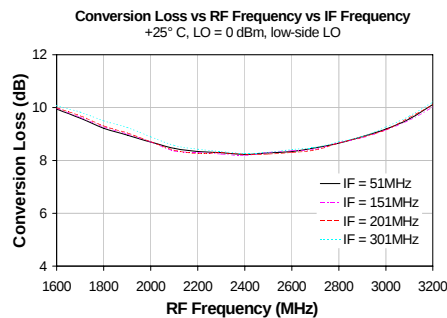
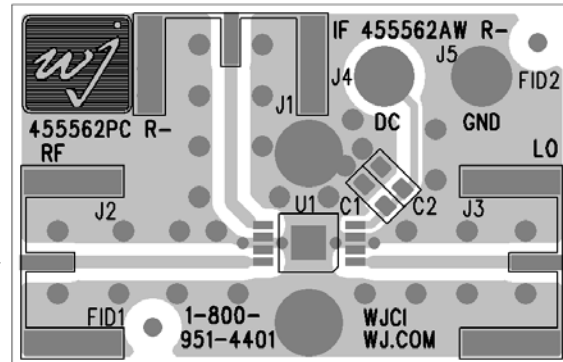
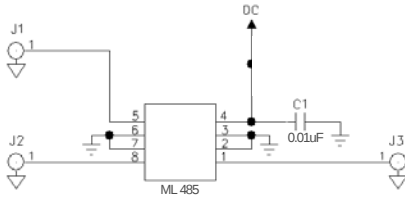


ML485

1.6–3.2 GHz High IP3 Mixer with Integrated LO Amp



Typical Downconversion Performance Plots Performance using the circuitry on the ML485-PCB Evaluation Board



Specifications and information are subject to change without notice

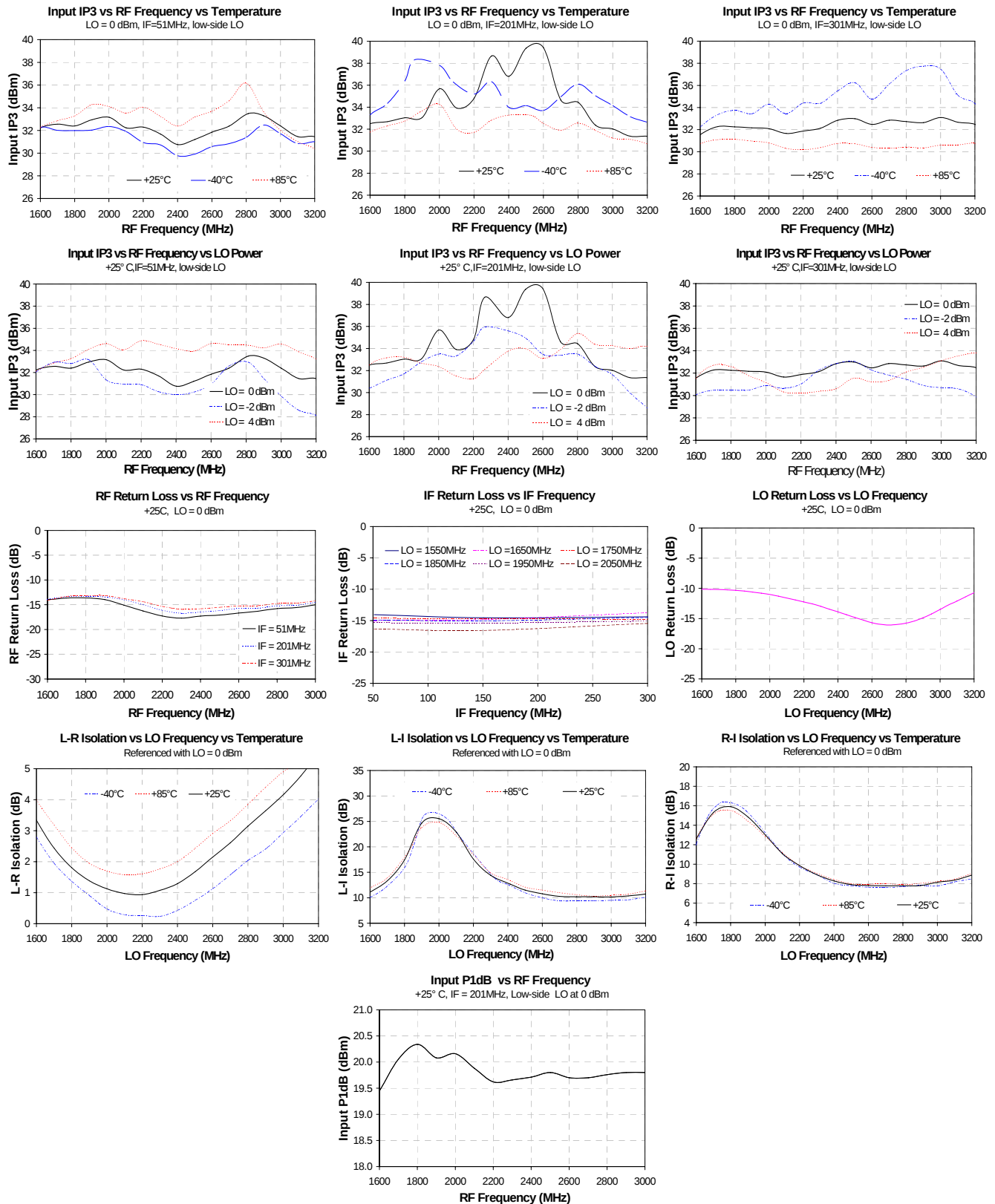


ML485

1.6–3.2 GHz High IP3 Mixer with Integrated LO Amp



Typical Downconversion Performance Plots (cont'd) Performance using the circuitry on the ML485-PCB Evaluation Board



Specifications and information are subject to change without notice



ML485

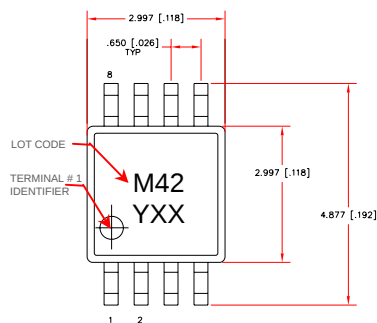
1.6–3.2 GHz High IP3 Mixer with Integrated LO Amp



Mechanical Information

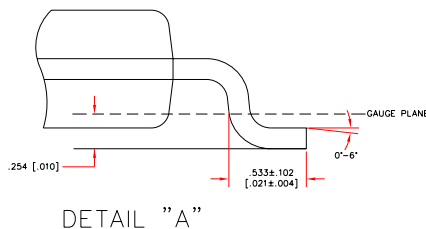
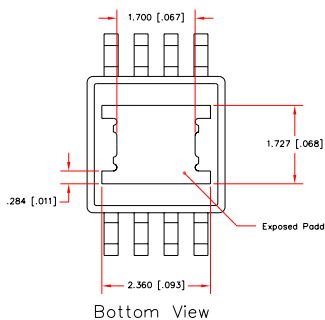
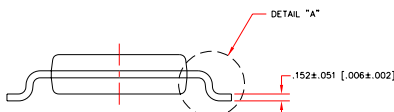
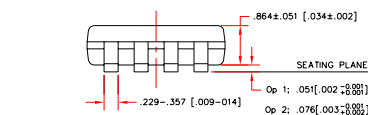
This package is lead-free/green/RoHS-compliant. The plating material on the leads is Matte-Tin. It is compatible with both lead-free (maximum 260 °C reflow temperature) and lead (maximum 245 °C reflow temperature) soldering processes.

Outline Drawing



NOTE:

- 1) ALL DIMENSIONS ARE IN MILLIMETERS [INCHES].
- 2) PACKAGE LENGTH DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURR.
- 3) PACKAGE WIDTH DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.



Product Marking

The component will be laser marked with a “M42” product label with an alphanumeric lot code on the top surface of the package.

Tape and reel specifications for this part will be located on the website in the “Application Notes” section.

ESD / MSL Information



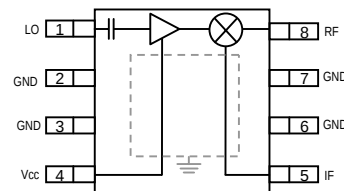
Caution! ESD sensitive device.

Value: Passes $\geq 200V$ to $< 250V$
 Test: Human Body Model (HBM)
 Standard: JEDEC Standard JESD22-A114

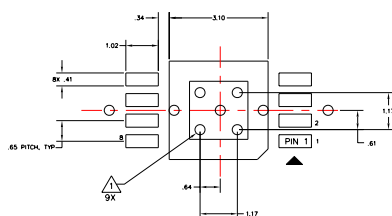
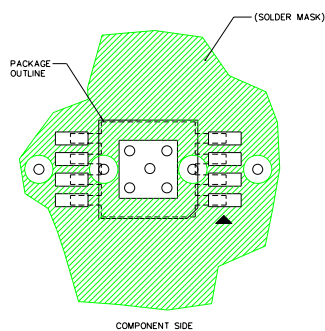
Value: Passes $\geq 500V$
 Test: Charged Device Model (CDM)
 Standard: JEDEC Standard JESD22-C101

MSL Rating: Level 2 at +260 °C convection reflow
 Standard: JEDEC Standard J-STD-020

Functional Pin Layout

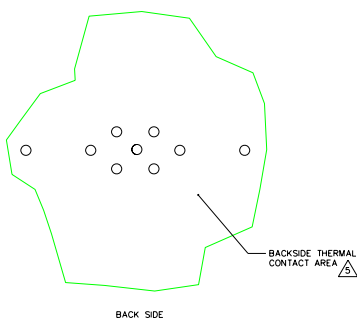


Mounting Configuration / Land Pattern



NOTES:

1. GROUND/THERMAL VIAS ARE CRITICAL FOR THE PROPER PERFORMANCE OF THIS DEVICE. VIAS SHOULD USE A .35mm (#80/.0135") DIAMETER DRILL AND HAVE A FINAL, PLATED THRU DIAMETER OF .25mm (.010").
2. ADD AS MUCH COPPER AS POSSIBLE TO INNER AND OUTER LAYERS NEAR THE PART TO ENSURE OPTIMAL THERMAL PERFORMANCE.
3. TO ENSURE RELIABLE OPERATION, DEVICE GROUND PADDLE-TO-GROUND PAD SOLDER JOINT IS CRITICAL.
4. FOR OPTIMAL THERMAL PERFORMANCE, EXPOSE SOLDERMASK ON BACKSIDE WHERE IT CONTACTS THE HEATSINK.
5. RF TRACE WIDTH DEPENDS UPON THE PC BOARD MATERIAL AND CONSTRUCTION.
6. USE 1 OZ. COPPER MINIMUM.
7. ALL DIMENSIONS ARE IN MILLIMETERS. ANGLES ARE IN DEGREES.



Pin	Function
Vcc	4
RF	8
IF	5
LO	1
GND	2, 3, 6, 7
GND	Backside Paddle

Specifications and information are subject to change without notice