

BM851



Mixer

1.7~2.7GHz High IIP3 GaAs MMIC Mixer with Integrated LO AMP

Device Features

- +33.9 dBm Input IP3
- 8.3dB Conversion Loss
- Integrated LO Driver
- -2 to +4dBm LO drive level
- Available 3.3V to 5V single voltage
- MSL 1, MSOP 8, Lead-free / Green / RoHS compliant
- ESD HBM Class 1B

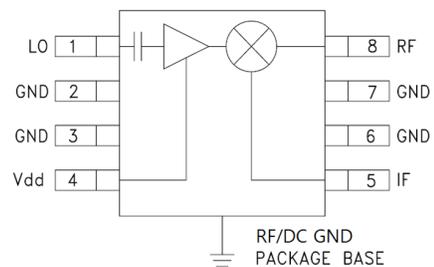


MSOP 8 Package

Product Description

The BM851 is a high linearity and dynamic covering range from 1.7GHz to 2.7GHz on 3.3V to 5V with a passive GaAs FET converter and two stage LO driver. This is packaged in a plastic surface mountable MSOP8 with Lead-free / Green / RoHS compliant. Typical Input IP3 and Conversion loss are 33.9dBm and 8.3dB, respectively. All devices are 100% RF/DC screened.

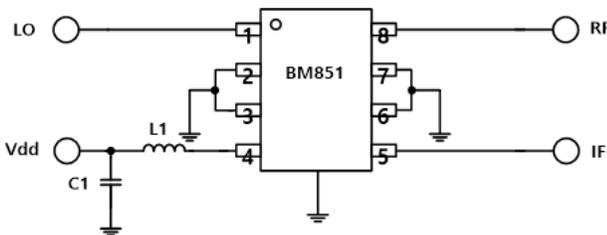
Functional Block Diagram



Applications

- Base station /Repeaters Infrastructure/Small Cell
- Commercial/Industrial/Military wireless system
- LTE / WCDMA /CDMA Wireless Infrastructure

Application Circuit



Bom	Value	Remark
C1	1nF	
L1	56nH	

Absolute Maximum Ratings

Parameter	Rating	Unit
Operating Case Temperature	-40 to +85	°C
Storage Temperature	-55 to +155	°C
Junction Temperature	+126	°C
Operating Voltage	+7	V
LO Power	+10	dBm
Input RF/IF Power	+25	dBm

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

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Typical Performance¹

Test condition _ Measured on BeRex E/B at 25°C, 50ohm system, Vdd=5V I_{ds}=57.5mA

Parameter	Min	Typ	Max	Units												
RF Frequency Range	1700 ~ 1800			1800 ~ 2000			2000 ~ 2200			2200 ~ 2400			2500 ~ 2700			MHz
LO Frequency Range	1400 ~ 1750			1500 ~ 1950			1700 ~ 2150			1900 ~ 2350			2200 ~ 2650			MHz
IF Frequency Range	50 ~ 300			50 ~ 300			50 ~ 300			50 ~ 300			50 ~ 300			MHz
SSB Conversion Loss		8.3			8.1			8.3			8.8			10.0		dB
Input IP ₃ ²		32.0			32.8			33.9			32.3			30.3		dBm
LO Leakage RF Port		-12.7			-9.1			-6.0			-4.6			-5.1		dBm
LO Leakage IF Port		-8.7			-14.0			-15.9			-13.0			-10.6		dBm
RF-IF Isolation		-16.6			-20.2			-17.8			-14.0			-10.6		dB
RF Return Loss		-11.5			-13.2			-15.5			-16.6			-15.7		dB
IF Return Loss		-9.2			-9.6			-11.8			-15.1			-24.3		dB
Input P _{1dB}		23.8			23.0			23.0			22.0			20.8		dBm
LO Drive Level	-2	0	+4	-2	0	+4	-2	0	+4	-2	0	+4	-2	0	+4	dBm

Test condition _ Measured on BeRex E/B at 25°C, 50ohm system, Vdd=3.3V I_{ds}= 44.5mA

Parameter	Min	Typ	Max	Units												
RF Frequency Range	1700 ~ 1800			1800 ~ 2000			2000 ~ 2200			2200 ~ 2400			2500 ~ 2700			MHz
LO Frequency Range	1400 ~ 1750			1500 ~ 1950			1700 ~ 2150			1900 ~ 2350			2200 ~ 2650			MHz
IF Frequency Range	50 ~ 300			50 ~ 300			50 ~ 300			50 ~ 300			50 ~ 300			MHz
SSB Conversion Loss		8.3			8.2			8.2			8.7			10.0		dB
Input IP ₃ ²		27.6			30.3			31.5			28.1			24.3		dBm
LO Leakage RF Port		-14.0			-12.2			-11.0			-10.9			-10.5		dBm
LO Leakage IF Port		-12.6			-18.4			-20.5			-18.2			-15.6		dBm
RF-IF Isolation		-16.5			-20.5			-18.1			-14.6			-11.0		dB
RF Return Loss		-11.6			-12.4			-13.3			-13.5			-14.5		dB
IF Return Loss		-11.1			-11.5			-14.2			-18.0			-16.7		dB
Input P _{1dB}		19.1			18.8			17.8			15.3			13.1		dBm
LO Drive Level	-2	0	+4	-2	0	+4	-2	0	+4	-2	0	+4	-2	0	+4	dBm

Parameter	Min.	Typical	Max.	Unit
Bandwidth	1700		2700	MHz
I _d @ (V _d = 5.0V)		57.5		mA
I _d @ (V _d = 3.3V)		44.5		mA
R _{TH}		99.0		°C/W

¹ Specifications show on 0dBm-LO driven power and 150 MHz-IF frequency in a down converting configuration with a low-side LO.

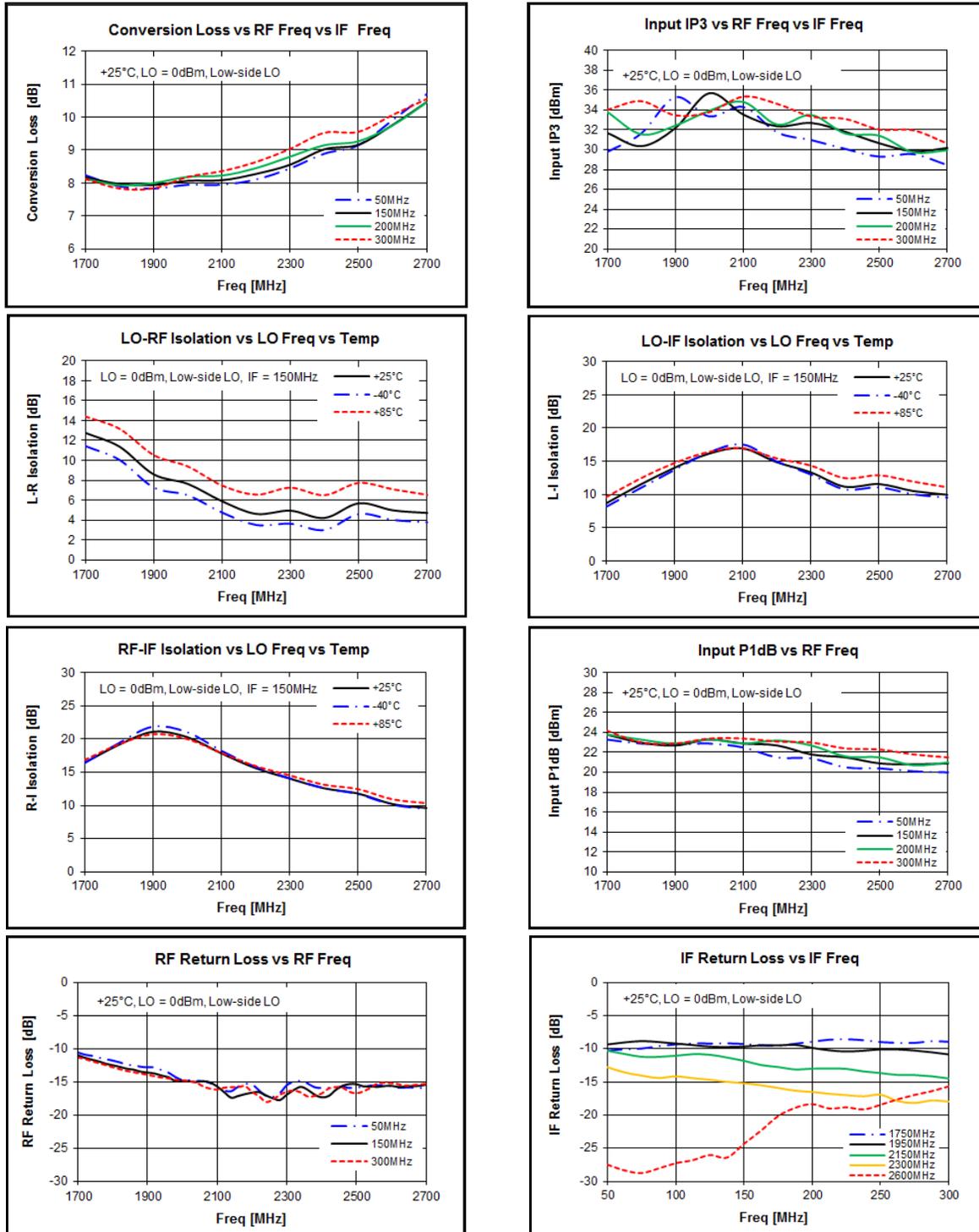
² IIP₃ is measured on two tone with RF in power 0dBm/ tone , F₂-F₁ = 1 MHz..

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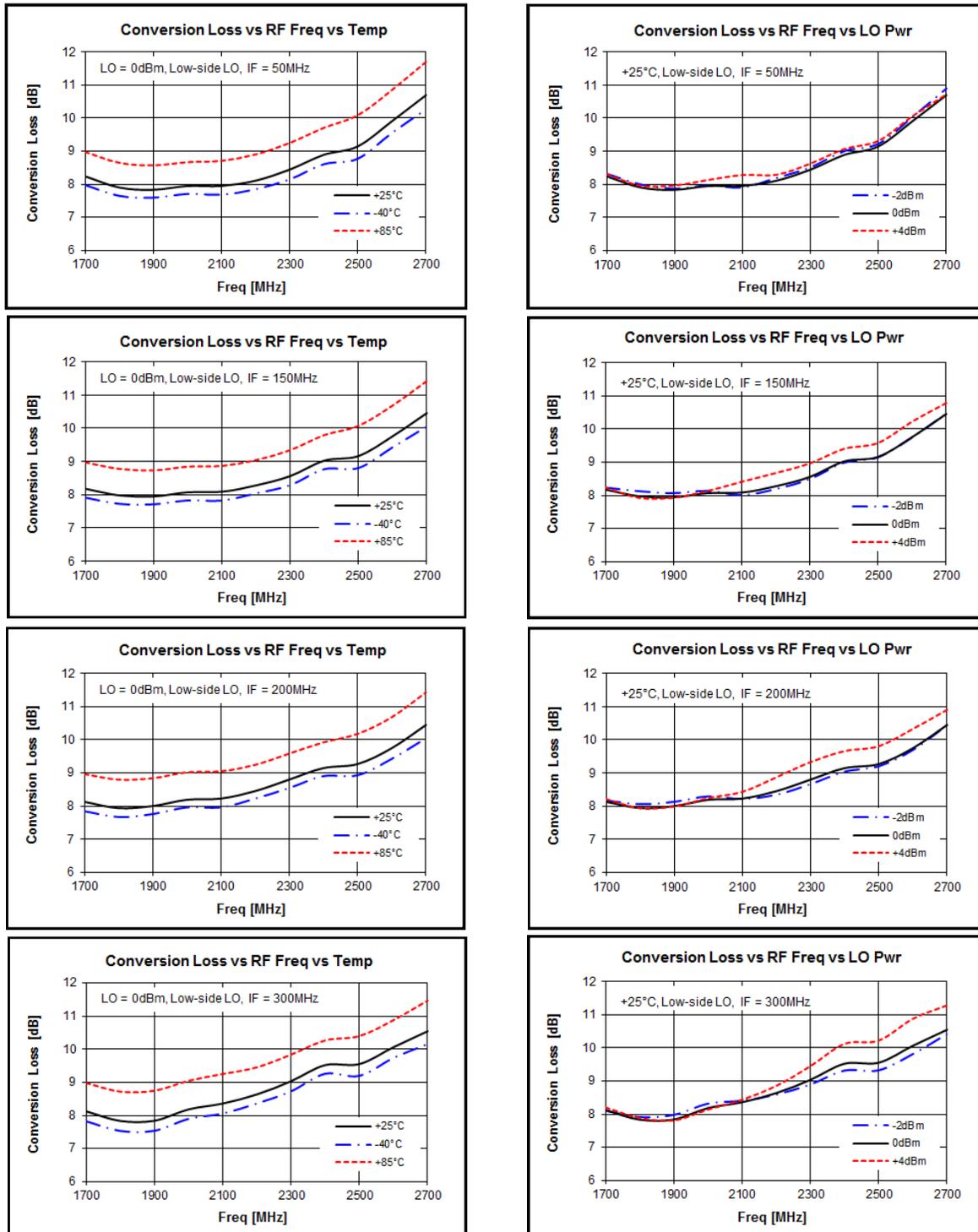


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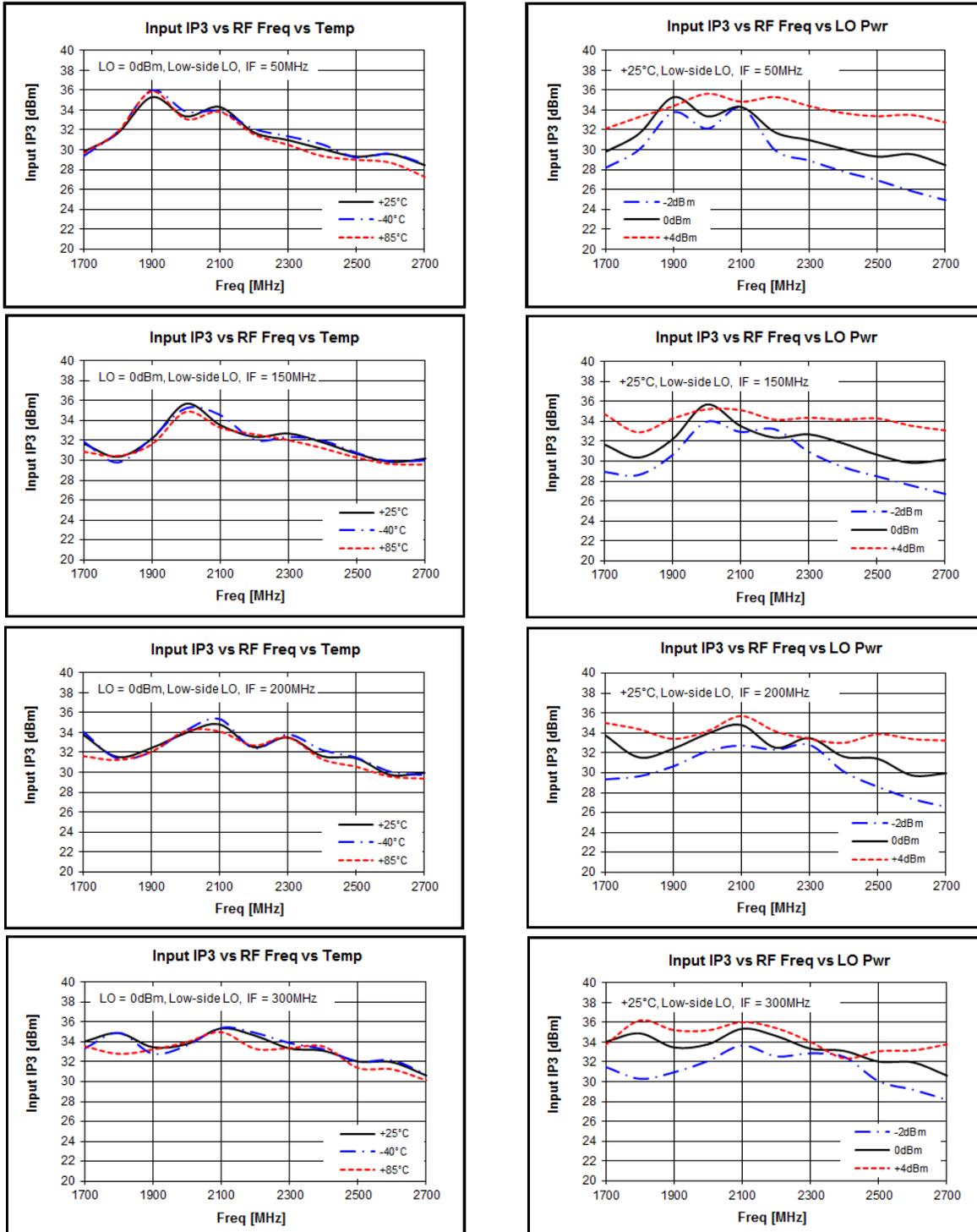


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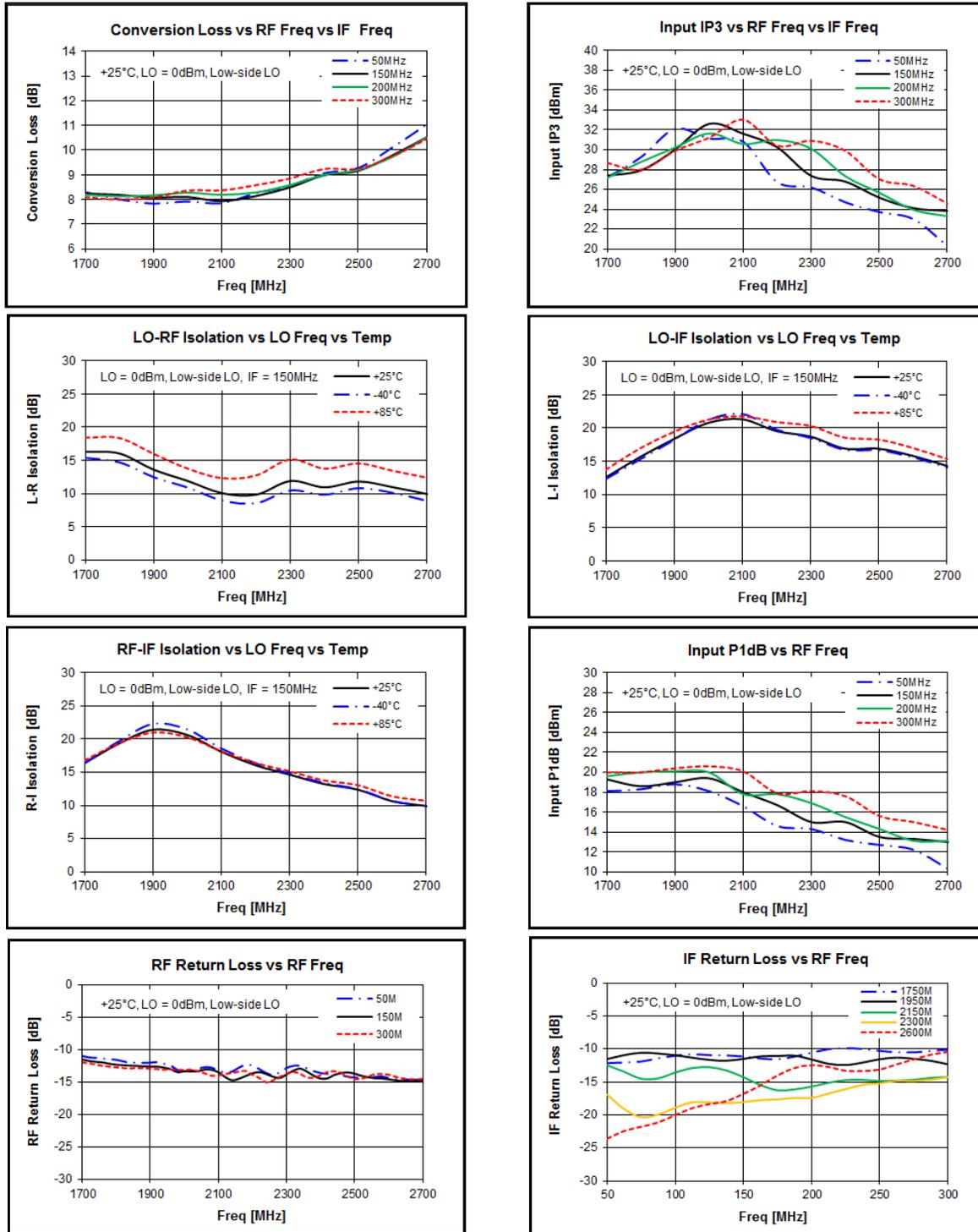


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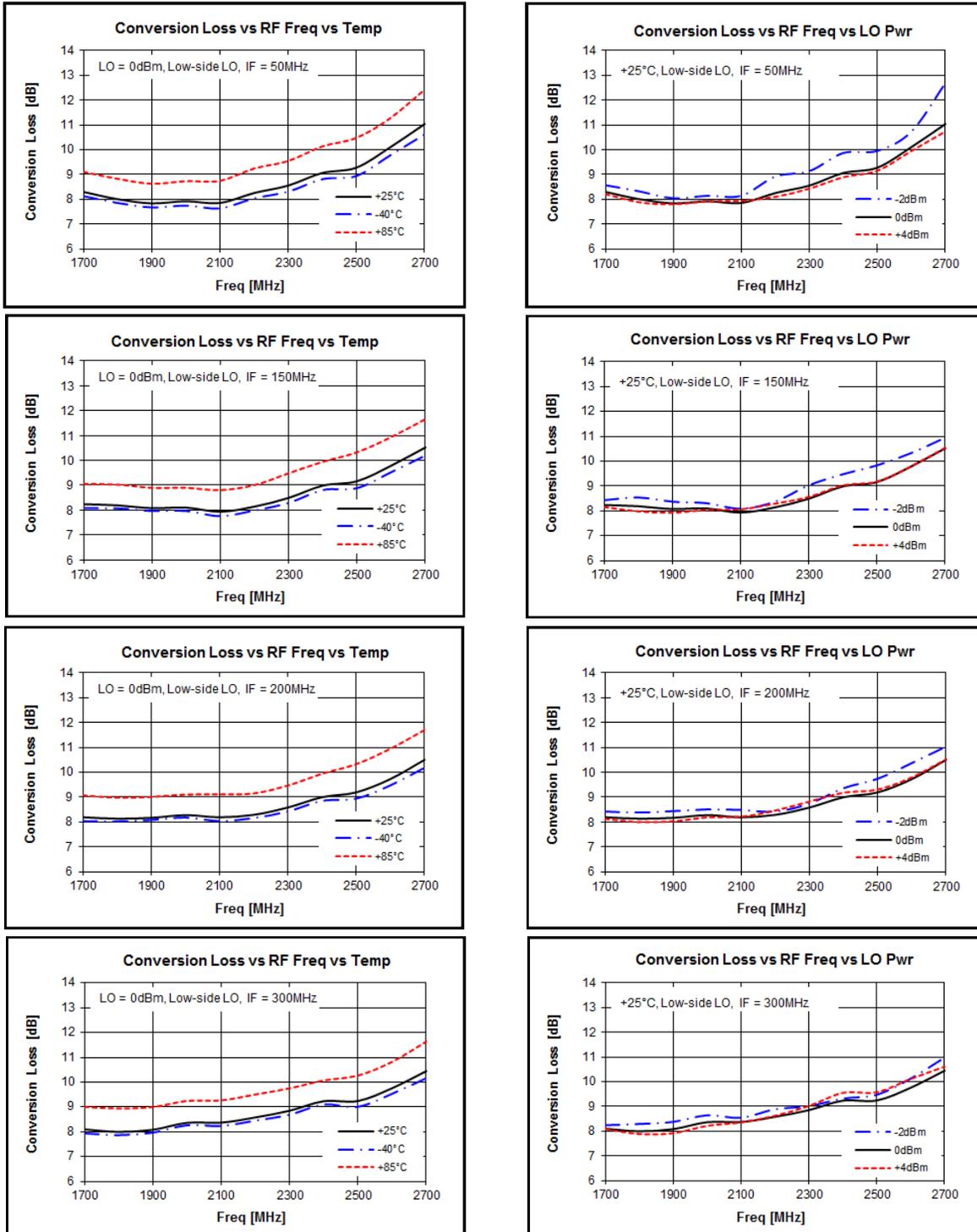


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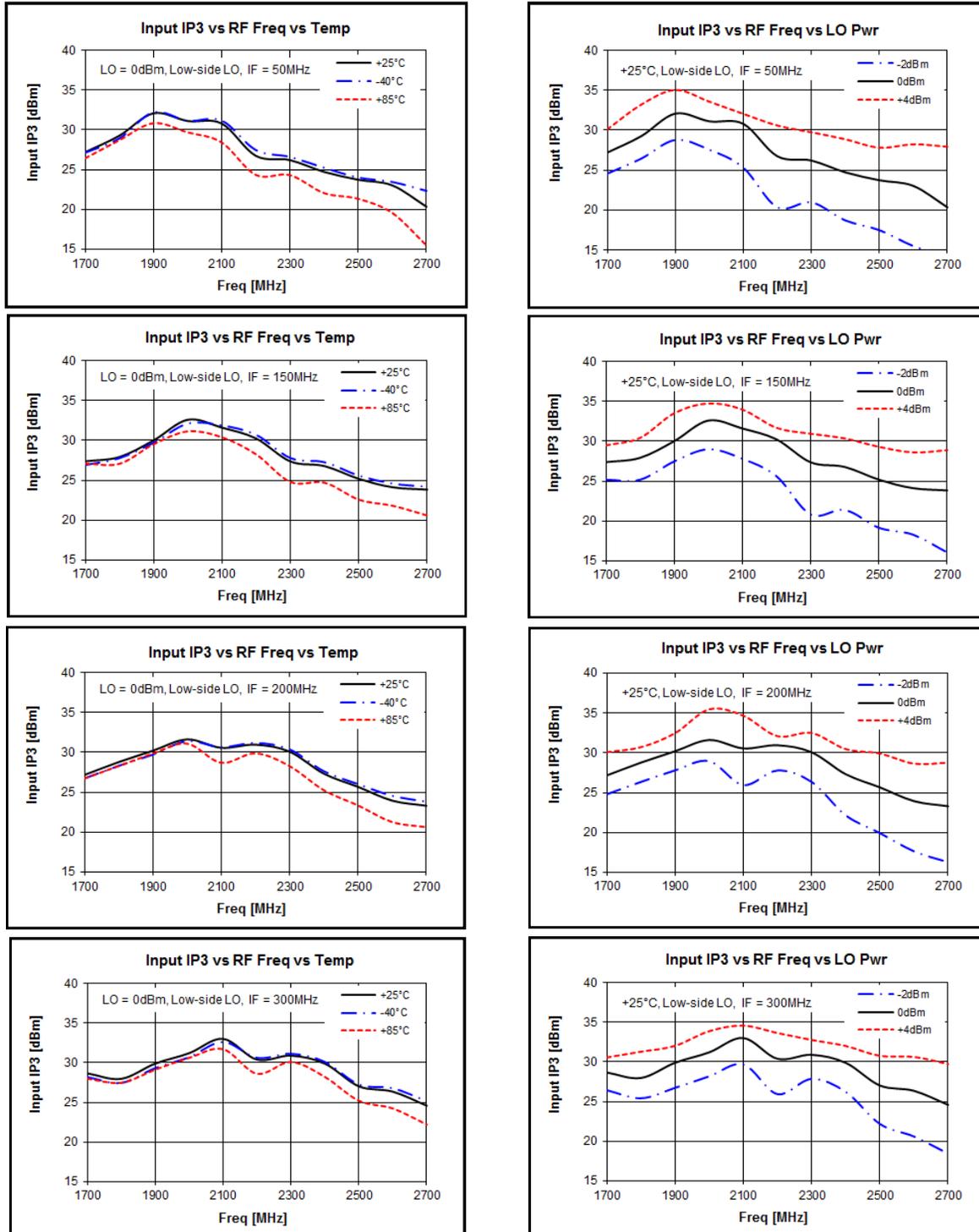


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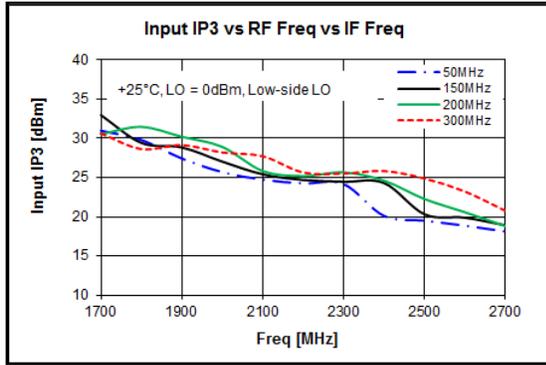


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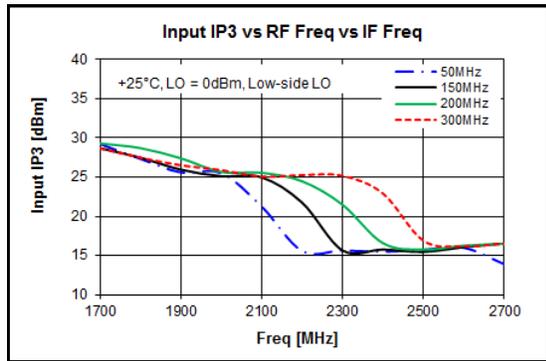
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Spur Table

		M					
		0	1	2	3	4	5
N	0		4	13	9	3	8
	1	13	0	24	25	24	20
	2	73	65	44	67	55	55
	3	73	90	76	84	67	75
	4	108	88	105	93	90	88
	5	102	94	91	102	100	94

Spur table is $N \times f_{RF} - M \times f_{LO}$ mixer spurious products for 0 dBm input power, unless otherwise noted.

RF Frequency = 1842 MHz

LO Frequency = 1642 MHz

All values in dBc relative to the IF Power Level.

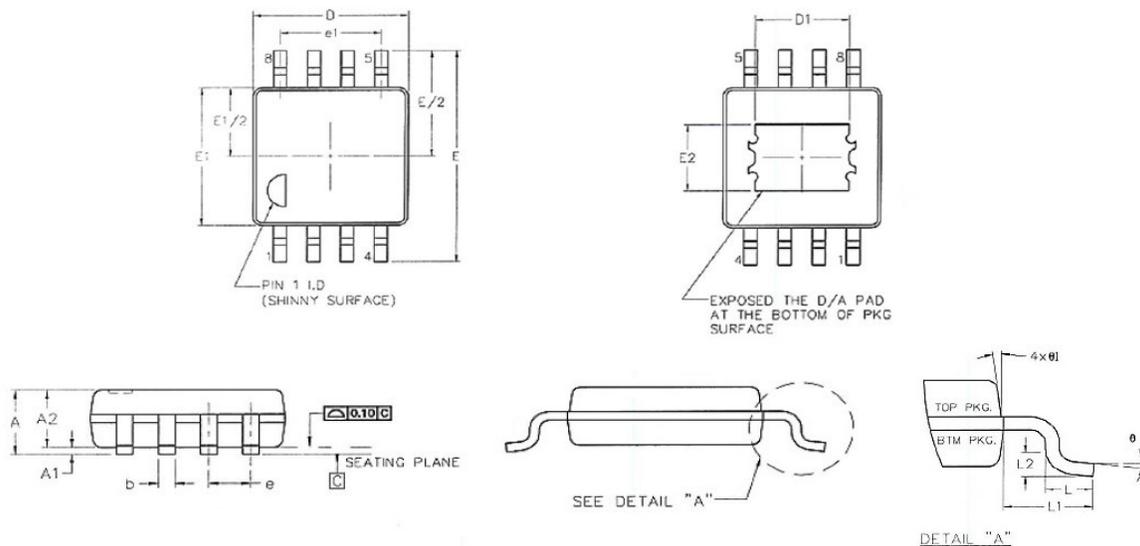
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Package Outline Drawing



	A	A1	A2	b	D	D1	E	E1	E2	e	e1	L	L1	L2
Min		2	32	11	114	66	188	114	54	25.5 Typ	76.7 Typ	16	37 Ref	10 Typ
Nom		4	34		118		192	118						
Max	42	6	36	15	122	70	196	122	58			27		

*Remark all unit in mils

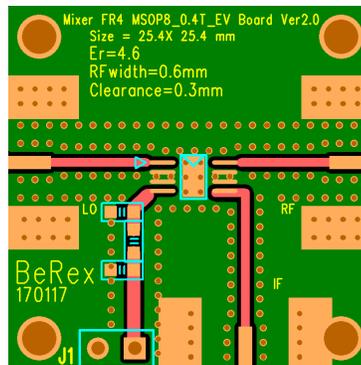
Package Marking



Pin 1

YY = Year, WW = Working Week,
XX = Wafer No.

Evaluation Board Drawing

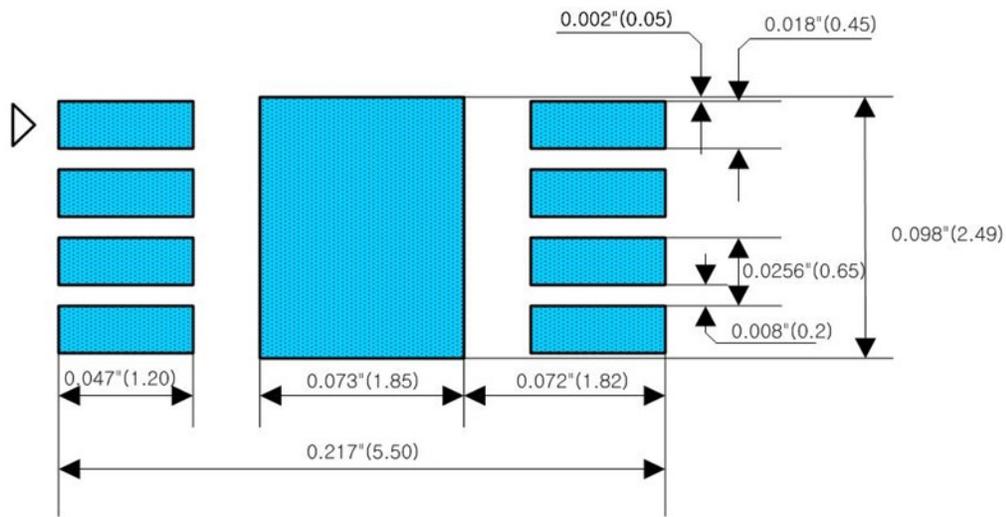


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Suggested PCB Land Pattern and PAD Layout

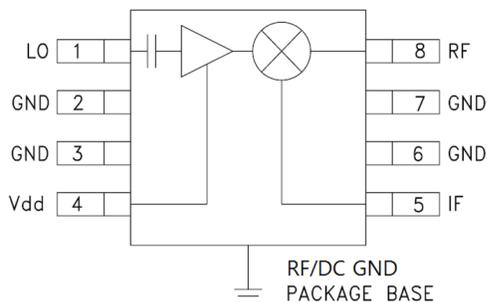
PCB Land Pattern



Note : 1. Connection to Bottom Ground with multiple via holes.

2. Via holes _ as many as possible.
3. All Dimensions _ millimeters.
4. PCB lay out _ on BeRex website.

Pin Configuration



Pin No.	Label	Description
1	LO	Local Oscillator Injection. Internally DC Blocked
2,3,6,7	GND	RF/DC Ground.
4	Vdd	Power supply for LO amplifier
5	IF	Intermediate Frequency
8	RF	Radio Frequency
Backside Paddle	GND	RF/DC Ground. Follow recommended via pattern and ensure good solder attach for best thermal and electrical performance.

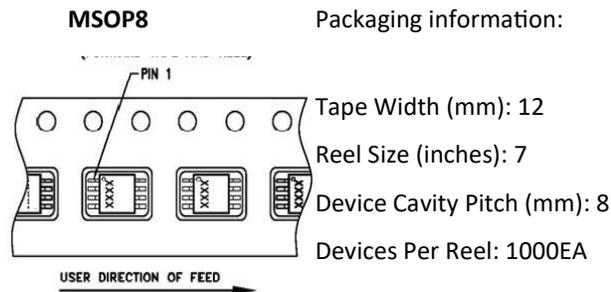
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Tape & Reel



Lead plating finish

100% Tin Matte finish

(All BeRex products undergoes a 1 hour, 150 degree C, Anneal bake to eliminate thin whisker growth concerns.)

MSL / ESD Rating

ESD Rating:	Class 1B
Value:	Passes <1000V
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114B
MSL Rating:	Level 1 at +265°C convection reflow
Standard:	JEDEC Standard J-STD-020



Proper ESD procedures should be followed when handling this device.

NATO CAGE code:

2	N	9	6	F
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