K band MMIC Sub-Harmonic Mixer

K-SHM-2225 Previously named LE-Ka1340309

GaAs MMIC Sub-Harmonic Mixer 22.5 - 25 GHz

Overview

K-SHM-2225 is a GaAs MMIC sub-harmonic mixer, covering frequencies from 22.5GHz to 25GHz with LO signals in the range of 10.8GHz to 13.6GHz. This MMIC MMIC incorporates an anti-parallel diode pair and is useable for LO drive levels of <10dBm at the first sub-harmonic frequency, with conversion losses <16dB achieved with an LO power of 8dBm.

The MMIC is fully passivated for additional protection and has all bond pads and backside gold plated. The MMIC is compatible with precision die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown is measured with the chip in a 50 Ohm environment and contacted with RF probes.

Features

- 22.5 – 25GHz.
- <16dB conversion loss.
- Low LO drive level requirement.

Applications

- Phase-locked loops.
- High speed data communications.
- Space communications.
- IOT.
- Security.

Specification Overview

Parameter	Min.	Typ.	Max.	Units	Comments
RF Frequency	22.5		25	GHz	
LO Frequency	10.8	12	13.6	GHz	Fixed RF = 24GHz
IF Frequency	0		3.2	GHz	Fixed RF = 24GHz
Conversion Loss		15.5		dB	

Notes
All tests are carried out at 25°C.

Absolute Maximum Ratings

Parameter	Rating
RF Drive Level (OUT, 24, 12REF)	25dBm
Storage Temperature	−65°C to +150°C
Channel Temperature	+150°C
Operating Temperature	−40°C to +85°C

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features proprietary protection circuitry, damage may occur on devices subjected to ESD. Proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

Measured Performance Data

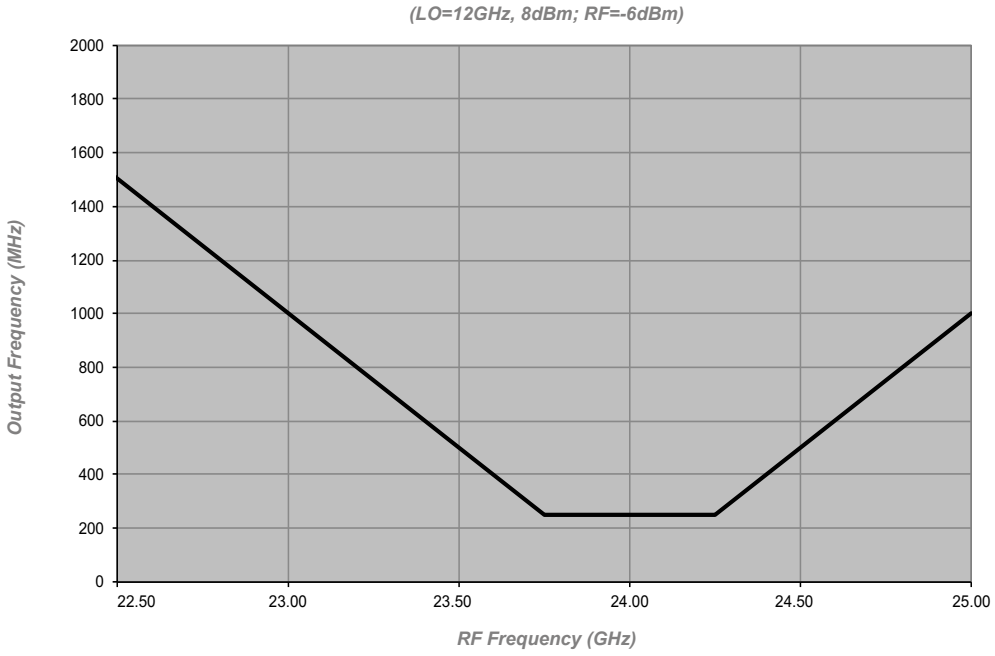


Figure 1
Output Frequency

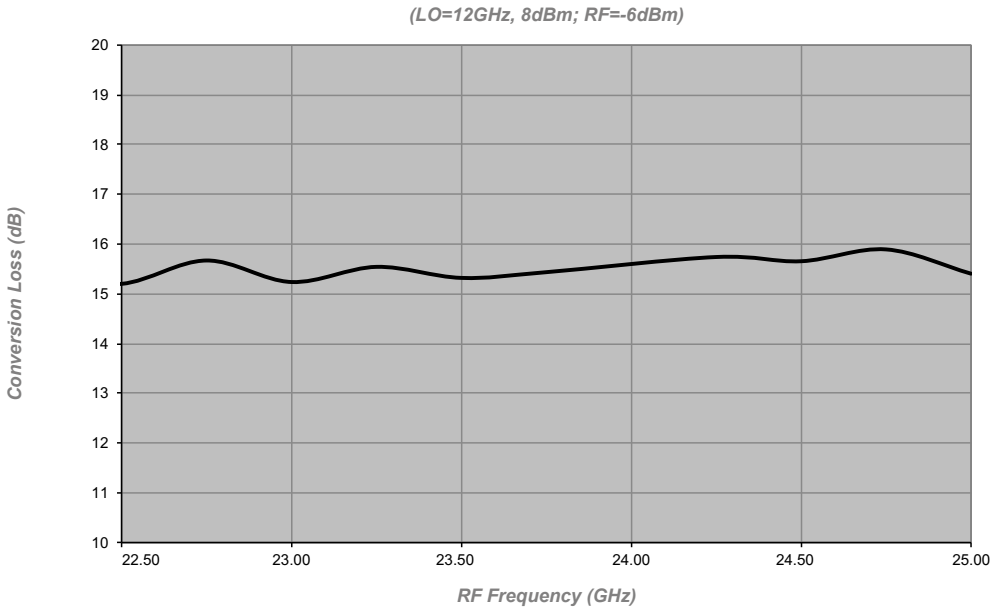
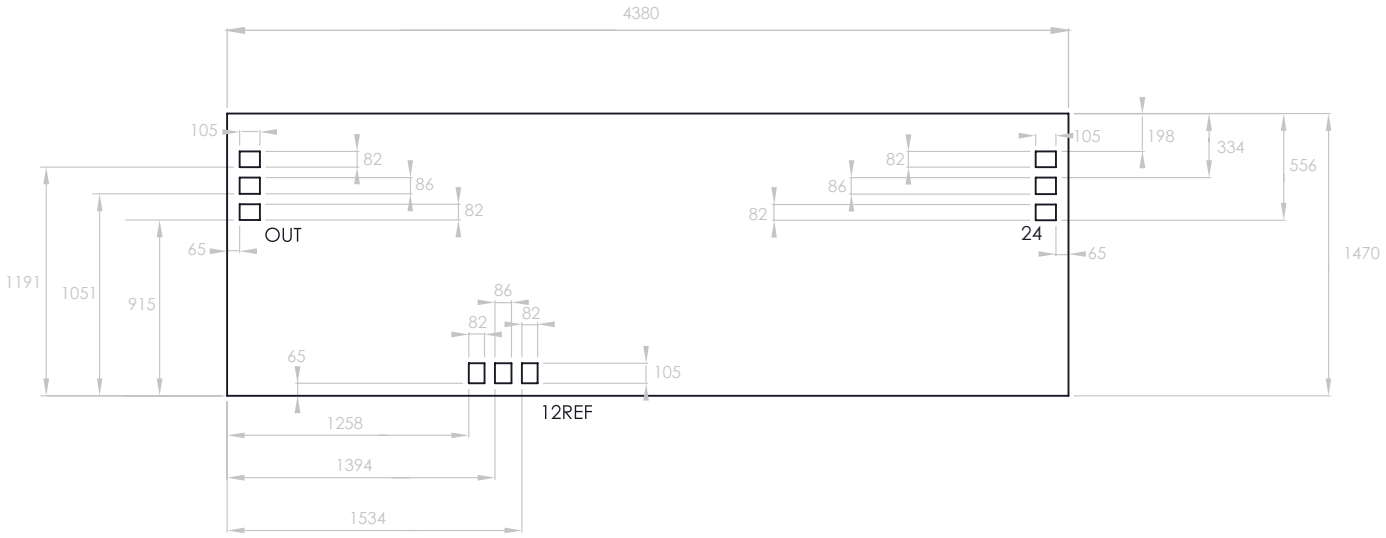


Figure 2
Conversion Loss

Outline Drawing



Notes

1. All dimensions are in um.
2. RF bond pads are 105 x 80um.
3. All pads have gold metalisation.
4. Gold backside metalisation.
5. Backside metal is ground.
6. Die thickness is 100um

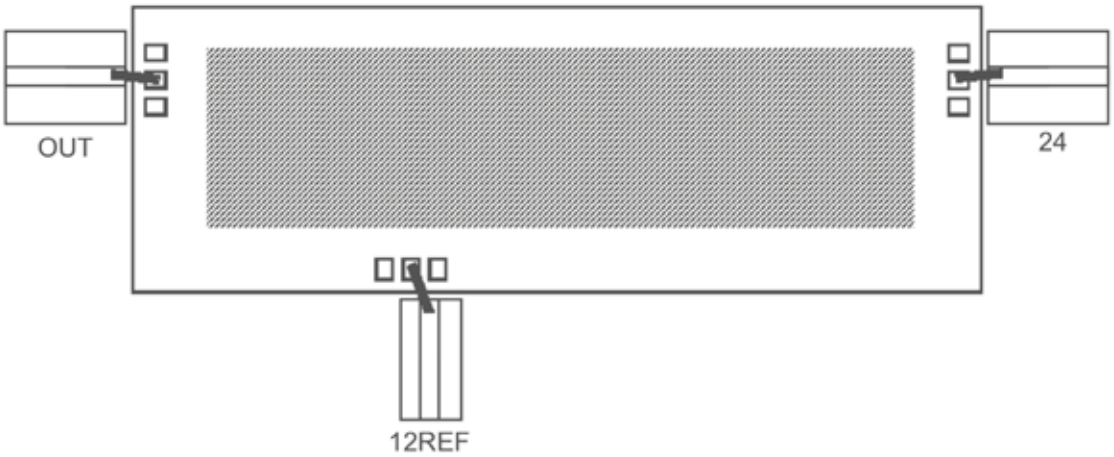
Die Packing Information

All die are delivered using gel-paks unless otherwise requested.

Pad Descriptions

Name	Description
OUT	Output IF frequency pad
12REF	Input pad for sub-harmonic LO signal
24	Input pad for RF signal
BOTTOM	The die backside must be connected to RF/DC ground

Connection Configurations



General Notes on Assembly

Die should be mounted on conductive material such as gold-plated metal to provide a good ground and suitable heat sink, if necessary.

1. Attaching the die using Au/Sn preforms is preferable. The Eutectic melt for Au/Sn occurs at approximately 280°C so the die (plus mount and preform) is initially heated up to 180°C and then it is heated for approximately 10 seconds to 280°C using a nitrogen heat gun. The device will survive 10 seconds at this temperature. The static breakdown for GaAs devices is approximately 330°C.
2. Pure, dry nitrogen should be used as the heat source.
3. If the devices cannot be lifted/ placed by a vacuum device, then ESD die-lifting tweezers are preferable.
4. Aluminium wire must not be used.

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