



MMIC SURFACE MOUNT WIDEBAND

Double Balanced Mixer

MDB-44H+

Mini-Circuits

Level 15 (LO Power 15dBm) 10-40 GHz

THE BIG DEAL

- Wide bandwidth 10 to 40 GHz
- High L-R Isolation, 37 dB typ. at 25 GHz
- Useable as Up & Down Converter
- Small Size, 3 mm x 3 mm x 0.89 mm
- Aqueous washable



CASE STYLE: DQ1225

Generic photo used for illustration purposes only

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

APPLICATIONS

- Satellite up and down converters
- Defense radar & communication
- VSAT
- Line of sight links
- Federal fixed service
- 5G
- ISM

PRODUCT OVERVIEW

MDB-44H+ is an advanced wideband frequency mixer fabricated using InGaP HBT technology with integrated LO and RF Baluns. It has repeatable performance making it suitable for volume production. It is packaged in tiny 3 mm x 3 mm x 0.89 mm MCLP™ package.

KEY FEATURES

| Feature | Advantages |
|-----------------------------------|---|
| Double Balanced | Results in excellent LO-RF (30-39 dB typical) & LO-IF (27-37 dB typical) Isolations mini-mizing need for external filtering |
| Wide Bandwidth, 10 to 40 GHz | Useful in wideband systems or in in several narrowband systems. Reducing inventory |
| Wide IF Bandwidth DC-15 GHz | Usable in first and second down converter applications. IF as low as DC enables use in phase detector applications. |
| 3 mm x 3 mm, 12 lead MCLP Package | Low Inductance, repeatable transitions, excellent thermal contact to PCB |

REV. B
ECO-009182
MDB-44H+
MCL NY
210809



ELECTRICAL SPECIFICATIONS¹ AT 25°C, UNLESS NOTED

| Parameter | Condition (GHz) | Min. | Typ. | Max. | Units |
|--|-----------------|------|------|------|-------|
| RF Frequency Range | - | 10 | - | 40 | GHz |
| LO Frequency Range | - | 10 | - | 40 | GHz |
| IF Frequency Range | - | DC | - | 15 | GHz |
| LO Power | - | +15 | | | dBm |
| Conversion Loss (at IF=30 MHz) | 10-20 | - | 8.0 | - | dB |
| | 20-30 | - | 8.4 | 11.0 | |
| | 30-40 | - | 8.9 | 13.4 | |
| LO-RF Isolation | 10-20 | - | 39 | - | dB |
| | 20-30 | 25 | 37 | - | |
| | 30-40 | - | 30 | - | |
| LO-IF Isolation | 10-20 | - | 33 | - | dB |
| | 20-30 | 20 | 37 | - | |
| | 30-40 | - | 27 | - | |
| RF-IF Isolation | 10-20 | - | 24 | - | dB |
| | 20-30 | - | 16 | - | |
| | 30-40 | - | 31 | - | |
| Input at 1dB Compression | 10-40 | - | 10 | - | dBm |
| Input IP3 | 10-20 | - | 20 | - | dBm |
| Noise Figure | 20 | - | 8.6 | - | dB |
| Thermal Resistance (junction-to-ground lead) | | - | 105 | - | °C/W |

1. Measured on Mini-Circuits Characterization test board TB-973-MDB44HC+. See Characterization Test Circuit Figure 1

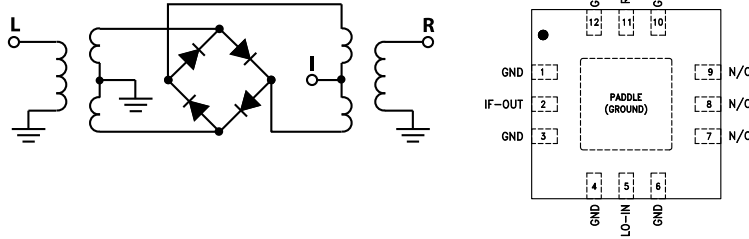
MAXIMUM RATINGS²

| Parameter | Ratings |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -65°C to 150°C |
| RF Power | 21 dBm |
| LO Power | 21 dBm |
| IF Current | 30 mA |

2. Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.



SIMPLIFIED SCHEMATIC AND BONDING PAD DESCRIPTION



PAD CONNECTIONS

| Function | Pad Number | Description |
|----------|-----------------------|-------------------------|
| RF-IN | 11 | RF input |
| LO-IN | 5 | LO input |
| IF-OUT | 2 | IF output |
| GND | 1,3,4,6,10,12, Paddle | Connect to Ground |
| NC | 7-9 | No connection, not used |

CHARACTERIZATION TEST CIRCUITS

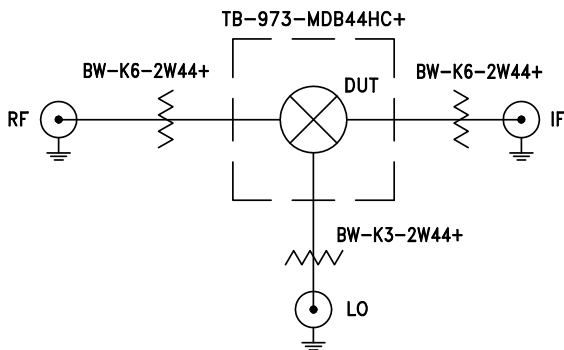


Figure 1A. Block Diagram of Test Circuit used for characterization of Conversion Loss, Isolations (LO-RF, LO-IF, RF-IF) and Return Loss (LO, RF, IF)

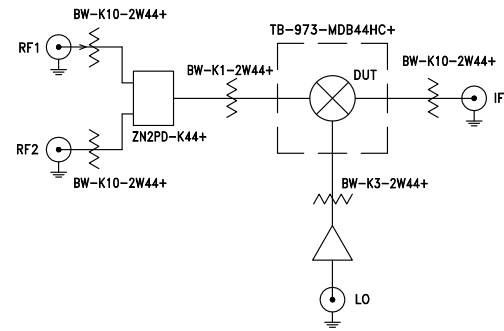


Figure 1B. Block Diagram of Test Circuit used for characterization of Input IP3

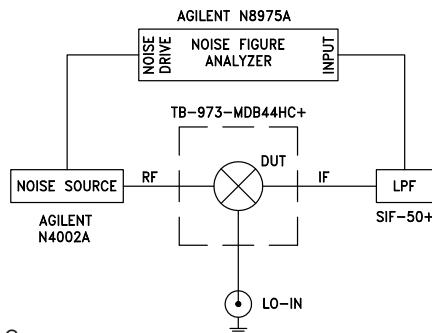


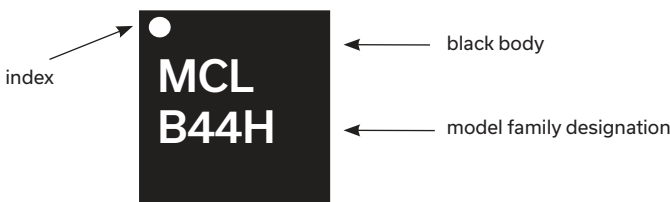
Figure 1C. Block Diagram of Test Circuit used for characterization of Noise Figure

Figure 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-973-MDB44HC+). Conversion Loss, Isolations L-R, L-I & R-I, Input IP3 are measured using Agilent PSA E4448A spectrum Analyzer and PSG E8257D Signal Generators. NF is measured using Agilent's N8975A NF Analyzer.

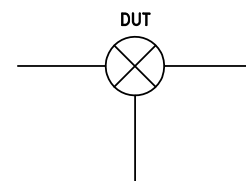
Conditions (Down Converter):

1. Conversion Loss, Isolations (L-R, L-I & R-I): RF= 0 dBm, LO=+15 dBm, IF=30 MHz
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.
3. Noise Figure: LO=+15 dBm

PRODUCT MARKING



APPLICATION CIRCUIT





ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

| | |
|--|--|
| Performance Data | Data Table Swept Graphs S-Parameter (S1P Files) Data Set (.zip file) |
| Case Style | DQ1225 Plastic package, exposed paddle, lead finish: matte-tin |
| Tape & Reel Standard quantities available on reel | F66 7" reels with 20, 50, 100, 200, 500, 1K and 2K devices |
| Suggested Layout for PCB Design | PL-540 |
| Evaluation Board | TB-973-MDB44HC+ |
| Environmental Ratings | ENV08T1 |

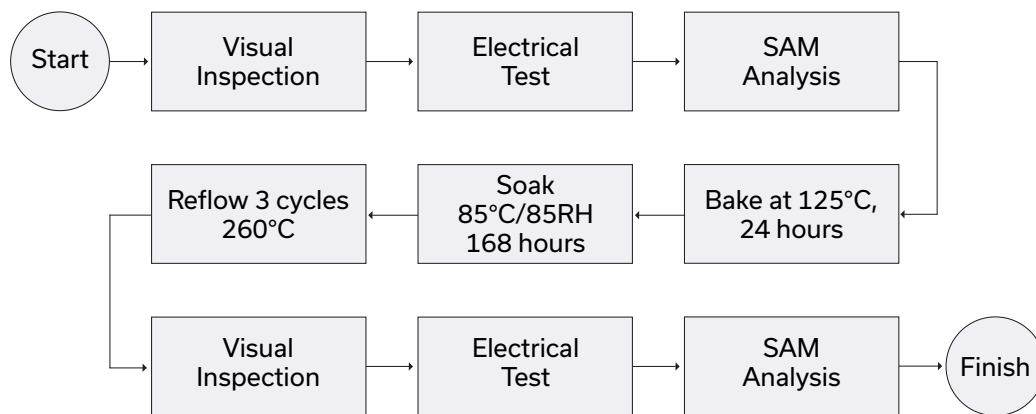
ESD RATING

Human Body Model (HBM): Class 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

MSL TEST FLOW CHART



- NOTES**
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
 - B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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