MMIC WIDEBAND

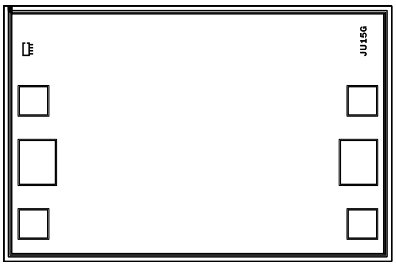
Gain Equalizer Die

EQY-15-24-D+

50Ω 6 to 20 GHz

THE BIG DEAL

- 15.7dB Slope
- Wide Bandwidth, 6-20GHz
- Excellent Return Loss, 20dB Typ.



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

SEE ORDERING INFORMATION ON THE LAST PAGE

APPLICATIONS

- Fixed Satellite
- Mobile
- Military Systems
- ELINT
- EW
- ECM

PRODUCT OVERVIEW

EQY-15-24-D+ is a MMIC gain equalizer die fabricated using highly repeatable GaAs IPD MMIC process incorporating resistors, capacitors and inductors to accomplish a positive attenuation slope vs. Frequency. EQY-15-24-D+ has a nominal attenuation slope of 15.7dB and can be applied to compensate for the negative gain slope of amplifiers to achieve relative gain flatness for the overall system.

KEY FEATURES

Feature	Advantages
Positive Attenuation Slope vs. Frequency	Useful in compensating for negate slope of an amplifier to achieve good gain flatness for the overall system.
Wideband Operation, 6 to 20 GHz	Supports a wide variety of applications including wireless cellular, microwave communications, satellite, defense and aerospace, medical and optic applications.
Excellent Power Handling Capability	Enables the product to be used at the output of an amplifier.
Unpackaged die	Enables user to integrates it directly into hybrids.

ELECTRICAL SPECIFICATIONS[1] AT 25°C, 50Ω, UNLESS OTHERWISE NOTED.

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		6		20	GHz
Insertion Loss	6		17.0		dB
	10		10.9		
	14		5.6		
	18		2.2		
	20		1.3		
VSWR	6 - 10		1.22		:1
	10 - 14		1.19		
	14 - 18		1.25		
	18 - 20		1.22		

1. Measured on Mini-Circuits Characterization Test Board. Die was packaged in a 2.5 x 2.5mm 8L MCLP and soldered on test board TB-EQY-15-24+ See Characterization Test Circuits (Figure 1).

MAXIMUM RATINGS[2]

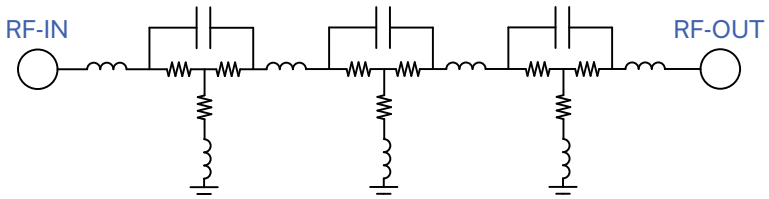
Parameter	Ratings
Operating Temperature	-40° C to 85° C
Input RF Power	31dBm

2. Permanent damage may occur if any of these limits are excedeed.

Gain Equalizer Die

EQY-15-24-D+

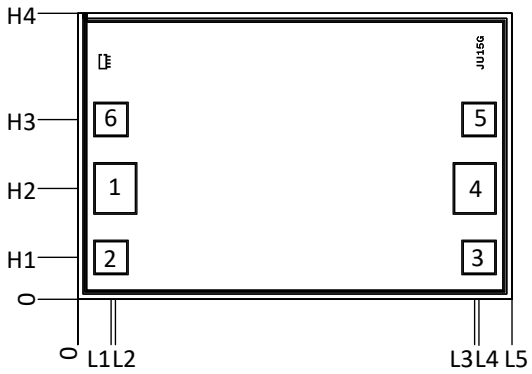
SIMPLIFIED SCHEMATIC



PAD DESCRIPTION

Pad Number	Description
1	RF IN
4	RF OUT
2,3,5,6	GROUND

BONDING PAD POSITION



DIE DIMENSIONS IN µm

L1	L2	L3	L4	L5	H1	H2	H3	H4
97.0	109.0	1152.0	1165.0	1260.0	122.0	322.0	522.0	830.0

Thickness	Die Size	Pad Size 1&4	Pad Size 2,3,5,6
100	1260 x 830	117 x 142	92 x 92

CHARACTERIZATION TEST CIRCUIT

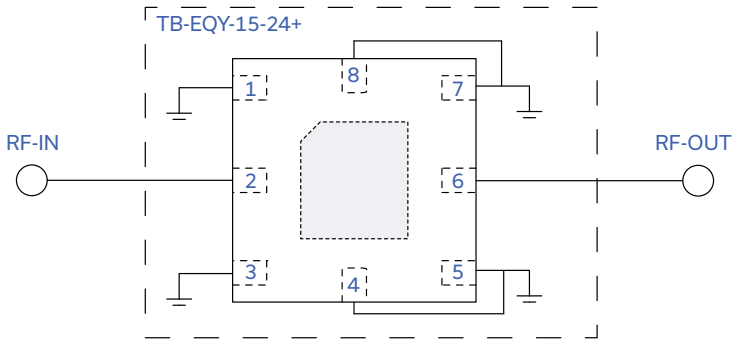
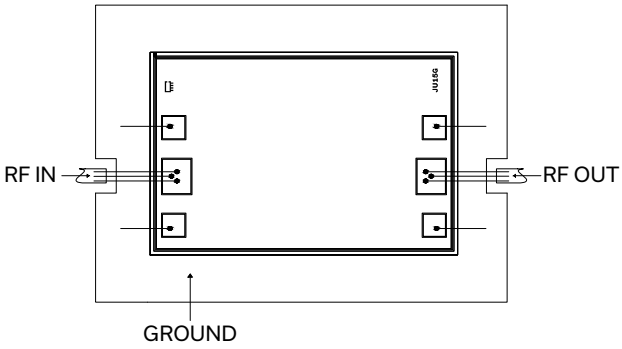


Fig 1. Block Diagram of test circuit used for characterization. Die is packaged in 2.5 x 2.5mm 8L MCLP and soldered on test board TB-EQY-15-24+

Conditions: Attenuation & Return Loss, Pin = 0dBm.

ASSEMBLY DIAGRAM



ASSEMBLY PROCEDURE

1. Storage
   Dice should be stored in a dry nitrogen purged desiccators or equivalent.
2. ESD
   MMIC GaAs Gain equalizer dice are susceptible to electrostatic and mechanical damage. Die are supplied in antistatic protected material, which should be open in clean room conditions at an appropriately grounded anti-static workstation.
3. Die Handling and Attachment
   Devices need careful handling using correctly designed collets, it is recommended to handle the chip along the edges with a custom design collet. The die mounting surface must be clean and flat. Using conductive silver filled epoxy, recommended epoxies are Ablestik 84-1 LMISR4 or equivalents. Apply sufficent epoxy to meet required epoxy bond line thickness, epoxy fillet height and epoxy coverage around total periphery. Parts shall be cured in a nitrogen filled atmosphere per manufacturer's cure condition. It is recommended to use anti-static die pick up tools only.
4. Wire Bonding
   Bond pad openings in the surface passivation above the bond pads are provided to allow wire bonding to the dice gold bond pads. Thermo-sonic bonding is used with minimized ultrasonic content. Bond force, time, ultrasonic power and temperature are all critical parameters. Suggested wire is pure gold, 1mil diameter. Bonds must be made from the bond pads on the die to the packaged or substrate. All bond wires should be kept as short as low as reasonable to minimize performance degradation due to undesirable series inductance.

Gain Equalizer

EQY-15-24-D+

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD.

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set with and without port extension(.zip file)	
Case Style	Die	
Die Ordering and packaging information	Quantity, Package Small, Gel - Pak: 5,10,50,100 KGD* Medium†, Partial wafer: KGD*<1620 Full wafer	Model No. EQY-15-24-DG+ EQY-15-24-DP+ EQY-15-24-DF+
	†Available upon request contact sales representative	
Die Marking	JU15G	
Environmental Ratings	ENV80	

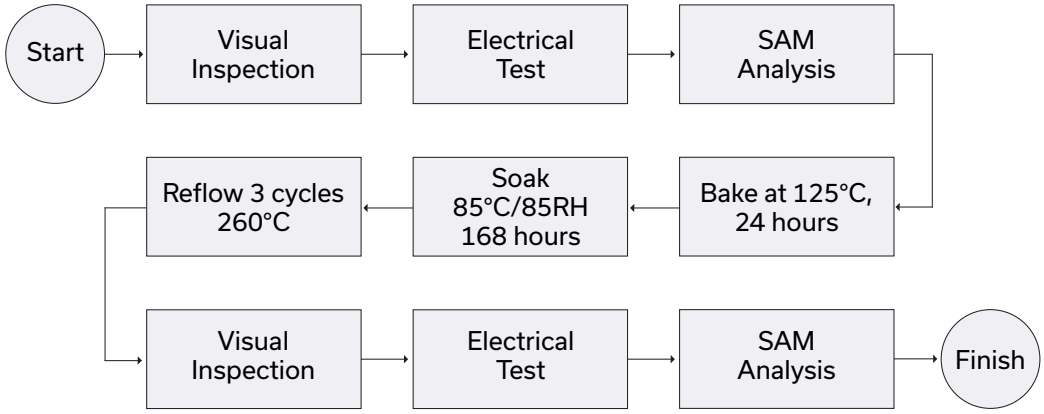
*Known Good Dice (''KGD'') means that the dice are taken from PCM good wafers that have been RF-tested. It provides enough confidence that the dice are capable of meeting typical RF electrical parameters specified by Mini-Circuits.

ESD RATING**

Human Body Model (HBM): Class 1C (Pass 1000V) in accordance with ANSI/ESD STM 5.1-2001 Machine

**ESD is measured in a 2.5 x 2.5mm 8L MCLP.

MSL TEST FLOW CHART



NOTES

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Mini-Circuits

Environmental Specifications ENV80

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -40° to 105° C or -55° to 105° C or -45° to 105° C Ambient Environment	Refer to Individual Model Data Sheet
Storage Environment (Die)	-65° to 150°C	Individual Model Data Sheet
Storage Environment(Packaging)	-40° to 70°C and 40 to 60% humidity (In Factory Shipped Package)	

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