HI-REL AND SPACE PRODUCT SCREENING BROCHURE 2020-2021

MicroWave Technology

High-Reliability and Space-Reliability Screening Options

SPACE QUALIFIED LOW NOISE AMPLIFIERS

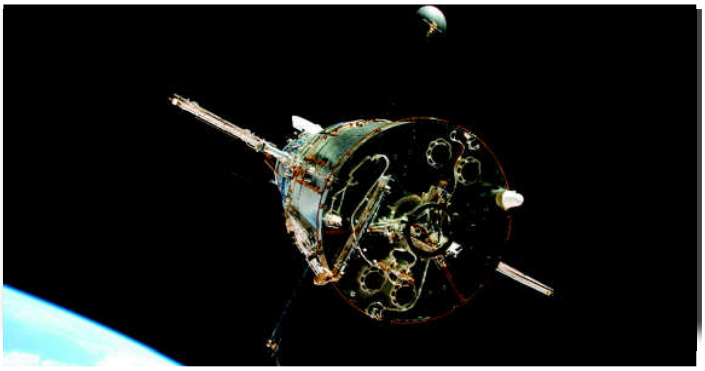
Model New	Pkg	Freq (GHz)	Linear Gain Typ (dB)	Gain Fitness Typ +/-(dB)	Input RL Typ (dB)	Output RL Typ (dB)	Pout @ -1dB Typ (dBm)	NF Typ (dB)	OIP3 Typ (dBm)	Vdd (V)	DC Current (mA)
MLA-01122B	C4,H6	1-10	17	1.0	14	11	16	1.6		5.0	55
MLA-0522A	87	6-18	19	2.0	10	11	20	3.0		4.5	135
LN-162315-H4	H4	1.6-2.3	26	0.3	16	16	12	1.5		5.0	38
LN-141510-H4	H4	0.150	20	1.0	12	10	16	1.0	26	12.0	30
GM-141526-H4	H4	0.150	20	1.0	14	14	26	5.0	37	12.0	150

SPACE QUALIFIED GAAS FETS

Model New	Pkg	Gate Width / Length um	Gate Layout Method	Gate Drain Source Bond Qty	Chip Thick-ness & VIA mil, y/n	S.S. Gain @12GHz Typ/Min dB	N.F. @12GHz Typ/Max dB	Ga @ N.F. @12GHz Typ/Min dB	P-1dB @ 12GHz Typ/Min dBm	IP3 @ 12GHz Typ dBm	Nominal Chip Size um ■ um	Ideal Circuit
MwT-1	70, 71	630/0.3	single stripe	1, 1, 2	5, no	10.0 / 9.0	2.0 / -	7.0 / -	24.0/23.0	-	775 ■ 241	FB Amp
MwT-2	70, 71	630/0.3	single stripe	2, 2, 3	5, no	8.5 / 8.0	- / -	- / -	24.5/23.0	-	775 ■ 241	BA Amp
MwT-3	70, 71	300/0.3	single stripe	1, 1, 2	5, no	11.0 / 10.0	- / -	- / -	21.0/20.0	-	406 ■ 241	BA Amp
MwT-7	70	250/0.3	single stripe	2, 2, 2	5, no	10.5 / 10.0	2.0 / -	8.0 / -	20.0/18.0	-	356 ■ 241	BA/SE Amp
MwT-LP7	70	250/0.3	single stripe	2, 2, 2	5, no	10.5 / 10.0	2.0 / -	8.0 / -	20.0/18.0	-	356 ■ 241	Oscillator
MwT-PH7	70, 71	250/0.3	single stripe	2, 1, 2	4, no	13.5 / 12.0	-	-	24.0/22.0	-	356 ■ 241	Medium Pow
MwT-8	71	2400/0.3	Interdigit	2, 2, 3	4, no	7.5 / 7.0	-	-	28.0/27.0	-	673 ■ 305	Power Amp
MwT-A9	70, 71	750/0.3	single stripe	1, 1, 2	5, no	9.0 / 8.0	-	-	25.5/23.0	-	419 ■ 292	FB Amp
MwT-PH9	70, 71	750/0.3	single stripe	1, 1, 2	4, no	10.0 / 9.0	-	-	27.0/26.0	-	419 ■ 292	Power Amp

SPACE QUALIFIED LOW NOISE FETS

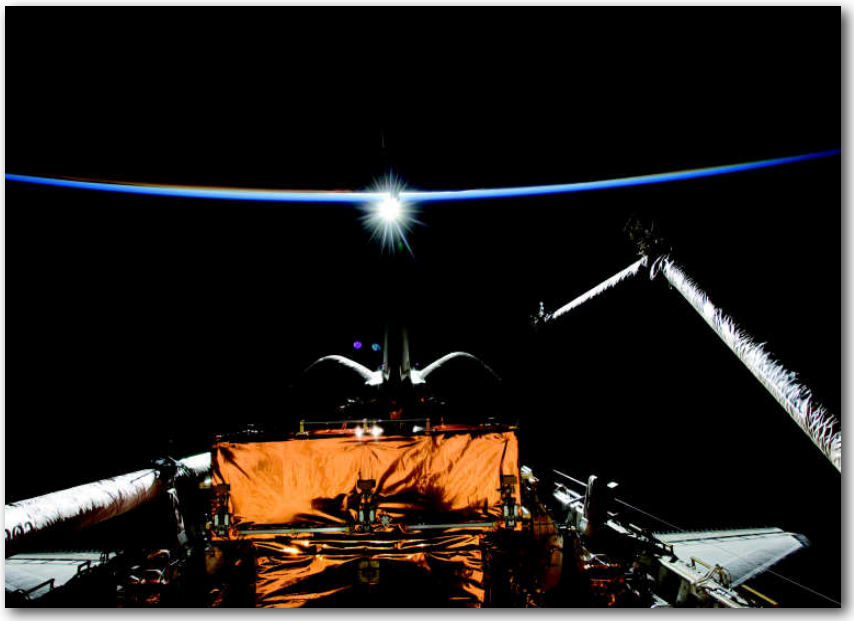
Model	Gate Width / Length	N.F. @12GHz Typ dB	N.F. @4GHz Typ dB	Ga @ N.F. @12GHz Typ/Min dB	Ga @ N.F. @4GHz Typ dB	P-1dB @ 12GHz Typ dBm
MwT-LN240	240/0.15	0.5	0.2	10 / --	13	16
MwT-LN300	300/0.15	0.6	0.2	10 / --	13	16
MwT-LN600	600/0.15	0.5	0.2	9 / 8	12	20



High-Reliability and Space-Reliability Screening Options

HI-RELIABILITY SCREENING CAPABILITIES

MwT performs space assembly, testing, screening and qualification testing for microwave semiconductor devices, components and sub-systems. For military and space applications, the procedures are based on the MIL-PRF-38534 and other industry and government standards such as MIL-STD-202, MIL-STD-883, MIL-STD-750, MIL-STD-810, MIL-Q-9858, MIL-STD-19500 AND MIL-I-45208. We have been providing components and semiconductor devices to military and space customers successfully since 1985.



PRODUCTS AVAILABLE FOR SCREENING

- GaAS pHEMT, and MESFETs
- Microwave Bipolar Transistors
- Microwave Diodes
- Microwave Components, such as amplifiers Microwave Subsystems
- Microwave MMICs
- High Rel and Space Screening for other manufacturer's products. Contact factory for details.

ELEMENT EVALUATION

MwT performs element evaluation per MIL-PRF-38534 on semiconductor devices, passive elements, substrates, packages, and other elements used in microwave components and sub-systems. A typical program for GaAs FET is as follows:

Test	Method	Class H	Class K
Element Electrical		■	■
Element Visual	2010,2072 or 2073	■	■
Internal Visual	2010,2072 or 2073	■	■
Temperature Cycling	1010		■
Mechanical Shock or	2002		■
Constant Acceleration	2001		■
Burn In	1015 240 hrs.at 125°C		■
Post Burn-in Electrical			■
Steady State Life	1005		■
Final Electrical		■	■
Wire-bond Evaluation	2011	■	■
SEM	2018, 2077		■

High-Reliability and Space-Reliability Screening Options

HYBRID ASSEMBLY FOR PACKAGED SEMICONDUCTOR DEVICES AND MICROWAVE COMPONENTS

MwT assembles active devices suches as FETs and MMIC's and passive devices, into hermetically sealed packages suitable for military and space applications. These assembly operations are controlled by MwT's stringent quality control system. Typical in-process control includes bond-pull and die-shear on sample circuits every shift. QA visual inspection on a sample basis is performed on all assembly lot.

HYBRID AND PACKAGED DEVICE SCREENING

Screening is done per MIL-PRF-38534 for either class H or Class K.

Test or Inspection	Method	Condition	Class H	Class K
Non-destructive Bond-pull	2023		N/A	100%
Internal Visual	2017		100%	100%
Temperature Cycling	1010	C	100%	100%
Constant Acceleration	2001	A	100%	100%
PIND	2020	A	N/A	100%
Pre-burn-in Electrical			100%	100%
Burn-In	1015	B	100%	100%
Final Electrical			100%	100%
Group A			100%	100%
Seal (Gross and Fine Leak)	1014	A1/C	100%	100%
Radiographic Examination	2012		N/A	100%
External Visual	2009		100%	100%

HYBRID AND PACKAGED DEVICE QUALIFICATIONS

Qualifications are performed according to MIL-PRF-38534 and MIL-STD-883

Test or Inspection	Method	Condition	Class H	Class K
External Visual	2009		■	■
PIND	2020		■	■
Temperature Cycling or	1010	C, minimum	■	■
Thermal Shock	1011	A, minimum	■	■
Mechanical shock and/or	2002	B, Y1 direction	■	■
Constant Acceleration	2001	3000 g, Y1 direction	■	■
Seal(Gross and Fine)	1014		■	■
Visual Inspection	1010		■	■
End-Point Electrical			■	■
Steady-state Life Test	1005	1000 Hr,125°C	■	■
Internal Water Vapor Content	1018		■	■
Wire-bond strength	2011		■	■
Die Shear	2019 or 2027		■	■

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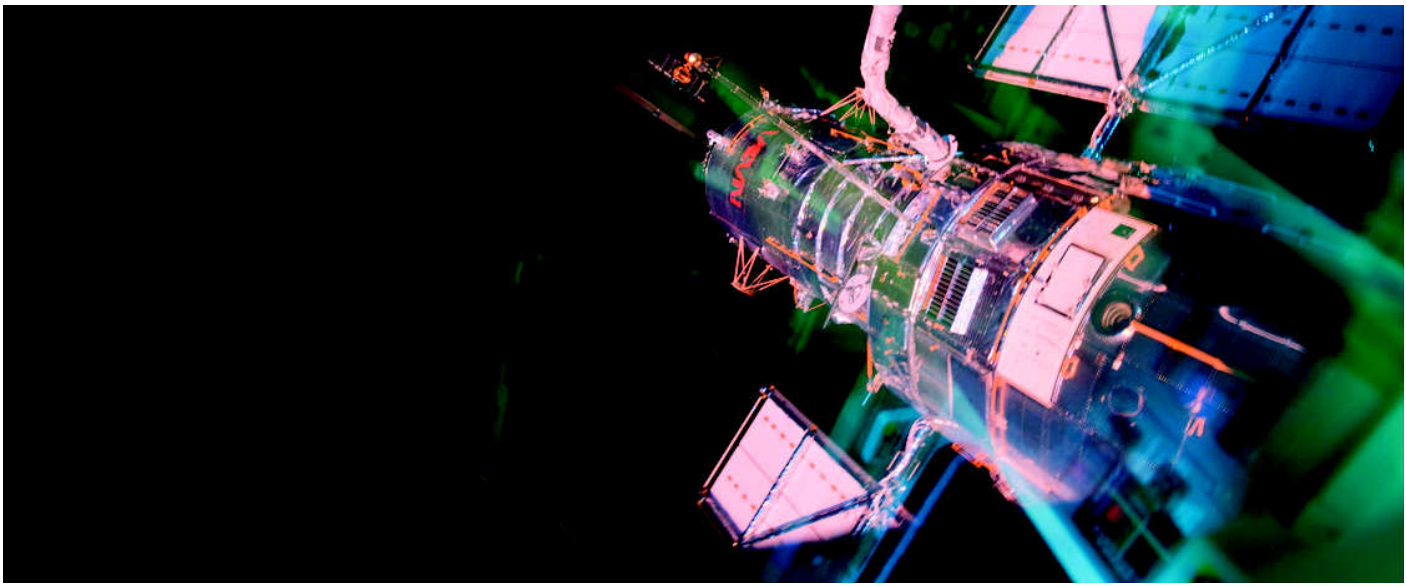

TESTING CAPABILITIES

RF Test on MMIC, Transistors and Diodes

1. Small Signal Gain, P1dB, Psat, IP3, IMD3, IMD5, VSWR, Reverse Isolation, and Noise Figure
2. S-parameter measurement
3. Measurements over temperature from -55°C to +85°C
4. Frequency Range: 100 KHz to 40 GHz

DC Test on MMIC, Transistors and Diodes:

5. FETs: I_{DSS}, Vp, G_m, BV_{GD}, BV_{GS}, I_{GSS}
6. Bipolar Transistors: I_{CBO}, I_{EBO}, h_{FE}, BV_{CEO}, BV_{CBO}, BV_{EBO}
7. MMIC: I_{DD}
8. Diodes: V_{BR}, C_T, Rs, Carrier Life time

PROGRAM MANAGEMENT

MwT has a dedicated program management team to provide support to customers for high reliability orders. From initial quoting, to the final shipment, program managers provide coordination, contact and control for all process. They provide up-to-date information on the status of the program and make sure that MwT complies with all customer requirements in hardware and software. Contact MwT for a list of space heritage. MwT provides a transparent operation to her customers.

MwT QUALITY SYSTEMS:

MwT is ISO9000-2008 registered and qualified. Our quality system complies with MIL-PRF-38534 Quality Management Program. Using statistical process control, periodic process capability certifications, design analysis, design robustness, off-line reliability assessment techniques, we insure product compliance to the quality and reliability requirements of hi-rel and space applications. We have a technology team made up of members from design engineering, production, quality control, manufacturing engineering and purchasing. The team controls the complete production line to achieve the highest process capabilities and quality. We conduct periodic assessment of the process/performances to look for opportunies for continuous improvement.

Over 20 Years of Space and Hi-Rel Experience.

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