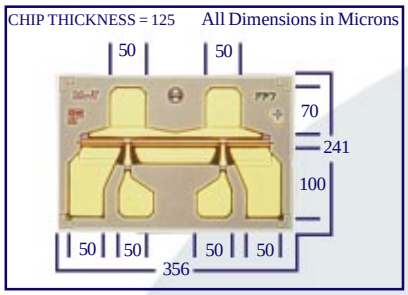
MwT-S7

18 GHz High Gain, Low Noise GaAs FET

DOWNLOAD ADDITIONAL DATA WWW.MWTINC.COM



FEATURES

- HIGH AVAILABLE GAIN WHEN BIASED FOR LOW-NOISE
- EXCELLENT FOR BROADBAND GAIN OR OSCILLATOR BUFFER APPLICATIONS
- 0.3 MICRON REFRACTORY METAL/GOLD GATE
- 250 MICRON GATE WIDTH
- CHOICE OF CHIP AND TWO PACKAGE TYPES

DESCRIPTION

The MwT-S7 is a GaAs MESFET device whose nominal quarter-micron gate length and 250 micron gate width make it ideally suited to applications requiring high-gain in the 500 MHz to 18 GHz frequency range while exhibiting a low noise figure. The straight geometry of the MwT-S7 makes it equally effective for either wideband (e.g. 6 to 18 GHz) or narrow-band applications. Procesing which guarantees low phase noise makes the MwT-S7 particularly attractive for oscillator applications. The chip is produced using MwT's reliable metal system and devices from each wafer are screened to insure reliability. All chips are passivated using MwT's patented "Diamond-Like Carbon" process for increased durability, Designers can use MwT's unique BIN selection feature to choose devices from narrow Idss ranges, insuring consistent circuit operation.

DC SPECIFICATIONS AT Ta = 25°C

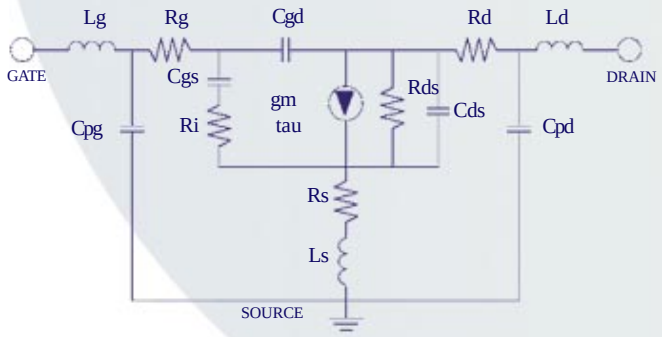
SYMBOL	PARAM. & CONDITIONS	UNITS	MIN	TYP	MAX
IDSS	Saturated Drain Current Vds= 4.0 V VGS= 0.0 V	mA	26		98
Gm	Transconductance Vds= 2.0 V VGS= 0.0 V	mS	45	60	
Vp	Pinch-off Voltage Vds= 3.0 V IDS= 5.0 mA	V		-1.5	-4.5
BVGSO	Gate-to-Source Breakdown Volt. Igs= -1.0 mA	V	-4.0	-7.0	
BVGDO	Gate-to-Drain Breakdown Volt. Igd= -1.0 mA	V	-5.0	-7.0	
Rth	Thermal Resistance MwT-S7 Chip, MwT-S770, S773	°C/W			180 380*

*Overall Rth depends on case mounting.

RF SPECIFICATIONS AT Ta = 25°C

SYMBOL	PARAMETERS AND CONDITIONS	FREQ	UNITS	MIN	TYP
P1dB	Output Power at 1 dB Compression VDS= 4.5 V Idss= 0.6 IDS=30mA	12 GHz	dBm		16.0
SSG	Small Signal Gain VDS= 4.5 V Idss= 0.6 IDS=30mA	12 GHz	dB	10.0	11.0
NFopt	Optimum Noise Figure VDS= 3.0V IDS= 10mA	12 GHz	dB		1.5
GA	Gain at Optimum Noise Figure VDS= 3.0V IDS= 10mA	12 GHz	dB	7.0	8.0
IDSS	Recommended IDSS Range for Optimum P1dB		mA		34-70

DEVICE EQUIVALENT CIRCUIT MODEL



PARAMETER		VALUE	
Source Resistance	Rs	2.6	Ω
Source Inductance	Ls	0.025	nH
Drain-Source Resistance	Rds	173	Ω
Drain-Source Capacitance	Cds	0.07	pF
Drain Resistance	Rd	3.67	Ω
Drain Pad Capacitance	Cpd	0.027	pF
Drain Inductance	Ld	0.159	nH
Gate Bond Wire Inductance	Lg	0.13	nH
Gate Pad Capacitance	Cpg	0.05	pF
Gate Resistance	Rg	0.2	Ω
Gate-Source Capacitance	Cgs	0.314	pF
Channel Resistance	Ri	6.9	Ω
Gate-Drain Capacitance	Cgd	0.027	pF
Transconductance	gm	69.0	mS
Transit Time	tau	2.0	psec

ORDERING INFORMATION

Chip	MwT-S7
Package 71	MwT-S771
Package 73	MwT-S773

NOTE:
For Package information, please see supplimentary application note from our website at www.mwtinc.com. When placing order or inquiring, please specify BIN range, wafer no., if known, and screening level required.

4268 Solar Way Fremont California 94538 Phone: (510) 651-6700 Fax: (510) 651-2208

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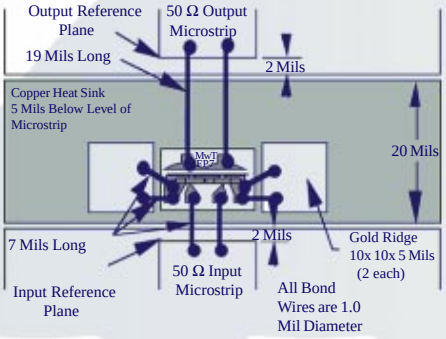
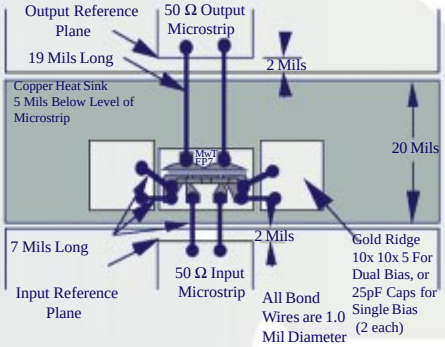
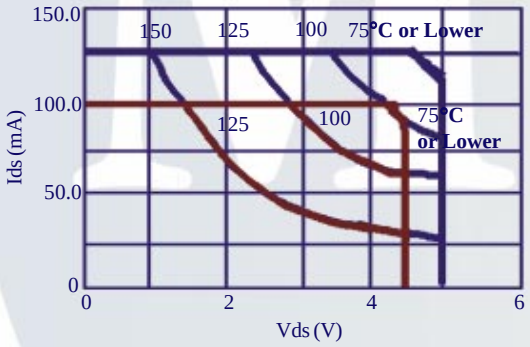
DUAL BIAS



MwT-S7
OPTIONAL BONDING



SAFE OPERATING LIMITS vs. BACKSIDE CHIP



MAXIMUM RATINGS AT Ta = 25°C

SYMBOL	PARAMETER	UNITS	CONT MAX[1]	ABSOLUTE MAX[2]
VDS	Drain to Source Voltage	V	See Safe Operating Limits	
Tch	Channel Temperature	°C	+150	+175
Tst	Storage Temperature	°C	-65 to +150	+175
Pin	RF Input Power	mW	50	75

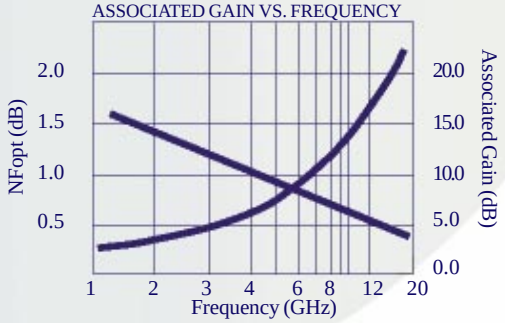
NOTES: 1. Exceeding any one of these limits in continuous operation may reduce the mean-time-to-failure below the design goals.
2. Exceeding any one of these limits may cause permanent damage.

TYPICAL NOISE PARAMETERS

MwT-S7LN Chip: VDS= 3.0V IDS= 5.0 mA

FREQUENCY GHz	NF MIN dB	GAMMA OPT MAG	GAMMA OPT ANGLE	Rn/50
2.00	0.29	0.68	27	0.188
4.00	0.56	0.49	57	0.182
8.00	1.06	0.41	114	0.165
12.00	1.5	0.49	149	0.152
16.00	1.89	0.55	168	0.143
18.00	2.1	0.58	175	0.14

NOISE FIGURE AND
ASSOCIATED GAIN VS. FREQUENCY



BIN SELECTION

BIN#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
IDSS (mA)	26-30	30-34	34-38	38-42	42-46	46-50	50-54	54-58	58-62	62-66	66-70	70-74	74-78	78-82	82-86	86-90	90-94	94-98

BIN ACCURACY STATEMENT

When placing order or inquiring, please specify BIN range, wafer no., if known, and screening level required.

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