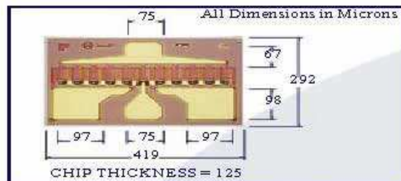
# MwT-9
## 18 GHz High Power GaAs FET

DOWNLOAD ADDITIONAL DATA WWW.MWTINC.COM




## FEATURES

- +26 dBm OUTPUT POWER AT 12 GHz
- 8.5 dB SMALL SIGNAL GAIN AT 12 GHz
- 0.3 MICRON REFRACTORY METAL/GOLD GATE
- 750 MICRON GATE WIDTH
- CHOICE OF CHIP AND THREE PACKAGE TYPES

## DESCRIPTION

The MwT-9 is a GaAs MESFET device whose nominal quarter-micron gate length and 750 micron gate width make it ideally suited to applications requiring high-gain in the 500 MHz to 18 GHz frequency range with power output ranging from +24 to +26 dBm. It can be easily matched as the driver stage in high power communications amplifiers or in broad-band military amplifiers and operated at reduced bias in battery powered wireless communications devices. 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

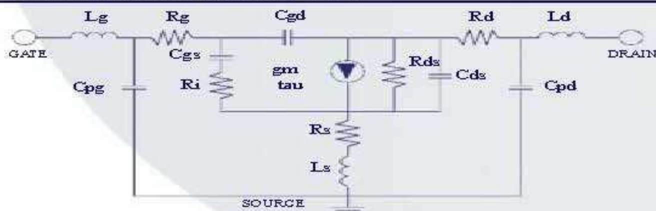
| SYMBOL | PARAM. & CONDITIONS | UNITS | MIN | TYP | MAX |
|---|---|---|---|---|---|
| IDSS | Saturated Drain Current Vds= 4.0 V VGS= 0.0 V | mA | 78 | | 282 |
| Gm | Transconductance Vds= 2.0 V VGS= 0.0 V | mS | 95 | 120 | |
| Vp | Pinch-off Voltage Vds= 3.0 V IDS= 5.0 mA | V | | -2.0 | -5.0 |
| BVGSO | Gate-to-Source Breakdown Volt. Igs= -1.0 mA | V | -6.0 | -12.0 | |
| BVGDO | Gate-to-Drain Breakdown Volt. Igd= -1.0 mA | V | -8.0 | -12.0 | |
| Rth | Thermal Resistance MwT-9 Chip, 971 / MwT-970, 973 | °C/W | | 70 / 175* | |

*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= 6.0 V IDS=180mA | 12 GHz | dBm | 25.0 | 26.0 |
| PAE | Power Added Efficiency VDS= 6.0 V IDS=180mA | 12 GHz | % | 30 | 35 |
| SSG | Small Signal Gain VDS= 6.0V IDS= 180mA | 12 GHz | dB | 8 | 8.5 |
| IDSS | Recommended IDSS Range for Optimum P1dB | | mA | | 198-270 |

## DEVICE EQUIVALENT CIRCUIT MODEL




| PARAMETER | | VALUE | |
|---|---|---|---|
| Source Resistance | Rs | 0.2 | Ω |
| Source Inductance | Ls | 0.055 | nH |
| Drain-Source Resistance | Rds | 300.0 | Ω |
| Drain-Source Capacitance | Cds | 0.05 | pF |
| Drain Resistance | Rd | 1.02 | Ω |
| Drain Pad Capacitance | Cpd | 0.05 | pF |
| Drain Inductance | Ld | 0.23 | nH |
| Gate Bond Wire Inductance | Lg | 0.15 | nH |
| Gate Pad Capacitance | Cpg | 0.07 | pF |
| Gate Resistance | Rg | 0.50 | Ω |
| Gate-Source Capacitance | Cgs | 0.85 | pF |
| Channel Resistance | Ri | 1.0 | Ω |
| Gate-Drain Capacitance | Cgd | 0.08 | pF |
| Transconductance | gm | 95.0 | mS |
| Transit Time | tau | 2.6 | psec |

## ORDERING INFORMATION

| | |
|---|---|
| Chip | MwT-9 |
| Package 70 | MwT-970 |
| Package 71 | MwT-971 |
| Package 73 | MwT-973 |

***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, CA 94538 | Email sales@mwtinc.com | Phone (510) 651-6700 | Fax (510) 952-4000

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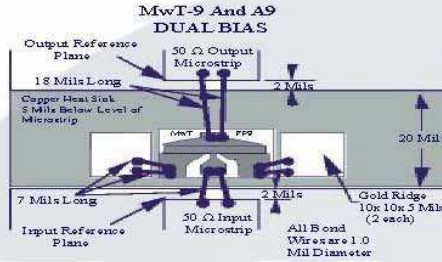


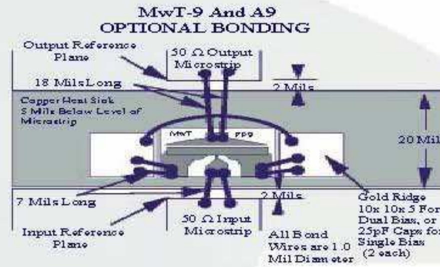


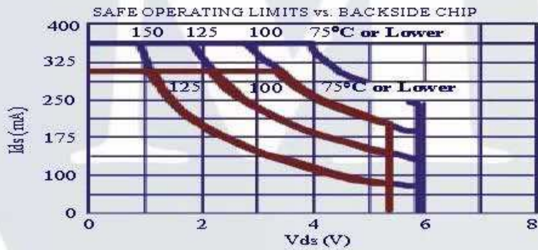


Absolute Maximum    Continuous Maximum

## 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 | 300 | 450 |

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-9LN Chip: VDS= 3.0V IDS= 35mA

| FREQUENCY GHz | NF MIN dB | GAMMA OPT MAG | GAMMA OPT ANGLE | Rn/50 |
|---|---|---|---|---|
| 2.00 | 0.326 | 0.858 | 19.11 | 0.48 |
| 4.00 | 0.6 | 0.726 | 38.47 | 0.41 |
| 6.00 | 0.858 | 0.623 | 58.31 | 0.38 |
| 10.00 | 1.33 | 0.51 | 98.59 | 0.33 |
| 12.00 | 1.55 | 0.493 | 117.7 | 0.313 |
| 16.00 | 1.96 | 0.508 | 150.4 | 0.286 |

**Bin Selection Guide**

| Bin No. | A | B | C | D | E |
|---|---|---|---|---|---|
| Idss Range | 78-114mA | 114-150mA | 150-198mA | 198-234mA | 234-294mA |

BIN ACCURACY STATEMENT

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