

Features:

- Ideal for DC – 4.0 GHz Low Noise / High Dynamic Range Applications
- Excellent RF Performance:
 - 45 dBm IP3
 - 16 dB SSG @ 2000 MHz
 - 1.3 dB NF @ 2000 MHz
- MTTF > 100 years @ channel temperature 150°C
- Lead Free RoHS Compliant Surface-Mount SOT-89 Package



Description:

The MwT-1789LN is a low noise GaAs MESFET device in low cost SOT89 package that is ideally suited for low noise/high dynamic range applications. The applications include 2G, 2.5G, and 3G wireless infrastructure standards, such as GSM, TDMA, CDMA, Edge, cdma2000, WCDMA, TD-SCDMA, and UMTS base stations. This product is also ideal for high data rate wireless LAN infrastructure applications, such as high QAM rate 802.11 WiFi and 802.16 WiMax base stations and APs (Access Points). In addition, the product can be used for point-to-point microwave communications links. The third order intercept performance of the MwT-1789LN is excellent, typically 18 dB above the 1 dB power gain compression point. The noise figure is as low as 0.8 dB at 900 MHz. The chip is produced using MwT's proprietary high linearity device design. It also uses MwT reliable metallization process. All chips are passivated using MwT's patented "Diamond-Like Carbon" process for increased durability.

Electrical Specifications⁽¹⁾: @ $V_{ds}=5V$, $I_{ds}=200mA$, $T_a=25\text{ }^\circ\text{C}$

| Parameter | Units | Typical Data | | | |
|------------------|-------|--------------|------|------|------|
| Test Frequency | MHz | 900 | 1950 | 2500 | 3500 |
| Gain | dB | 18 | 16 | 13 | 10 |
| Output IP3 | dBm | 43 | 43 | 45 | 45 |
| Noise Figure (2) | dB | 0.8 | 1.3 | 1.5 | 2.2 |

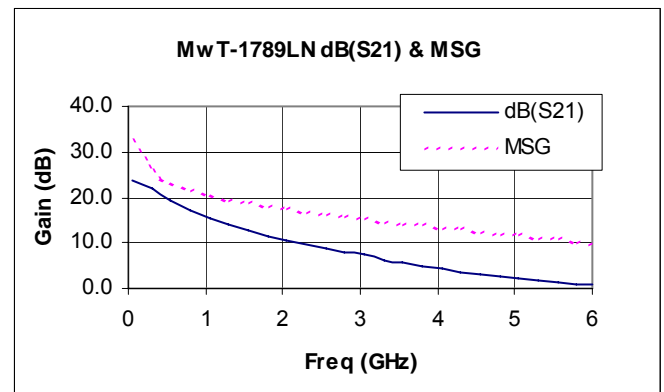
1. RF data is taken from an application circuit. See application notes for details of RF performance and configuration of application circuit.
2. Noise Figure is taken at $I_{ds}=100mA$.

DC Specifications: ($T_a = 25^\circ\text{C}$)

| SYMBOL | PARAMETERS & CONDITIONS | UNITS | MIN | TYP | MAX |
|--------|--|---------------------------|------|-------|------|
| IDSS | Saturated Drain Current Vds=3.0 V Vgs=0.0 V | mA | 440 | | 680 |
| Gm | Transconductance Vds=2.0 V Vgs=0.0 V | mS | | 380 | |
| Vp | Pinch-off Voltage Vds=3.0 V Ids=16.0 mA | V | | -2.5 | -5.0 |
| BVGSO | Gate-to-Source Breakdown Voltage Igs= -2.4 mA | V | -6.0 | -12.0 | |
| BVGDO | Gate-to-Drain Breakdown Voltage Igd= -2.4 mA | V | -9.0 | -12.0 | |
| Rth | Thermal Resistance | $^\circ\text{C}/\text{W}$ | | 30 | |

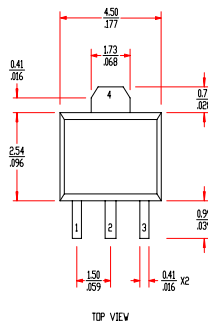
| Freq. MHz | Fmin dB | Γ_o | | R/50 |
|--------------|------------|------------|-----|------|
| | | Mag. | Ang | |
| 910 | 0.8 | 0.18 | 75 | 0.14 |
| 2000 | 1.2 | 0.3 | 138 | 0.13 |
| 2500 | 1.3 | 0.25 | 164 | 0.12 |
| 3000 | 1.5 | 0.27 | 175 | 0.12 |
| 3500 | 1.7 | 0.29 | 180 | 0.11 |

MwT-1789LN Noise Parameters
($I_{ds}=100\text{mA}$, $V_{ds}=5\text{V}$)



SOT-89 Outline Diagram

OUTLINE DRAWING



1: Gate; 2,4: Source; 3: Drain, Dimensions in mm/inch

Typical Scattering Parameters:

(Vds=6.5V, Ids=200mA, Ta =25°C Reference Planes at Leads)

| F [GHz] | S11 | | S21 | | S12 | | S22 | |
|---------|-------|----------|--------|---------|-------|--------|-------|----------|
| | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 0.250 | 0.883 | -62.592 | 13.372 | 145.807 | 0.030 | 54.281 | 0.199 | -61.148 |
| 0.500 | 0.822 | -101.770 | 9.977 | 124.388 | 0.042 | 42.491 | 0.205 | -99.716 |
| 0.750 | 0.788 | -125.905 | 7.610 | 111.294 | 0.049 | 36.904 | 0.207 | -120.156 |
| 1.000 | 0.772 | -141.758 | 6.104 | 102.405 | 0.051 | 35.628 | 0.207 | -132.755 |
| 1.250 | 0.765 | -153.729 | 5.130 | 95.579 | 0.056 | 35.655 | 0.205 | -141.214 |
| 1.500 | 0.762 | -163.638 | 4.378 | 88.965 | 0.056 | 35.370 | 0.201 | -149.045 |
| 1.750 | 0.762 | -172.772 | 3.909 | 84.423 | 0.060 | 38.592 | 0.198 | -156.773 |
| 2.000 | 0.760 | 178.628 | 3.503 | 77.228 | 0.063 | 35.009 | 0.196 | -165.448 |
| 2.250 | 0.761 | 170.294 | 3.103 | 72.602 | 0.063 | 38.580 | 0.201 | -175.051 |
| 2.500 | 0.765 | 162.141 | 2.867 | 67.380 | 0.067 | 37.582 | 0.210 | 174.935 |
| 2.750 | 0.768 | 154.540 | 2.561 | 61.985 | 0.067 | 38.516 | 0.224 | 165.112 |
| 3.000 | 0.772 | 147.101 | 2.384 | 57.569 | 0.068 | 38.547 | 0.238 | 156.386 |
| 3.250 | 0.779 | 140.309 | 2.140 | 51.937 | 0.069 | 41.708 | 0.257 | 148.369 |
| 3.500 | 0.781 | 133.919 | 1.966 | 49.164 | 0.072 | 41.931 | 0.276 | 141.018 |
| 3.750 | 0.781 | 128.561 | 1.859 | 45.298 | 0.072 | 42.125 | 0.295 | 134.092 |
| 4.000 | 0.782 | 123.650 | 1.687 | 40.539 | 0.075 | 45.268 | 0.313 | 128.716 |
| 4.250 | 0.788 | 119.391 | 1.576 | 38.185 | 0.072 | 45.630 | 0.332 | 125.490 |
| 4.500 | 0.792 | 114.854 | 1.477 | 35.447 | 0.080 | 51.701 | 0.358 | 122.346 |
| 4.750 | 0.796 | 110.082 | 1.413 | 30.992 | 0.086 | 49.126 | 0.378 | 118.908 |
| 5.000 | 0.795 | 105.529 | 1.291 | 28.392 | 0.088 | 51.114 | 0.394 | 114.941 |
| 5.250 | 0.792 | 100.361 | 1.271 | 24.881 | 0.096 | 49.424 | 0.403 | 110.320 |
| 5.500 | 0.796 | 95.934 | 1.170 | 19.496 | 0.096 | 45.481 | 0.410 | 104.083 |
| 5.750 | 0.799 | 90.277 | 1.125 | 18.186 | 0.105 | 48.822 | 0.426 | 98.804 |
| 6.000 | 0.804 | 84.180 | 1.088 | 13.075 | 0.112 | 46.367 | 0.446 | 91.560 |

Absolute Maximum Ratings: (Ta= 25 °C)*

| SYMBOL | PARAMETERS | UNITS | ABSOLUTE MAXIMUM |
|---------|----------------------|-------|------------------|
| Vds | Drain-Source Voltage | V | 8 |
| Vgs | Gate-Source Voltage | V | -6 to +0.8 |
| Ids | Drain Current | mA | 400 |
| Igs | Gate Current | mA | 3 |
| Pdiss | DC Power Dissipation | W | 2.5 |
| Pin max | RF Input Power | dBm | +28 |
| Tch | Channel Temperature | °C | 150 |
| Tstg | Storage Temperature | °C | -60 to 150 |