

## Features



- Ideal for DC –4000 MHz High Linearity / High Dynamic Range Applications
- Excellent RF Performance:
  - 46 dBm IP3
  - 70 dBc ACPR
  - 28 dBm P1dB
  - 14 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
- 📄 [Download MwT-1789 SPARAM Files](#) (zipped file)

## Product Description

The MwT-1789 is a high linearity GaAs MESFET device in low cost SOT89 package that is ideally suited for high linearity driver, PA (Power Amplifier), and high dynamic range LNA 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-1789 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.

## Typical RF Performance <sup>(1)</sup>

● Target for Driver and PA applications ( $V_{ds}=6.5V$ ,  $I_{ds}=200mA$ ,  $T_a=25\text{ }^\circ C$ )

Parameter	Units	Typical Data			
Test Frequency	MHz	900	1950	2500	3500
Gain	dB	18	14	11	10
Input Return Loss	dB	10	10	10	10
Output Return Loss	dB	10	8	10	10
Output P1dB	dBm	28.5	28.5	28.5	28.5
Output IP3	dBm	46	46	46	46
Noise Figure	dB	3	3	4	4

● Target for High Dynamic Range and Low Noise Applications ( $V_{ds}=5V$ ,  $I_{ds}=200mA$ ,  $T_a=25\text{ }^\circ C$ )

Parameter	Units	Typical Data			
Test Frequency	MHz	900	1950	2500	3500
Gain	dB	18	16	13	10
Output IP3	dBm	43	43	46	46
Noise Figure <sup>(2)</sup>	dB	0.8	1.3	1.5	2.2

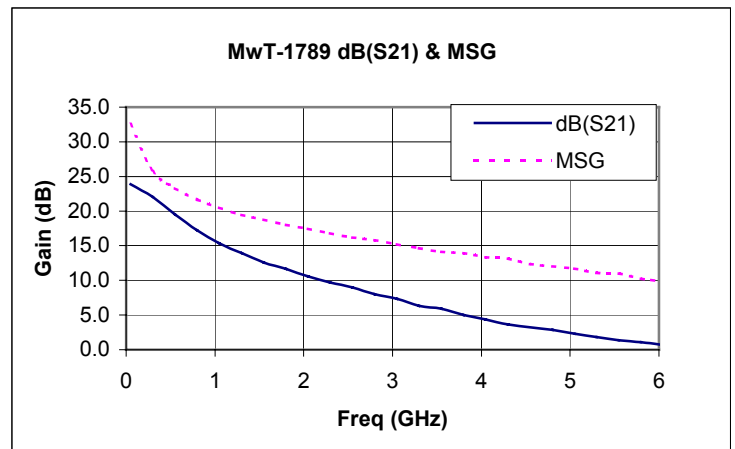
1. RF data is taken from an application circuit. See application notes for details of RF performance and configuration of application circuit.
2. Noise Figure is taken at  $I_{ds}=100mA$ .

## DC Specifications (Ta = 25°C)

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

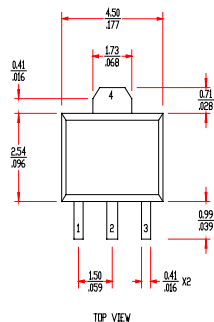
Freq. MHz	Fmin dB	$\Gamma_o$		R/50
		Mag.	Ang	
910	0.8	0.18	75	0.14
2000	1.2	0.3	138	0.13
2500	1.3	0.25	164	0.12
3000	1.5	0.27	175	0.12
3500	1.7	0.29	180	0.11

**MwT-1789 Noise Parameters**  
(Ids=100mA, Vds=5V)



## Outline Diagram

OUTLINE DRAWING



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

## Typical Scattering Parameters

(V<sub>ds</sub>=6.5V, I<sub>ds</sub>=200mA, T<sub>a</sub> =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 (T<sub>a</sub>= 25 °C)\*

SYMBOL	PARAMETERS	UNITS	ABSOLUTE MAXIMUM
V <sub>ds</sub>	Drain-Source Voltage	V	8
V <sub>gs</sub>	Gate-Source Voltage	V	-6 to +0.8
I <sub>ds</sub>	Drain Current	mA	400
I <sub>gs</sub>	Gate Current	mA	3
P <sub>diss</sub>	DC Power Dissipation	W	2.5
P <sub>in max</sub>	RF Inputer Power	dBm	+28
T <sub>ch</sub>	Channel Temperature	°C	150
T <sub>stg</sub>	Storage Temperature	°C	-60 to 150

\*Operation of this device above any one of these parameters may cause permanent damage.