


**HEWLETT  
PACKARD**
**ATF-44100 (AT-8141)  
2-8 GHz Medium Power  
Gallium Arsenide FET**

## Features

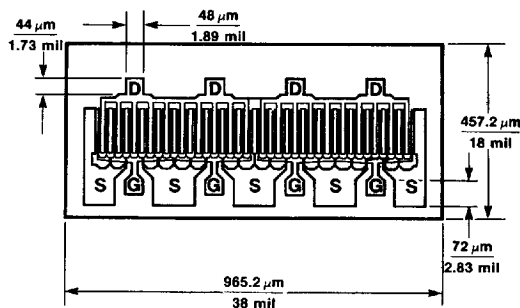
- **High Output Power:**  
32.0 dBm typical  $P_{1\text{ dB}}$  at 4 GHz
- **High Gain at 1 dB Compression:**  
9.0 dB typical  $G_{1\text{ dB}}$  at 4 GHz
- **High Power Efficiency:**  
36% typical at 4 GHz

## Description

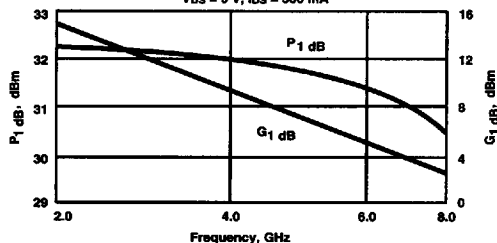
The ATF-44100 is a gallium arsenide Schottky-barrier-gate field effect transistor designed for medium power, linear amplification in the 2 to 8 GHz frequency range. This nominally 0.5 micron gate length GaAs FET is an interdigitated four-cell structure using airbridge interconnects between source fingers. Total gate periphery is 5 millimeters. Proven gold based metallization systems and nitride passivation assure a rugged, reliable device.

The recommended mounting procedure is to die attach at a stage temperature of 300°C using a gold-tin preform under forming gas. Assembly should be performed with wedge bonding using either 0.7 mil or 1.0 mil gold wire. See also "Chip Use" in the APPLICATIONS section.

## Chip Outline



POWER OUTPUT @ 1 dB GAIN COMPRESSION AND  
1 dB COMPRESSED GAIN vs. FREQUENCY  
 $V_{DS} = 9\text{ V}$ ,  $I_{DS} = 500\text{ mA}$



## Electrical Specifications, $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions <sup>1</sup>	Units	Min.	Typ.	Max.
$P_{1\text{ dB}}$	Output Power @ 1 dB Gain Compression: $V_{DS} = 9\text{ V}$ , $I_{DS} = 500\text{ mA}$ $f = 4.0\text{ GHz}$ $f = 6.0\text{ GHz}$ $f = 8.0\text{ GHz}$	dBm		32.0 31.5 31.0	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{DS} = 9\text{ V}$ , $I_{DS} = 500\text{ mA}$ $f = 4.0\text{ GHz}$ $f = 6.0\text{ GHz}$ $f = 8.0\text{ GHz}$	dB	8.0	9.0 6.0 3.0	
$\eta_{add}$	Efficiency @ $P_{1\text{ dB}}$ : $V_{DS} = 9\text{ V}$ , $I_{DS} = 500\text{ mA}$ $f = 4.0\text{ GHz}$	%		36	
$g_m$	Transconductance: $V_{DS} = 2.5\text{ V}$ , $I_{DS} = 500\text{ mA}$	mmho		300	
$I_{DSS}$	Saturated Drain Current: $V_{DS} = 1.75\text{ V}$ , $V_{GS} = 0\text{ V}$	mA	800	1300	1500
$V_P$	Pinchoff Voltage: $V_{DS} = 2.5\text{ V}$ , $I_{DS} = 5\text{ mA}$	V	-5.4	-4.5	-2.0

Note: 1. RF Performance is determined by assembling and testing 10 samples per wafer.

# Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum <sup>1</sup>
Drain-Source Voltage	V <sub>DS</sub>	+14 V
Gate-Source Voltage	V <sub>GS</sub>	-7 V
Drain Current	I <sub>DS</sub>	I <sub>DSS</sub>
Power Dissipation <sup>2,3</sup>	PT	8.3 W
Channel Temperature	T <sub>CH</sub>	175°C
Storage Temperature	T <sub>STG</sub>	-65°C to +175°C

Thermal Resistance:  $\theta_{jc} = 18^{\circ}\text{C/W}$ ; T<sub>CH</sub> = 150°C  
Liquid Crystal Measurement; 1  $\mu\text{m}$  Spot Size<sup>4</sup>

## Notes:

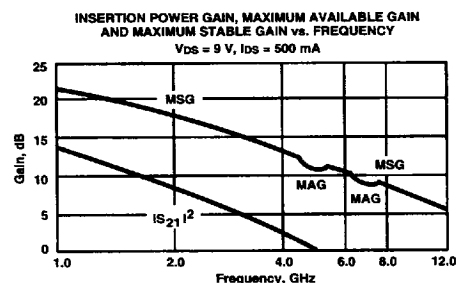
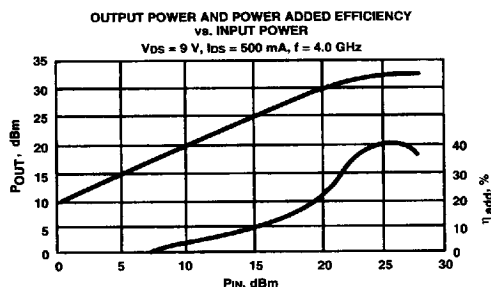
- Operation of this device above any one of these parameters may cause permanent damage.
- Mounting Surface Temperature = 25°C.
- Derate at 55.6 mW/°C for T<sub>MOUNTING SURFACE</sub> > 26°C.
- The small spot size of this technique results in a higher, though more accurate determination of  $\theta_{jc}$  than do alternate methods. See MEASUREMENTS section for more information.

# Part Number Ordering Information

Part Number	Devices Per Tray
ATF-44100-GP1	5
ATF-44100-GP3	50
ATF-44100-GP6	up to 300

# Typical Performance, T<sub>A</sub> = 25°C

(unless otherwise noted)



# Typical Scattering Parameters: Common Source, Z<sub>0</sub> = 50 $\Omega$

T<sub>A</sub> = 25°C, V<sub>DS</sub> = 9 V, I<sub>DS</sub> = 500 mA

Freq. GHz	S <sub>11</sub>		dB	S <sub>21</sub>		dB	S <sub>12</sub>		S <sub>22</sub>	
	Mag	Ang		Mag	Ang		Mag	Ang	Mag	Ang
1.0	.88	-117	13.1	4.52	111	-28.0	.040	34	.37	-162
2.0	.89	-149	8.1	2.55	88	-26.0	.050	36	.41	-168
3.0	.89	-163	5.1	1.80	72	-25.4	.054	38	.44	-170
4.0	.90	-172	2.4	1.32	60	-24.7	.058	44	.47	-173
5.0	.91	-179	0.3	1.04	49	-24.3	.061	46	.52	-176
6.0	.92	175	-1.4	.85	39	-23.5	.067	47	.56	-178
7.0	.92	170	-3.2	.69	30	-23.0	.071	49	.60	180
8.0	.93	167	-4.4	.60	24	-22.6	.074	50	.64	176
9.0	.93	162	-5.7	.52	15	-22.2	.078	51	.67	175
10.0	.94	158	-6.7	.46	10	-21.7	.082	52	.70	173
11.0	.95	153	-7.7	.41	3	-21.3	.086	50	.73	172
12.0	.95	145	-9.1	.35	-4	-20.7	.092	49	.76	171

A model for this device is available in the DEVICE MODELS section.