



ATF-46100 (AT-8161)
2-14 GHz Medium Power
Gallium Arsenide FET

T-31-25

Features

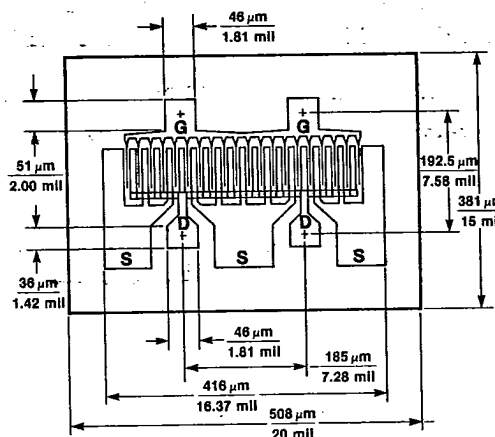
- **High Output Power:**
27.0 dBm typical $P_{1\text{ dB}}$ at 4 GHz
- **High Gain at 1 dB Compression:**
12.0 dB typical $G_{1\text{ dB}}$ at 4 GHz
- **High Power Efficiency:**
38% typical at 4 GHz

Description

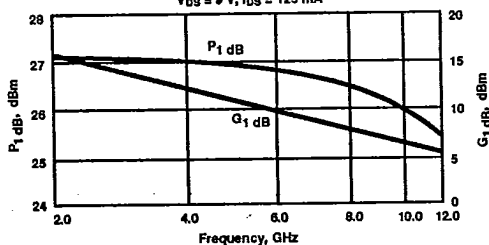
The ATF-46100 is a gallium arsenide Schottky-barrier-gate field effect transistor designed for medium power, linear amplification in the 2 to 14 GHz frequency range. This nominally 0.5 micron gate length GaAs FET is an interdigitated four-cell structure using airbridge interconnects between drain fingers. Total gate periphery is 1.25 millimeters. Proven gold based metallization systems and nitride passivation assure a rugged, reliable device. All metal surfaces are gold plated for ease of bonding and die attach.

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

Avantek Chip Outline



POWER OUTPUT @ 1 dB COMPRESSION and 1 dB COMPRESSED GAIN vs. FREQUENCY
 $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$



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

Symbol	Parameters and Test Conditions ¹	Units	Min.	Typ.	Max.
$P_{1\text{ dB}}$	Output Power @ 1 dB Gain Compression: $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$	dBm	26.0	27.0	
	$f = 4.0\text{ GHz}$			26.5	
	$f = 8.0\text{ GHz}$			25.5	
	$f = 12.0\text{ GHz}$				
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$	dB	11.0	12.0	
	$f = 4.0\text{ GHz}$			8.0	
	$f = 8.0\text{ GHz}$			6.0	
	$f = 12.0\text{ GHz}$				
η_{add}	Efficiency @ $P_{1\text{ dB}}$: $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$	%		38	
g_m	Transconductance: $V_{DS} = 2.5\text{ V}$, $I_{DS} = 125\text{ mA}$	mmho		100	
I_{DSS}	Saturated Drain Current: $V_{DS} = 2.5\text{ V}$, $V_{GS} = 0\text{ V}$	mA	200	330	450
V_p	Pinchoff Voltage: $V_{DS} = 2.5\text{ V}$, $I_{DS} = 5\text{ mA}$	V	-5.4	-3.5	-2.0

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

ATF-46100, 2-14 GHz
Medium Power Gallium Arsenide FET
Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum ¹
Drain-Source Voltage	V _{DS}	+14 V
Gate-Source Voltage	V _{GS}	-7 V
Drain Current	I _{DS}	I _{DSS}
Power Dissipation ^{2,3}	P _T	2.2 W
Channel Temperature	T _{CH}	175°C
Storage Temperature	T _{STG}	-65°C to +175°C

Thermal Resistance: $\theta_{JO} = 70^\circ\text{C/W}$; T_{CH} = 150°C
 Liquid Crystal Measurement; 1 μm Spot Size⁴

Notes:

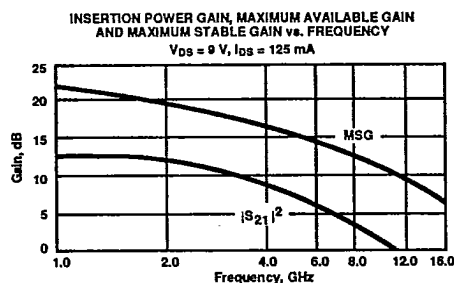
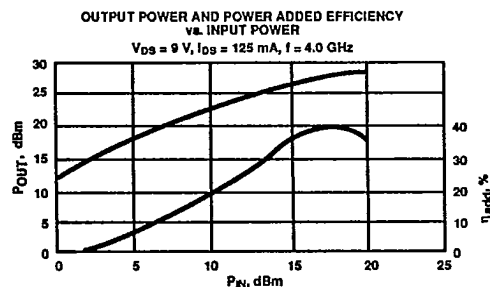
1. Operation of this device above any one of these parameters may cause permanent damage.
2. Mounting Surface Temperature = 25°C.
3. Derate at 14.3 mW/°C for T_{MOUNTING SURFACE} > 21°C.
4. The small spot size of this technique results in a higher, though more accurate determination of θ_{JO} than do alternate methods. See MEASUREMENTS section for more information.

T-31-25**Part Number Ordering Information**

Part Number	Devices Per Tray
ATF-46100-GP1	5
ATF-46100-GP3	50
ATF-46100-GP5	up to 300

Typical Performance, T_A = 25°C

(unless otherwise noted)

**Typical Scattering Parameters: Common Source, Z₀ = 50 Ω** T_A = 25°C, V_{DS} = 9 V, I_{DS} = 250 mA

Freq. GHz	S ₁₁			S ₂₁			S ₁₂			S ₂₂	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang
1.0	.97	-44	13.0	4.48	148	-30.8	.029	70	.60	-15	
2.0	.89	-80	11.3	3.69	121	-27.1	.044	70	.56	-26	
3.0	.84	-106	9.9	3.13	101	-25.5	.053	69	.51	-36	
4.0	.81	-129	8.3	2.59	83	-24.4	.060	68	.47	-45	
5.0	.81	-147	6.8	2.20	67	-23.9	.064	66	.45	-59	
6.0	.82	-161	5.6	1.90	53	-23.5	.067	64	.42	-74	
7.0	.83	-172	4.2	1.63	40	-22.9	.072	62	.42	-89	
8.0	.84	180	3.3	1.46	29	-22.0	.079	60	.45	-105	
9.0	.85	171	2.3	1.31	16	-20.8	.091	58	.49	-125	
10.0	.86	163	1.0	1.12	4	-19.8	.102	56	.55	-139	
11.0	.88	156	0.3	1.03	-7	-18.9	.113	54	.61	-154	
12.0	.89	149	-1.0	.89	-18	-18.5	.119	51	.66	-162	
13.0	.90	142	-2.0	.79	-26	-17.7	.130	42	.72	-172	
14.0	.91	135	-3.2	.69	-38	-17.4	.135	39	.76	180	
15.0	.92	130	-4.3	.61	-45	-16.9	.143	33	.79	175	
16.0	.93	126	-5.4	.54	-51	-16.4	.151	24	.82	167	

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