



ATF-10235
2-12 GHz Low Noise
Gallium Arsenide FET

T-31-25

Features

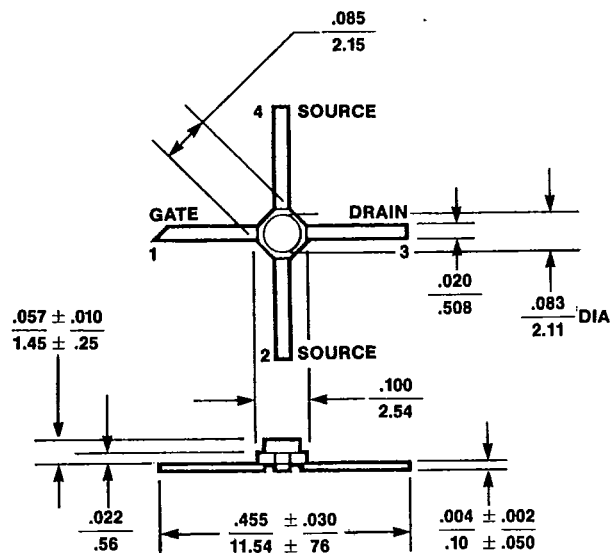
- **Low Noise Figure**
0.8 dB typical at 4 GHz
- **Low Bias**
 $V_{DS}=2V$, $I_{DS}=20$ mA
- **High Associated Gain**
13.0 dB typical at 4 GHz
- **High Output Power**
20.0 dBm typical P_1 dB at 4 GHz
- **Cost Effective Ceramic Microstrip Package**

Description

Avantek's ATF-10235 is a high performance gallium arsenide Schottky-barrier-gate field effect transistor housed in a cost effective microstrip package. Its low noise figure makes this device appropriate for use in the second stage of low noise amplifiers operating in the 2-12 GHz frequency range.

This GaAs FET device has a nominal 0.3 micron gate length using airbridge interconnects between drain fingers. Total gate periphery is 500 micron. Proven gold based metalization systems and nitride passivation assure a rugged, reliable device.

Avantek micro-X Package



NOTES:
 (unless otherwise specified)
 1. Dimensions are in mm
 2. Tolerances
 in .xxx = $\pm .005$
 mm .xx = $\pm .13$

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

Symbol	Parameters: Test Conditions	Units	Min.	Typ.	Max.
NF _O	Optimum Noise Figure: $V_{DS}=2V$, $I_{DS}=20$ mA	f=2 GHz dB f=4 GHz dB f=6 GHz dB		0.6 0.8 1.0	1.0
G _A	Gain @ NF _O : $V_{DS}=2V$, $I_{DS}=20$ mA	f=2 GHz dB f=4 GHz dB f=6 GHz dB	12.0	16.5 13.0 10.5	
P ₁ dB	Output Power @ 1 dB Gain Compression $V_{DS}=4V$, $I_{DS}=70$ mA	f=4 GHz dBm		20.0	
G ₁ dB	Gain @ 1 dB Compression $V_{DS}=4V$, $I_{DS}=70$ mA	f=4 GHz dB		12.0	
g _m	Transconductance: $V_{DS}=2V$, $V_{GS}=0V$	mmho	80	140	
I _{DSS}	Saturated Drain Current: $V_{DS}=2V$, $V_{GS}=0V$	mA	50	130	180
V _P	Pinchoff Voltage: $V_{DS}=2V$, $I_{DS}=1$ mA	V	-3.0	-1.3	-0.8

ATF-10235, 2–12 GHz
Low Noise Gallium Arsenide FET

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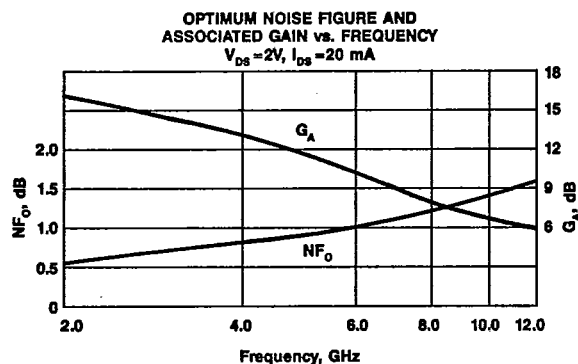
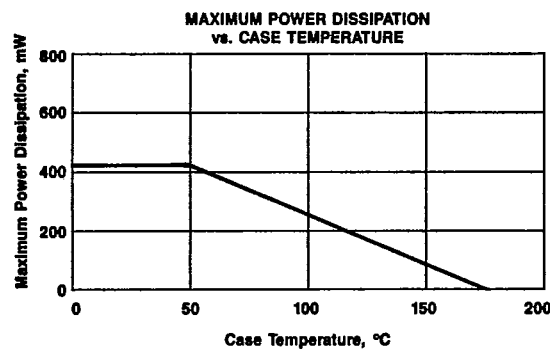
Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum ¹
Drain-Source Voltage	V_{DS}	+5V
Gate-Source Voltage	V_{GS}	-4V
Drain Current	I_{DS}	430 mA
Total Power Dissipation ²	P_T	430 mW
Channel Temperature	T_{CH}	175°C
Storage Temperature ³	T_{STG}	175°C

Thermal Resistance: $\theta_{jc} = 350^\circ \text{C/W}$; $T_{CH} = 150^\circ \text{C}$
 Liquid Crystal Measurement; 1 μm Spot Size⁴

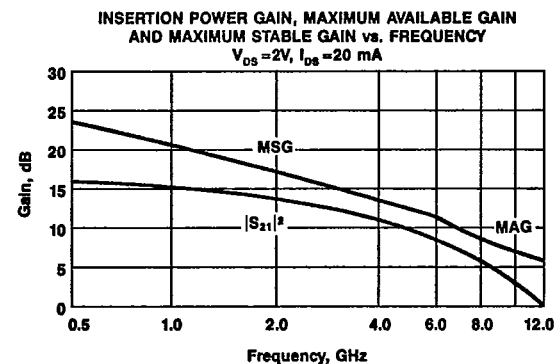
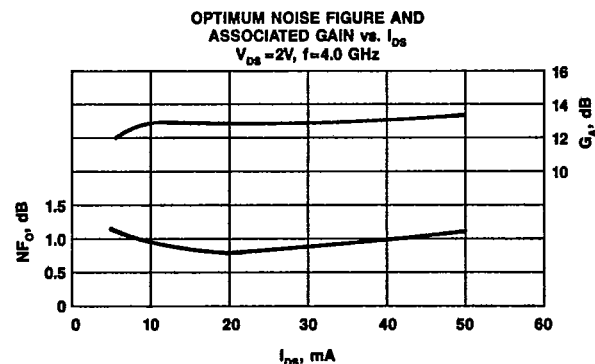
Notes:

- Operation of this device above any one of these parameters may cause permanent damage.
- Case Temperature = 25°C.
- Storage above +150°C may tarnish the leads of this package making it difficult to solder into a circuit. After a device has been soldered into a circuit, it may be safely stored up to 175°C.
- The small spot size of this technique results in a higher, though more accurate determination of θ_{jc} than do alternate methods. See Applications section for more information.

Typical Performance Curves, $T_A = 25^\circ \text{C}$
 (unless otherwise noted)


NOISE PARAMETERS
 $V_{DS} = 2\text{V}$, $I_{DS} = 20\text{ mA}$

Freq. GHz	NF_0 dB	Mag Γ_o	Ang	$R_N/50$
2.0	0.6	.73	74	.33
4.0	0.8	.45	148	.15
6.0	1.0	.42	-137	.12
8.0	1.3	.49	-80	.45

**Typical Scattering Parameters, Common Source** $V_{DS} = 2\text{V}$, $I_{DS} = 20\text{ mA}$

Freq. GHz	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
0.5	.97	-20	15.1	5.68	162	-32.8	.023	76	.47	-11
1.0	.93	-41	14.9	5.58	143	-26.0	.050	71	.45	-23
2.0	.77	-81	13.6	4.76	107	-21.3	.086	51	.36	-38
3.0	.59	-114	12.2	4.06	80	-18.4	.120	35	.30	-51
4.0	.48	-148	10.9	3.51	52	-16.5	.149	18	.23	-67
5.0	.46	166	9.6	3.03	26	-15.3	.172	3	.10	-67
6.0	.53	125	8.5	2.65	1	-14.5	.189	-14	.09	48
7.0	.62	96	6.9	2.22	-20	-14.4	.191	-28	.24	55
8.0	.71	73	4.9	1.75	-39	-14.5	.189	-41	.37	51
9.0	.75	54	3.3	1.47	-55	-14.7	.184	-46	.46	42
10.0	.78	39	2.1	1.28	-72	-14.9	.180	-59	.51	34
11.0	.82	26	0.3	1.04	-86	-14.9	.179	-71	.54	26
12.0	.84	12	-0.5	0.95	-101	-15.0	.177	-82	.54	17

 LOW NOISE AND
 GEN. PURPOSE GaAs FETs