



ATF-10236
0.5-12 GHz Low Noise
Gallium Arsenide FET

T-31-25

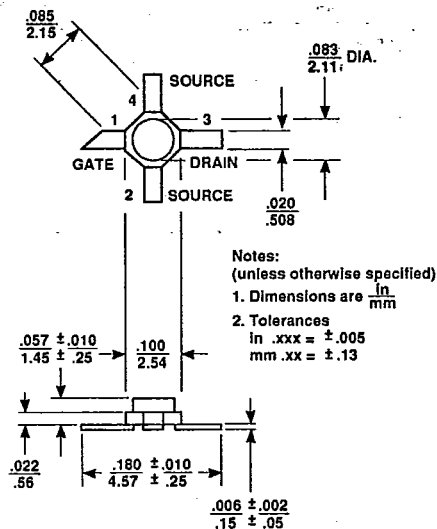
Features

- Low Noise Figure: 0.8 dB typical at 4 GHz
- Low Bias: $V_{DS} = 2V$, $I_{DS} = 20\text{ mA}$
- High Associated Gain: 13.0 dB typical at 4 GHz
- High Output Power: 20.0 dBm typical $P_{1\text{ dB}}$ at 4 GHz
- Cost Effective Ceramic Microstrip Package
- Tape-And-Reel Packaging Option Available²

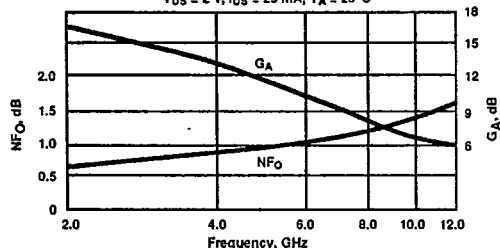
Description

Avantek's ATF-10236 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 0.5-12 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 microns. Proven gold based metallization systems and nitride passivation assure a rugged, reliable device.

Avantek 36 micro-X Package¹

OPTIMUM NOISE FIGURE AND
 ASSOCIATED GAIN vs. FREQUENCY
 $V_{DS} = 2\text{ V}$, $I_{DS} = 25\text{ mA}$, $T_A = 25^\circ\text{C}$

**Noise Parameters: $V_{DS} = 2\text{ V}$, $I_{DS} = 25\text{ mA}$**

Freq. GHz	NF0 dB	Gamma Opt Mag	Ang	$R_N/50$
1.0	0.5	.87	36	.63
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

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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
NF0	Optimum Noise Figure: $V_{DS} = 2\text{ V}$, $I_{DS} = 25\text{ mA}$				
	$f = 2.0\text{ GHz}$	dB		0.6	
	$f = 4.0\text{ GHz}$	dB		0.8	1.0
	$f = 6.0\text{ GHz}$	dB		1.0	
GA	Gain @ NF0: $V_{DS} = 2\text{ V}$, $I_{DS} = 25\text{ mA}$				
	$f = 2.0\text{ GHz}$	dB		16.5	
	$f = 4.0\text{ GHz}$	dB	12.0	13.0	
	$f = 6.0\text{ GHz}$	dB		10.5	
$P_{1\text{ dB}}$	Output Power @ 1 dB Gain Compression: $V_{DS} = 4\text{ V}$, $I_{DS} = 70\text{ mA}$	dBm		20.0	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{DS} = 4\text{ V}$, $I_{DS} = 70\text{ mA}$	dB		12.0	
g_m	Transconductance: $V_{DS} = 2\text{ V}$, $V_{GS} = 0\text{ V}$	mmho	80	140	
I_{DSS}	Saturated Drain Current: $V_{DS} = 2\text{ V}$, $V_{GS} = 0\text{ V}$	mA	50	130	180
V_p	Pinchoff Voltage: $V_{DS} = 2\text{ V}$, $I_{DS} = 1\text{ mA}$	V	-3.0	-1.3	-0.8

Notes: 1. Long leaded 35 package available upon request.

2. Refer to PACKAGING section "Tape-and-Reel Packaging for Surface Mount Semiconductors".

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Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum ¹
Drain-Source Voltage	V _{DS}	+5 V
Gate-Source Voltage	V _{GS}	-4 V
Drain Current	I _{DS}	I _{DSS}
Power Dissipation ^{2,3}	P _T	430 mW
Channel Temperature	T _{CH}	175°C
Storage Temperature ⁴	T _{STG}	175°C

Thermal Resistance: $\theta_{JC} = 350^\circ\text{C/W}$; T_{CH} = 150°C
Liquid Crystal Measurement; 1 μm Spot Size⁵

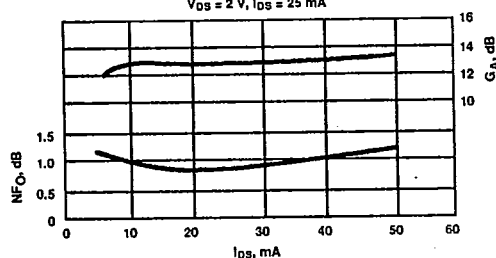
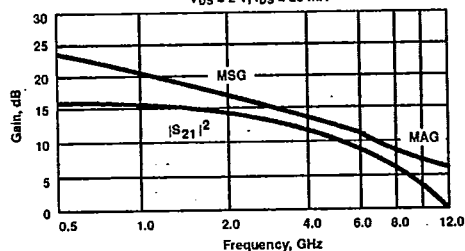
Notes:

1. Operation of this device above any one of these parameters may cause permanent damage.
2. Case Temperature = 25°C.
3. Derate at 2.9 mW/°C for T_{CASE} > 25°C.
4. 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.
5. The small spot size of this technique results in a higher, though more accurate determination of θ_{JC} than do alternate methods. See MEASUREMENTS section for more information.

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Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
ATF-10236-TR1	1000	7"
ATF-10236-TR2	4000	13"
ATF-10236-STR	1	STRIP

Typical Performance, T_A = 25°C
(unless otherwise noted)OPTIMUM NOISE FIGURE AND
ASSOCIATED GAIN vs. I_{DS}
V_{DS} = 2 V, I_{DS} = 25 mAINSERTION POWER GAIN, MAXIMUM AVAILABLE
GAIN AND MAXIMUM STABLE GAIN vs. FREQUENCY
V_{DS} = 2 V, I_{DS} = 25 mATypical Scattering Parameters: Common Source, Z₀ = 50 Ω T_A = 25°C, V_{DS} = 2 V, I_{DS} = 25 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

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