



ATF-13336
2-16 GHz Low Noise
Gallium Arsenide FET

T-31-25

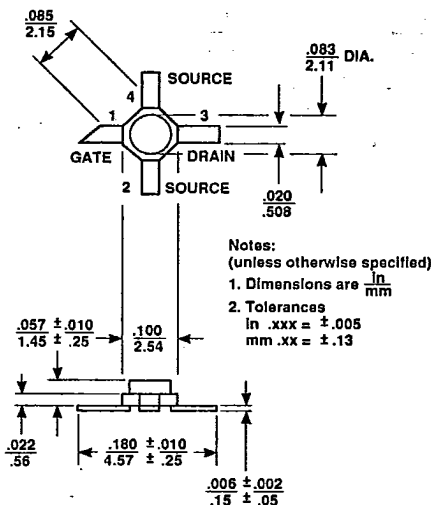
Features

- Low Noise Figure: 1.4 dB typical at 12 GHz
- High Associated Gain: 9.0 dB typical at 12 GHz
- High Output Power: 17.5 dBm typical P_1 dB at 12 GHz
- Cost Effective Ceramic Microstrip Package
- Tape-and-Reel Packaging Option Available²

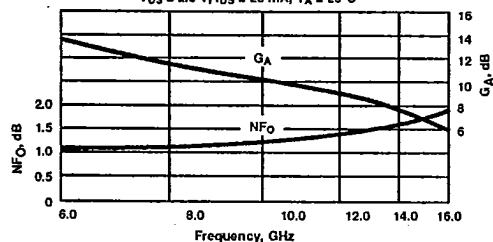
Description

Avantek's ATF-13336 is a high performance gallium arsenide Schottky-barrier-gate field effect transistor housed in a cost effective microstrip package. Its premium noise figure makes this device appropriate for use in the second stage of low noise amplifiers operating in the 2-16 GHz frequency range.

This GaAs FET device has a nominal 0.3 micron gate length with a total gate periphery of 250 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
 $V_{DS} = 2.5$ V, $I_{DS} = 20$ mA, $T_A = 25^\circ\text{C}$

Noise Parameters: $V_{DS} = 2.5$ V, $I_{DS} = 20$ mA

Freq. GHz	NF0 dB	Gamma Opt Mag	Ang	RN/50
4.0	0.8	.63	93	.27
6.0	1.1	.47	138	.10
8.0	1.2	.40	-153	.20
12.0	1.4	.52	-45	.88
14.0	1.6	.57	-2	1.3

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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
NF0	Optimum Noise Figure: $V_{DS} = 2.5$ V, $I_{DS} = 15 - 30$ mA	dB		1.2	
		dB		1.4	
		dB		1.6	1.6
GA	Gain @ NF0: $V_{DS} = 2.5$ V, $I_{DS} = 15 - 30$ mA	dB		11.5	
		dB	8.0	9.0	
		dB		7.5	
P_1 dB	Output Power @ 1 dB Gain Compression: $V_{DS} = 4$ V, $I_{DS} = 40$ mA	dBm		17.5	
G_1 dB	1 dB Compressed Gain: $V_{DS} = 4$ V, $I_{DS} = 40$ mA	dB		8.5	
g_m	Transconductance: $V_{DS} = 2.5$ V, $V_{GS} = 0$ V	mmho	25	55	
I_{DSS}	Saturated Drain Current: $V_{DS} = 2.5$ V, $V_{GS} = 0$ V	mA	20	50	100
V_p	Pinchoff Voltage: $V_{DS} = 2.5$ V, $I_{DS} = 1$ mA	V	-4.0	-1.5	-0.5

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	225 mW
Channel Temperature	T _{CH}	175°C
Storage Temperature ⁴	T _{STG}	-65°C to +175°C

Thermal Resistance: $\theta_{JC} = 400^\circ\text{C/W}$; T_{CH} = 150°C
 Liquid Crystal Measurement; 1 μm Spot Size⁵

Notes:

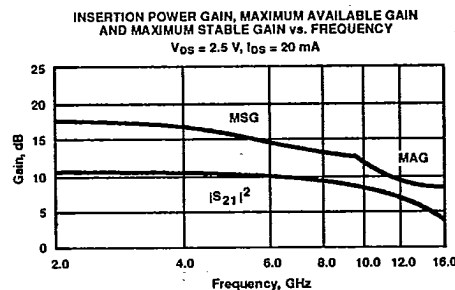
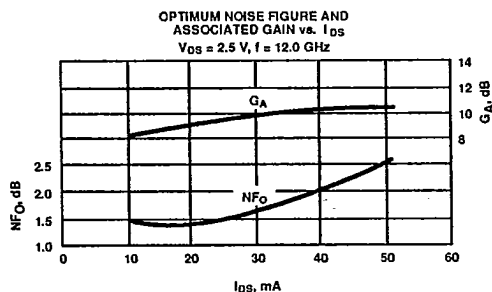
- Operation of this device above any one of these parameters may cause permanent damage.
- Case Temperature = 25°C.
- Derate at 2.5 mW/°C for T_{CASE} > 85°C.
- Storage above +150°C may tarnish the leads of this package difficult to solder into a circuit. After a device has been soldered into a circuit, 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 MEASUREMENTS section for more information.

Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
ATF-13336-TR1	1000	7"
ATF-13336-TR2	4000	13"
ATF-13336-STR	1	STRIP

Typical Performance, T_A = 25°C

(unless otherwise noted)

**Typical Scattering Parameters: Common Source, Z₀ = 50 Ω** T_A = 25°C, V_{DS} = 2.5 V, I_{DS} = 20 mA

Freq. GHz	S ₁₁			S ₂₁			S ₁₂			S ₂₂	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang
2.0	.96	-51	10.6	3.39	127	-27.1	.044	57	.61	-41	
3.0	.88	-75	10.3	3.28	106	-23.4	.060	33	.58	-51	
4.0	.86	-96	10.1	3.19	86	-22.6	.074	25	.57	-57	
5.0	.79	-117	9.9	3.13	66	-20.6	.093	12	.54	-65	
6.0	.69	-142	10.2	3.22	46	-18.9	.114	1	.49	-79	
7.0	.60	-178	10.1	3.21	21	-17.6	.132	-18	.42	-97	
8.0	.54	141	9.8	3.10	-4	-17.3	.137	-33	.31	-112	
9.0	.56	103	8.9	2.80	-26	-16.7	.147	-48	.21	-121	
10.0	.56	74	8.3	2.60	-48	-16.5	.150	-63	.09	-145	
11.0	.58	44	7.6	2.39	-68	-16.8	.145	-78	.07	89	
12.0	.63	20	6.7	2.17	-90	-17.5	.133	-95	.16	43	
13.0	.65	3	6.0	2.00	-108	-18.3	.121	-107	.19	21	
14.0	.66	-7	5.5	1.89	-126	-18.9	.114	-121	.19	-4	
15.0	.70	-19	4.9	1.76	-144	-19.0	.112	-129	.16	-28	
16.0	.72	-34	4.4	1.66	-175	-19.2	.110	-142	.14	-32	

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