AVANTEK

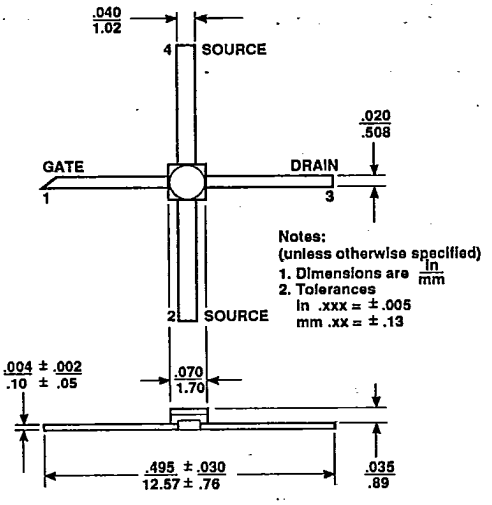
ATF-25170 (AT-8250)
0.5-10 GHz Low Noise Gallium Arsenide FET

T-31-25

Features

- **Low Noise Figure: 0.8 dB typical at 4 GHz**
- **High Associated Gain: 14.0 dB typical at 4 GHz**
- **High Output Power: 21.0 dBm typical $P_{1\,dB}$ at 4 GHz**
- **Hermetic Gold-Ceramic Microstrip Package**

Avantek 70 mil Package



Description

Avantek's ATF-25170 is a high performance gallium arsenide Schottky-barrier-gate field effect transistor housed in a hermetic, high reliability package. Its noise figure makes this device appropriate for use in low noise amplifiers operating in the 0.5-10 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.

Noise Parameters: V_{DS} = 3 V, I_{DS} = 20 mA

Freq. GHz	NF_O dB	Gamma Opt Mag	Gamma Opt Ang	$R_N/50$
1.0	0.6	.89	24	.78
2.0	0.7	.77	50	.53
4.0	0.8	.63	105	.33
6.0	1.0	.66	147	.06
8.0	1.2	.62	–159	.11

Electrical Specifications, T_A = 25°C

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.
NF_O	Optimum Noise Figure: V_{DS} = 3 V, I_{DS} = 20 mA	f = 4.0 GHz f = 6.0 GHz f = 8.0 GHz	dB dB dB		0.8 1.0 1.2	1.0
G_A	Gain @ NF_O: V_{DS} = 3 V, I_{DS} = 20 mA	f = 4.0 GHz f = 6.0 GHz f = 8.0 GHz	dB dB dB	13.0	14.0 11.5 9.0	
$P_{1\,dB}$	Output Power @ 1 dB Gain Compression: V_{DS} = 5 V, I_{DS} = 50 mA	f = 4.0 GHz	dBm		21.0	
$G_{1\,dB}$	1dB Compressed Gain: V_{DS} = 5 V, I_{DS} = 50 mA	f = 4.0 GHz	dB		15.0	
g_m	Transconductance: V_{DS} = 3 V, V_{GS} = 0 V		mmho	50	80	
I_{DSS}	Saturated Drain Current: V_{DS} = 3 V, V_{GS} = 0 V		mA	50	100	150
V_P	Pinchoff Voltage: V_{DS} = 3 V, I_{DS} = 1 mA		V	–3.0	–2.0	–0.8

Avantek, Inc. • 3175 Bowers Ave., Santa Clara, CA 95054 • Phone (408) 727-0700 • FAX: (408) 727-0539 • TWX: 310-371-8717 or 310-371-8478 • TELEX: 34-6337

ATF-25170, 0.5-10 GHz
Low Noise Gallium Arsenide FET

T-31-25

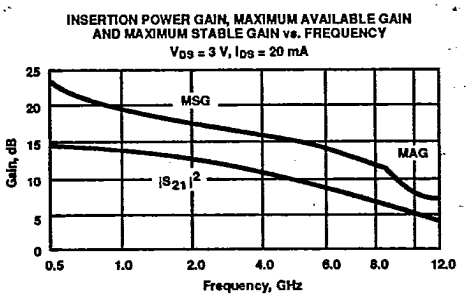
Absolute Maximum Ratings

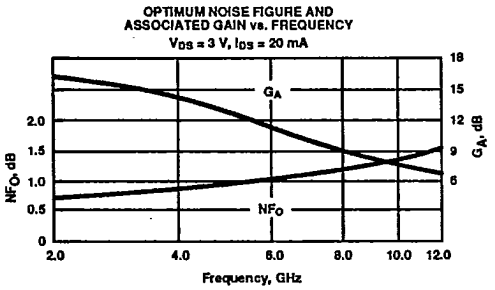
Parameter	Symbol	Absolute Maximum[1]
Drain-Source Voltage	V_{DS}	+7 V
Gate-Source Voltage	V_{GS}	–4 V
Drain Current	I_{DS}	I_{DSS}
Power Dissipation[2,3]	P_T	450 mW
Channel Temperature	T_{CH}	175°C
Storage Temperature	T_{STG}	–65°C to +175°C

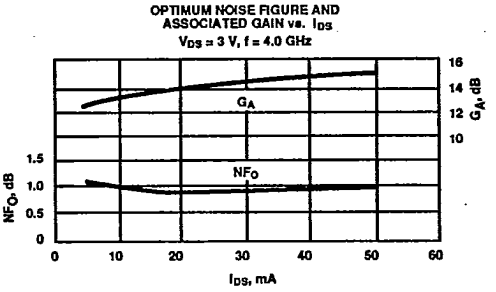
Thermal Resistance: θ_{jc} = 300°C/W; T_{CH} = 150°C
Liquid Crystal Measurement; 1 µm Spot Size[4]

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 3.3 mW/°C for $T_{MOUNTING\ SURFACE}$ > 40°C.
4. 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.

Typical Performance, T_A = 25°C
(unless otherwise noted)







Typical Scattering Parameters: Common Source, Z_O = 50 Ω
T_A = 25°C, V_{DS} = 3 V, I_{DS} = 20 mA

Freq. GHz	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
0.5	.98	–23	13.6	4.80	160	–32.8	.023	76	.50	–23
1.0	.96	–38	13.0	4.46	147	–23.6	.037	67	.48	–30
2.0	.88	–66	11.5	3.75	121	–23.6	.066	50	.44	–45
3.0	.80	–86	10.2	3.23	102	–21.8	.081	41	.41	–55
4.0	.77	–106	9.3	2.93	82	–19.7	.103	28	.38	–65
5.0	.71	–127	8.5	2.66	62	–18.6	.118	17	.35	–78
6.0	.65	–149	7.9	2.47	42	–17.7	.130	6	.30	–93
7.0	.60	–173	7.3	2.33	24	–16.5	.149	–4	.26	–111
8.0	.56	161	6.8	2.20	5	–15.8	.162	–16	.22	–134
9.0	.56	136	6.2	2.05	–14	–15.1	.175	–26	.21	–166
10.0	.55	118	5.4	1.87	–31	–15.0	.178	–35	.21	173
11.0	.53	108	4.9	1.76	–46	–14.9	.180	–42	.22	164
12.0	.53	95	4.7	1.71	–62	–14.8	.183	–52	.23	159

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