AVANTEK

ATF-45171 (AT-11571)
2-8 GHz Medium Power Gallium Arsenide FET

T-31-25

Features

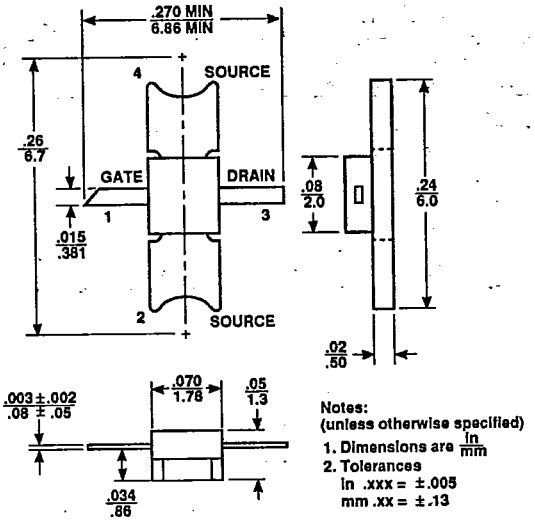
- **High Output Power:**
  29.0 dBm typical $P_{1\,dB}$ at 4 GHz
- **High Gain at 1 dB Compression:**
  10.5 dB typical $G_{1\,dB}$ at 4 GHz
- **High Power Efficiency:**
  38% typical at 4 GHz
- **Hermetic Metal-Ceramic Stripline Package**

Description

The ATF-45171 is a gallium arsenide Schottky-barrier-gate field effect transistor designed for medium power, linear amplification in the 2 to 8 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 2.5 millimeters. Proven gold based metallization systems and nitride passivation assure a rugged, reliable device.

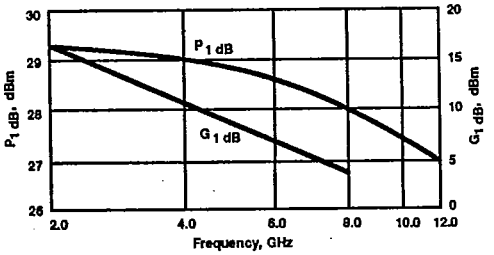
This device is suitable for applications in space, airborne, military ground and shipboard, and commercial environments. It is supplied in a hermetic high reliability package with low parasitic reactance and minimum thermal resistance.

Avantek 70 mil Flange Package



Notes:
(unless otherwise specified)
1. Dimensions are $\frac{in}{mm}$
2. Tolerances
   in .xxx = ±.005
   mm .xx = ±.13

POWER OUTPUT @ 1 dB COMPRESSION and 1 dB COMPRESSED GAIN vs. FREQUENCY
V_{DS} = 9 V, I_{DS} = 250 mA



Electrical Specifications, T_A = 25°C

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.
$P_{1\,dB}$	Output Power @ 1 dB Gain Compression: V_{DS} = 9 V, I_{DS} = 250 mA	f = 4.0 GHz f = 8.0 GHz	dBm	28.0	29.0 28.0	
$G_{1\,dB}$	1 dB Compressed Gain: V_{DS} = 9 V, I_{DS} = 250 mA	f = 4.0 GHz f = 8.0 GHz	dB	9.5	10.5 4.5	
η_{add}	Efficiency @ $P_{1\,dB}$: V_{DS} = 9 V, I_{DS} = 250 mA	f = 4.0 GHz	%		38	
g_m	Transconductance: V_{DS} = 2.5 V, I_{DS} = 250 mA		mmho		200	
I_{DSS}	Saturated Drain Current: V_{DS} = 1.75 V, V_{GS} = 0 V		mA	400	600	800
V_P	Pinchoff Voltage: V_{DS} = 2.5 V, I_{DS} = 5 mA		V	–5.4	–4.0	–2.0

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	3.6 W
Channel Temperature	T_{CH}	175°C
Storage Temperature	T_{STG}	–65°C to +175°C

Thermal Resistance: θ_{jc} = 42°C/W; T_{CH} = 150°C
Liquid Crystal Measurement; 1 µm Spot Size[4]

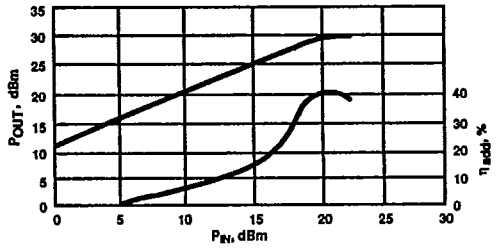
Notes:
1. Operation of this device above any one of these parameters may cause permanent damage.
2. Case Temperature = 25°C.
3. Derate at 24 mW/°C for T_{CASE} > 24°C.
4. The small spot size of this technique results in a higher, though more accurate determination of θ_{jc} than do alternate methods. See MEASUREMENTS section for more information.

Typical Performance, T_A = 25°C

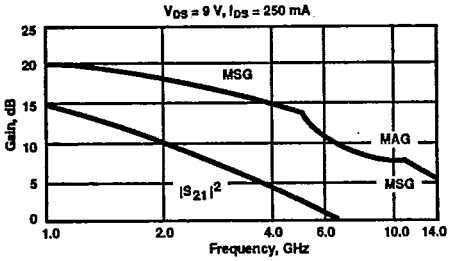
(unless otherwise noted)

T-31-25

OUTPUT POWER AND POWER ADDED EFFICIENCY vs. INPUT POWER
V_{DS} = 9 V, I_{DS} = 250 mA, f = 4.0 GHz



INSERTION POWER GAIN, MAXIMUM AVAILABLE GAIN AND MAXIMUM STABLE GAIN vs. FREQUENCY
V_{DS} = 9 V, I_{DS} = 250 mA



Typical Scattering Parameters: Common Source, Z_O = 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	Mag	Ang
1.0	.91	–83	14.5	5.30	122	–26.7	.046	46	.37	–46
2.0	.83	–137	10.8	3.45	83	–26.4	.048	19	.26	–91
3.0	.83	–167	7.4	2.34	54	–26.0	.050	5	.31	–131
4.0	.86	174	4.4	1.66	32	–25.5	.053	2	.43	–155
5.0	.86	162	2.1	1.28	12	–25.1	.055	0	.52	–167
6.0	.85	152	0.7	1.09	–3	–24.7	.058	–2	.56	–176
7.0	.84	138	0.1	1.01	–22	–24.4	.060	–6	.59	173
8.0	.84	124	–0.9	.90	–40	–23.8	.064	–13	.62	154
9.0	.85	114	–2.5	.75	–59	–23.4	.068	–19	.66	135
10.0	.85	106	–4.3	.61	–70	–22.5	.075	–25	.71	123
11.0	.85	100	–5.2	.55	–81	–21.6	.083	–30	.76	119
12.0	.83	95	–6.2	.49	–90	–20.8	.091	–39	.79	111
13.0	.80	76	–6.7	.46	–107	–19.3	.109	–50	.81	98
14.0	.77	59	–8.0	.40	–125	–18.9	.113	–61	.83	78

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