



ATF-46171 (AT-11671)
2-10 GHz Medium Power
Gallium Arsenide FET

T-31-25

Features

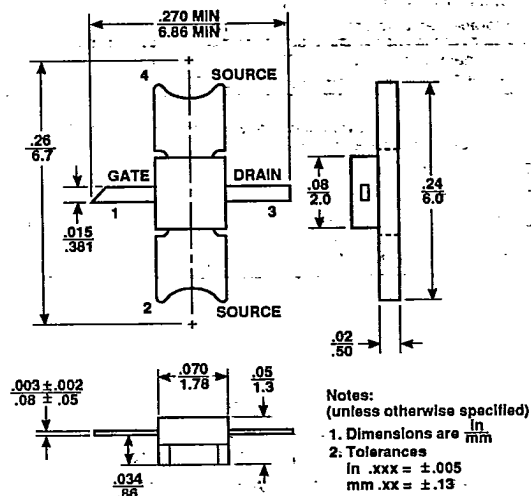
- **High Output Power:**
27.0 dBm typical $P_{1\text{ dB}}$ at 4 GHz
- **High Gain at 1 dB Compression:**
11.0 dB typical $G_{1\text{ dB}}$ at 4 GHz
- **High Power Efficiency:**
38% typical at 4 GHz
- **Hermetic Metal-Ceramic Stripline Package**

Description

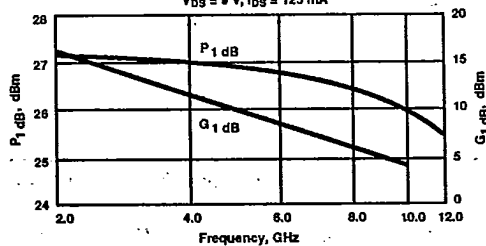
The ATF-46171 is a gallium arsenide Schottky-barrier-gate field effect transistor designed for medium power, linear amplification in the 2 to 10 GHz frequency range. This nominally 0.5 micron gate length GaAs FET is an interdigitated four-cell structure using airbridge interconnects between drain fingers. Total gate periphery is 1.25 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



POWER OUTPUT @ 1 dB COMPRESSION and 1 dB
 COMPRESSED GAIN vs. FREQUENCY
 $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$



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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
$P_{1\text{ dB}}$	Output Power @ 1 dB Gain Compression: $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$ $f = 4.0\text{ GHz}$ $f = 8.0\text{ GHz}$	dBm	26.0	27.0 26.5	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$ $f = 4.0\text{ GHz}$ $f = 8.0\text{ GHz}$	dB	10.0	11.0 6.0	
η_{add}	Efficiency @ $P_{1\text{ dB}}$: $V_{DS} = 9\text{ V}$, $I_{DS} = 125\text{ mA}$ $f = 4.0\text{ GHz}$	%		38	
g_m	Transconductance: $V_{DS} = 2.5\text{ V}$, $I_{DS} = 125\text{ mA}$	mmho		100	
I_{DSS}	Saturated Drain Current: $V_{DS} = 2.5\text{ V}$, $V_{GS} = 0\text{ V}$	mA	200	330	450
V_p	Pinchoff Voltage: $V_{DS} = 2.5\text{ V}$, $I_{DS} = 5\text{ mA}$	V	-5.4	-3.5	-2.0

ATF-46171, 2-10 GHz
Medium Power Gallium Arsenide FET
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	2.0 W
Channel Temperature	T _{CH}	175°C
Storage Temperature	T _{STG}	-65°C to +175°C

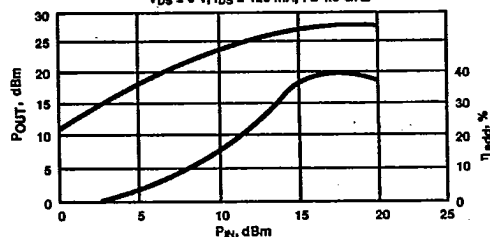
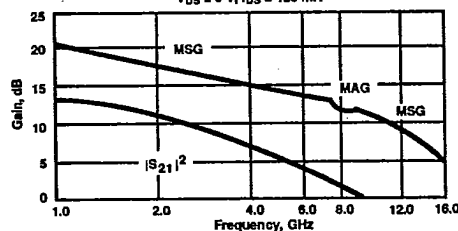
Thermal Resistance: $\theta_{JC} = 75^\circ\text{C/W}$; T_{CH} = 150°CLiquid Crystal Measurement; 1 μm Spot Size⁴**Notes:**

- Operation of this device above any one of these parameters may cause permanent damage.
- Case Temperature = 25°C.
- Derate at 13 mW/°C for T_{CASE} > 25°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.

Typical Performance, T_A = 25°C

(unless otherwise noted)

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OUTPUT POWER AND POWER ADDED EFFICIENCY vs. INPUT POWERV_{DS} = 9 V, I_{DS} = 125 mA, f = 4.0 GHz**INSERTION POWER GAIN, MAXIMUM AVAILABLE GAIN AND MAXIMUM STABLE GAIN vs. FREQUENCY**V_{DS} = 9 V, I_{DS} = 125 mA**Typical Scattering Parameters: Common Source, Z₀ = 50 Ω**T_A = 25°C, V_{DS} = 9 V, I_{DS} = 125 mA

Freq. GHz	S ₁₁		S ₂₁			S ₁₂			S ₂₂	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
1.0	.95	-54	12.7	4.30	138	-29.4	.034	63	.71	-22
2.0	.84	-106	11.0	3.56	99	-26.7	.046	30	.60	-44
3.0	.81	-145	8.9	2.80	67	-25.7	.052	13	.52	-71
4.0	.81	-172	6.6	2.14	40	-25.0	.056	2	.52	-101
5.0	.80	171	4.6	1.70	18	-24.4	.060	-3	.58	-122
6.0	.79	159	3.1	1.44	1	-24.0	.063	-6	.63	-135
7.0	.78	141	2.2	1.29	-18	-23.5	.067	-10	.63	-147
8.0	.77	123	1.4	1.17	-36	-23.0	.071	-14	.64	-164
9.0	.79	108	-0.1	.99	-58	-22.5	.075	-17	.67	171
10.0	.79	100	-1.4	.85	-73	-22.0	.079	-21	.74	152
11.0	.78	93	-2.5	.75	-86	-21.6	.083	-24	.76	142
12.0	.76	85	-3.5	.67	-97	-20.6	.093	-32	.79	133
13.0	.73	67	-4.3	.61	-118	-19.5	.106	-49	.80	119
14.0	.71	47	-5.8	.51	-138	-19.0	.112	-66	.83	98
15.0	.73	35	-7.5	.42	-157	-18.6	.118	-71	.85	83
16.0	.75	26	-8.9	.36	-157	-18.3	.121	-78	.90	72

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