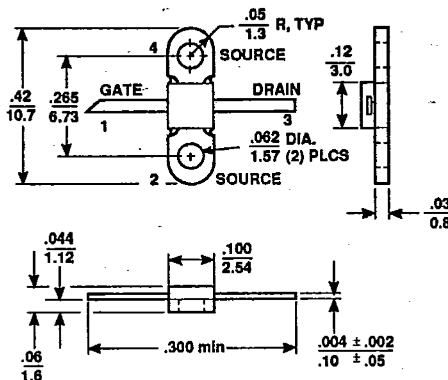
ATF-45101 (AT-8150)
2-8 GHz Medium Power
Gallium Arsenide FET

T-31-25

Features

- **High Output Power:** 29.0 dBm typical P_{1dB} at 4 GHz
- **High Gain at 1 dB Compression:** 10.0 dB typical G_{1dB} at 4 GHz
- **High Power Efficiency:** 38% typical at 4 GHz
- **Hermetic Metal-Ceramic Stripline Package**

Avantek 100 mil Flange Package



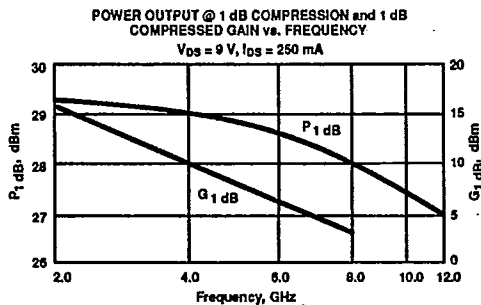
Notes:
(unless otherwise specified)
1. Dimensions are in/mm
2. Tolerances
in .xxx = ±.005
mm .xx = ±.13

Description

The ATF-45101 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 metalization 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.

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_{1dB}	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_{1dB}	1 dB Compressed Gain: V_{DS} = 9 V, I_{DS} = 250 mA	f = 4.0 GHz f = 8.0 GHz	dB	9.0	10.0 4.0	
η_{add}	Efficiency @ P_{1dB}: 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

ATF-45101, 2-8 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	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)

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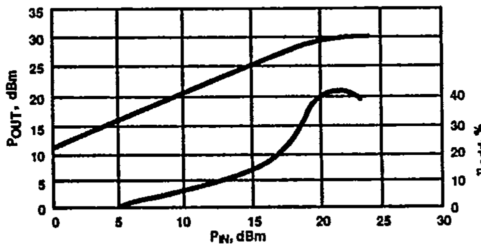
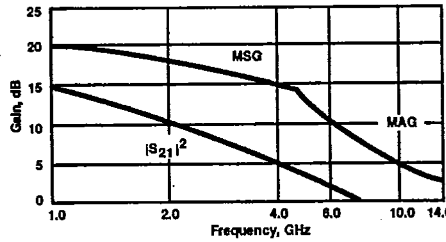
OUTPUT POWER AND POWER ADDED EFFICIENCY vs. INPUT POWER
V_{DS} = 9 V, I_{DS} = 250 mA, f = 4.0 GHz



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	S11 Mag	S11 Ang	S21 dB	S21 Mag	S21 Ang	S12 dB	S12 Mag	S12 Ang	S22 Mag	S22 Ang
1.0	.89	−88	14.9	5.54	119	−26.2	.049	43	.31	−63
2.0	.83	−135	10.8	3.48	82	−26.0	.050	18	.33	−108
3.0	.81	−158	7.6	2.40	58	−25.8	.051	7	.39	−129
4.0	.84	−174	5.4	1.86	38	−25.5	.053	3	.46	−144
5.0	.82	170	3.8	1.55	18	−25.2	.055	−2	.50	−154
6.0	.81	152	2.6	1.36	−2	−24.4	.060	−8	.52	−168
7.0	.81	133	1.2	1.15	−25	−23.9	.064	−15	.55	173
8.0	.81	122	−0.3	.97	−42	−23.5	.067	−20	.59	154
9.0	.80	113	−1.8	.81	−60	−22.6	.074	−31	.64	137
10.0	.79	107	−3.2	.69	−73	−22.0	.079	−40	.68	123
11.0	.77	94	−4.6	.59	−91	−21.5	.084	−45	.72	113
12.0	.73	82	−5.8	.51	−106	−20.3	.097	−55	.76	99
13.0	.68	69	−6.7	.46	−123	−18.3	.121	−63	.78	89
14.0	.64	56	−7.1	.44	−137	−15.9	.161	−79	.80	79

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