2–16 GHz General Purpose Gallium Arsenide FET

Technical Data

ATF-26884

Features

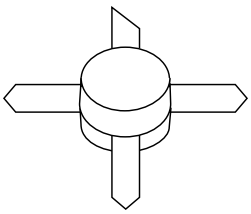
- **High Output Power:** 18.0 dBm Typical $P_{1\ dB}$ at 12 GHz
- **High Gain:** 9.0 dB Typical G_{SS} at 12 GHz
- **Low Cost Plastic Package**
- **Tape-and-Reel Packaging Option Available[1]**

Description

The ATF-26884 is a high performance gallium arsenide Schottky-barrier-gate field effect transistor housed in a cost effective microstrip package. This device is designed for use in oscillator applications and general purpose amplifier applications 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.

84 Plastic Package



Electrical Specifications, T_A = 25°C

Symbol	Parameters and Test Conditions		Units	Min.	Typ.	Max.
G_{SS}	Tuned Small Signal Gain: V_{DS} = 5 V, I_{DS} = 30 mA	f = 12.0 GHz	dB	7.0	9.0	
NF_O	Optimum Noise Figure: V_{DS} = 3 V, I_{DS} = 10 mA	f = 12.0 GHz	dB		2.2	
G_A	Gain @ NF_O: V_{DS} = 3 V, I_{DS} = 10 mA	f = 12.0 GHz	dB		6.0	
$P_{1\ dB}$	Power Output @ 1 dB Gain Compression: V_{DS} = 5 V, I_{DS} = 30 mA	f = 12.0 GHz	dBm	15.0	18.0	
g_m	Transconductance: V_{DS} = 3 V, V_{GS} = 0 V		mmho	15	35	
I_{DSS}	Saturated Drain Current: V_{DS} = 3 V, V_{GS} = 0 V		mA	30	50	90
V_P	Pinch-off Voltage: V_{DS} = 3 V, I_{DS} = 1 mA		V	-3.5	-1.5	-0.5

Note:

1. Refer to PACKAGING section “Tape-and-Reel Packaging for Surface Mount Semiconductors.”

ATF-26884 Absolute Maximum Ratings

Symbol	Parameter	Units	Absolute Maximum[1]
V_{DS}	Drain-Source Voltage	V	+7
V_{GS}	Gate-Source Voltage	V	-4
V_{GD}	Gate-Drain Voltage	V	-8
I_{DS}	Drain Current	mA	I_{DSS}
P_T	Power Dissipation [2,3]	mW	275
T_{CH}	Channel Temperature	°C	175
T_{STG}	Storage Temperature	°C	-65 to +150

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

Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. $T_{CASE\ TEMPERATURE}$ = 25°C.
3. Derate at 3.3 mW/°C for T_{CASE} > 92.5°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.

Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
ATF-26884-TR1	1000	7"
ATF-26884-STR	10	strip

ATF-26884 Typical Performance, T_A = 25°C

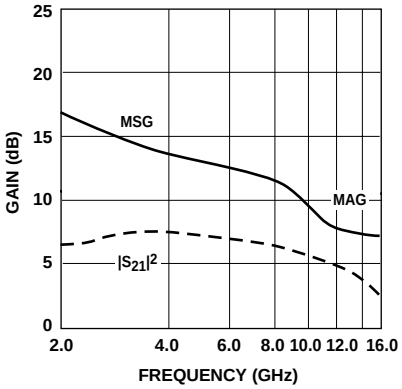


Figure 1. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency. V_{DS} = 3 V, I_{DS} = 10 mA.

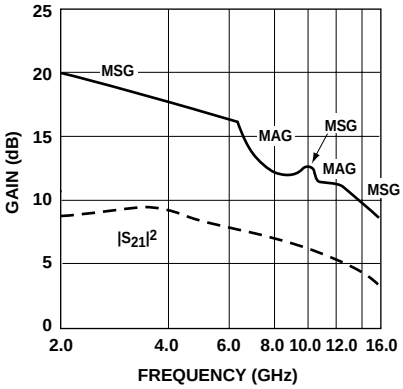


Figure 2. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency. V_{DS} = 5 V, I_{DS} = 30 mA.

Typical Scattering Parameters, Common Emitter, Z_O = 50 Ω, T_A = 25°C, V_{DS} = 3 V, I_{DS} = 10 mA

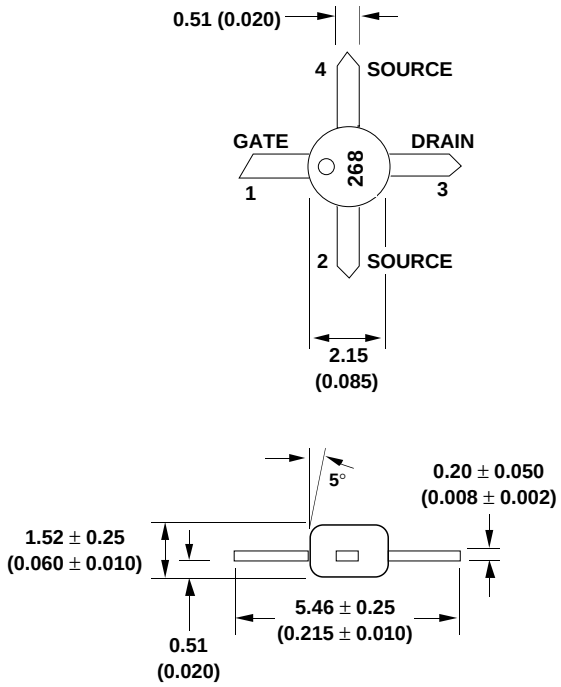
Freq.	S_{11}		S_{21}			S_{12}			S_{22}	
GHz	Mag.	Ang.	dB	Mag.	Ang.	dB	Mag.	Ang.	Mag.	Ang.
2.0	.96	-36	6.9	2.21	142	-26.6	.047	64	.81	-25
3.0	.91	-56	7.4	2.35	123	-23.0	.071	50	.77	-38
4.0	.86	-78	7.6	2.39	103	-20.6	.093	36	.70	-50
5.0	.79	-97	7.2	2.30	86	-19.5	.106	25	.66	-61
6.0	.73	-113	6.8	2.20	71	-18.9	.114	16	.62	-70
7.0	.67	-127	6.4	2.10	56	-18.4	.120	9	.61	-78
8.0	.62	-144	6.4	2.08	41	-17.9	.128	1	.58	-88
9.0	.57	-168	6.2	2.03	23	-17.5	.134	-8	.54	-101
10.0	.53	168	5.8	1.96	6	-17.3	.136	-16	.47	-116
11.0	.52	147	5.2	1.81	-10	-17.2	.138	-22	.41	-133
12.0	.49	124	4.9	1.76	-22	-17.1	.140	-26	.39	-143
13.0	.52	103	4.6	1.70	-36	-16.7	.146	-31	.37	-154
14.0	.56	80	4.0	1.58	-54	-16.3	.153	-37	.35	-171
15.0	.60	65	3.3	1.46	-72	-16.3	.153	-42	.35	173
16.0	.65	52	2.9	1.40	-83	-16.3	.153	-48	.37	132
17.0	.68	40	2.3	1.30	-99	-16.0	.158	-56	.41	101
18.0	.69	30	1.3	1.16	-112	-15.9	.159	-72	.47	87

Typical Scattering Parameters, Common Emitter, Z_O = 50 Ω, T_A = 25°C, V_{DS} = 5 V, I_{DS} = 30 mA

Freq.	S_{11}		S_{21}			S_{12}			S_{22}	
GHz	Mag.	Ang.	dB	Mag.	Ang.	dB	Mag.	Ang.	Mag.	Ang.
2.0	.94	-41	9.2	2.88	138	-30.8	.029	65	.84	-23
3.0	.87	-65	9.5	2.97	118	-27.3	.043	51	.80	-34
4.0	.79	-89	9.3	2.93	97	-25.5	.053	40	.74	-44
5.0	.71	-109	8.7	2.73	79	-24.9	.057	35	.71	-53
6.0	.64	-126	8.1	2.54	64	-24.4	.060	33	.69	-60
7.0	.57	-142	7.5	2.38	50	-24.0	.063	31	.69	-67
8.0	.52	-162	7.2	2.30	35	-23.1	.070	30	.69	-76
9.0	.48	174	6.9	2.21	18	-21.9	.080	28	.67	-87
10.0	.48	149	6.5	2.11	1	-20.4	.095	24	.63	-100
11.0	.48	130	5.9	1.97	-14	-19.7	.104	22	.57	-114
12.0	.49	108	5.6	1.91	-25	-18.1	.125	20	.55	-122
13.0	.53	88	5.2	1.82	-39	-16.2	.155	18	.54	-132
14.0	.57	69	4.7	1.71	-55	-15.2	.173	5	.52	-146
15.0	.62	56	4.1	1.60	-75	-14.8	.182	-1	.52	-165
16.0	.70	44	3.7	1.53	-87	-13.8	.205	-16	.52	165
17.0	.75	33	3.0	1.41	-103	-12.9	.226	-28	.54	135
18.0	.74	24	2.3	1.30	-117	-13.6	.210	-44	.63	114

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

84 Plastic Package Dimensions



DIMENSIONS ARE IN MILLIMETERS (INCHES)

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