

# 2–16 GHz General Purpose Gallium Arsenide FET

## Technical Data

**ATF-26884**

### Features

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

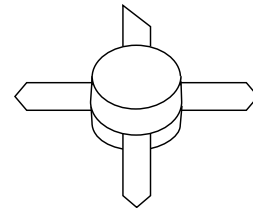
### Description

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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
$G_{\text{SS}}$	Tuned Small Signal Gain: $V_{\text{DS}} = 5\text{ V}$ , $I_{\text{DS}} = 30\text{ mA}$ $f = 12.0\text{ GHz}$	dB	7.0	9.0	
$\text{NF}_O$	Optimum Noise Figure: $V_{\text{DS}} = 3\text{ V}$ , $I_{\text{DS}} = 10\text{ mA}$ $f = 12.0\text{ GHz}$	dB		2.2	
$G_A$	Gain @ $\text{NF}_O$ : $V_{\text{DS}} = 3\text{ V}$ , $I_{\text{DS}} = 10\text{ mA}$ $f = 12.0\text{ GHz}$	dB		6.0	
$P_{1\text{dB}}$	Power Output @ 1 dB Gain Compression: $V_{\text{DS}} = 5\text{ V}$ , $I_{\text{DS}} = 30\text{ mA}$ $f = 12.0\text{ GHz}$	dBm	15.0	18.0	
$g_m$	Transconductance: $V_{\text{DS}} = 3\text{ V}$ , $V_{\text{GS}} = 0\text{ V}$	mmho	15	35	
$I_{\text{DSS}}$	Saturated Drain Current: $V_{\text{DS}} = 3\text{ V}$ , $V_{\text{GS}} = 0\text{ V}$	mA	30	50	90
$V_P$	Pinch-off Voltage: $V_{\text{DS}} = 3\text{ V}$ , $I_{\text{DS}} = 1\text{ mA}$	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 <sup>[1]</sup>
V <sub>DS</sub>	Drain-Source Voltage	V	+7
V <sub>GS</sub>	Gate-Source Voltage	V	-4
V <sub>GD</sub>	Gate-Drain Voltage	V	-8
I <sub>DS</sub>	Drain Current	mA	I <sub>DSS</sub>
P <sub>T</sub>	Power Dissipation <sup>[2,3]</sup>	mW	275
T <sub>CH</sub>	Channel Temperature	°C	175
T <sub>STG</sub>	Storage Temperature	°C	-65 to +150

**Thermal Resistance:**  $\theta_{jc} = 300^{\circ}\text{C}/\text{W}; T_{CH} = 150^{\circ}\text{C}$   
**Liquid Crystal Measurement:** 1  $\mu\text{m}$  Spot Size<sup>[4]</sup>

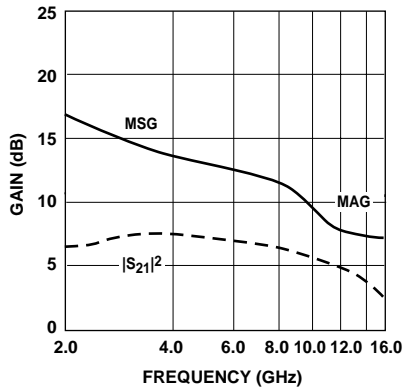
### Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. T<sub>CASE TEMPERATURE</sub> = 25°C.
3. Derate at 3.3 mW/°C for T<sub>CASE</sub> > 92.5°C.
4. The small spot size of this technique results in a higher, though more accurate determination of  $\theta_{jc}$  than do alternate methods. See MEASUREMENTS section for more information.

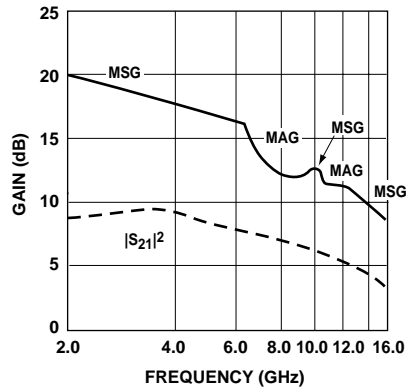
## Part Number Ordering Information

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

## ATF-26884 Typical Performance, T<sub>A</sub> = 25°C



**Figure 1. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency.**  
V<sub>DS</sub> = 3 V, I<sub>DS</sub> = 10 mA.



**Figure 2. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency.**  
V<sub>DS</sub> = 5 V, I<sub>DS</sub> = 30 mA.

**Typical Scattering Parameters, Common Emitter,  $Z_0 = 50 \Omega$ ,  $T_A = 25^\circ\text{C}$ ,  $V_{DS} = 3\text{V}$ ,  $I_{DS} = 10\text{mA}$**

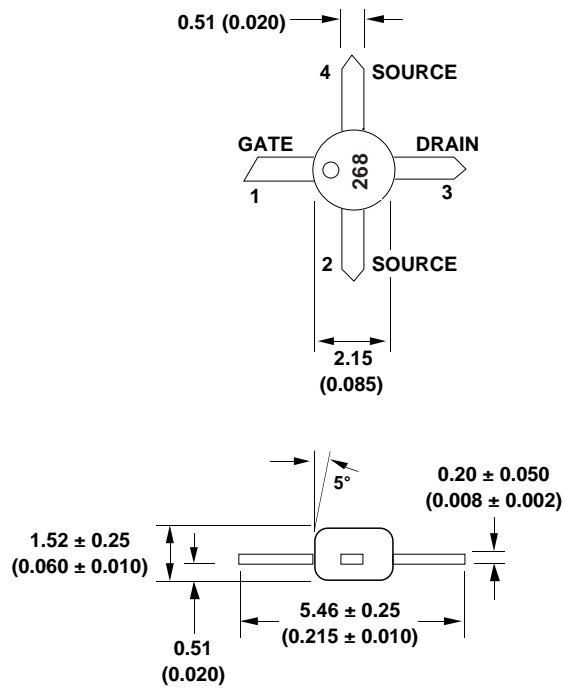
Freq. GHz	$S_{11}$		dB	$S_{21}$		dB	$S_{12}$		$S_{22}$	
	Mag.	Ang.		Mag.	Ang.		Mag.	Ang.	Mag.	Ang.
2.0	.96	-36	6.9	2.21	142	-26.6	.047	64	.81	-25
3.0	.91	-56	7.4	2.35	123	-23.0	.071	50	.77	-38
4.0	.86	-78	7.6	2.39	103	-20.6	.093	36	.70	-50
5.0	.79	-97	7.2	2.30	86	-19.5	.106	25	.66	-61
6.0	.73	-113	6.8	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,  $Z_0 = 50 \Omega$ ,  $T_A = 25^\circ\text{C}$ ,  $V_{DS} = 5\text{V}$ ,  $I_{DS} = 30\text{mA}$**

Freq. GHz	$S_{11}$		dB	$S_{21}$		dB	$S_{12}$		$S_{22}$	
	Mag.	Ang.		Mag.	Ang.		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)