

# 0.5–10 GHz General Purpose Gallium Arsenide FET

## Technical Data

**ATF-25735**

### Features

- **High Output Power:**  
19.0 Bm Typical  $P_{1\text{dB}}$  at 4 GHz
- **High Gain:**  
12.5 dB Typical  $G_{1\text{dB}}$  at 4 GHz
- **Low Noise Figure:**  
1.2 dB Typical at 4 GHz
- **Cost Effective Ceramic  
Microstrip Package**

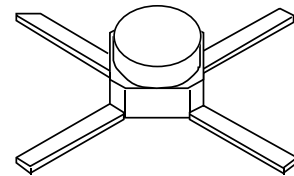
### Description

The ATF-25735 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 general purpose amplifier and oscillator applications in the 0.5-10 GHz frequency range.

This GaAs FET device has a nominal 0.3 micron gate length using airbridge interconnects between drain fingers. Total gate periphery is 500 microns. Proven gold based metallization systems and nitride passivation assure a rugged, reliable device.

### 35 micro-X Package



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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
NF <sub>O</sub>	Optimum Noise Figure: $V_{DS} = 3\text{ V}, I_{DS} = 20\text{ mA}$	$f = 2.0\text{ GHz}$ $f = 4.0\text{ GHz}$ $f = 6.0\text{ GHz}$	dB		1.0 1.2 1.4 1.5
G <sub>A</sub>	Gain @ NF <sub>O</sub> : $V_{DS} = 3\text{ V}, I_{DS} = 20\text{ mA}$	$f = 2.0\text{ GHz}$ $f = 4.0\text{ GHz}$ $f = 6.0\text{ GHz}$	dB	11.5	15.0 13.0 10.5
P <sub>1dB</sub>	Power Output @ 1 dB Gain Compression: $V_{DS} = 5\text{ V}, I_{DS} = 50\text{ mA}$	$f = 4.0\text{ GHz}$	dBm		19.0
G <sub>1dB</sub>	1 dB Compressed Gain: $V_{DS} = 5\text{ V}, I_{DS} = 50\text{ mA}$	$f = 4.0\text{ GHz}$	dB		12.5
g <sub>m</sub>	Transconductance: $V_{DS} = 3\text{ V}, V_{GS} = 0\text{ V}$		mmho	50	80
I <sub>DSS</sub>	Saturated Drain Current: $V_{DS} = 3\text{ V}, V_{GS} = 0\text{ V}$		mA	50	100
V <sub>P</sub>	Pinch-off Voltage: $V_{DS} = 3\text{ V}, I_{DS} = 1\text{ mA}$		V	-3.0	-2.0

## ATF-25735 Absolute Maximum Ratings

Symbol	Parameter	Units	Absolute Maximum <sup>[1]</sup>
$V_{DS}$	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 <sup>[2,3]</sup>	mW	450
$T_{CH}$	Channel Temperature	°C	175
$T_{STG}$	Storage Temperature <sup>[4]</sup>	°C	-65 to +175

**Thermal Resistance:**

$$\theta_{jc} = 325^{\circ}\text{C/W}; T_{CH} = 150^{\circ}\text{C}$$

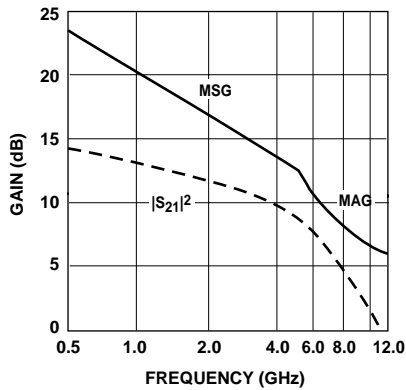
**Liquid Crystal Measurement:**

$$1 \mu\text{m Spot Size}^{[5]}$$

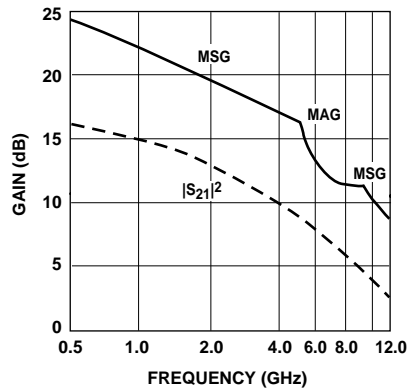
### Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2.  $T_{CASE \text{ TEMPERATURE}} = 25^{\circ}\text{C}$ .
3. Derate at  $3 \text{ mW}/^{\circ}\text{C}$  for  $T_{CASE} > 29^{\circ}\text{C}$ .
4. Storage above  $+150^{\circ}\text{C}$  may tarnish the leads of this package difficult to solder into a circuit. After a device has been soldered into a circuit, it may be safely stored up to  $175^{\circ}\text{C}$ .
5. 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.

## ATF-25735 Typical Performance, $T_A = 25^{\circ}\text{C}$



**Figure 1. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency.  $V_{DS} = 3 \text{ V}$ ,  $I_{DS} = 20 \text{ mA}$ .**



**Figure 2. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency.  $V_{DS} = 5 \text{ V}$ ,  $I_{DS} = 50 \text{ mA}$ .**

**Typical Scattering Parameters, Common Emitter,  $Z_O = 50 \Omega$ ,  $T_A = 25^\circ\text{C}$ ,  $V_{DS} = 3\text{V}$ ,  $I_{DS} = 20\text{mA}$**

Freq. GHz	$S_{11}$		dB	$S_{21}$		dB	$S_{12}$		$S_{22}$	
	Mag.	Ang.		Mag.	Ang.		Mag.	Ang.	Mag.	Ang.
0.5	.98	-22	13.9	4.95	159	-32.0	.025	77	.52	-12
1.0	.94	-45	13.3	4.61	142	-27.1	.044	64	.52	-20
2.0	.85	-82	12.2	4.06	110	-21.6	.083	45	.46	-41
3.0	.70	-116	11.0	3.54	81	-19.3	.109	24	.38	-61
4.0	.58	-152	10.0	3.17	54	-17.7	.131	12	.35	-81
5.0	.50	165	8.9	2.78	27	-16.7	.146	-7	.29	-97
6.0	.52	122	7.7	2.43	1	-16.1	.156	-20	.18	-112
7.0	.59	90	6.3	2.06	-23	-15.8	.162	-34	.07	-161
8.0	.65	66	5.1	1.79	-43	-15.5	.167	-46	.09	107
9.0	.69	44	3.8	1.55	-63	-15.3	.172	-53	.15	76
10.0	.73	32	2.7	1.36	-82	-15.4	.170	-65	.18	53
11.0	.79	20	1.1	1.14	-100	-15.5	.168	-78	.21	24
12.0	.84	7	-0.2	.98	-119	-15.7	.161	-93	.26	-5

**Typical Scattering Parameters, Common Emitter,  $Z_O = 50 \Omega$ ,  $T_A = 25^\circ\text{C}$ ,  $V_{DS} = 5\text{V}$ ,  $I_{DS} = 50\text{mA}$**

Freq. GHz	$S_{11}$		dB	$S_{21}$		dB	$S_{12}$		$S_{22}$	
	Mag.	Ang.		Mag.	Ang.		Mag.	Ang.	Mag.	Ang.
0.5	.93	-21	16.0	6.29	156	-34.0	.020	69	.56	-10
1.0	.88	-42	15.4	5.89	140	-29.6	.033	62	.53	-21
2.0	.78	-81	14.1	5.08	108	-24.4	.060	49	.47	-43
3.0	.65	-112	12.6	4.27	83	-22.6	.074	39	.44	-55
4.0	.55	-142	11.4	3.73	58	-21.0	.089	28	.41	-64
5.0	.48	-176	10.6	3.37	36	-19.7	.104	20	.37	-69
6.0	.47	142	9.7	3.04	10	-18.3	.122	6	.28	-83
7.0	.56	104	8.4	2.64	-14	-17.5	.134	-6	.14	-105
8.0	.65	80	7.0	2.25	-35	-16.7	.146	-17	.07	172
9.0	.73	61	5.8	1.94	-53	-16.1	.157	-26	.14	113
10.0	.78	47	4.7	1.71	-72	-15.4	.169	-40	.20	94
11.0	.80	34	3.6	1.51	-90	-15.1	.176	-53	.27	68
12.0	.85	18	2.7	1.36	-109	-14.8	.181	-64	.36	45

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

### 35 micro-X Package Dimensions

