

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**

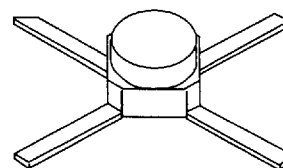
Description

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_O	Optimum Noise Figure: $V_{DS} = 3\text{ V}$, $I_{DS} = 20\text{ mA}$				
	$f = 2.0\text{ GHz}$	dB		1.0	1.5
	$f = 4.0\text{ GHz}$			1.2	
	$f = 6.0\text{ GHz}$			1.4	
G_A	Gain @ NF_O : $V_{DS} = 3\text{ V}$, $I_{DS} = 20\text{ mA}$				
	$f = 2.0\text{ GHz}$	dB	11.5	15.0	
	$f = 4.0\text{ GHz}$			13.0	
	$f = 6.0\text{ GHz}$			10.5	
$P_{1\text{ dB}}$	Power Output @ 1 dB Gain Compression: $V_{DS} = 5\text{ V}$, $I_{DS} = 50\text{ mA}$	$f = 4.0\text{ GHz}$		19.0	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{DS} = 5\text{ V}$, $I_{DS} = 50\text{ mA}$	$f = 4.0\text{ GHz}$		12.5	
g_m	Transconductance: $V_{DS} = 3\text{ V}$, $V_{GS} = 0\text{ V}$	mmho	50	80	
I_{DSS}	Saturated Drain Current: $V_{DS} = 3\text{ V}$, $V_{GS} = 0\text{ V}$	mA	50	100	150
V_P	Pinch-off Voltage: $V_{DS} = 3\text{ V}$, $I_{DS} = 1\text{ mA}$	V	-3.0	-2.0	-0.8

ATF-25735 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	450
T_{CH}	Channel Temperature	°C	175
T_{STG}	Storage Temperature ^[4]	°C	-65 to +175

Thermal Resistance:

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

Liquid Crystal Measurement:

1 μm Spot Size^[5]

Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. T_{CASE} TEMPERATURE = 25°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°C .
5. 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.

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

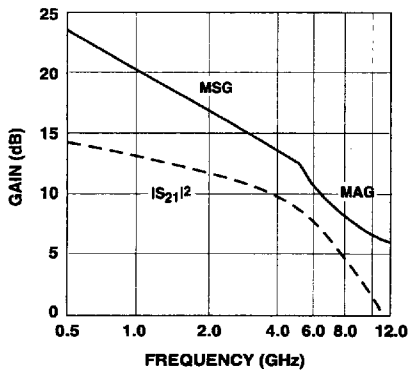


Figure 1. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency. $V_{DS} = 3\text{ V}$, $I_{DS} = 20\text{ mA}$.

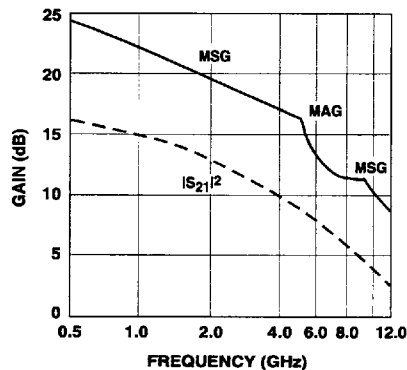


Figure 2. Insertion Power Gain, Maximum Available Gain and Maximum Stable Gain vs. Frequency. $V_{DS} = 5\text{ V}$, $I_{DS} = 50\text{ mA}$.

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

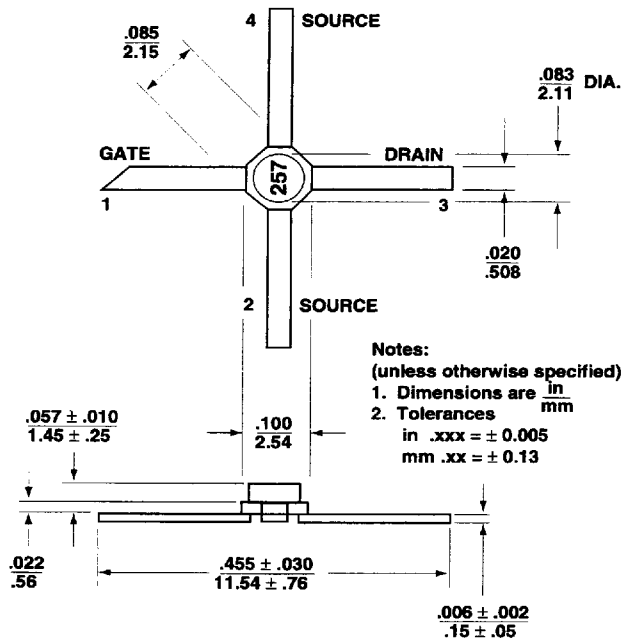
Freq. GHz	S_{11}		dB	S_{21}		dB	S_{12}		S_{22}	
	Mag.	Ang.		Mag.	Ang.		Mag.	Ang.	Mag.	Ang.
0.5	.98	-22	13.9	4.95	159	-32.0	.025	77	.52	-12
1.0	.94	-45	13.3	4.61	142	-27.1	.044	64	.52	-20
2.0	.85	-82	12.2	4.06	110	-21.6	.083	45	.46	-41
3.0	.70	-116	11.0	3.54	81	-19.3	.109	24	.38	-61
4.0	.58	-152	10.0	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



For technical assistance or the location of your nearest Hewlett-Packard sales office, distributor or representative call:

Americas/Canada: 1-800-235-0312 or 408-654-8675

Far East/Australasia: Call your local HP sales office.

Japan: (81 3) 3335-8152

Europe: Call your local HP sales office.

Data subject to change.
Copyright © 1997 Hewlett-Packard Co.

Printed in U.S.A. 5965-8710E (9/97)

4447584 0017714 T72



86164