

FEATURES

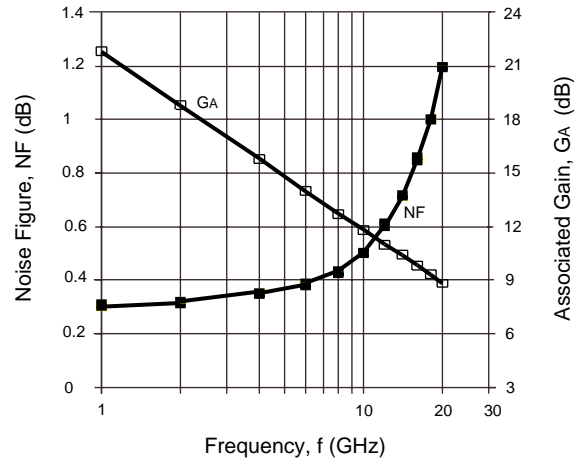
- **VERY LOW NOISE FIGURE:**
0.6 dB typical at 12 GHz
- **HIGH ASSOCIATED GAIN:**
11 dB typical at 12 GHz
- **L_G = 0.25 μm, W_G = 200 μm**
- **LOW COST METAL/CERAMIC PACKAGE**
- **TAPE & REEL PACKAGING OPTION AVAILABLE**

DESCRIPTION

The NE32484A is a pseudomorphic Hetero-Junction FET that uses the junction between Si-doped AlGaAs and undoped InGaAs to create very high mobility electrons. The device features mushroom shaped TiAl gates for decreased gate resistance and improved power handling capabilities. The mushroom gate also results in lower noise figure and high associated gain. This device is housed in an epoxy-sealed, metal/ceramic package and is intended for high volume consumer and industrial applications.

NEC's stringent quality assurance and test procedures assure the highest reliability and performance.

**NOISE FIGURE & ASSOCIATED
GAIN vs. FREQUENCY**
V_{DS} = 2 V, I_{DS} = 10 mA



ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER PACKAGE OUTLINE			NE32484A 84AS		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
NFOPT ¹	Noise Figure, V _{DS} = 2.0 V, I _D = 10 mA, f = 12 GHz	dB		0.6	0.7
GA ¹	Associated Gain, V _{DS} = 2.0 V, I _D = 10 mA, f = 12 GHz	dB	10.0	11.0	
P _{1dB}	Output Power at 1 dB Gain Compression Point, f = 12 GHz V _{DS} = 2.0 V, I _{DS} = 10 mA V _{DS} = 2.0 V, I _{DS} = 20 mA	dBm dBm		8.5 11.0	
G _{1dB}	Gain at P _{1dB} , f = 12 GHz V _{DS} = 2.0 V, I _{DS} = 10 mA V _{DS} = 2.0 V, I _{DS} = 20 mA	dB dB		10.0 10.5	
I _{DSS}	Saturated Drain Current, V _{DS} = 2.0 V, V _{GS} = 0 V	mA	15	40	70
V _P	Pinch-off Voltage, V _{DS} = 2.0 V, I _{DS} = 0.1 mA	V	-2.0	-0.8	-0.2
g _m	Transconductance, V _{DS} = 2.0 V, I _D = 10 mA	mS	45	60	
I _{GSO}	Gate to Source Leakage Current, V _{GS} = -3.0 V, I _D = 0 mA	μA		0.5	10.0
R _{TH} (CH-A)	Thermal Resistance (Channel to Ambient)	°C/W		750	
R _{TH} (CH-C)	Thermal Resistance (Channel to Case)	°C/W			350

Note:

1. Typical values of noise figures and associated gain are those obtained when 50% of the devices from a large number of lots were individually measured in a circuit with the input individually tuned to obtain the minimum value. Maximum values are criteria established on the production line as a "go-no-go" screening tuned for the "generic" type but not for each specimen.

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{DS}	Drain to Source Voltage	V	4.0
V _{GS}	Gate to Source Voltage	V	-3.0
I _{DS}	Drain Current	mA	I _{DSS}
I _{GRF}	Gate Current	μA	200
T _{CH}	Channel Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150
P _T	Total Power Dissipation	mW	165

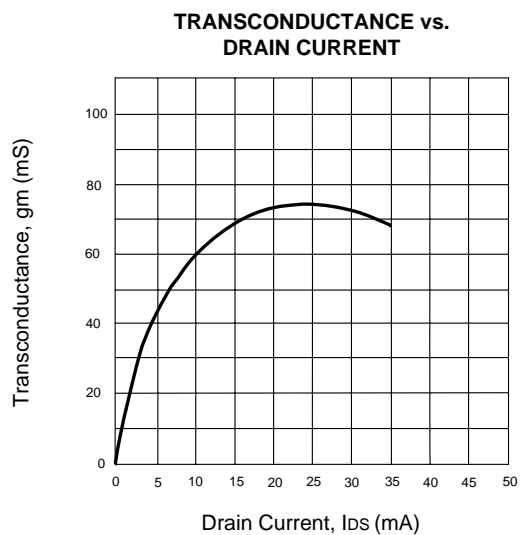
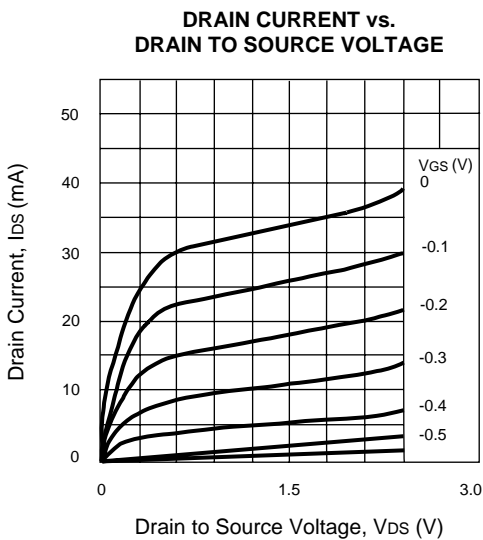
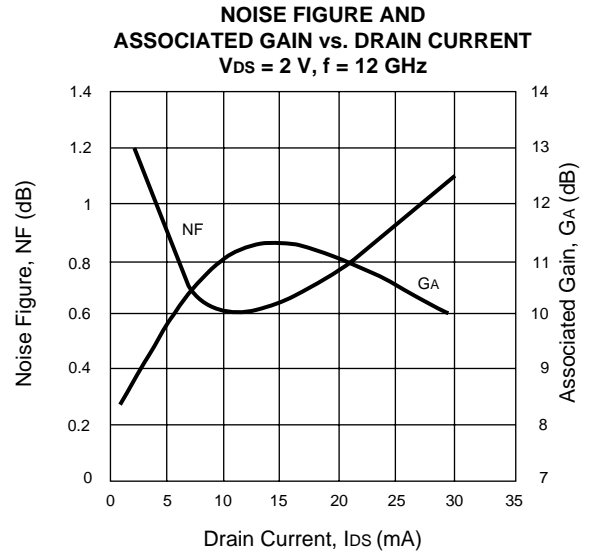
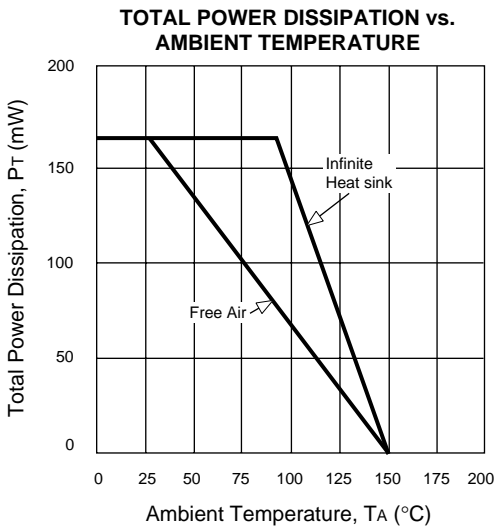
Note:

1. Operation in excess of any of these parameters may result in permanent damage.

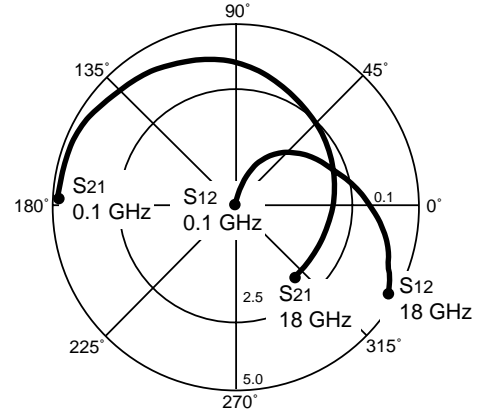
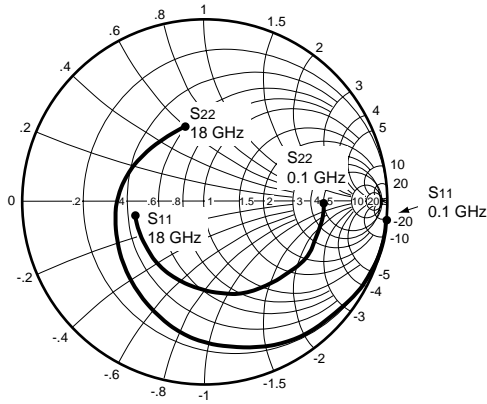
TYPICAL NOISE PARAMETERS (T_A = 25°C)

FREQ. (GHz)	NF _{MIN} (dB)	G _A (dB)	Γ _{OPT}		Rn/50
			MAG	ANG	
V _C = 2 V, I _{DS} = 10 mA					
1.00	0.30	24.91	0.88	13.00	0.33
2.00	0.31	23.05	0.82	28.00	0.31
4.00	0.32	20.13	0.71	59.00	0.26
6.00	0.37	16.23	0.60	82.00	0.20
8.00	0.43	13.95	0.50	106.00	0.13
10.00	0.51	12.52	0.40	131.00	0.09
12.00	0.60	11.41	0.33	159.00	0.06
14.00	0.72	10.70	0.28	-166.00	0.05
16.00	0.86	10.29	0.28	-132.00	0.04
18.00	1.00	10.22	0.31	-104.00	0.04

TYPICAL PERFORMANCE CURVES (T_A = 25°C)



TYPICAL COMMON SOURCE SCATTERING PARAMETERS (TA = 25°C)



NE32484A

VDS = 2 V, IDS = 10 mA

FREQUENCY (GHz)	S11		S21		S12		S22		K	MAG ¹ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.1	0.999	-1.8	4.893	178.2	0.002	88.5	0.647	-0.9	0.071	33.885
0.2	0.999	-3.8	4.889	176.2	0.003	87.1	0.646	-2.4	0.053	32.121
1.0	0.992	-18.2	4.812	161.6	0.018	77.3	0.641	-12.6	0.101	24.271
2.0	0.960	-34.6	4.649	145.5	0.033	67.3	0.632	-24.2	0.213	21.488
3.0	0.916	-50.5	4.453	129.8	0.046	58.1	0.614	-35.1	0.313	19.859
4.0	0.870	-65.5	4.229	114.9	0.059	49.2	0.590	-45.3	0.398	18.554
5.0	0.810	-80.0	4.011	100.8	0.069	41.2	0.568	-55.1	0.502	17.644
6.0	0.754	-94.4	3.780	87.0	0.077	33.8	0.550	-64.3	0.594	16.910
7.0	0.702	-107.9	3.541	74.4	0.082	27.3	0.531	-73.5	0.688	16.353
8.0	0.660	-119.6	3.314	62.4	0.087	22.4	0.513	-81.3	0.774	15.808
9.0	0.621	-131.2	3.141	51.1	0.090	17.7	0.498	-88.4	0.861	15.428
10.0	0.584	-142.2	3.033	40.1	0.096	13.9	0.485	-94.9	0.909	14.996
11.0	0.538	-154.6	2.943	28.7	0.102	9.6	0.472	-101.8	0.964	14.602
12.0	0.506	-168.2	2.831	17.3	0.107	4.9	0.458	-110.0	1.005	13.809
13.0	0.484	177.4	2.757	6.1	0.112	-0.0	0.447	-119.0	1.014	13.179
14.0	0.463	165.1	2.672	-4.5	0.118	-4.3	0.437	-127.3	1.027	12.551
15.0	0.445	152.3	2.611	-16.0	0.124	-9.3	0.427	-135.9	1.033	12.126
16.0	0.420	137.6	2.577	-27.3	0.133	-15.4	0.418	-145.4	1.019	12.029
17.0	0.415	121.5	2.528	-39.3	0.140	-22.7	0.407	-156.6	1.002	12.288
18.0	0.425	102.2	2.517	-51.3	0.149	-30.2	0.397	-168.9	0.945	12.277

Note:

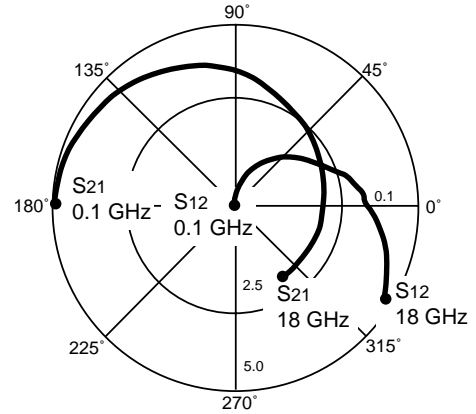
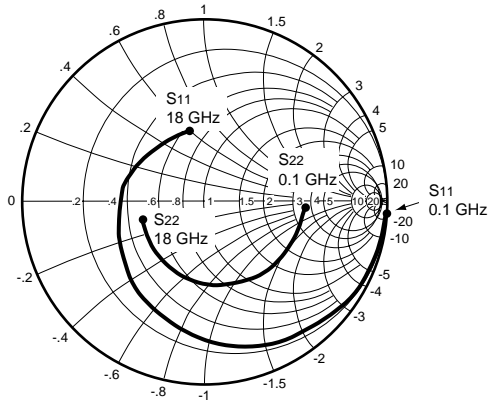
1. Gain Calculations:

$$MAG = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } MSG = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

MAG = Maximum Available Gain

MSG = Maximum Stable Gain

TYPICAL COMMON SOURCE SCATTERING PARAMETERS (TA = 25°C)



NE32484A

VDS = 2 V, IDS = 20 mA

FREQUENCY (GHz)	S11		S21		S12		S22		K	MAG ¹ (dB)
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG		
0.1	0.999	-2.7	5.59	177.2	0.002	88.5	0.560	-2.8	0.055	34.464
0.2	0.999	-3.9	5.57	175.6	0.003	87.4	0.559	-4.0	0.041	32.687
1.0	0.986	-18.9	5.47	160.9	0.016	78.6	0.550	-12.8	0.143	25.339
2.0	0.950	-35.9	5.26	144.2	0.030	68.8	0.538	-23.8	0.274	22.439
3.0	0.903	-52.1	5.01	128.3	0.043	60.9	0.526	-34.1	0.373	20.664
4.0	0.848	-67.4	4.70	113.1	0.054	52.9	0.515	-43.8	0.479	19.397
5.0	0.786	-82.1	4.41	98.9	0.064	45.9	0.503	-53.1	0.578	18.383
6.0	0.727	-96.4	4.12	85.1	0.073	39.3	0.492	-62.0	0.665	17.516
7.0	0.676	-110.1	3.85	72.4	0.079	33.4	0.480	-70.6	0.747	16.878
8.0	0.628	-121.5	3.59	60.7	0.086	28.7	0.468	-78.0	0.825	16.206
9.0	0.587	-133.1	3.37	49.4	0.090	24.4	0.457	-84.7	0.908	15.734
10.0	0.551	-143.7	3.24	38.4	0.099	19.7	0.445	-90.9	0.936	15.149
11.0	0.514	-155.9	3.11	27.3	0.108	15.8	0.434	-97.4	0.958	14.593
12.0	0.477	-169.9	3.00	16.2	0.115	9.8	0.422	-105.2	0.989	14.164
13.0	0.456	175.8	2.91	5.20	0.121	3.7	0.410	-114.3	0.998	13.811
14.0	0.437	163.6	2.82	-5.30	0.129	-1.4	0.399	-122.4	1.000	13.397
15.0	0.420	150.6	2.75	-16.6	0.136	-7.8	0.387	-131.0	1.006	12.573
16.0	0.392	135.6	2.70	-28.0	0.147	-14.2	0.376	-140.7	0.996	12.640
17.0	0.393	119.7	2.65	-39.7	0.154	-22.5	0.364	-151.8	0.979	12.357
18.0	0.404	100.5	2.63	-51.4	0.163	-30.8	0.352	-163.8	0.935	12.078

Note:

1. Gain Calculations:

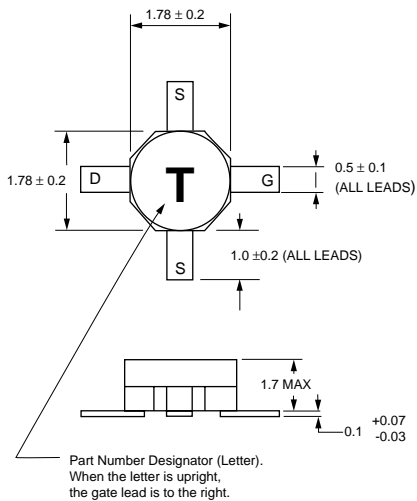
$$MAG = \frac{|S_{21}|}{|S_{12}|} \left(K \pm \sqrt{K^2 - 1} \right). \text{ When } K \leq 1, \text{ MAG is undefined and MSG values are used. } MSG = \frac{|S_{21}|}{|S_{12}|}, K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2 |S_{12} S_{21}|}, \Delta = S_{11} S_{22} - S_{21} S_{12}$$

MAG = Maximum Available Gain

MSG = Maximum Stable Gain

OUTLINE DIMENSIONS (TA = 25Y⊗C)

NE32484AS
PACKAGE OUTLINE 84AS
 (Units in mm)



ORDERING INFORMATION

PART NUMBER	QTY	PACKAGE
NE32484AS	Bulk up to 1 K	84AS
NE32484A-T1	1K/Reel	84AS

Note:
 Long leaded (1.7 min.) 84A package available upon request in bulk quantities up to 1000 pcs. To order specify NE32484A-SL.