

FEATURES

- **LOW COST**
- **LOW NOISE FIGURE**
0.8 dB at 4 GHz
1.7 dB at 8 GHz
- **HIGH ASSOCIATED GAIN**
12.0 dB at 4 GHz
9.0 dB at 8 GHz
- **HIGH MAXIMUM AVAILABLE GAIN**
16.0 dB at 4 GHz
12.0 dB at 8 GHz

DESCRIPTION AND APPLICATIONS

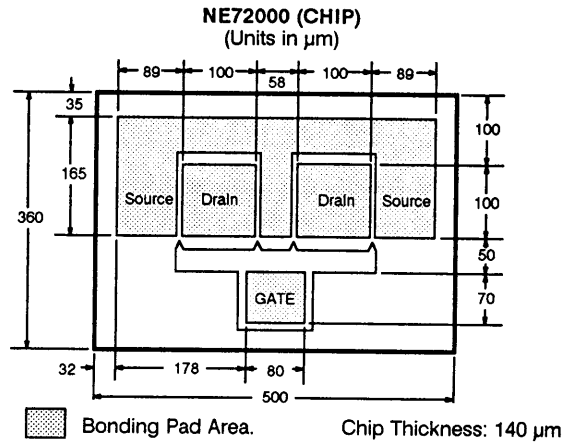
The NE720 is NEC's low cost 1.0 μ recessed gate GaAs FET, offering a low noise figure and high gain through 8 GHz. It is designed for consumer applications.

The device is available as a chip (NE72000) and in two hermetically sealed stripline packages (NE72084 and NE72089A). The chip's gate and channel are glassivated with a thin layer of SiO₂ for mechanical protection. All bonding pads use a Ti-Pt-Au metallization system.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

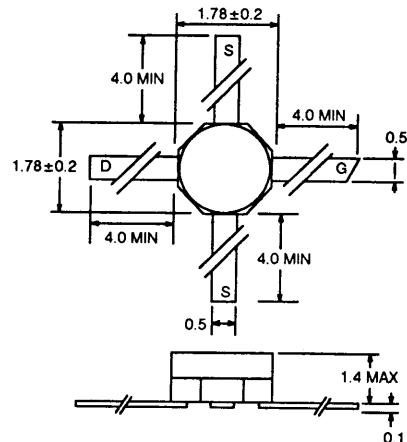
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{DS}	Drain to Source Voltage	V	5.0
V _{GDO}	Gate to Drain Voltage	V	-6.0
V _{GSO}	Gate to Source Voltage	V	-6.0
I _{GF}	Gate Current	mA	4.0
I _{DS}	Drain Current	mA	150
T _{CH}	Channel Temperature	°C	175
T _{STG}	Storage Temperature	°C	-65 to +125
	NE72084	°C	-65 to +175
	NE72089A	°C	-65 to +175

OUTLINE DIMENSIONS (Units in mm)

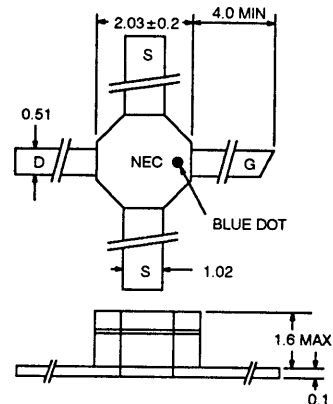


OUTLINE 84

(Units in mm)



OUTLINE 89A



NE720 SERIES

ELECTRICAL CHARACTERISTICS (TA = 25°C)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE72000 00 (CHIP)			NE72084 2SK571 84			NE72089A 2SK354A 89A		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
I _{DSS}	Drain Current at V _{DS} = 3 V, V _{GS} = 0 V	mA	30	60	150	30	60	150	30	60	150
V _P	Pinch-off Voltage at V _{DS} = 3 V, I _{DS} = 0.1 mA	V	-0.8	-2.0	-4.0	-0.8	-2.0	-4.0	-0.8	-2.0	-4.0
g _M	Transconductance at V _{DS} = 3 V, I _{DS} = 10 mA	mS	20	40	60	20	40	60	20	40	60
I _{GSO}	Gate to Source Leakage Current at V _{GS} = -5 V	μA		1.0	10			10		1.0	10
R _{TH}	Thermal Resistance (Channel-to-Ambient)	°C/W			170 ²			400			400
P _T	Total Power Dissipation	mW			500			300			300

Notes:

- Electronic Industrial Association of Japan.
- R_{TH} (Channel-to-Case) for chips mounted on a copper heatsink.

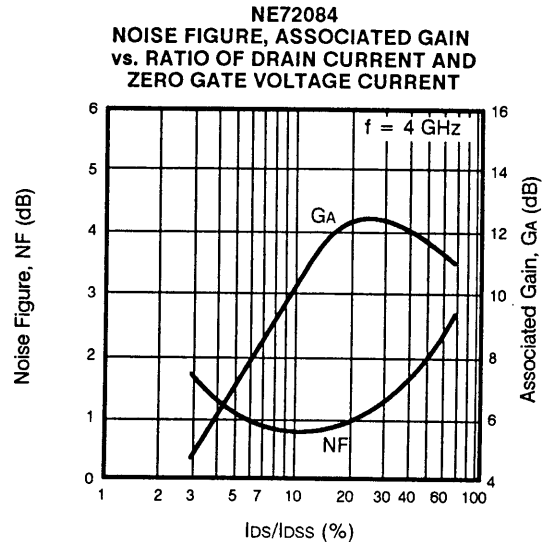
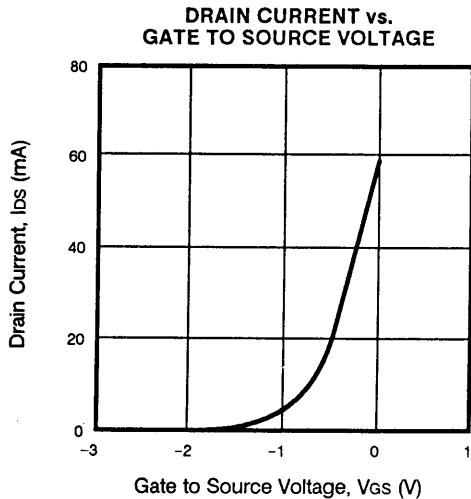
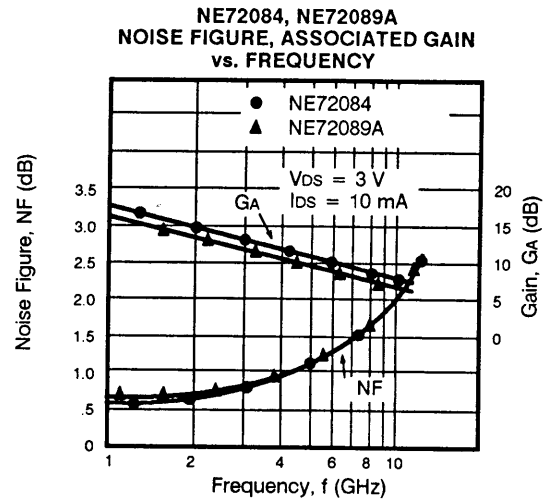
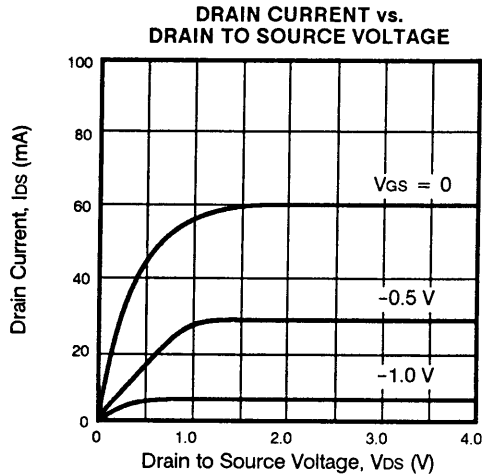
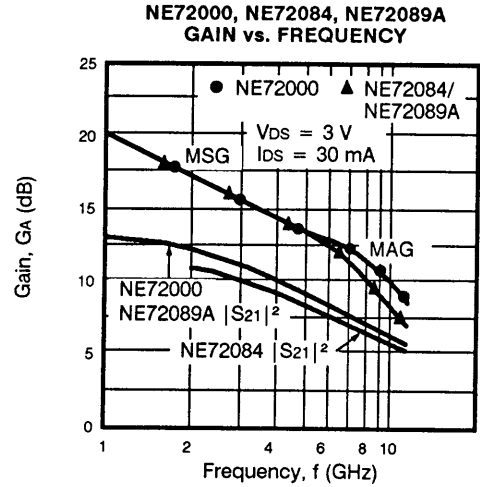
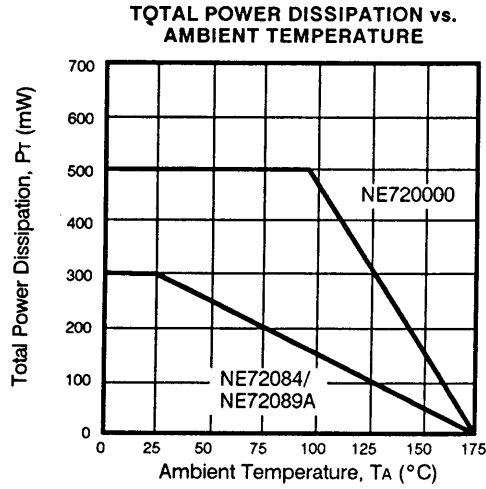
PERFORMANCE SPECIFICATIONS (TA = 25°C)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE			NE72000 00 (CHIP)			NE72084 2SK571 84			NE72089A 2SK354A 89A		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
f _{MAX}	Maximum Frequency of Oscillation at V _{DS} = 3 V, I _{DS} = 30 mA	GHz		60			60			60	
MAG	Maximum Available Gain ² at V _{DS} = 3 V, I _{DS} = 30 mA (Typ. I _{DS} = 50% I _{DSS}) f = 2 GHz f = 4 GHz f = 8 GHz f = 12 GHz	dB dB dB dB		16.5 11.5			17.5 15.0 12.0 8.0			16.0 11.0	
N _{FOPT}	Optimum Noise Figure ³ at V _{DS} = 3 V, I _{DS} = 10 mA (Typ. I _{DS} = 15% I _{DSS}) f = 2 GHz f = 4 GHz f = 8 GHz	dB dB dB		1.0 1.7	1.4 ⁴		0.6 0.8 2.0	1.4		1.0 1.7	1.4
GA	Associated Gain at NF at V _{DS} = 3 V, I _{DS} = 10 mA (Typ. I _{DS} = 15% I _{DSS}) f = 2 GHz f = 4 GHz f = 8 GHz	dB dB dB		11.0 9.0			15.0 12.0 8.5			11.0 8.5	
P _{1dB}	Output Power at 1 dB Compression Point at V _{DS} = 4 V, I _{DS} = 30 mA (Typ. I _{DS} = 50% I _{DSS}) f = 4 GHz	dBm		15.0			15.0			15.0	

Notes:

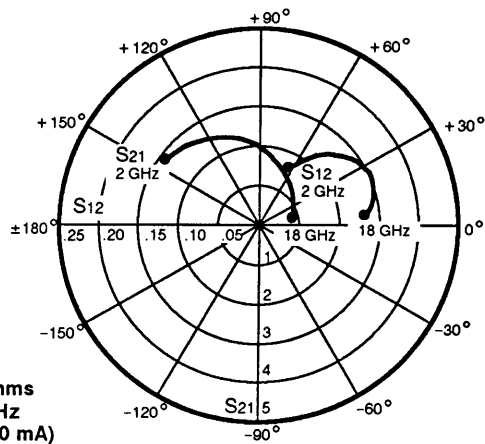
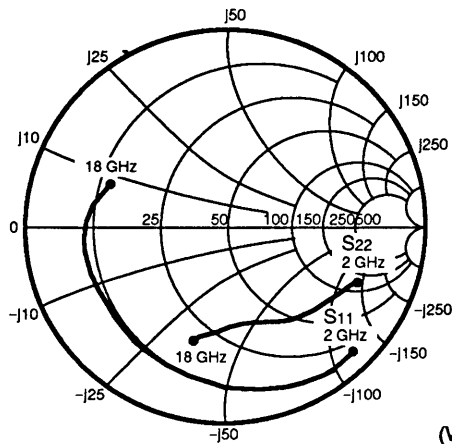
- Electronic Industrial Association of Japan.
- Gain Calculations: $MAG = \frac{|S_{21}|}{|S_{12}|} (K \pm \sqrt{K^2 - 1})$, $K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2|S_{12}| |S_{21}|}$, $\Delta = S_{11} S_{22} - S_{21} S_{12}$
- Typical values of noise figures are those obtained when 50% 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.
- RF performance is determined by packaging and testing 10 samples per wafer; wafer rejection criteria for standard devices is 2 rejects for 10 samples.

TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



NE720 SERIES

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



NE72000
Coordinates in Ohms
Frequency in GHz
(V_{DS} = 3 V, I_{DS} = 10 mA)

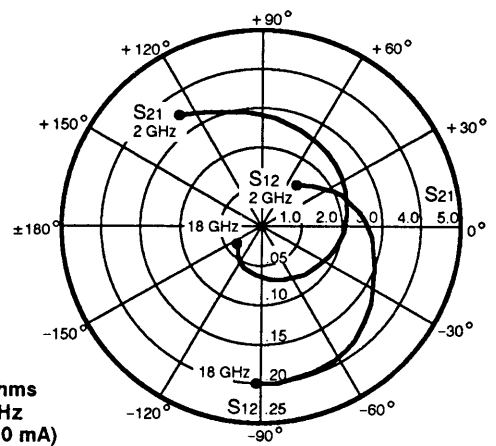
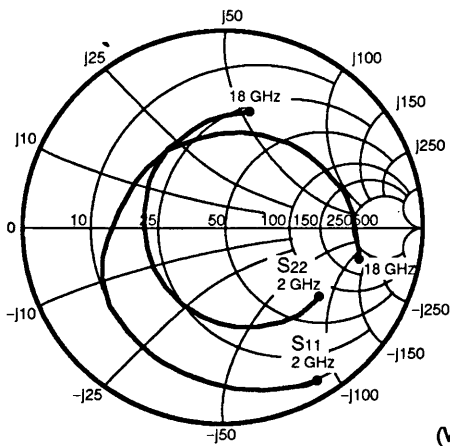
S-MAGN AND ANGLES:
V_{DS} = 3 V, I_{DS} = 10 mA

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
2000	.91	-44	2.95	144	.08	64	.71	-22
3000	.90	-63	2.81	132	.11	53	.68	-27
4000	.83	-81	2.47	113	.12	44	.62	-35
5000	.78	-96	2.27	105	.14	36	.58	-43
6000	.75	-108	2.08	97	.15	32	.56	-52
7000	.70	-119	1.83	87	.15	26	.55	-58
8000	.67	-130	1.65	79	.15	19	.55	-63
9000	.66	-140	1.49	72	.15	18	.56	-65
10000	.64	-152	1.37	64	.15	15	.56	-67
11000	.64	-158	1.24	59	.14	14	.54	-66
12000	.67	-165	1.18	54	.14	13	.54	-67
13000	.69	-168	1.11	49	.14	11	.51	-74
14000	.69	-175	1.11	44	.14	12	.54	-80
15000	.65	-178	.98	38	.13	9	.55	-86
16000	.66	174	1.02	33	.14	9	.53	-90
17000	.63	164	.96	26	.13	8	.56	-95
18000	.64	160	.86	21	.13	9	.50	-97

V_{DS} = 3 V, I_{DS} = 30 mA

2000	.90	-49	3.61	143	.07	62	.65	-24
3000	.89	-70	3.39	130	.10	52	.61	-28
4000	.83	-88	2.91	117	.11	44	.55	-36
5000	.78	-103	2.63	104	.12	36	.51	-44
6000	.75	-116	2.37	97	.13	33	.49	-53
7000	.70	-126	2.08	87	.13	27	.49	-59
8000	.68	-137	1.87	79	.13	22	.49	-64
9000	.67	-148	1.67	73	.13	21	.51	-67
10000	.65	-158	1.53	65	.12	19	.51	-68
11000	.65	-164	1.37	60	.12	18	.49	-67
12000	.70	-171	1.32	55	.12	18	.47	-68
13000	.72	-174	1.23	51	.12	17	.47	-75
14000	.74	-180	1.22	46	.13	20	.49	-81
15000	.67	177	1.09	40	.12	17	.50	-87
16000	.69	169	1.12	36	.12	18	.50	-90
17000	.66	158	1.05	28	.13	18	.52	-96
18000	.67	156	.94	24	.12	20	.56	-98

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



NE72084
Coordinates in Ohms
Frequency in GHz
(V_{ds} = 3 V, I_{ds} = 30 mA)

S-MAGN AND ANGLES:

V_{DS} = 3 V, I_{DS} = 10 mA

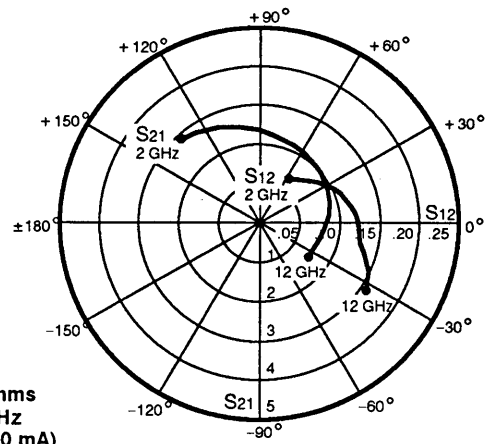
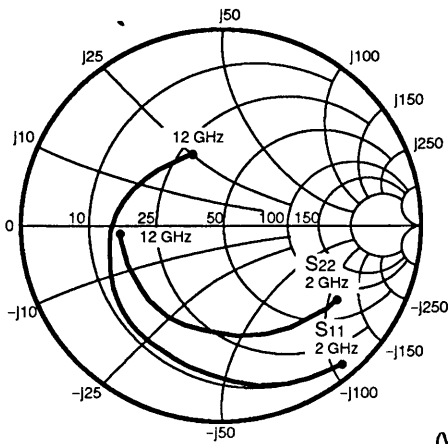
FREQUENCY (MHz)

	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
2000	.92	-54	2.91	130	.08	53	.69	-37
4000	.79	-102	2.47	85	.13	23	.61	-70
6000	.68	-141	2.19	49	.15	0	.54	-100
8000	.53	-177	1.82	15	.15	-16	.47	-126
10000	.47	136	1.68	-17	.16	-30	.43	-159
12000	.48	89	1.45	-51	.16	-45	.45	164
14000	.52	49	1.22	-82	.17	-62	.49	131
16000	.61	14	1.03	-115	.18	-82	.58	98
18000	.66	-5	.81	-138	.18	-98	.64	77

V_{DS} = 3 V, I_{DS} = 30 mA

2000	.91	-59	3.53	127	.07	54	.60	-37
4000	.76	-110	2.87	83	.10	26	.52	-69
6000	.65	-151	2.45	46	.12	8	.46	-97
8000	.52	171	2.02	14	.13	-4	.42	-122
10000	.49	124	1.82	-18	.15	-16	.38	-155
12000	.52	79	1.55	-50	.17	-31	.41	166
14000	.57	41	1.30	-82	.19	-51	.46	132
16000	.65	9	1.08	-114	.20	-74	.56	98
18000	.70	-10	.86	-136	.20	-91	.62	77

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



NE72089A
Coordinates in Ohms
Frequency in GHz
(V_{ds} = 3 V, I_{ds} = 10 mA)

S-MAGN AND ANGLES:

V_{DS} = 3 V, I_{DS} = 10 mA

FREQUENCY (MHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
2000	.92	-52	2.94	130	.07	54	.68	-35
3000	.84	-75	2.62	108	.09	38	.63	-51
4000	.76	-95	2.34	90	.11	26	.59	-66
5000	.71	-113	2.18	72	.12	16	.58	-79
6000	.65	-131	2.02	56	.13	7	.56	-93
7000	.59	-146	1.86	41	.13	-1	.54	-105
8000	.55	-160	1.76	26	.13	-7	.54	-116
9000	.49	-177	1.68	13	.13	-12	.53	-129
10000	.44	165	1.66	-1	.14	-17	.53	-139
11000	.39	140	1.63	-19	.15	-26	.52	-154
12000	.37	112	1.55	-34	.16	-33	.51	-170

V_{DS} = 3 V, I_{DS} = 30 mA

2000	.89	-58	3.76	127	.06	55	.60	-35
3000	.79	-82	3.27	105	.08	40	.56	-50
4000	.72	-103	2.88	86	.09	31	.53	-64
5000	.66	-121	2.61	69	.10	22	.51	-75
6000	.60	-139	2.38	54	.11	16	.50	-86
7000	.55	-155	2.18	38	.11	10	.50	-97
8000	.50	-170	2.04	24	.12	6	.50	-108
9000	.44	172	1.93	11	.12	2	.49	-118
10000	.40	152	1.89	-3	.14	-2	.50	-126
11000	.36	126	1.83	-20	.15	-11	.49	-138
12000	.35	99	1.72	-36	.16	-18	.48	-151

NE72084 TYPICAL NOISE PARAMETERS

FREQ. (GHz)	NF _{OPT} (dB)	G _A (dB)	Γ _{OPT}		R _n /50
			(MAG)	(ANG)	
1.0	0.55	17.5	0.90	15	0.52
2.0	0.60	14.5	0.81	38	0.49
4.0	1.00	11.5	0.74	59	0.39
6.0	1.30	9.5	0.66	102	0.30
8.0	1.70	8.5	0.49	130	0.24
10.0	2.15	7.5	0.32	172	0.18
12.0	2.50	6.5	0.26	-115	0.16
14.0	2.95	5.5	0.30	-54	0.13
16.0	3.30	4.7	0.26	-4	0.11
18.0	3.70	4.0	0.26	13	0.09

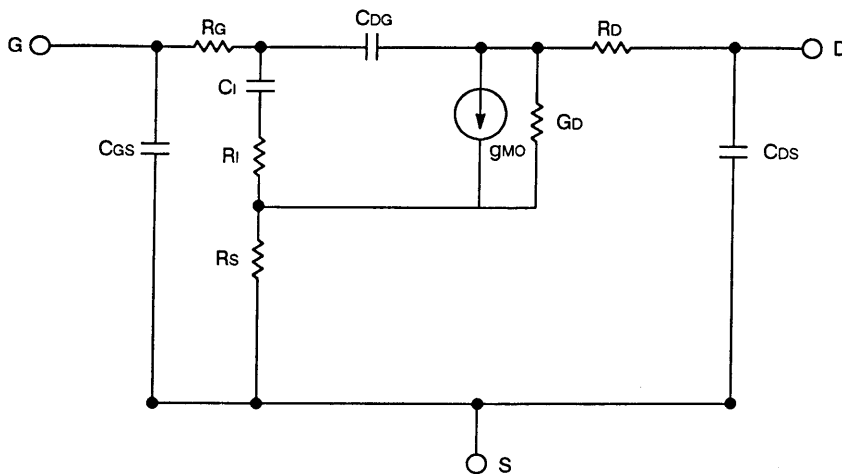
(V_{DS} = 3 V, I_{DS} = 10 mA)

NE72089A TYPICAL NOISE PARAMETERS

FREQ. (GHz)	NF _{OPT} (dB)	G _A (dB)	Γ _{OPT}		R _n /50
			(MAG)	(ANG)	
1.0	0.60	17.5	0.76	13	0.68
2.0	0.75	14.5	0.73	36	0.58
4.0	1.00	11.5	0.65	68	0.42
6.0	1.30	9.0	0.53	100	0.28
8.0	1.70	8.5	0.42	138	0.19
10.0	2.05	7.0	0.31	175	0.15
12.0	2.50	6.5	0.25	-117	0.25

(V_{DS} = 3 V, I_{DS} = 10 mA)

NE72000 EQUIVALENT CIRCUIT



COMPONENT	VALUE
R _g	0.57 Ω
C _i	0.15 pF
R _i	2.00 Ω
R _s	2.00 Ω
C _{dG}	0.03 pF
R _d	2.00 Ω
C _{ds}	0.015 pF
g _{mo}	40.0 (mS)
G _d	2.0 (mS)
C _{gs}	0.55 pF

FEATURES

- **LOW NOISE FIGURE**
NF = 1.6 dB TYP at f = 12 GHz
- **HIGH ASSOCIATED GAIN**
GA = 9 dB TYP at f = 12 GHz
- **GATE LENGTH:** L_g = 0.3 μm
- **GATE WIDTH:** W_g = 280 μm
- **ION IMPLANTATION**
- **AVAILABILITY:** Chip, Hermetic Package, Low Cost Package

DESCRIPTION AND APPLICATIONS

The NE76000 provides a low noise figure and high associated gain thru K-Band. The NE760 devices are fabricated by ion implantation for improved RF and DC performance, reliability, and uniformity. These devices feature a recessed 0.3 micron gate and triple epitaxial technology.

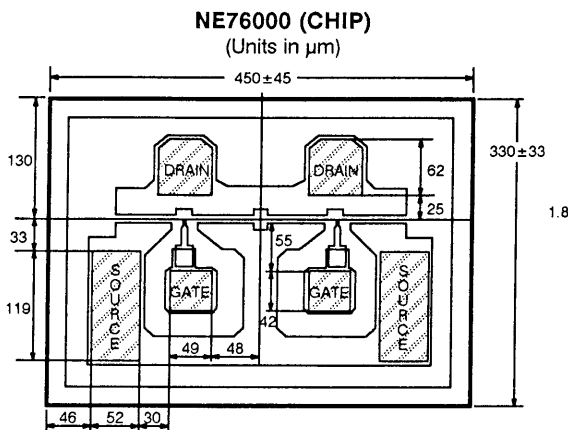
The surface of the device, except for bonding pads, is passivated with SiO₂ and SiN₄ for scratch protection as well as surface stability.

The device is available in chip form (NE76000) and packages. The NE76083A for industrial and military and the NE76084 for low cost consumer applications.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

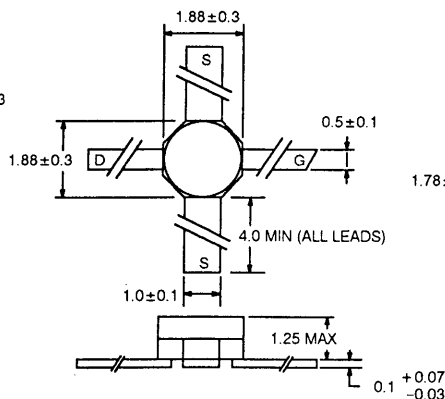
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{DS}	Drain to Source Voltage	V	5
V _{GDO}	Gate to Drain Voltage	V	-5
V _{GSO}	Gate to Source Voltage	V	-3
I _{DS}	Drain Current	mA	50
P _{IN}	RF Input (CW)	dBm	+ 15
T _{CH}	Channel Temperature	°C	175
T _{STG}	Storage Temperature	°C	-65 to + 175

OUTLINE DIMENSIONS (Units in mm)

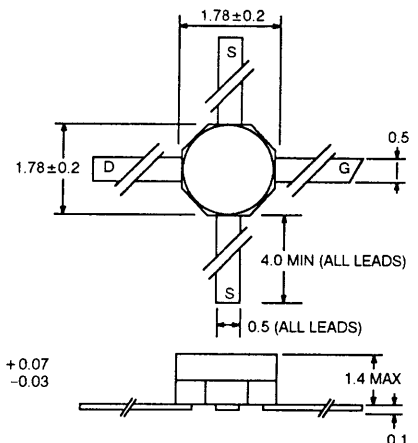


Bonding Pad Area Chip Thickness: 140 μm ± 20 μm

OUTLINE 83A



OUTLINE 84



ELECTRICAL SPECIFICATIONS (T_A = 25°C)

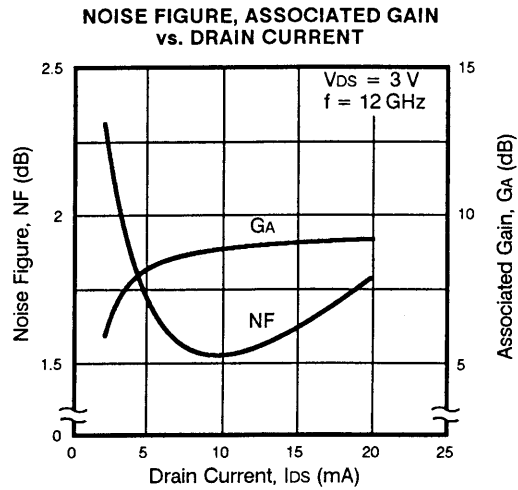
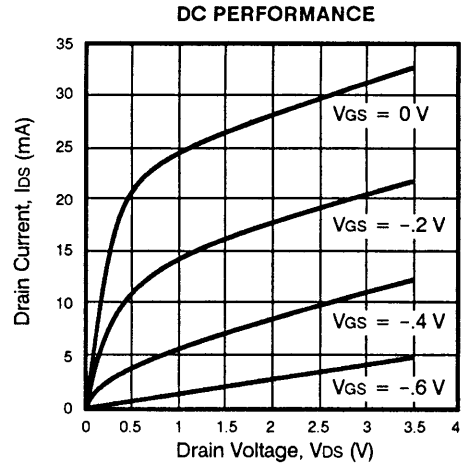
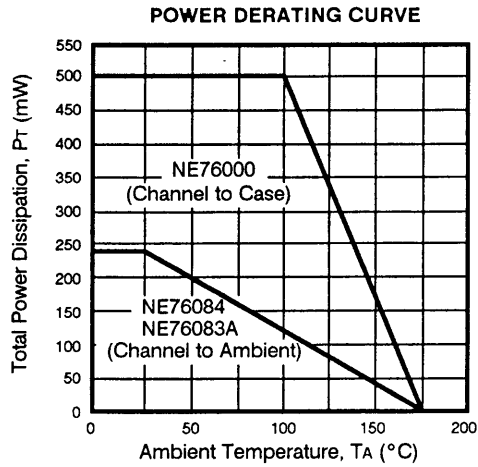
PART NUMBER PACKAGE OUTLINE			NE76000 CHIP			NE76083A 83A			NE76084 ⁵ 84			NE76084-2.4 ⁵ 84		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX
f _{MAX}	Maximum Frequency of Oscillation at V _{DS} = 3 V, I _{DS} = 30 mA	GHz		90			90			90			90	
MAG	Maximum Available Gain ¹ at V _{DS} = 3 V, I _{DS} = 20 mA, f = 4 GHz f = 12 GHz	dB dB		17 12			17 12							
NFOPT	Optimum Noise Figure ² at V _{DS} = 3 V, I _{DS} = 10 mA, f = 4 GHz f = 12 GHz	dB dB		0.6 1.6	1.8 ⁴		0.6 1.6	0.7 1.8			1.6 1.8			1.8 2.4
GA	Associated Gain V _{DS} = 3 V, I _{DS} = 10 mA, f = 4 GHz f = 12 GHz	dB dB		13.0 ⁴ 9		11.5 8	13.0 9				8 9			8 9
P _{1dB}	Output Power at 1 dB Compression V _{DS} = 3 V, I _{DS} = 10 mA, f = 12 GHz	dBm		14.5			14.5				14.5			14.5
I _{DS}	Drain Current at V _{DS} = 3 V, V _{GS} = 0	mA	15	30	50	15	30	50	15	30	50	15	30	50
V _P	Pinch-off Voltage at V _{DS} = 3 V, I _{DS} = 0.1 mA	V	-3	-0.8	-0.5	-3	-0.8	-0.5	-3	-0.8	-0.5	-3	-0.8	-0.5
g _m	Transconductance V _{DS} = 3 V, I _{DS} = 10 mA	mS	30	40	70	30	40	70	30	40	70	30	40	70
I _{GSO}	Gate to Source Leakage Current V _{GS} = -4 V	μA		1	10		1	10		1	10		1	10
R _{TH}	Thermal Resistance (Channel to Ambient)	°C/W			190 ³			625			625			625
P _T	Total Power Dissipation	mW			500			240			240			240

- Notes:**
- Gain Calculations: $MAG = \frac{|S_{21}|}{|S_{12}|} (K \pm \sqrt{K^2 - 1})$, $K = \frac{1 + |\Delta|^2 - |S_{11}|^2 - |S_{22}|^2}{2|S_{12}||S_{21}|}$, $\Delta = S_{11}S_{22} - S_{21}S_{12}$. When $K \leq 1$, $MAG = MSG$.
 MAG = Maximum Available Gain
 MSG = Maximum Stable Gain
 - Typical values of noise figures 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 test with the fixture tuned for the "generic" type but not for each specimen.
 - R_{TH} for chip mounted on a copper heatsink.
 - RF performance is determined by packaging and testing 10 samples per wafer; wafer rejection criteria for standard devices is 2 rejects for 10 samples.
 - Package type 84 recommended for use below 13 GHz. Refer to NE76083A for use above 13 GHz.



NE760 SERIES

TYPICAL PERFORMANCE CHARACTERISTICS (T_A = 25°C)



NE76000 TYPICAL NOISE PARAMETERS¹

FREQ. (GHz)	NF _{OPT} (dB)	G _A (dB)	Γ _{OPT}		Rn/50
			(MAG)	(ANG)	
1	0.50	20	.84	12	.69
2	0.55	17	.76	25	.63
4	0.60	14.0	.70	45	.49
6	0.80	12	.64	65	.41
8	1.00	11	.60	83	.36
10	1.30	10	.56	99	.32
12	1.60	9	.52	114	.27
14	1.90	8.5	.49	125	.23
16	2.20	7.9	.48	135	.20
18	2.50	7.3	.47	145	.18

Γ_{opt} includes bond wires.
 Bond wires used during testing.
 Gate: 2 wires total, 1 per bond pad, 0.0139" long each wire.
 Drain: 2 wires total, 1 per bond pad, 0.0115" long each wire.
 Sources: 4 wires total, 2 per side, 0.0066" long each wire.
 Wire: 0.0007" diameter, gold.

NE76083A TYPICAL NOISE PARAMETERS¹

(V_{DS} = 3 V, I_{DS} = 10 mA)

FREQ. (GHz)	NF _{OPT} (dB)	G _A (dB)	Γ _{OPT}		Rn/50
			(MAG)	(ANG)	
1	0.50	20	.92	16	.69
2	0.55	17	.86	35	.64
4	0.60	14	.73	73	.55
6	0.80	12	.62	109	.47
8	1.00	11	.55	138	.39
10	1.30	10	.48	168	.27
12	1.60	9	.46	-161	.24
14	1.90	8.4	.42	-133	.22
16	2.30	7.8	.40	-105	.19
18	2.60	7.2	.38	-69	.17

NE76084 TYPICAL NOISE PARAMETERS¹

(V_{DS} = 3 V, I_{DS} = 10 mA)

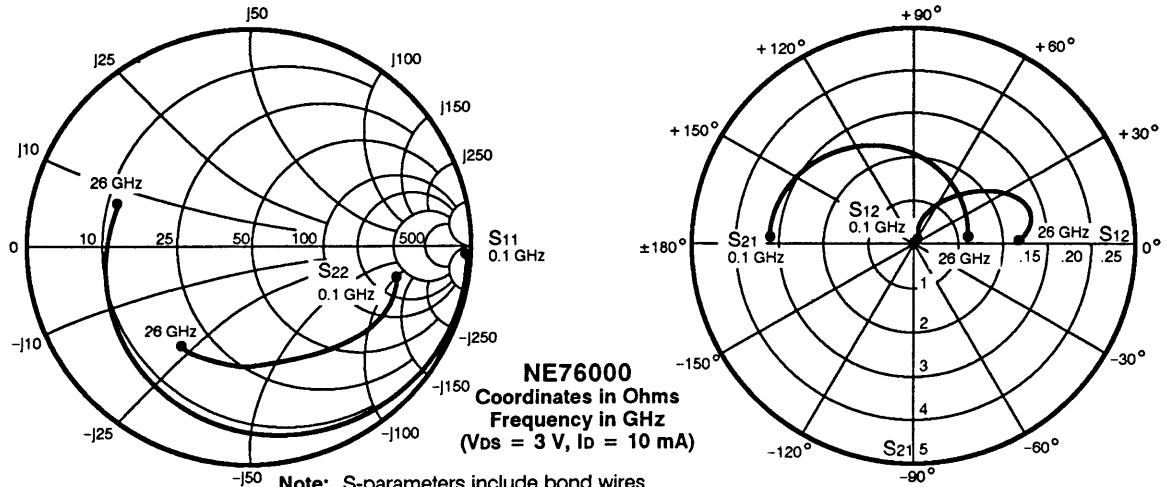
FREQ. (GHz)	NF _{OPT} (dB)	G _A (dB)	Γ _{OPT}		Rn/50
			(MAG)	(ANG)	
1	0.50	20	.93	11	.58
2	0.55	17	.88	31	.51
4	0.60	14	.72	69	.46
6	0.80	12	.60	107	.37
8	1.00	11	.52	148	.32
10	1.30	10	.46	-175	.26
12	1.60	9	.45	-138	.21

Notes:

1. Typical values of noise figures 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 test with the fixture tuned for the "generic" type but not for each specimen.



TYPICAL COMMON SOURCE SCATTERING PARAMETERS



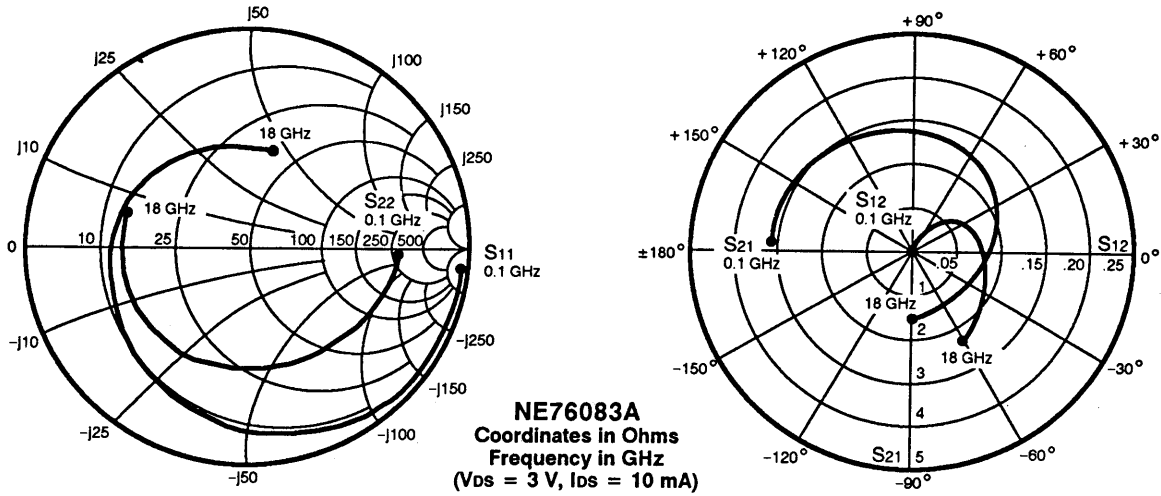
Note: S-parameters include bond wires.

- Gate: Total 2 wire (s), 1 per bond pad, 0.0139" (354 μm) long each wire.
- Drain: Total 2 wire (s), 1 per bond pad, 0.0115" (291 μm) long each wire.
- Source: Total 4 wire (s), 2 per side, 0.0066" (168 μm) long each wire.
- Wire: 0.0007" (17.8 μm) Diameter, Gold.

S-MAGN AND ANGLES:
VDS = 3 V, ID = 10 mA
FREQUENCY (GHz)

FREQUENCY (GHz)	S11	S21	S12	S22	k ¹	MAG ¹
0.05	0.99 -1	3.32 180	0.001 89	0.68 -1	0.15	35.2
0.10	0.99 -2	3.30 179	0.002 87	0.68 -1	0.10	32.2
0.20	0.99 -3	3.29 178	0.004 86	0.68 -2	0.10	29.2
0.50	0.99 -7	3.28 175	0.009 85	0.68 -3	0.05	25.6
1.0	0.99 -14	3.27 169	0.02 81	0.67 -8	.05	21.9
2.0	0.99 -27	3.19 158	0.04 74	0.67 -16	.08	19.1
3.0	0.97 -39	3.08 148	0.06 66	0.66 -23	.13	17.3
4.0	0.95 -50	2.95 138	0.07 59	0.64 -30	.18	16.1
5.0	0.92 -61	2.81 129	0.09 51	0.62 -36	.24	15.2
6.0	0.89 -70	2.67 120	0.09 47	0.60 -42	.30	14.5
7.0	0.87 -78	2.55 113	0.10 41	0.59 -47	.34	13.9
8.0	0.86 -87	2.45 104	0.11 36	0.58 -53	.38	13.5
9.0	0.83 -96	2.33 97	0.11 30	0.57 -58	.45	13.1
10.0	0.81 -104	2.24 90	0.12 29	0.57 -63	.45	12.7
11.0	0.80 -112	2.16 83	0.13 23	0.56 -68	.48	12.3
12.0	0.77 -120	2.08 76	0.13 19	0.56 -73	.52	12.0
13.0	0.75 -128	2.00 70	0.13 16	0.55 -77	.56	11.9
14.0	0.74 -135	1.93 63	0.13 12	0.55 -81	.59	11.6
15.0	0.73 -141	1.85 58	0.13 9	0.55 -85	.62	11.4
16.0	0.72 -147	1.80 53	0.13 6	0.55 -88	.65	11.3
17.0	0.71 -152	1.73 47	0.13 5	0.55 -91	.72	11.3
18.0	0.70 -155	1.65 43	0.13 3	0.55 -94	.80	11.0
19.0	0.69 -159	1.57 38	0.12 2	0.55 -96	.97	11.1
20.0	0.68 -162	1.53 35	0.12 4	0.55 -99	.99	11.0
21.0	0.67 -166	1.49 30	0.12 5	0.55 -102	1.02	10.0
22.0	0.67 -171	1.46 26	0.12 4	0.55 -107	1.09	9.3
23.0	0.65 -176	1.41 21	0.12 5	0.55 -111	1.13	8.7
24.0	0.64 178	1.39 16	0.12 5	0.55 -116	1.08	8.9
25.0	0.63 171	1.32 11	0.12 5	0.55 -120	1.17	7.9
26.0	0.62 164	1.29 7	0.12 4	0.55 -123	1.18	7.6

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



S-MAGN AND ANGLES:

V_{DS} = 3 V, I_{DS} = 10 mA

FREQUENCY (GHz)

FREQUENCY (GHz)	S ₁₁	S ₂₁	S ₁₂	S ₂₂	k ¹	MAG ¹
0.1	0.99 -2	3.22 178	0.001 87	0.65 -1	0.20	35.1
0.2	0.99 -4	3.20 177	0.002 85	0.65 -3	0.12	32.0
0.5	0.99 -11	3.18 170	0.007 80	0.65 -8	0.05	26.6
1.0	0.99 -20	3.15 160	0.02 78	0.65 -15	0.10	22.7
2.0	0.97 -40	3.05 142	0.04 62	0.64 -29	0.17	18.8
3.0	0.93 -59	2.95 123	0.05 48	0.62 -43	0.32	17.7
4.0	0.89 -78	2.80 106	0.07 37	0.61 -56	0.36	16.02
5.0	0.84 -96	2.65 89	0.07 25	0.59 -69	0.53	15.8
6.0	0.80 -114	2.48 73	0.08 14	0.57 -81	0.62	14.9
7.0	0.76 -130	2.30 58	0.08 4	0.56 -93	0.83	14.6
8.0	0.74 -145	2.15 44	0.08 -2	0.56 -103	0.85	14.3
9.0	0.72 -158	2.03 31	0.08 -9	0.56 -112	0.95	14.0
10.0	0.68 -172	1.94 17	0.08 -16	0.56 -121	1.11	11.8
11.0	0.66 -173	1.85 4	0.09 -21	0.56 -130	1.06	11.6
12.0	0.64 158	1.77 -10	0.09 -27	0.55 -140	1.05	11.5
13.0	0.64 145	1.71 -23	0.09 -32	0.55 -150	1.19	10.1
14.0	0.63 132	1.65 -35	0.09 -34	0.55 -159	1.23	9.7
15.0	0.60 120	1.61 -48	0.10 -42	0.56 -168	1.19	9.4
16.0	0.56 104	1.58 -63	0.11 -50	0.56 -177	1.20	8.8
17.0	0.54 86	1.56 -77	0.11 -59	0.54 173	1.31	8.2
18.0	0.55 70	1.54 -91	0.12 -67	0.53 164	1.20	8.3

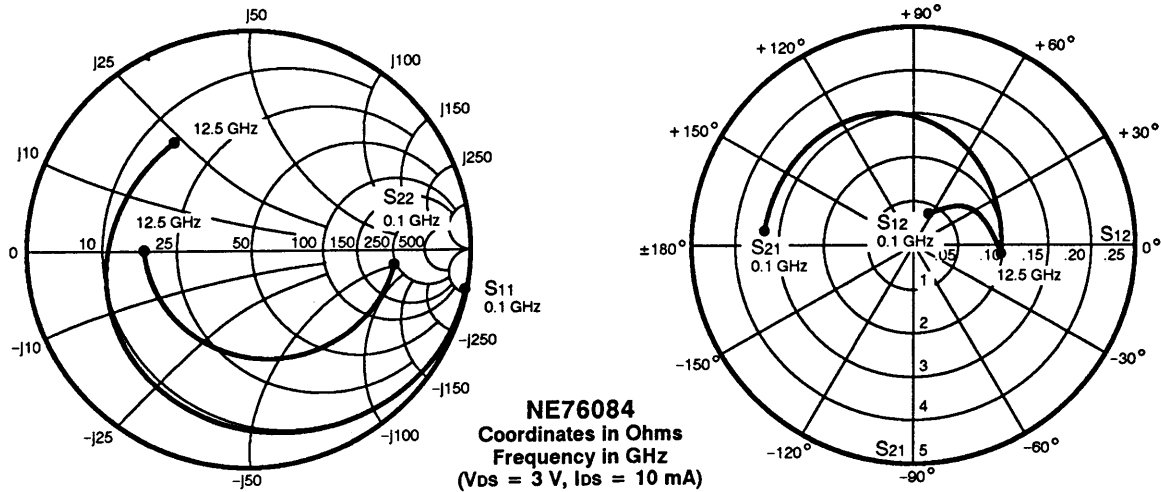
V_{DS} = 3 V, I_{DS} = 30 mA

0.1	0.99 -2	4.45 178	0.001 90	0.59 -1	0.14	36.4
0.2	0.99 -5	4.41 176	0.002 88	0.59 -3	0.06	33.4
0.5	0.99 -13	4.38 169	0.004 86	0.59 -7	0.32	30.4
1.0	0.99 -22	4.35 159	0.02 79	0.59 -15	0.07	23.4
2.0	0.95 -43	4.17 140	0.03 64	0.58 -29	0.26	21.4
3.0	0.90 -64	3.93 121	0.04 50	0.56 -42	0.43	19.9
4.0	0.85 -83	3.68 103	0.05 41	0.55 -55	0.52	18.7
5.0	0.79 -102	3.42 86	0.06 29	0.53 -67	0.66	17.6
6.0	0.74 -120	3.15 70	0.07 22	0.52 -79	0.72	16.5
7.0	0.71 -136	2.90 55	0.07 13	0.51 -90	0.86	16.2
8.0	0.68 -151	2.68 42	0.07 9	0.51 -100	0.97	15.8
9.0	0.65 -164	2.51 28	0.07 3	0.52 -109	1.09	13.6
10.0	0.62 -177	2.38 15	0.08 -1	0.52 -118	1.07	13.1
11.0	0.59 168	2.26 2	0.08 -6	0.52 -126	1.19	11.9
12.0	0.57 153	2.14 -11	0.09 -12	0.52 -135	1.15	11.4
13.0	0.57 140	2.06 -24	0.09 -18	0.52 -145	1.18	11.0
14.0	0.56 128	1.98 -37	0.10 -21	0.52 -154	1.12	10.9
15.0	0.53 115	1.93 -50	0.10 -30	0.54 -163	1.17	10.3
16.0	0.49 100	1.87 -64	0.11 -40	0.54 -172	1.19	9.7
17.0	0.48 82	1.84 -78	0.12 -49	0.54 179	1.12	9.8
18.0	0.49 67	1.81 -92	0.13 -60	0.52 170	1.10	9.6



NE760 SERIES

TYPICAL COMMON SOURCE SCATTERING PARAMETERS



S-MAGN AND ANGLES:

V_{DS} = 3 V, I_{DS} = 10 mA

FREQUENCY (GHz)	S ₁₁	S ₂₁	S ₁₂	S ₂₂	k ¹	MAG ¹
0.1	0.99 -2	3.42 177	0.001 88	0.66 -2	0.18	35.3
0.2	0.99 -4	3.40 176	0.002 86	0.66 -3	0.18	32.3
0.5	0.99 -11	3.38 170	0.007 84	0.66 -8	0.17	26.8
1.0	0.99 -20	3.36 160	0.02 76	0.65 -15	0.08	21.9
2.0	0.96 -41	3.31 141	0.04 64	0.63 -28	0.23	18.8
3.0	0.90 -62	3.12 121	0.06 49	0.60 -42	0.39	17.2
4.0	0.85 -81	2.92 103	0.07 37	0.58 -55	0.51	16.0
5.0	0.79 -101	2.78 87	0.08 29	0.54 -69	0.59	15.2
6.0	0.73 -120	2.54 69	0.09 18	0.51 -82	0.77	14.7
7.0	0.69 -139	2.46 53	0.09 10	0.49 -97	0.80	14.2
8.0	0.66 -157	2.27 39	0.09 5	0.47 -110	0.95	13.9
9.0	0.64 -174	2.14 26	0.10 -1	0.47 -124	0.97	13.4
10.0	0.62 167	1.97 10	0.10 -7	0.46 -139	1.11	11.1
11.0	0.60 150	1.85 4	0.11 -4	0.46 -156	1.09	10.5
12.0	0.61 133	1.71 -13	0.10 -13	0.47 -171	1.22	9.4
12.5	0.60 125	1.73 -19	0.11 -17	0.46 -180	1.15	9.6

V_{DS} = 3 V, I_{DS} = 30 mA

0.1	0.99 -3	4.91 177	0.001 88	0.59 -2	0.17	37.6
0.2	0.99 -5	4.87 176	0.001 86	0.58 -3	0.11	35.7
0.5	0.99 -13	4.81 169	0.00 84	0.58 -7	0.37	31.3
1.0	0.98 -24	4.77 159	0.02 76	0.58 -15	0.14	24.5
2.0	0.93 -48	4.65 137	0.04 64	0.55 -27	0.34	21.2
3.0	0.86 -71	4.28 117	0.05 52	0.52 -40	0.51	19.5
4.0	0.78 -92	3.89 98	0.06 42	0.49 -51	0.69	18.3
5.0	0.72 -114	3.60 82	0.07 34	0.46 -64	0.78	17.3
6.0	0.66 -133	3.20 64	0.07 27	0.44 -76	0.99	16.6
7.0	0.63 -154	3.02 49	0.08 19	0.42 -89	1.01	15.2
8.0	0.60 -171	2.73 35	0.08 17	0.41 -101	1.15	13.0
9.0	0.58 171	2.55 22	0.09 12	0.41 -115	1.14	12.4
10.0	0.57 153	2.32 7	0.09 6	0.40 -129	1.21	11.3
11.0	0.56 136	2.16 2	0.11 6	0.40 -147	1.15	10.7
12.0	0.57 121	1.97 -15	0.11 -3	0.41 -163	1.22	9.8
12.5	0.56 114	1.98 -19	0.12 -8	0.41 -172	1.16	9.9