

L to S BAND LOW NOISE AMPLIFIER N-CHANNEL HJ-FET

FEATURES

- Super Low Noise Figure & High Associated Gain
NF = 0.6 dB TYP. $G_a = 17.5$ dB TYP. $OIP_3 = 20$ dBm TYP. @f = 2 GHz
- 4-pin super minimold package
- $W_g = 400 \mu\text{m}$

ORDERING INFORMATION (PLAN)

Part Number	Package	Supplying Form
NE34118-T1	4-pin super minimold	Embossed tape 8 mm wide. Pin 3 (Source), Pin 4 (Drain) face to perforation side of the tape. Qty 3 kp/reel.
NE34118-T2		Embossed tape 8 mm wide. Pin 1 (Source), Pin 2 (Gate) face to perforation side of the tape. Qty 3 kp/reel.

Remark To order evaluation samples, please contact your local NEC sales office. (Part number for sample order: NE34118)

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	4.0	V
Gate to Source Voltage	V_{GS}	-3.0 to +0.4	V
Drain Current	I_D	40	mA
Gate Current	I_G	± 100	μA
Total Power Dissipation	P_{tot}	150	mW
Channel Temperature	T_{ch}	125	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +125	$^\circ\text{C}$

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

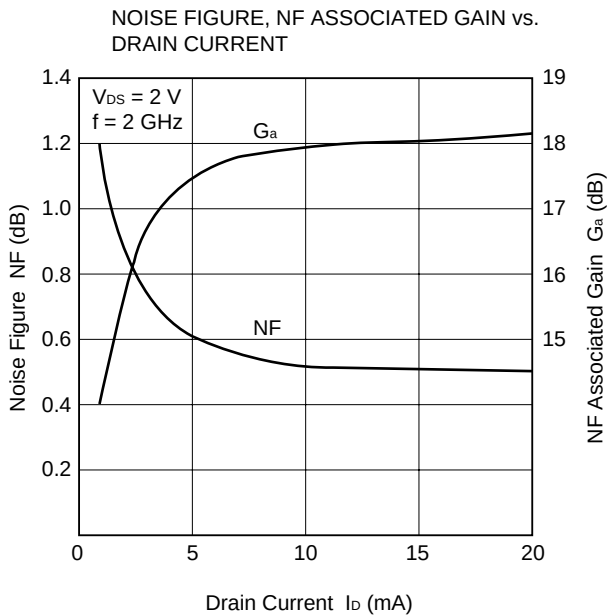
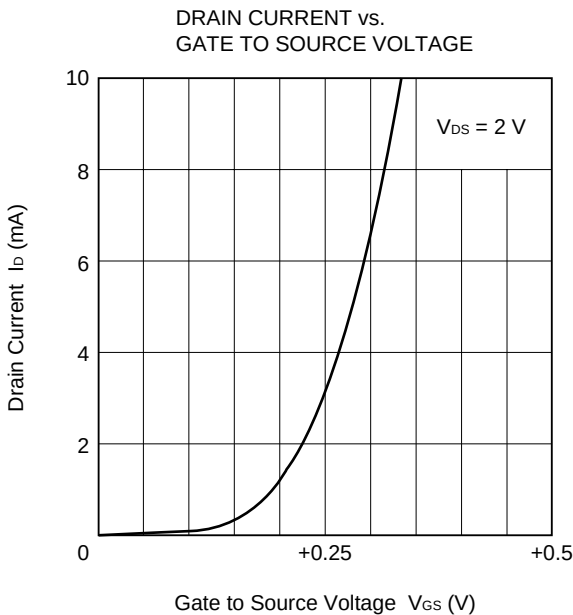
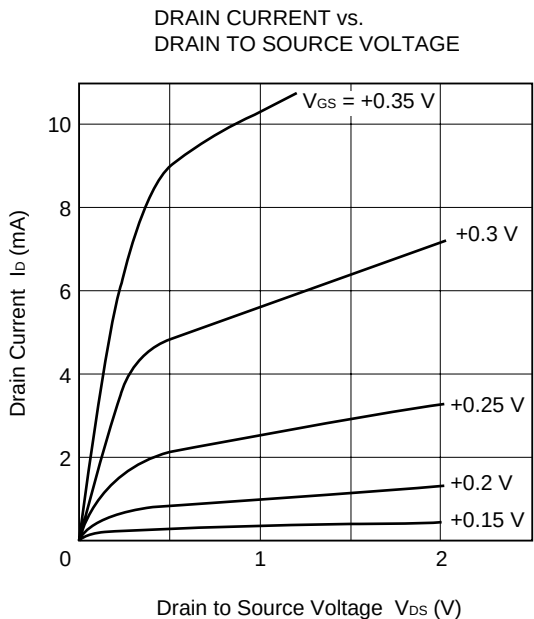
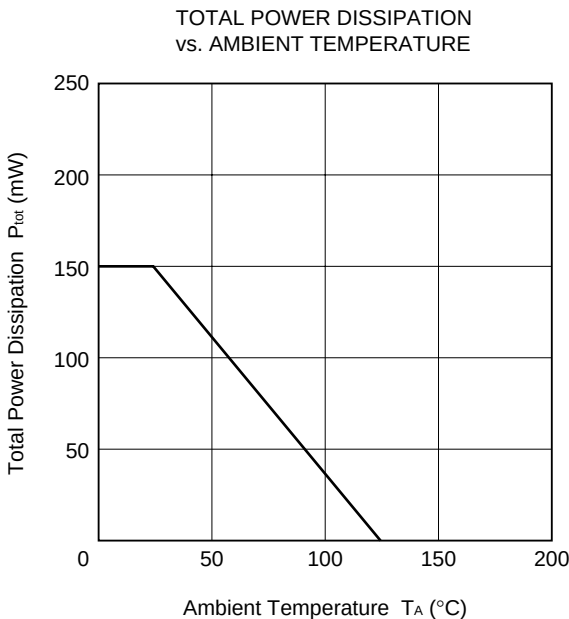
RECOMMENDED OPERATING CONDITIONS ($T_A = +25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}	–	2	3	V
Drain Current	I_D	–	5	15	mA
Input Power	P_{in}	–	–	0	dBm

ELECTRICAL CHARACTERISTICS ($T_A = +25\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSO}	$V_{GS} = -3\text{ V}$	–	0.5	10	μA
Gate to Source Cut off Voltage	$V_{GS(off)}$	$V_{DS} = 2\text{ V}, I_{DS} = 100\text{ }\mu\text{A}$	0	+0.1	+0.25	V
Transconductance	g_m	$V_{DS} = 2\text{ V}, I_{DS} = 5\text{ mA}$	50	70	–	mS
Noise Figure	NF	$V_{DS} = 2\text{ V}, I_{DS} = 5\text{ mA}$ $f = 2\text{ GHz}$	–	0.6	1.0	dB
NF Associated Gain	G_a		15	17.5	–	dB
Out Third-Order Distortion Intercept Point	OIP_3	$V_{DS} = 2\text{ V}, I_{DS} = 5\text{ mA}$ $f = 2\text{ GHz}$	–	20	–	dBm
Noise Figure	NF	$V_{DS} = 2\text{ V}, I_{DS} = 3\text{ mA}$ $f = 2\text{ GHz}$	–	0.75	1.1	dB
NF Associated Gain	G_a		15	17	–	dB
Out Third-Order Distortion Intercept Point	OIP_3	$V_{DS} = 2\text{ V}, I_{DS} = 3\text{ mA}$ $f = 2\text{ GHz}$	–	19	–	dBm

TYPICAL CHARACTERISTICS (T_A = +25 °C)



S-PARAMETERS**MAG. AND ANG.****V_{DS} = 2 V, I_D = 3 mA**

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
500.0000	0.983	-13.8	4.075	163.0	0.024	79.9	0.867	-9.4
600.0000	0.976	-16.8	4.146	159.8	0.029	75.9	0.861	-11.7
700.0000	0.970	-19.5	4.061	156.5	0.033	73.2	0.861	-13.5
800.0000	0.968	-22.3	4.095	153.2	0.038	70.8	0.853	-15.1
900.0000	0.965	-25.1	4.128	150.0	0.042	69.1	0.850	-17.0
1000.0000	0.957	-27.6	4.052	147.0	0.047	66.1	0.849	-18.5
1100.0000	0.936	-30.5	4.074	143.7	0.050	64.2	0.841	-20.2
1200.0000	0.944	-32.5	4.034	140.6	0.055	62.1	0.838	-22.0
1300.0000	0.936	-35.4	4.029	137.7	0.058	60.0	0.830	-23.4
1400.0000	0.932	-37.9	4.025	134.8	0.062	58.6	0.830	-24.9
1500.0000	0.924	-40.2	3.985	131.7	0.066	55.6	0.824	-26.7
1600.0000	0.916	-42.7	3.996	128.8	0.069	54.3	0.819	-28.0
1700.0000	0.908	-44.9	3.938	126.1	0.073	52.0	0.814	-29.4
1800.0000	0.902	-47.4	3.916	123.1	0.076	49.8	0.805	-30.7
1900.0000	0.891	-49.6	3.872	120.4	0.080	48.2	0.802	-32.2
2000.0000	0.833	-51.9	3.738	115.3	0.081	44.5	0.752	-32.9
2100.0000	0.818	-54.4	3.719	112.5	0.084	42.1	0.744	-34.3
2200.0000	0.810	-57.0	3.687	109.6	0.087	40.6	0.733	-36.1
2300.0000	0.793	-59.3	3.654	106.8	0.088	38.6	0.728	-36.9
2400.0000	0.778	-61.5	3.605	104.0	0.091	36.8	0.716	-38.2
2500.0000	0.771	-63.5	3.566	101.5	0.093	35.3	0.710	-39.3
2600.0000	0.754	-66.1	3.555	98.6	0.094	33.5	0.700	-40.5
2700.0000	0.742	-68.5	3.497	95.9	0.097	31.6	0.692	-41.9
2800.0000	0.726	-70.7	3.491	93.2	0.099	29.8	0.680	-42.8
2900.0000	0.713	-73.1	3.444	90.5	0.101	28.3	0.675	-44.2
3000.0000	0.699	-75.5	3.422	87.8	0.104	26.3	0.663	-45.4

AMPLIFIER PARAMETERS

FREQUENCY MHz	G _{Umax} dB	G _{Amax} dB	S ₂₁ ² dB	S ₁₂ ² dB	K	Delay ns	Mason's U dB	G ₁ dB	G ₂ dB
500.0000	32.97		12.20	-32.40	0.15	0.089	34.450	14.70	6.06
600.0000	31.55		12.35	-30.79	0.19	0.089	29.125	13.32	5.88
700.0000	30.27		12.17	-29.51	0.23	0.090	27.220	12.22	5.88
800.0000	29.91		12.24	-28.31	0.26	0.091	26.262	12.02	5.65
900.0000	29.48		12.31	-27.56	0.27	0.089	26.497	11.60	5.57
1000.0000	28.45		12.15	-26.51	0.31	0.083	24.490	10.75	5.55
1100.0000	26.58		12.20	-25.98	0.35	0.092	23.874	9.04	5.34
1200.0000	27.02		12.11	-25.23	0.36	0.086	23.575	9.65	5.25
1300.0000	26.24		12.10	-24.69	0.38	0.082	23.160	9.08	5.06
1400.0000	26.00		12.10	-24.11	0.39	0.080	23.183	8.84	5.07
1500.0000	25.31		12.01	-23.59	0.43	0.085	22.037	8.37	4.93
1600.0000	24.80		12.03	-23.18	0.44	0.082	22.082	7.95	4.82
1700.0000	24.17		11.90	-22.73	0.47	0.076	21.329	7.54	4.73
1800.0000	23.69		11.86	-22.36	0.50	0.083	20.864	7.30	4.54
1900.0000	23.10		11.76	-21.97	0.51	0.074	20.649	6.86	4.48
2000.0000	20.22		11.45	-21.84	0.64	0.140	18.642	5.15	3.61
2100.0000	19.70		11.41	-21.56	0.67	0.080	18.207	4.80	3.50
2200.0000	19.32		11.33	-21.26	0.67	0.079	18.204	4.64	3.35
2300.0000	18.83		11.26	-21.10	0.71	0.077	17.826	4.30	3.28
2400.0000	18.30		11.14	-20.85	0.73	0.078	17.530	4.04	3.12
2500.0000	18.02		11.04	-20.67	0.75	0.069	17.413	3.93	3.05
2600.0000	17.59		11.02	-20.51	0.77	0.081	17.226	3.65	2.92
2700.0000	17.17		10.87	-20.24	0.79	0.075	16.941	3.47	2.83
2800.0000	16.81		10.86	-20.07	0.81	0.076	16.722	3.25	2.70
2900.0000	16.47		10.74	-19.93	0.83	0.075	16.645	3.08	2.64
3000.0000	16.12		10.68	-19.66	0.85	0.074	16.360	2.92	2.51

S-PARAMETERS

MAG. AND ANG.

 $V_{DS} = 2\text{ V}$, $I_D = 5\text{ mA}$

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
500.0000	0.976	-16.2	5.849	160.9	0.023	77.1	0.808	-10.5
600.0000	0.967	-19.7	5.898	157.2	0.028	74.7	0.799	-12.9
700.0000	0.958	-22.8	5.795	153.6	0.032	73.0	0.797	-14.8
800.0000	0.951	-26.0	5.781	150.0	0.036	69.7	0.787	-16.7
900.0000	0.942	-29.1	5.782	146.5	0.040	68.2	0.782	-18.7
1000.0000	0.931	-32.1	5.665	143.1	0.043	66.4	0.778	-20.2
1100.0000	0.910	-35.4	5.656	139.5	0.047	62.4	0.770	-22.1
1200.0000	0.913	-37.8	5.584	136.1	0.051	61.4	0.766	-23.8
1300.0000	0.901	-40.9	5.524	132.9	0.055	59.3	0.756	-25.3
1400.0000	0.890	-43.7	5.477	129.7	0.058	57.6	0.751	-26.8
1500.0000	0.877	-46.2	5.398	126.4	0.061	54.5	0.745	-28.5
1600.0000	0.864	-48.8	5.369	123.2	0.064	53.2	0.738	-29.9
1700.0000	0.853	-51.5	5.278	120.3	0.068	51.8	0.732	-31.2
1800.0000	0.840	-53.9	5.203	117.1	0.070	49.4	0.721	-32.5
1900.0000	0.826	-56.6	5.125	114.2	0.073	48.2	0.718	-34.0
2000.0000	0.761	-58.7	4.911	109.4	0.074	44.5	0.665	-34.2
2100.0000	0.744	-61.4	4.848	106.4	0.077	43.3	0.658	-35.5
2200.0000	0.730	-64.1	4.786	103.3	0.079	41.3	0.646	-37.2
2300.0000	0.711	-66.4	4.712	100.5	0.080	39.8	0.639	-37.7
2400.0000	0.693	-68.9	4.630	97.6	0.083	38.1	0.627	-38.9
2500.0000	0.682	-70.8	4.560	95.1	0.086	36.4	0.622	-39.8
2600.0000	0.664	-73.5	4.508	92.1	0.087	35.0	0.612	-40.8
2700.0000	0.648	-76.0	4.425	89.4	0.088	34.1	0.601	-42.2
2800.0000	0.630	-78.1	4.380	86.7	0.091	32.6	0.592	-42.9
2900.0000	0.616	-80.8	4.306	83.9	0.093	30.6	0.586	-44.0
3000.0000	0.599	-83.2	4.246	81.3	0.094	29.5	0.575	-45.0

AMPLIFIER PARAMETERS

FREQUENCY MHz	G _{Umax} dB	G _{Amax} dB	S ₂₁ ² dB	S ₁₂ ² dB	K	Delay ns	Mason's U dB	G ₁ dB	G ₂ dB
500.0000	33.10		15.34	-32.63	0.20	0.103	31.146	13.17	4.59
600.0000	31.66		15.41	-31.11	0.23	0.103	30.437	11.82	4.42
700.0000	30.53		15.26	-29.78	0.25	0.099	30.091	10.88	4.39
800.0000	29.66		15.24	-28.93	0.29	0.101	28.223	10.23	4.20
900.0000	28.81		15.24	-27.87	0.31	0.099	28.393	9.46	4.11
1000.0000	27.84		15.06	-27.25	0.33	0.094	27.957	8.74	4.04
1100.0000	26.60		15.05	-26.48	0.39	0.100	25.428	7.65	3.90
1200.0000	26.56		14.94	-25.81	0.40	0.094	26.168	7.80	3.83
1300.0000	25.76		14.84	-25.27	0.42	0.089	25.596	7.24	3.67
1400.0000	25.19		14.77	-24.69	0.44	0.088	25.350	6.82	3.61
1500.0000	24.53		14.65	-24.23	0.48	0.091	24.023	6.38	3.51
1600.0000	23.98		14.60	-23.81	0.50	0.089	24.051	5.97	3.41
1700.0000	23.42		14.45	-23.39	0.52	0.082	24.047	5.65	3.33
1800.0000	22.84		14.33	-23.08	0.55	0.090	23.229	5.32	3.19
1900.0000	22.33		14.19	-22.75	0.57	0.079	23.383	4.99	3.15
2000.0000	20.12		13.82	-22.67	0.70	0.133	20.686	3.76	2.54
2100.0000	19.67		13.71	-22.31	0.72	0.084	20.636	3.50	2.46
2200.0000	19.25		13.60	-22.07	0.74	0.086	20.408	3.31	2.35
2300.0000	18.80		13.46	-21.94	0.77	0.077	20.117	3.06	2.28
2400.0000	18.33		13.31	-21.66	0.80	0.080	19.767	2.84	2.17
2500.0000	18.02		13.18	-21.35	0.81	0.071	19.486	2.72	2.13
2600.0000	17.64		13.08	-21.19	0.84	0.082	19.354	2.52	2.04
2700.0000	17.23		12.92	-21.08	0.85	0.076	19.334	2.36	1.95
2800.0000	16.90		12.83	-20.85	0.88	0.074	19.100	2.20	1.87
2900.0000	16.58		12.68	-20.63	0.89	0.079	18.818	2.07	1.83
3000.0000	16.23		12.56	-20.52	0.91	0.071	18.699	1.93	1.74

S-PARAMETERS**MAG. AND ANG.****V_{DS} = 2 V, I_D = 10 mA**

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
500.0000	0.963	-19.8	8.573	157.6	0.021	77.7	0.705	-11.6
600.0000	0.948	-23.9	8.510	153.4	0.026	76.1	0.696	-14.1
700.0000	0.933	-27.6	8.357	149.3	0.029	73.0	0.692	-16.1
800.0000	0.921	-31.3	8.235	145.1	0.033	69.0	0.682	-18.1
900.0000	0.907	-34.9	8.128	141.2	0.036	68.0	0.674	-20.1
1000.0000	0.890	-38.3	7.953	137.3	0.040	65.4	0.668	-21.6
1100.0000	0.865	-41.8	7.811	133.4	0.043	63.5	0.659	-23.5
1200.0000	0.856	-44.6	7.654	129.6	0.046	61.9	0.652	-25.0
1300.0000	0.839	-47.9	7.509	126.1	0.049	59.8	0.642	-26.6
1400.0000	0.821	-50.8	7.359	122.7	0.052	58.4	0.638	-27.9
1500.0000	0.803	-53.6	7.193	119.2	0.054	56.6	0.629	-29.5
1600.0000	0.786	-56.5	7.059	115.8	0.058	55.0	0.623	-30.6
1700.0000	0.768	-59.1	6.896	112.6	0.060	53.8	0.616	-31.9
1800.0000	0.751	-61.8	6.738	109.4	0.063	52.1	0.606	-33.0
1900.0000	0.731	-64.2	6.585	106.3	0.066	50.6	0.602	-34.1
2000.0000	0.665	-66.3	6.257	101.9	0.066	48.2	0.554	-33.4
2100.0000	0.643	-69.0	6.119	98.9	0.068	46.6	0.546	-34.5
2200.0000	0.625	-71.8	5.987	95.7	0.071	45.6	0.537	-35.8
2300.0000	0.606	-74.1	5.860	93.0	0.072	44.0	0.531	-36.3
2400.0000	0.585	-76.6	5.726	90.1	0.075	42.9	0.520	-37.1
2500.0000	0.573	-78.5	5.605	87.6	0.076	41.7	0.515	-38.0
2600.0000	0.552	-81.1	5.492	84.8	0.079	39.7	0.507	-38.5
2700.0000	0.535	-83.7	5.377	82.0	0.081	39.1	0.498	-39.7
2800.0000	0.518	-85.7	5.270	79.5	0.082	37.7	0.491	-40.3
2900.0000	0.503	-88.4	5.158	76.8	0.085	36.3	0.486	-41.2
3000.0000	0.488	-90.8	5.057	74.4	0.087	34.9	0.477	-42.0

AMPLIFIER PARAMETERS

FREQUENCY MHz	G _{Umax} dB	G _{Amax} dB	S ₂₁ ² dB	S ₁₂ ² dB	K	Delay ns	Mason's U dB	G ₁ dB	G ₂ dB
500.0000	33.04		18.66	-33.52	0.23	0.118	35.663	11.40	2.98
600.0000	31.41		18.60	-31.80	0.26	0.118	36.254	9.93	2.88
700.0000	30.17		18.44	-30.64	0.30	0.114	33.235	8.90	2.83
800.0000	29.20		18.31	-29.68	0.36	0.116	30.323	8.17	2.72
900.0000	28.34		18.20	-28.81	0.37	0.110	31.142	7.51	2.63
1000.0000	27.39		18.01	-27.99	0.42	0.107	29.654	6.82	2.56
1100.0000	26.31		17.85	-27.36	0.46	0.109	29.030	5.98	2.48
1200.0000	25.81		17.68	-26.80	0.48	0.104	29.178	5.73	2.40
1300.0000	25.11		17.51	-26.21	0.51	0.098	28.509	5.28	2.31
1400.0000	24.47		17.34	-25.72	0.54	0.094	28.297	4.86	2.27
1500.0000	23.83		17.14	-25.34	0.57	0.099	27.918	4.51	2.19
1600.0000	23.28		16.97	-24.79	0.59	0.092	27.550	4.17	2.13
1700.0000	22.71		16.77	-24.44	0.62	0.089	27.572	3.87	2.07
1800.0000	22.16		16.57	-24.08	0.65	0.090	27.037	3.60	1.99
1900.0000	21.65		16.37	-23.65	0.67	0.084	26.586	3.33	1.95
2000.0000	20.05		15.93	-23.58	0.80	0.124	23.482	2.53	1.59
2100.0000	19.59		15.73	-23.33	0.83	0.083	23.098	2.32	1.53
2200.0000	19.18		15.54	-23.03	0.84	0.087	23.116	2.16	1.48
2300.0000	18.78		15.36	-22.85	0.87	0.076	22.643	1.99	1.44
2400.0000	18.34		15.16	-22.55	0.90	0.080	22.380	1.82	1.37
2500.0000	18.04		14.97	-22.34	0.91	0.070	22.222	1.73	1.34
2600.0000	17.67		14.79	-22.10	0.94	0.078	21.714	1.58	1.29
2700.0000	17.32		14.61	-21.86	0.95	0.077	21.753	1.47	1.24
2800.0000	16.99		14.44	-21.72	0.97	0.071	21.394	1.36	1.20
2900.0000	16.69		14.25	-21.38	0.98	0.074	21.259	1.27	1.17
3000.0000	16.38		14.08	-21.21	1.00	0.069	20.959	1.18	1.12

S-PARAMETERS**MAG. AND ANG.****V_{DS} = 3 V, I_D = 5 mA**

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
500.0000	0.976	-16.0	5.918	160.9	0.023	75.8	0.821	-10.4
600.0000	0.967	-19.4	5.970	157.4	0.027	74.8	0.811	-12.7
700.0000	0.959	-22.4	5.858	153.8	0.031	72.5	0.810	-14.7
800.0000	0.952	-25.5	5.855	150.2	0.036	70.6	0.802	-16.5
900.0000	0.944	-28.7	5.858	146.7	0.040	68.3	0.795	-18.4
1000.0000	0.931	-31.6	5.740	143.2	0.043	66.2	0.792	-20.0
1100.0000	0.909	-34.7	5.723	139.7	0.046	63.3	0.783	-21.9
1200.0000	0.913	-37.1	5.652	136.4	0.051	61.7	0.778	-23.5
1300.0000	0.901	-40.2	5.605	133.2	0.054	58.9	0.769	-25.0
1400.0000	0.892	-42.9	5.553	130.1	0.057	57.3	0.767	-26.5
1500.0000	0.880	-45.4	5.475	126.8	0.060	55.0	0.758	-28.2
1600.0000	0.865	-48.1	5.446	123.5	0.063	53.9	0.750	-29.6
1700.0000	0.854	-50.5	5.358	120.7	0.066	51.8	0.745	-30.9
1800.0000	0.843	-53.1	5.281	117.6	0.069	50.1	0.734	-32.2
1900.0000	0.827	-55.5	5.212	114.7	0.071	48.3	0.731	-33.6
2000.0000	0.765	-57.6	4.985	109.8	0.072	45.5	0.678	-33.8
2100.0000	0.747	-60.2	4.921	106.8	0.074	43.4	0.669	-35.0
2200.0000	0.732	-63.1	4.856	103.7	0.076	41.6	0.660	-36.8
2300.0000	0.713	-65.3	4.786	101.0	0.079	40.0	0.652	-37.4
2400.0000	0.695	-67.6	4.708	98.1	0.081	38.6	0.640	-38.6
2500.0000	0.686	-69.4	4.636	95.5	0.084	36.8	0.634	-39.4
2600.0000	0.666	-72.1	4.582	92.6	0.085	35.6	0.623	-40.4
2700.0000	0.651	-74.6	4.505	89.9	0.087	33.8	0.615	-41.8
2800.0000	0.634	-76.7	4.452	87.2	0.089	33.1	0.604	-42.5
2900.0000	0.619	-79.3	4.379	84.4	0.090	31.5	0.597	-43.8
3000.0000	0.603	-81.6	4.322	81.8	0.091	29.9	0.588	-44.6

AMPLIFIER PARAMETERS

FREQUENCY MHz	G _{Umax} dB	G _{Amax} dB	S ₂₁ ² dB	S ₁₂ ² dB	K	Delay ns	Mason's U dB	G ₁ dB	G ₂ dB
500.0000	33.56		15.44	-32.95	0.22	0.098	29.934	13.26	4.86
600.0000	32.02		15.52	-31.36	0.23	0.098	30.427	11.85	4.65
700.0000	30.90		15.35	-30.23	0.26	0.100	29.528	10.91	4.63
800.0000	30.07		15.35	-28.96	0.28	0.100	29.093	10.25	4.47
900.0000	29.33		15.36	-27.95	0.31	0.098	28.420	9.63	4.34
1000.0000	28.21		15.18	-27.34	0.34	0.095	27.674	8.74	4.29
1100.0000	26.90		15.15	-26.67	0.39	0.099	26.065	7.62	4.13
1200.0000	26.89		15.04	-25.89	0.40	0.092	26.234	7.81	4.04
1300.0000	26.14		14.97	-25.41	0.43	0.088	25.133	7.27	3.89
1400.0000	25.63		14.89	-24.82	0.45	0.086	24.983	6.88	3.85
1500.0000	24.94		14.77	-24.38	0.48	0.090	24.344	6.46	3.71
1600.0000	24.30		14.72	-23.99	0.50	0.092	24.473	5.98	3.59
1700.0000	23.76		14.58	-23.67	0.52	0.079	23.917	5.66	3.51
1800.0000	23.19		14.45	-23.19	0.55	0.087	23.615	5.37	3.37
1900.0000	22.67		14.34	-22.94	0.57	0.080	23.304	5.01	3.33
2000.0000	20.45		13.95	-22.83	0.70	0.135	21.150	3.82	2.68
2100.0000	19.95		13.84	-22.56	0.73	0.083	20.696	3.54	2.57
2200.0000	19.55		13.73	-22.34	0.74	0.086	20.565	3.34	2.48
2300.0000	19.08		13.60	-22.09	0.77	0.077	20.214	3.08	2.40
2400.0000	18.61		13.46	-21.82	0.79	0.081	19.997	2.86	2.29
2500.0000	18.31		13.32	-21.56	0.81	0.070	19.660	2.76	2.23
2600.0000	17.91		13.22	-21.45	0.84	0.082	19.595	2.55	2.14
2700.0000	17.53		13.07	-21.24	0.85	0.075	19.336	2.40	2.06
2800.0000	17.18		12.97	-21.03	0.87	0.074	19.350	2.24	1.97
2900.0000	16.84		12.83	-20.90	0.89	0.079	19.163	2.09	1.92
3000.0000	16.52		12.71	-20.77	0.91	0.071	18.914	1.96	1.84

S-PARAMETERS**MAG. AND ANG.****V_{DS} = 3 V, I_D = 10 mA**

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
500.0000	0.963	-19.8	8.730	157.6	0.020	75.9	0.726	-11.5
600.0000	0.947	-23.8	8.672	153.3	0.025	74.6	0.717	-14.1
700.0000	0.933	-27.5	8.503	149.2	0.029	72.3	0.713	-16.0
800.0000	0.920	-31.1	8.376	145.1	0.032	70.3	0.704	-18.0
900.0000	0.905	-34.6	8.276	141.1	0.035	66.7	0.694	-20.1
1000.0000	0.887	-38.1	8.081	137.2	0.039	64.7	0.689	-21.6
1100.0000	0.863	-41.5	7.956	133.3	0.042	63.8	0.679	-23.4
1200.0000	0.854	-44.3	7.795	129.6	0.046	61.2	0.673	-25.0
1300.0000	0.836	-47.6	7.635	125.9	0.048	60.2	0.661	-26.4
1400.0000	0.819	-50.7	7.483	122.6	0.052	58.3	0.657	-27.6
1500.0000	0.800	-53.4	7.315	119.1	0.054	56.7	0.649	-29.3
1600.0000	0.783	-56.2	7.168	115.7	0.056	54.6	0.641	-30.5
1700.0000	0.766	-58.7	7.009	112.5	0.059	53.8	0.634	-31.6
1800.0000	0.748	-61.4	6.848	109.3	0.061	52.1	0.625	-32.7
1900.0000	0.728	-64.0	6.696	106.2	0.064	50.1	0.619	-33.7
2000.0000	0.661	-66.0	6.356	101.8	0.065	47.8	0.571	-33.3
2100.0000	0.640	-68.4	6.219	98.8	0.066	46.9	0.563	-34.2
2200.0000	0.623	-71.2	6.085	95.6	0.068	45.0	0.554	-35.6
2300.0000	0.603	-73.4	5.952	93.0	0.070	44.2	0.547	-36.0
2400.0000	0.582	-75.8	5.817	90.1	0.073	42.3	0.536	-36.7
2500.0000	0.570	-77.6	5.692	87.6	0.075	41.3	0.531	-37.7
2600.0000	0.550	-80.2	5.577	84.8	0.077	39.9	0.522	-38.3
2700.0000	0.532	-83.0	5.459	82.0	0.079	38.7	0.514	-39.5
2800.0000	0.515	-84.7	5.348	79.5	0.080	37.8	0.507	-39.9
2900.0000	0.500	-87.4	5.235	76.9	0.083	36.4	0.502	-41.0
3000.0000	0.484	-89.8	5.138	74.4	0.084	36.1	0.493	-41.8

AMPLIFIER PARAMETERS

FREQUENCY MHz	G _{Umax} dB	G _{Amax} dB	S ₂₁ ² dB	S ₁₂ ² dB	K	Delay ns	Mason's U dB	G ₁ dB	G ₂ dB
500.0000	33.44		18.82	-33.87	0.25	0.120	33.150	11.36	3.26
600.0000	31.77		18.76	-32.17	0.27	0.120	33.546	9.87	3.14
700.0000	30.56		18.59	-30.90	0.31	0.115	32.522	8.88	3.09
800.0000	29.54		18.46	-29.79	0.34	0.114	32.113	8.11	2.97
900.0000	28.62		18.36	-29.03	0.39	0.110	29.812	7.41	2.85
1000.0000	27.67		18.15	-28.15	0.42	0.107	29.239	6.72	2.80
1100.0000	26.63		18.01	-27.54	0.45	0.110	29.547	5.94	2.68
1200.0000	26.12		17.84	-26.84	0.49	0.102	28.636	5.67	2.62
1300.0000	25.37		17.66	-26.29	0.51	0.102	29.015	5.21	2.50
1400.0000	24.75		17.48	-25.76	0.54	0.093	28.418	4.81	2.45
1500.0000	24.11		17.28	-25.40	0.57	0.097	28.235	4.44	2.38
1600.0000	23.52		17.11	-24.99	0.60	0.094	27.395	4.12	2.30
1700.0000	22.99		16.91	-24.51	0.62	0.088	27.785	3.84	2.24
1800.0000	22.43		16.71	-24.36	0.65	0.089	27.245	3.56	2.16
1900.0000	21.90		16.52	-23.86	0.68	0.087	26.365	3.28	2.10
2000.0000	20.27		16.06	-23.70	0.80	0.122	23.536	2.49	1.71
2100.0000	19.82		15.87	-23.60	0.83	0.085	23.412	2.29	1.65
2200.0000	19.40		15.68	-23.29	0.85	0.087	23.059	2.13	1.59
2300.0000	19.00		15.49	-23.10	0.87	0.073	22.872	1.96	1.54
2400.0000	18.56		15.29	-22.78	0.90	0.081	22.344	1.79	1.47
2500.0000	18.25		15.11	-22.47	0.91	0.068	22.256	1.71	1.44
2600.0000	17.87		14.93	-22.28	0.94	0.079	21.933	1.56	1.38
2700.0000	17.52		14.74	-22.08	0.95	0.076	21.788	1.45	1.33
2800.0000	17.19		14.56	-21.93	0.97	0.070	21.557	1.34	1.29
2900.0000	16.89		14.38	-21.66	0.98	0.073	21.423	1.25	1.26
3000.0000	16.58		14.22	-21.48	1.00	0.070	21.455	1.16	1.21

NOISE PARAMETERS

$V_{DS} = 2\text{ V}$, $I_D = 10\text{ mA}$

Freq. (GHz)	NF _{min.} (dB)	G _a (dB)	Γ _{opt}		Rn/50
			MAG.	ANG. (deg)	
0.9	0.40	22.7	0.63	58	0.14
1.0	0.41	22.3	0.64	65	0.14
1.5	0.45	19.8	0.58	100	0.09
2.0	0.50	17.9	0.50	136	0.04
2.5	0.54	16.1	0.55	165	0.02

$V_{DS} = 2\text{ V}$, $I_D = 5\text{ mA}$

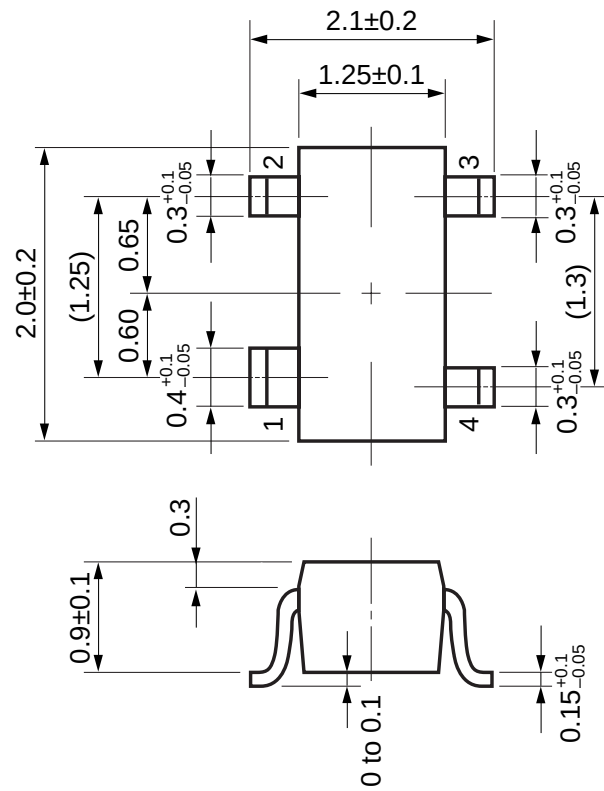
Freq. (GHz)	NF _{min.} (dB)	G _a (dB)	Γ _{opt}		Rn/50
			MAG.	ANG. (deg)	
0.9	0.44	22.6	0.61	63	0.20
1.0	0.45	22.2	0.62	71	0.18
1.5	0.49	19.4	0.57	105	0.10
2.0	0.53	17.2	0.51	137	0.05
2.5	0.60	15.4	0.52	175	0.02

$V_{DS} = 2\text{ V}$, $I_D = 3\text{ mA}$

Freq. (GHz)	NF _{min.} (dB)	G _a (dB)	Γ _{opt}		Rn/50
			MAG.	ANG. (deg)	
0.9	0.46	21.3	0.70	62	0.26
1.0	0.47	21.0	0.69	70	0.24
1.5	0.50	18.7	0.64	106	0.12
2.0	0.55	16.4	0.57	134	0.05
2.5	0.63	14.5	0.58	176	0.02

PACKAGE DIMENSIONS

4 pin super minimold (Unit : mm)



PIN CONNECTIONS

1. Source
2. Gate
3. Source
4. Drain

NOTE ON CORRECT USE

- (1) Because this device is a GaAs MES FET with a Schottky barrier gate structure, it is necessary that sufficient care be taken regarding static electricity and strong electric fields.
Take measures against static electricity and make sure the body is earthed when mounting the device.
- (2) Follow the procedure below when operating the device by a gate-and-drain-independent dual power supply.
Directly ground both the source pins.
 V_{GS} = fixed to approximately -4 V.
Increase V_{DS} to a predetermined voltage level (within the recommended operating range of V_{DS}).
Adjust V_{GS} in line with a predetermined I_D .
- (3) It is recommended that the bias application circuit be able to have a fixed voltage and current.
- (4) Adjust the I/O matching circuit after turning the bias OFF.

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your NEC sales representative.

Soldering Method	Soldering Conditions	Recommended Condition Symbol
Infrared Reflow	Package peak temperature: 230 °C or below Time: 30 seconds or less (at 210 °C) Count: 3, Exposure limit : None ^{Note}	IR30-00-3
VPS	Package peak temperature: 215 °C or below Time: 40 seconds or less (at 200 °C) Count: 3, Exposure limit : None ^{Note}	VP15-00-3
Wave Soldering	Soldering bath temperature: 260 °C or below Time: 10 seconds or less Count: 1, Exposure limit : None ^{Note}	WS60-00-1
Partial Heating	Pin temperature: 230 °C Time: 10 seconds or less Exposure limit : None ^{Note}	—

Note After opening the dry pack, keep it in a place below 25 °C and 65 % RH for the allowable storage period.

Caution Do not use different soldering methods together (except for partial heating).

For details of recommended soldering conditions for surface mounting, refer to information document SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535E).

PRECAUTION Avoid high static voltage and electric fields, because this device is Hetero Junction field transistor with shottky barrier gate.

CAUTION

The Great Care must be taken in dealing with the devices in this guide.

The reason is that the material of the devices is GaAs (Gallium Arsenide), which is designated as harmful substance according to the law concerned.

Keep the law concerned and so on, especially in case of removal.

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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

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