NEC

Hetero Junction Field Effect transistor

NE38018

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

FEATURES

○ Super Low noise figure & High Associated Gain

NF = 0.55 dB typ. Ga = 14.5 dB typ. OIP_3 = 22 dBm (V67), OIP_3 = 23 dBm (V68) typ. at f = 2 GHz

NF = 0.4 dB typ. Ga = 20 dB typ. at f = 900 MHz

4 pins super mini mold package

Wg = 800 μm

ORDERING INFORMATION (PLAN)

Part Number	Quantity	Packing Style
NE38018-T1	3 kpcs/Reel.	Embossed tape 8 mm wide. Pin3 (Source), Pin4 (Drain) face to perforation side of the tape.
NE38018-T2	3 kpcs/Reel.	Embossed tape 8 mm wide. Pin1 (Source), Pin2 (Gate) face to perforation side of the tape.

Remark Please contact with responsible NEC person, if you require evaluation sample.
(Part number for sample order: NE38018)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	4.0	V
Gate to Source Voltage	V_{GS}	–3.0	V
Drain Current	I_D	I_{DSS}	mA
Gate Current	I_G	100	μA
Total Power Temperature	P_{tot}	150	mA
Channel Temperature	T_{ch}	125	°C
Storage Temperature	T_{stg}	–65 to +125	°C

RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}	1	2	3	V
Drain Current	I_D	2	5	30	mA
Input Power	P_{in}	–	–	0	dBm

The information in this document is subject to change without notice.

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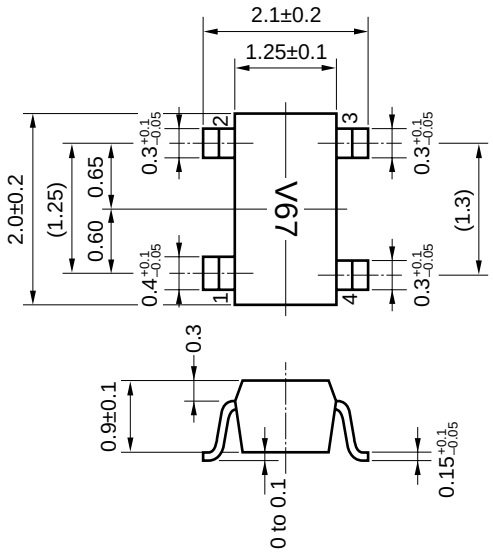
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Gate to Source Leak Current	I_{GSO}	V_{GS} = –3 V	–	1.0	20	μA
Saturated Drain Current	I_{DSS}	V_{DS} = 2 V V_{GS} = 0 V	40	–	170	mA
Gate to Source Cut off Voltage	$V_{GS(off)}$	V_{DS} = 2 V I_{DS} = 100 μA	–0.1	–	–1.5	V
Transconductance	g_m	V_{DS} = 2 V I_{DS} = 5 mA	50	–	–	mS
Noise Figure	NF	V_{DS} = 2 V I_{DS} = 5 mA	–	0.55	1.0	dB
Associated Gain	Ga	f = 2 GHz	12.5	14.5	–	dB
Power Gain	Gs		–	16	–	dB
Output Power at 1 dB Gain Compression Point	$P_{0(1\ dB)}$	V_{DS} = 3 V I_{DS} = 30 mA f = 2 GHz	–	17 (V67)	–	dBm
			–	18 (V68)	–	
Output Third-Order Distortion Intercept Point	OIP_3	V_{DS} = 2 V I_{DS} = 5 mA f = 2 GHz	–	22 (V67)	–	dBm
			–	23 (V68)	–	

I_{DSS} CLASSIFICATIONS

Rank	I_{DSS} (mA)	Marking
67	40 to 90	V67
68	70 to 170	V68

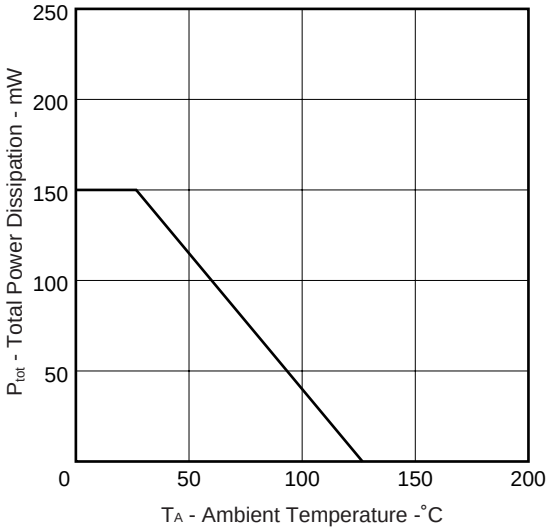
DIMENSIONS (Unit: mm)



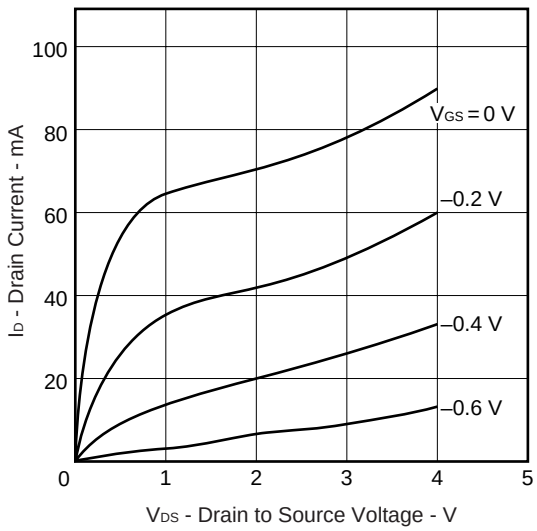
PIN CONNECTIONS
1. Source
2. Gate
3. Source
4. Drain

TYPICAL CHARACTERISTICS (T_A = 25°C)

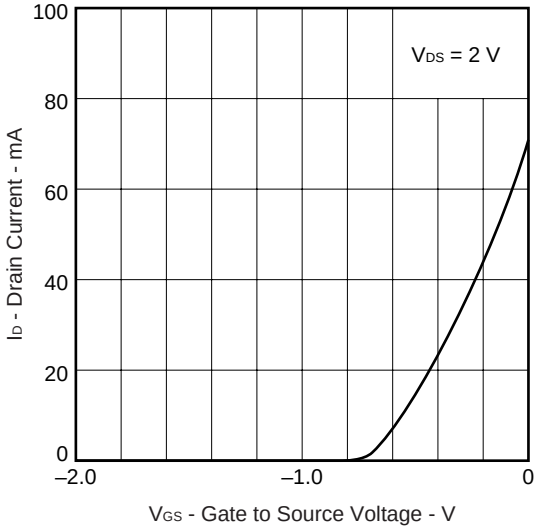
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



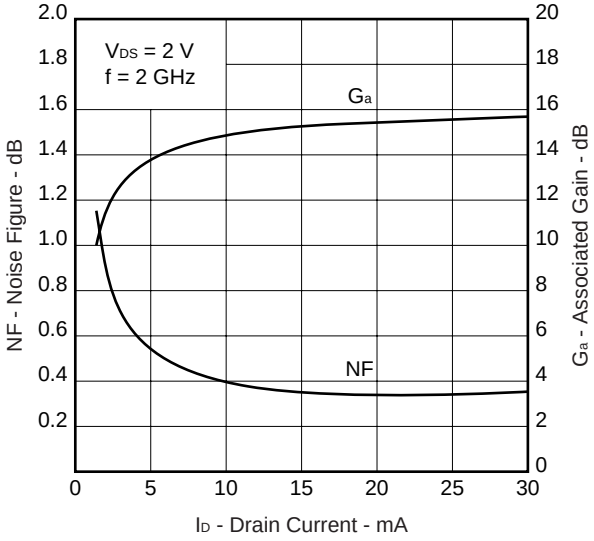
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



DRAIN CURRENT vs.
GATE TO SOURCE VOLTAGE



NOISE FIGURE, ASSOCIATED GAIN vs.
DRAIN CURRENT



S-PARAMETER

MAG. AND ANG.

V_{DS} = 2 V, I_D = 5 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
500.0000	.962	–30.1	5.769	154.6	.042	71.3	.643	–21.7
600.0000	.949	–36.0	5.770	149.8	.050	68.6	.632	–26.0
700.0000	.941	–41.6	5.650	145.1	.057	65.3	.623	–29.7
800.0000	.930	–46.8	5.582	140.8	.064	61.9	.613	–33.5
900.0000	.915	–52.4	5.518	136.4	.070	59.3	.602	–36.9
1000.0000	.907	–57.4	5.382	132.3	.076	55.7	.589	–40.5
1100.0000	.881	–63.0	5.296	127.9	.081	53.2	.578	–43.7
1200.0000	.876	–67.0	5.200	124.1	.086	50.8	.568	–46.7
1300.0000	.861	–72.2	5.093	120.1	.092	48.1	.557	–49.7
1400.0000	.847	–76.5	4.983	116.6	.097	45.6	.547	–52.5
1500.0000	.833	–80.9	4.873	112.8	.101	43.6	.534	–55.2
1600.0000	.820	–85.4	4.788	108.9	.105	41.5	.522	–58.0
1700.0000	.804	–89.6	4.682	105.6	.109	39.6	.513	–60.7
1800.0000	.792	–93.9	4.590	102.2	.113	37.4	.506	–62.6
1900.0000	.774	–98.2	4.490	98.8	.117	35.4	.496	–65.1
2000.0000	.720	–104.7	4.227	95.0	.115	33.2	.416	–61.3
2100.0000	.702	–108.5	4.138	91.7	.118	31.1	.405	–65.1
2200.0000	.688	–112.1	4.038	88.4	.121	29.4	.383	–68.5
2300.0000	.680	–116.4	3.951	85.4	.123	27.9	.364	–70.8
2400.0000	.668	–120.9	3.874	82.2	.126	26.1	.349	–73.5
2500.0000	.649	–125.8	3.776	78.9	.128	24.1	.336	–76.7
2600.0000	.641	–129.8	3.721	76.3	.129	22.7	.324	–78.6
2700.0000	.619	–134.5	3.613	73.0	.133	20.9	.307	–82.9
2800.0000	.607	–139.1	3.547	70.2	.133	19.6	.286	–86.4
2900.0000	.593	–144.2	3.459	67.4	.136	18.3	.271	–89.3
3000.0000	.577	–149.5	3.383	64.6	.137	16.8	.257	–92.6

AMP. PARAMETERS

V_{DS} = 2 V, I_D = 5 mA

FREQUENCY MHz	GUmax dB	GAmax dB	$\|S_{21}\|^2$ dB	$\|S_{12}\|^2$ dB	K	Delay ns	Mason's U dB	G1 dB	G2 dB
500.0000	28.78		15.22	–27.52	.13	.132	37.633	11.25	2.31
600.0000	27.49		15.22	–26.00	.14	.132		10.06	2.21
700.0000	26.62		15.04	–24.89	.15	.131		9.45	2.13
800.0000	25.70		14.94	–23.88	.17	.121		8.72	2.05
900.0000	24.65		14.84	–23.08	.19	.123		7.87	1.95
1000.0000	24.00		14.62	–22.34	.20	.114		7.53	1.85
1100.0000	22.75		14.48	–21.85	.23	.122		6.50	1.77
1200.0000	22.34		14.32	–21.30	.24	.104		6.33	1.69
1300.0000	21.62		14.14	–20.75	.26	.112		5.86	1.61
1400.0000	20.97		13.95	–20.29	.28	.098		5.48	1.54
1500.0000	20.37		13.76	–19.92	.30	.104		5.15	1.46
1600.0000	19.84		13.60	–19.56	.31	.108		4.85	1.38
1700.0000	19.25		13.41	–19.23	.33	.093		4.51	1.33
1800.0000	18.80		13.24	–18.91	.35	.095		4.28	1.28
1900.0000	18.25		13.04	–18.63	.37	.094		3.98	1.23
2000.0000	16.53		12.52	–18.81	.53	.106	24.944	3.18	.83
2100.0000	16.06		12.34	–18.53	.55	.090	24.408	2.95	.78
2200.0000	15.60		12.12	–18.37	.58	.092	24.058	2.79	.69
2300.0000	15.25		11.93	–18.18	.60	.084	24.196	2.70	.62
2400.0000	14.90		11.76	–18.01	.62	.089	24.103	2.57	.57
2500.0000	14.43		11.54	–17.84	.65	.090	23.007	2.37	.52
2600.0000	14.19		11.41	–17.75	.66	.075	23.048	2.30	.48
2700.0000	13.69		11.16	–17.54	.70	.091	22.005	2.10	.43
2800.0000	13.37		11.00	–17.51	.73	.078	21.443	2.00	.37
2900.0000	13.00		10.78	–17.34	.75	.077	20.972	1.89	.33
3000.0000	12.64		10.59	–17.24	.78	.078	20.186	1.76	.30

S-PARAMETER

MAG. AND ANG.

V_{DS} = 2 V, I_D = 10 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
500.0000	.935	–35.4	8.514	150.3	.037	71.4	.481	–26.8
600.0000	.916	–42.0	8.368	144.9	.043	67.9	.470	–31.6
700.0000	.898	–48.5	8.140	139.6	.049	65.0	.460	–36.2
800.0000	.879	–54.3	7.931	134.9	.056	62.4	.452	–40.3
900.0000	.854	–60.4	7.710	130.1	.060	60.2	.438	–44.2
1000.0000	.838	–66.0	7.472	125.5	.066	57.4	.426	–48.1
1100.0000	.809	–71.8	7.215	121.0	.070	55.1	.414	–51.4
1200.0000	.794	–76.5	7.025	117.1	.075	52.4	.403	–55.0
1300.0000	.771	–81.7	6.773	112.9	.079	50.2	.390	–57.9
1400.0000	.754	–86.3	6.550	109.1	.082	48.9	.382	–61.0
1500.0000	.736	–91.1	6.344	105.4	.087	47.1	.371	–64.0
1600.0000	.717	–95.5	6.149	101.6	.091	46.0	.359	–67.2
1700.0000	.698	–99.9	5.961	98.1	.094	43.8	.352	–69.5
1800.0000	.682	–104.2	5.793	94.8	.097	41.9	.344	–71.7
1900.0000	.664	–108.7	5.624	91.4	.101	40.5	.336	–74.1
2000.0000	.625	–115.4	5.254	88.4	.099	39.3	.252	–67.5
2100.0000	.605	–119.4	5.103	85.3	.103	37.7	.243	–72.0
2200.0000	.591	–122.9	4.945	82.1	.106	36.1	.224	–76.0
2300.0000	.583	–127.4	4.805	79.3	.109	34.7	.209	–78.2
2400.0000	.572	–132.2	4.676	76.4	.112	33.7	.198	–81.8
2500.0000	.554	–137.0	4.543	73.2	.114	32.5	.189	–86.2
2600.0000	.549	–141.1	4.428	70.7	.118	31.2	.180	–88.6
2700.0000	.529	–146.1	4.290	67.8	.120	29.7	.167	–95.2
2800.0000	.522	–150.7	4.176	65.3	.121	29.6	.151	–100.3
2900.0000	.514	–156.1	4.060	62.8	.124	27.8	.140	–105.1
3000.0000	.503	–161.5	3.954	60.3	.126	26.7	.129	–112.4

AMP. PARAMETERS

V_{DS} = 2 V, I_D = 10 mA

FREQUENCY MHz	GUmax dB	GAmax dB	$\|S_{21}\|^2$ dB	$\|S_{12}\|^2$ dB	K	Delay ns	Mason's U dB	G1 dB	G2 dB
500.0000	28.74		18.60	–28.57	.20	.152	40.416	8.99	1.15
600.0000	27.45		18.45	–27.27	.23	.152	40.577	7.92	1.09
700.0000	26.37		18.21	–26.12	.25	.145		7.13	1.03
800.0000	25.42		17.99	–25.11	.28	.131		6.44	.99
900.0000	24.35		17.74	–24.37	.31	.134		5.68	.92
1000.0000	23.59		17.47	–23.65	.33	.126		5.26	.87
1100.0000	22.59		17.16	–23.10	.37	.127		4.61	.81
1200.0000	22.02		16.93	–22.55	.39	.107		4.32	.77
1300.0000	21.25		16.62	–22.08	.43	.117		3.91	.72
1400.0000	20.66		16.32	–21.72	.45	.104		3.65	.68
1500.0000	20.08		16.05	–21.25	.47	.104		3.39	.64
1600.0000	19.51		15.78	–20.81	.49	.104		3.13	.60
1700.0000	18.98		15.51	–20.58	.52	.096		2.90	.57
1800.0000	18.52		15.26	–20.23	.54	.093		2.72	.55
1900.0000	18.04		15.00	–19.89	.56	.093		2.52	.52
2000.0000	16.85		14.41	–20.05	.70	.083	27.137	2.15	.28
2100.0000	16.40		14.16	–19.71	.73	.086	26.620	1.98	.27
2200.0000	15.97		13.88	–19.48	.75	.090	25.873	1.87	.22
2300.0000	15.63		13.63	–19.24	.77	.077	25.484	1.80	.19
2400.0000	15.29		13.40	–19.05	.79	.083	25.825	1.72	.17
2500.0000	14.90		13.15	–18.84	.81	.087	25.386	1.59	.16
2600.0000	14.63		12.92	–18.55	.82	.069	25.606	1.56	.14
2700.0000	14.19		12.65	–18.44	.86	.081	23.866	1.42	.12
2800.0000	13.90		12.41	–18.36	.88	.069	23.850	1.38	.10
2900.0000	13.59		12.17	–18.10	.90	.070	23.052	1.33	.09
3000.0000	13.28		11.94	–17.97	.92	.069	22.305	1.27	.07

S-PARAMETER

MAG. AND ANG.

V_{DS} = 3 V, I_D = 5 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
500.0000	.962	–29.9	5.774	154.7	.041	71.4	.657	–21.3
600.0000	.951	–35.6	5.771	150.0	.049	68.7	.645	–25.4
700.0000	.942	–41.3	5.650	145.4	.056	65.1	.636	–29.1
800.0000	.931	–46.4	5.582	141.0	.063	62.2	.627	–32.8
900.0000	.916	–51.9	5.527	136.7	.068	59.6	.615	–36.0
1000.0000	.907	–56.8	5.393	132.5	.075	56.3	.604	–39.5
1100.0000	.882	–62.4	5.299	128.1	.080	53.4	.593	–42.7
1200.0000	.877	–66.6	5.215	124.4	.086	51.4	.584	–45.7
1300.0000	.862	–71.5	5.114	120.4	.091	48.4	.571	–48.7
1400.0000	.850	–76.0	4.993	116.8	.096	45.6	.562	–51.4
1500.0000	.835	–80.4	4.878	113.2	.098	44.1	.549	–54.0
1600.0000	.822	–84.8	4.797	109.3	.104	41.7	.537	–56.9
1700.0000	.806	–89.0	4.696	106.0	.107	39.5	.528	–59.3
1800.0000	.793	–93.2	4.605	102.6	.111	37.4	.520	–61.2
1900.0000	.777	–97.5	4.510	99.1	.116	35.6	.511	–63.7
2000.0000	.722	–104.0	4.246	95.4	.114	33.3	.432	–59.9
2100.0000	.705	–107.7	4.154	92.1	.117	31.4	.422	–63.6
2200.0000	.690	–111.3	4.051	88.8	.119	29.8	.399	–67.1
2300.0000	.681	–115.6	3.970	85.8	.121	28.0	.380	–69.1
2400.0000	.670	–120.2	3.892	82.6	.124	26.3	.365	–71.8
2500.0000	.650	–124.9	3.802	79.3	.127	24.2	.351	–74.7
2600.0000	.641	–128.9	3.735	76.6	.129	22.6	.339	–76.8
2700.0000	.620	–133.7	3.639	73.4	.130	20.8	.322	–80.6
2800.0000	.607	–138.3	3.570	70.5	.132	20.1	.302	–83.8
2900.0000	.594	–143.5	3.481	67.7	.133	18.4	.288	–86.6
3000.0000	.578	–148.7	3.405	64.9	.135	16.6	.271	–89.7

AMP. PARAMETERS

V_{DS} = 3 V, I_D = 5 mA

FREQUENCY MHz	GUmax dB	GAmax dB	$\|S_{21}\|^2$ dB	$\|S_{12}\|^2$ dB	K	Delay ns	Mason's U dB	G1 dB	G2 dB
500.0000	28.91		15.23	–27.70	.13	.130	37.792	11.22	2.46
600.0000	27.73		15.23	–26.26	.14	.130		10.17	2.34
700.0000	26.77		15.04	–25.03	.15	.129		9.47	2.26
800.0000	25.85		14.94	–23.98	.17	.121		8.74	2.17
900.0000	24.85		14.85	–23.30	.18	.121		7.93	2.07
1000.0000	24.13		14.64	–22.55	.20	.116		7.53	1.97
1100.0000	22.91		14.48	–21.98	.23	.121		6.54	1.88
1200.0000	22.52		14.34	–21.31	.23	.102		6.36	1.81
1300.0000	21.80		14.18	–20.82	.26	.113		5.91	1.72
1400.0000	21.18		13.97	–20.39	.28	.100		5.56	1.65
1500.0000	20.50		13.77	–20.15	.29	.098		5.18	1.56
1600.0000	19.98		13.62	–19.70	.31	.110		4.88	1.48
1700.0000	19.41		13.43	–19.42	.33	.091		4.56	1.42
1800.0000	18.95		13.27	–19.08	.35	.095		4.31	1.37
1900.0000	18.42		13.08	–18.75	.37	.096		4.02	1.32
2000.0000	16.65		12.56	–18.89	.52	.103	25.087	3.19	.90
2100.0000	16.21		12.37	–18.62	.54	.094	25.123	2.99	.85
2200.0000	15.71		12.15	–18.50	.57	.091	24.612	2.81	.75
2300.0000	15.36		11.98	–18.31	.59	.084	24.225	2.71	.68
2400.0000	15.01		11.80	–18.13	.61	.089	24.455	2.58	.62
2500.0000	14.56		11.60	–17.93	.64	.090	23.164	2.38	.57
2600.0000	14.28		11.45	–17.80	.66	.076	22.974	2.30	.53
2700.0000	13.81		11.22	–17.72	.69	.089	21.882	2.11	.48
2800.0000	13.47		11.05	–17.60	.72	.081	21.909	2.00	.41
2900.0000	13.10		10.83	–17.49	.75	.078	21.134	1.89	.38
3000.0000	12.74		10.64	–17.39	.78	.077	20.108	1.76	.33

S-PARAMETER

MAG. AND ANG.

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

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}	
MHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)
500.0000	.941	–35.2	8.537	150.9	.036	71.6	.510	–25.3
600.0000	.922	–41.7	8.386	145.5	.043	67.9	.498	–30.0
700.0000	.905	–48.0	8.146	140.4	.048	65.3	.488	–34.2
800.0000	.887	–53.7	7.943	135.6	.054	62.7	.477	–38.2
900.0000	.864	–59.7	7.728	130.8	.060	60.3	.466	–41.9
1000.0000	.847	–65.1	7.479	126.4	.065	57.3	.452	–45.5
1100.0000	.820	–70.8	7.261	121.9	.068	54.6	.441	–49.0
1200.0000	.807	–75.4	7.042	118.0	.073	52.3	.429	–52.0
1300.0000	.787	–80.4	6.814	113.7	.078	51.1	.418	–54.8
1400.0000	.768	–85.0	6.597	110.1	.082	48.4	.407	–57.7
1500.0000	.749	–89.4	6.381	106.5	.085	46.8	.396	–60.3
1600.0000	.733	–93.8	6.200	102.7	.089	45.3	.384	–63.1
1700.0000	.714	–98.0	6.007	99.3	.092	43.6	.376	–65.3
1800.0000	.700	–102.2	5.849	96.0	.095	41.8	.368	–67.3
1900.0000	.681	–106.3	5.668	92.6	.099	40.5	.360	–69.3
2000.0000	.638	–113.1	5.314	89.5	.099	39.2	.277	–61.9
2100.0000	.620	–116.8	5.169	86.3	.101	37.3	.269	–66.2
2200.0000	.606	–120.5	5.005	83.3	.105	36.0	.248	–69.4
2300.0000	.598	–124.8	4.870	80.5	.107	35.1	.231	–71.2
2400.0000	.587	–129.5	4.744	77.5	.110	33.5	.219	–74.3
2500.0000	.569	–134.1	4.611	74.3	.112	32.0	.208	–78.1
2600.0000	.561	–138.2	4.506	71.8	.115	31.0	.198	–79.5
2700.0000	.542	–143.0	4.371	68.9	.117	29.2	.183	–85.5
2800.0000	.532	–147.6	4.255	66.3	.120	28.2	.163	–89.5
2900.0000	.523	–152.8	4.141	63.7	.121	27.0	.150	–93.8
3000.0000	.511	–158.4	4.037	61.3	.124	26.3	.137	–99.4

AMP. PARAMETERS

MAG. AND ANG.
V_{DS} = 3 V, I_D = 10 mA

FREQUENCY MHz	GUmax dB	GAmax dB	$\|S_{21}\|^2$ dB	$\|S_{12}\|^2$ dB	K	Delay ns	Mason's U dB	G1 dB	G2 dB
500.0000	29.33		18.63	–28.83	.18	.149		9.40	1.31
600.0000	27.97		18.47	–27.37	.22	.149	47.710	8.26	1.24
700.0000	26.81		18.22	–26.30	.24	.143		7.41	1.18
800.0000	25.82		18.00	–25.37	.26	.134		6.70	1.12
900.0000	24.80		17.76	–24.41	.29	.132		5.97	1.06
1000.0000	23.95		17.48	–23.80	.32	.123		5.48	.99
1100.0000	23.01		17.22	–23.30	.35	.127		4.85	.94
1200.0000	22.41		16.95	–22.72	.37	.106		4.57	.89
1300.0000	21.70		16.67	–22.17	.40	.119		4.20	.83
1400.0000	21.05		16.39	–21.74	.42	.100		3.87	.79
1500.0000	20.41		16.10	–21.40	.45	.103		3.58	.74
1600.0000	19.89		15.85	–21.06	.47	.103		3.35	.69
1700.0000	19.33		15.57	–20.69	.50	.096		3.10	.66
1800.0000	18.89		15.34	–20.40	.52	.091		2.92	.63
1900.0000	18.38		15.07	–20.11	.54	.094		2.71	.60
2000.0000	17.13		14.51	–20.08	.68	.086	27.582	2.27	.35
2100.0000	16.70		14.27	–19.92	.71	.088	26.662	2.11	.33
2200.0000	16.25		13.99	–19.60	.73	.084	26.190	1.99	.27
2300.0000	15.91		13.75	–19.40	.75	.079	26.581	1.92	.24
2400.0000	15.57		13.52	–19.21	.77	.083	26.283	1.84	.21
2500.0000	15.17		13.28	–19.00	.80	.087	25.503	1.70	.19
2600.0000	14.89		13.08	–18.80	.81	.069	25.488	1.64	.17
2700.0000	14.47		12.81	–18.64	.84	.082	23.995	1.51	.15
2800.0000	14.14		12.58	–18.42	.86	.072	23.516	1.44	.12
2900.0000	13.83		12.34	–18.31	.89	.072	22.858	1.39	.10
3000.0000	13.52		12.12	–18.15	.91	.066	22.417	1.32	.08

NOISE PARAMETERS

V_{DS} = 2 V, I_{DS} = 5 mA

Frequency (GHz)	NF_{min} (dB)	Ga (dB)	Γopt		Rn/50
			MAG.	ANG. (deg)	
0.9	0.41	21.1	0.65	25.1	0.18
1.0	0.42	20.3	0.63	27.2	0.18
1.5	0.48	16.9	0.55	42.4	0.17
1.9	0.54	15.0	0.48	58.0	0.16
2.0	0.55	14.7	0.46	62.1	0.15
2.5	0.62	13.4	0.38	81.3	0.13

V_{DS} = 2 V, I_{DS} = 10 mA

Frequency (GHz)	NF_{min} (dB)	Ga (dB)	Γopt		Rn/50
			MAG.	ANG. (deg)	
0.9	0.37	22.0	0.59	29.2	0.13
1.0	0.38	21.8	0.50	38.0	0.12
1.5	0.44	17.6	0.50	39.6	0.12
1.9	0.49	15.6	0.38	45.1	0.11
2.0	0.50	15.5	0.39	54.4	0.11
2.5	0.56	13.9	0.38	70.3	0.10

V_{DS} = 3 V, I_{DS} = 5 mA

Frequency (GHz)	NF_{min} (dB)	Ga (dB)	Γopt		Rn/50
			MAG.	ANG. (deg)	
0.9	0.41	21.8	0.67	24.9	0.18
1.0	0.42	20.8	0.65	26.9	0.18
1.5	0.48	16.9	0.54	42.1	0.17
1.9	0.54	14.8	0.47	57.8	0.16
2.0	0.55	14.4	0.45	61.8	0.15
2.5	0.62	13.3	0.38	80.7	0.13

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[Note]: None	IR30-00-3
VPS	Package peak temperature: 215°C or below Time: 40 seconds or less (at 200°C) Count: 3, Exposure limit[Note]: None	VP15-00-3
Wave Soldering	Soldering bath temperature: 260°C or below Time: 10 seconds or less Count: 1, Exposure limit[Note]: None	WS60-00-1
Partial Heating	Pin temperature: 230°C Time: 10 seconds or less (per pin row) Exposure limit[Note]: None	–

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).

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

[MEMO]

[MEMO]

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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