To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

GaAs MES FET
NE76118

L to S BAND LOW NOISE AMPLIFIER
N-CHANNEL GaAs MES FET

DESCRIPTION

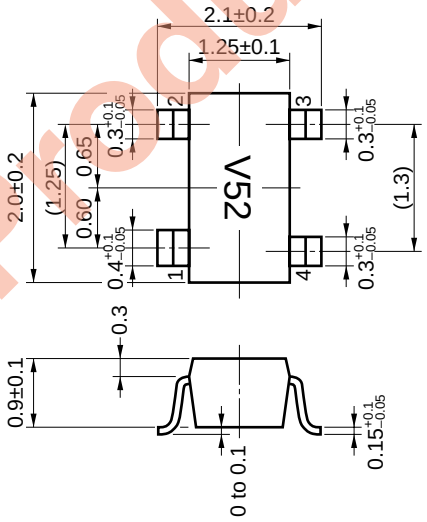
NE76118 is a n-channel GaAs MES FET housed in MOLD package.

FEATURES

- Low noise figure
  NF = 0.8 dB TYP. at f = 2 GHz
- High associated gain
  Ga = 13.5 dB TYP. at f = 2 GHz
- Gate width : Wg = 400 μm
- 4 pins super mini mold
- Tape & reel packaging only available

PACKAGE DIMENSIONS

in millimeters



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

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
NE76118-T1	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin 3 (Source), Pin 4 (Drain) face to perforation side of the tape.
NE76118-T2	3 Kpcs/Reel.	Embossed tape 8 mm wide. Pin 1 (Source), Pin 2 (Gate) face to perforation side of the tape.

* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: NE76118)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V_{DS}	5.0	V
Gate to Source Voltage	V_{GSO}	–5.0	V
Gate to Drain Voltage	V_{GDO}	–6.0	V
Drain Current	I_D	I_{DSS}	mA
Total Power Dissipation	P_{tot}	130	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Document No. P11129EJ2V0DS00 (2nd edition)
Date Published January 1997 N
Printed in Japan

RECOMMENDED OPERATING CONDITION (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	Unit
Drain to Source Voltage	V_{DS}		3	4	V
Drain Current	I_D		10	20	mA
Input Power	P_{in}			0	dBm

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
Gate to Source Leak Current	I_{GSO}	–	–	10	μA	V_{GS} = –5 V	
Saturated Drain Current	I_{DSS}	30	–	100	mA	V_{DS} = 3 V, V_{GS} = 0 V	
Gate to Source Cut off Voltage	$V_{GS(off)}$	–0.5	–	–3.0	V	V_{DS} = 3 V, I_D = 100 μA	
Transconductance	gm	20	45	–	mS	V_{DS} = 3 V, I_D = 10 mA	
Noise Figure	NF		0.8		dB	f = 2 GHz	V_{DS} = 3 V I_D = 10 mA,
Associated Gain	Ga		13.5		dB		
Noise Figure	NF		0.9	1.4	dB	f = 4 GHz	
Associated Gain	Ga	9.5	10.5		dB		

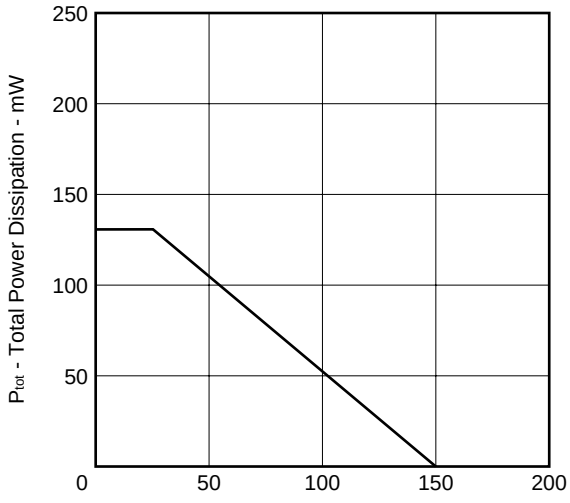
I_{DSS} rank is specified as follows.

K : 30 to 100 mA

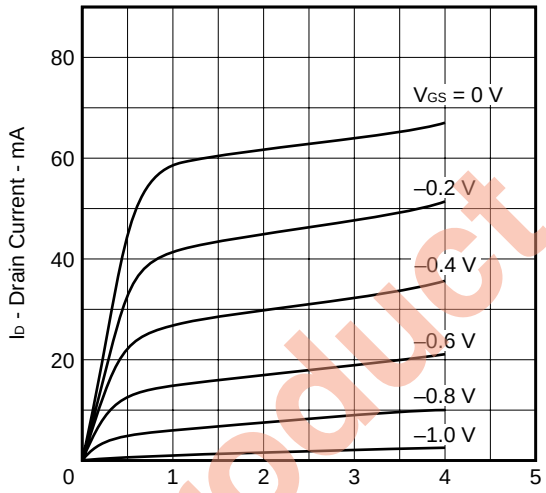
M : 50 to 100 mA

TYPICAL CHARACTERISTICS (T_A = 25 °C)

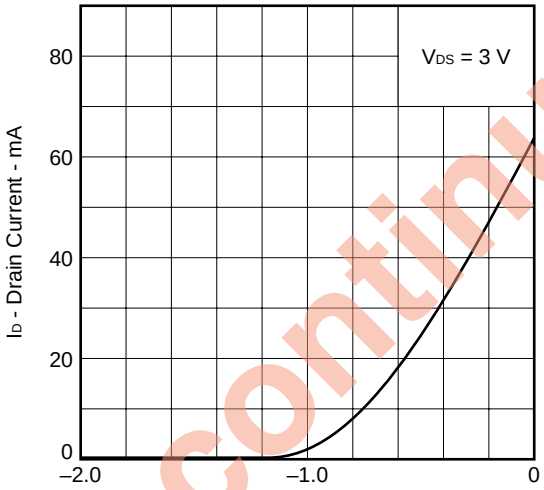
TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE



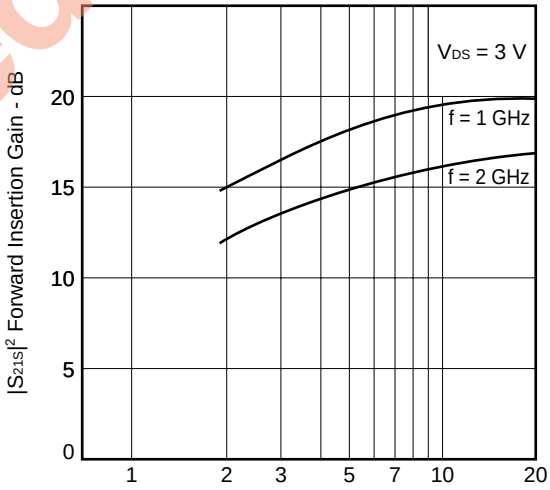
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



DRAIN CURRENT vs.
GATE TO SOURCE VOLTAGE



FORWARD INSERTION GAIN vs.
DRAIN CURRENT



S-PARAMETER

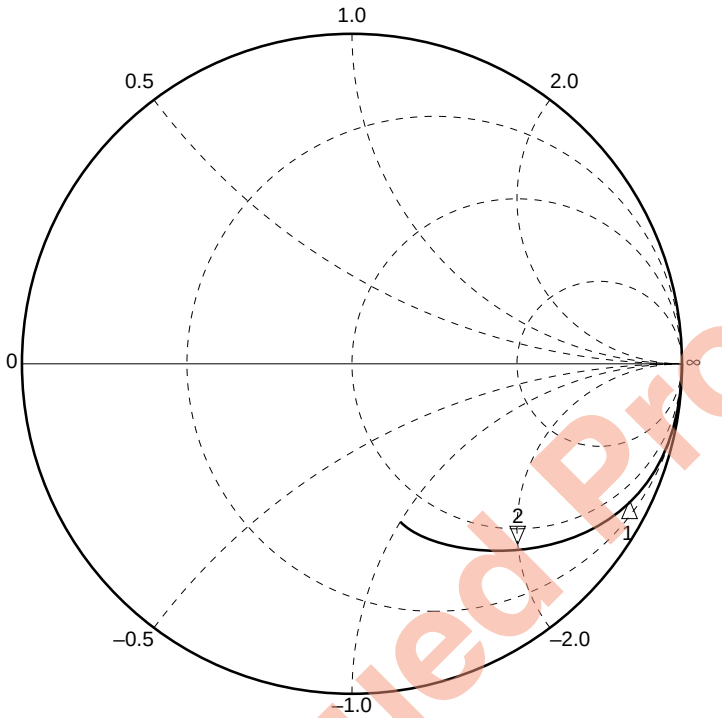
V_{DS} = 3 V, I_D = 10 mA

FREQUENCY	S_{11}		S_{21}		S_{12}		S_{22}		MSG	K
MHz	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	MAG.	ANG. (deg.)	dB	
500	.992	–12.2	3.647	162.5	.020	83.0	.765	–5.9	22.6	.17
600	.979	–14.7	3.618	158.3	.024	83.3	.759	–7.3	21.8	.23
700	.964	–17.6	3.594	154.7	.027	81.7	.757	–9.1	21.2	.29
800	.943	–20.2	3.536	151.0	.032	80.5	.747	–10.0	20.5	.38
900	.923	–22.6	3.510	148.4	.034	81.6	.739	–11.5	20.1	.41
1000	.911	–24.9	3.492	145.2	.038	78.7	.736	–12.0	19.7	.47
1100	.900	–27.6	3.477	142.4	.043	77.7	.727	–13.8	19.1	.47
1200	.894	–29.8	3.473	139.0	.046	76.9	.734	–14.3	18.8	.49
1300	.885	–32.5	3.453	135.8	.049	76.0	.724	–16.0	18.5	.50
1400	.868	–35.1	3.410	132.2	.054	75.2	.724	–17.3	18.0	.52
1500	.842	–37.1	3.359	129.3	.057	74.0	.712	–18.9	17.7	.58
1600	.817	–39.9	3.325	125.9	.061	72.9	.707	–20.1	17.4	.63
1700	.783	–42.2	3.269	122.8	.064	72.0	.692	–21.0	17.1	.70
1800	.759	–45.0	3.235	119.6	.067	71.1	.689	–22.2	16.8	.73
1900	.734	–47.6	3.197	116.6	.070	70.1	.676	–22.7	16.6	.78
2000	.712	–50.0	3.152	113.3	.074	70.0	.676	–23.9	16.3	.80
2100	.686	–51.5	3.086	110.2	.075	68.7	.663	–25.0	16.1	.87
2200	.680	–52.6	3.026	107.8	.077	68.2	.653	–26.7	15.9	.89
2300	.667	–55.1	3.013	105.2	.081	68.3	.644	–27.7	15.7	.89
2400	.641	–58.1	2.999	102.1	.085	68.2	.640	–29.4	15.5	.89
2500	.612	–61.0	2.978	99.3	.089	67.3	.631	–30.6	15.3	.92
2600	.589	–63.8	2.944	96.3	.092	67.9	.627	–32.0	15.1	.93
2700	.570	–66.5	2.904	93.5	.095	67.0	.623	–32.9	14.9	.95
2800	.556	–68.9	2.862	90.7	.099	66.9	.620	–34.1	14.6	.95
2900	.540	–70.5	2.809	88.0	.102	66.4	.614	–35.1	14.4	.97
3000	.520	–72.6	2.768	85.3	.107	66.8	.602	–36.3	14.1	.98

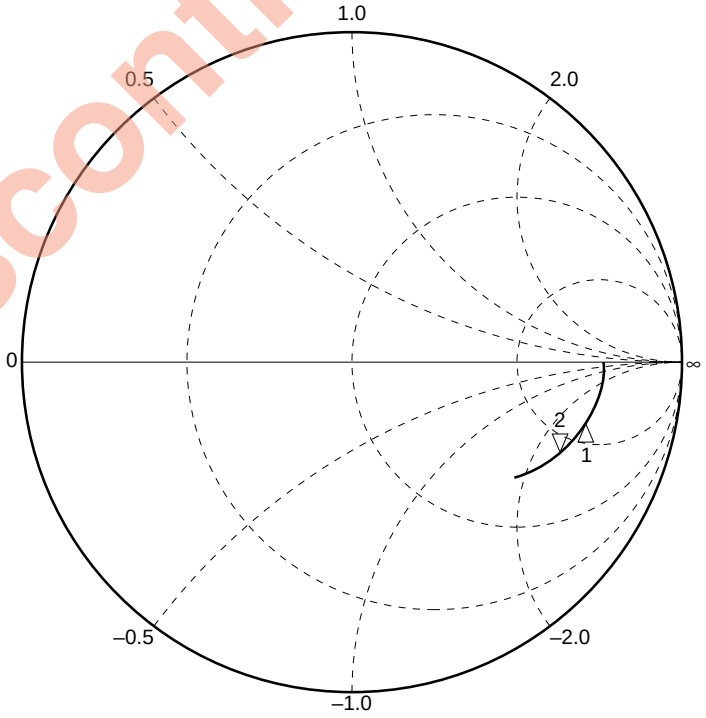
S-Parameter

V_{DS} = 3 V, I_D = 10 mA
START 100 MHz, STOP 3 GHz, STEP 100 MHz

S11



S22



RECOMMENDED SOLDERING CONDITIONS

The following conditions (see table below) must be met when soldering this product.

Please consult with our sales offices in case other soldering process is used, or in case soldering is done under different conditions.

<TYPES OF SURFACE MOUNT DEVICE>

For more details, refer to our document “SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL” (C10535E).

Soldering process	Soldering conditions	Symbol
VPS	Package peak temperature : 215 °C, Time : 40 seconds MAX. (200 °C MIN.), Number of times : 2, Number of days : not limited*	VP15-00-2
Wave soldering	Soldering bath temperature : 260 °C MAX., Time : 10 seconds MAX., Number of times : 1, Number of days : not limited*	WS60-00-1
Infrared ray reflow	Peak package’s surface temperature: 230 °C or below, Reflow time: 30 seconds or below (210 °C or higher), Number of reflow process: 2, Exposure limit*: None	IR30-00-2
Partial heating method	Terminal temperature: 230 °C or below, Flow time: 10 seconds or below, Exposure limit*: None	

* Exposure limit before soldering after dry-pack package is opened.
Storage conditions: 25 °C and relative humidity at 65 % or less.

Note Do not apply more than a single process at once, except for “Partial heating method”.

PRECAUTION **Avoid high static voltage and electric fields, because this device is MES FET with GaAs shottky barrier gate.**

[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.

M4 96.5