

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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30W L-BAND POWER GaAs FET

N-CHANNEL GaAs MES FET

DESCRIPTION

The NES1417B-30 is power GaAs FET which provides high output power and high gain in the 1.4-1.7GHz band.

Internal input matching circuits are designed to optimize performance. The device has a $0.8 \mu\text{m}$ gate length for increased linear gain. To reduce thermal resistance, the device uses PHS (Plated Heat Sink) technology.

The device incorporates WSi (tungsten silicide) gate for high reliability and SiO_2 glassivation for surface stability.

FEATURES

- High output power
- High gain
- High power added efficiency
- Internally matched input
- High reliability

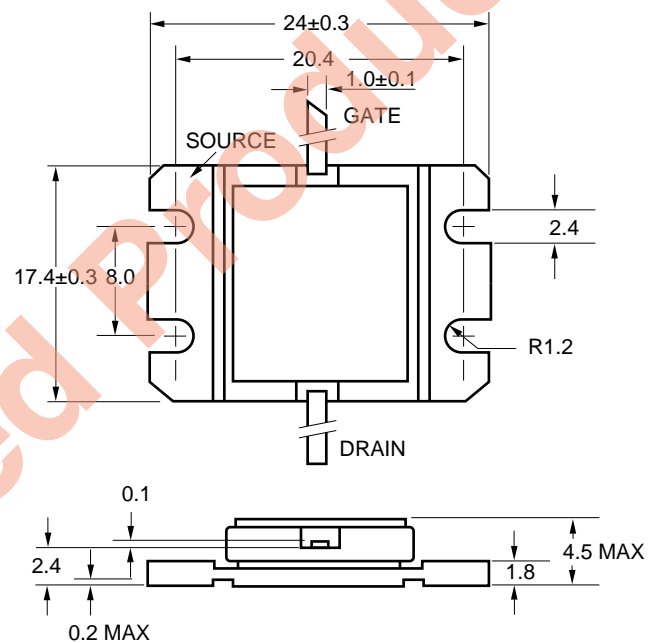
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

Drain to Source Voltage	V_{DS}	15	V
Gate to Source Voltage	V_{GS}	-7	V
Gate to Drain Voltage	V_{GD}	-18	V
Drain Current	I_D	27	A
Gate Current	I_G	180	mA
Total Power Dissipation	$P_T^{(*)}$	110	W
Channel Temperature	T_{ch}	175	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +175	$^\circ\text{C}$

* $T_C = 25^\circ\text{C}$

Caution Please handle this device at static-free workstation, because this is an electrostatic sensitive device.

PACKAGE DIMENSIONS (UNIT: mm)



ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Saturated Drain Current	I _{DSS}	--	18.0	--	A	V _{DS} = 2.5 V, V _{GS} = 0 V
Pinch-off Voltage	V _P	-4.0	-2.6	--	V	V _{DS} = 2.5 V, I _{DS} = 80 mA
Thermal Resistance	R _{th}	--	1.4	1.7	°C/W	Channel to Case
Output Power	P ₀ *1	44.5	45.0	--	dBm	freq. = 1.5 GHz V _{DS} = 10 V I _{DS} = 1.0 A set R _g = 30 Ω *3
Linear Gain	GL	12.0	13.0	--	dB	
Drain Current	I _D *2	--	2.5	--	A	

*1 P_{IN} = 35.5 dBm *2 P₀ = 37 dBm

RECOMMENDING OPERATING LIMITS

R _g *3 (Ω)	V _{DS} (V)	T _{ch} (°C)	G.C.P *4
30	to 10	to 125	to 3dB comp

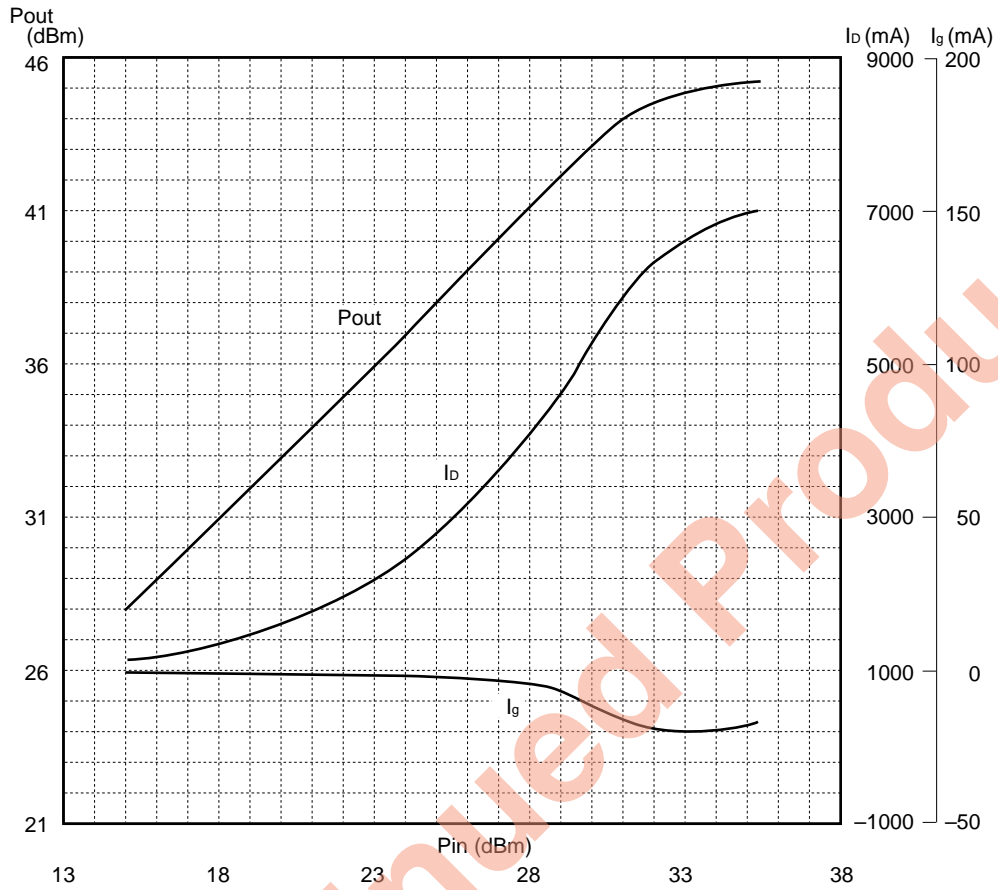
Note *3 R_g is the series resistance between the gate supply and the FET gate.

*4 G.C.P: Gain Compression Point

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TYPICAL RF PERFORMANCE

f = 1.5 GHz, Vd = 10 V, Id = 1 A set, Rg = 30 Ω



S-PARAMETER

V_{DS} = 10 V, I_{DS} = 1Aset

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
1 300.000	0.871	131.4	1.322	-5.5	0.023	-76.9	0.755	149.3
1 310.000	0.869	130.8	1.337	-8.4	0.024	-78.1	0.754	149.0
1 320.000	0.867	130.2	1.345	-10.8	0.025	-79.0	0.753	148.9
1 330.000	0.867	129.3	1.351	-12.7	0.026	-79.8	0.751	148.7
1 340.000	0.866	128.3	1.362	-13.8	0.028	-80.9	0.750	148.4
1 350.000	0.863	127.0	1.393	-14.5	0.030	-83.0	0.748	148.2
1 360.000	0.858	125.8	1.450	-14.8	0.032	-86.2	0.747	148.0
1 370.000	0.852	124.9	1.534	-15.5	0.034	-90.4	0.745	147.6
1 380.000	0.850	123.6	1.638	-17.1	0.036	-94.7	0.743	147.3
1 390.000	0.847	122.4	1.755	-19.9	0.037	-98.8	0.741	146.8
1 400.000	0.845	121.0	1.863	-23.6	0.038	-102.0	0.737	146.2
1 410.000	0.842	119.5	1.951	-27.7	0.038	-104.6	0.735	145.7
1 420.000	0.839	117.7	2.018	-31.8	0.040	-106.6	0.731	145.0
1 430.000	0.835	116.0	2.068	-35.3	0.041	-108.2	0.729	144.1
1 440.000	0.829	114.0	2.118	-38.1	0.044	-109.6	0.723	143.2
1 450.000	0.826	111.5	2.180	-40.7	0.048	-111.5	0.718	142.2
1 460.000	0.819	108.9	2.277	-42.7	0.053	-114.5	0.709	141.1
1 470.000	0.810	106.0	2.418	-44.8	0.058	-119.0	0.699	139.8
1 480.000	0.801	102.4	2.615	-47.5	0.063	-124.3	0.686	138.3
1 490.000	0.789	98.4	2.857	-51.1	0.068	-130.0	0.670	136.7
1 500.000	0.774	93.5	3.133	-55.9	0.072	-135.8	0.647	134.7
1 510.000	0.757	87.7	3.439	-61.8	0.077	-141.5	0.619	132.5
1 520.000	0.733	80.6	3.757	-68.5	0.082	-147.1	0.580	130.1
1 530.000	0.700	71.8	4.094	-76.0	0.089	-153.3	0.528	127.4
1 540.000	0.657	60.9	4.424	-84.4	0.097	-160.4	0.462	125.2
1 550.000	0.604	47.1	4.751	-94.0	0.105	-168.8	0.379	124.5
1 560.000	0.541	29.0	5.023	-104.9	0.114	-178.7	0.282	128.6
1 570.000	0.475	5.57	5.213	-117.0	0.120	169.5	0.199	147.8
1 580.000	0.423	-24.6	5.245	-129.8	0.122	156.9	0.207	-175.8
1 590.000	0.414	-58.3	5.097	-142.5	0.120	144.5	0.311	-158.3
1 600.000	0.449	-89.2	4.774	-154.4	0.113	132.5	0.436	-156.2
1 610.000	0.503	-114.0	4.285	-165.0	0.103	121.7	0.551	-159.7
1 620.000	0.561	-131.6	3.812	-173.7	0.093	112.5	0.640	-164.1
1 630.000	0.610	-145.1	3.352	179.3	0.083	105.8	0.708	-168.6
1 640.000	0.648	-155.5	2.954	174.0	0.075	100.0	0.757	-172.6
1 650.000	0.680	-163.7	2.656	170.4	0.069	94.8	0.793	-176.0
1 660.000	0.703	-170.5	2.439	167.5	0.064	89.7	0.822	-179.0
1 670.000	0.724	-176.1	2.296	164.4	0.059	84.2	0.844	178.3
1 680.000	0.739	179.1	2.183	160.2	0.054	78.9	0.861	176.0
1 690.000	0.751	175.0	2.065	154.9	0.049	73.8	0.874	173.9
1 700.000	0.760	171.5	1.919	149.2	0.044	69.5	0.885	172.0
1 710.000	0.769	168.3	1.743	143.5	0.039	66.4	0.894	170.4
1 720.000	0.774	165.4	1.550	139	0.035	64.6	0.901	168.9
1 730.000	0.780	162.9	1.374	135.8	0.032	63.8	0.908	167.5
1 740.000	0.785	160.7	1.220	134.3	0.030	64.0	0.914	166.2
1 750.000	0.788	158.6	1.103	134.1	0.029	63.5	0.920	165.1
1 760.000	0.790	156.7	1.025	134.8	0.028	62.3	0.924	164.0
1 770.000	0.793	154.8	0.988	135.4	0.028	59.8	0.928	163.0
1 780.000	0.795	153.1	0.975	134.6	0.027	56.0	0.933	162.1
1 790.000	0.796	151.4	0.971	131.8	0.025	51.7	0.935	161.1
1 800.000	0.795	149.8	0.951	127.6	0.024	47.9	0.938	160.3
1 810.000	0.794	148.3	0.908	122.5	0.022	45.0	0.940	159.4
1 820.000	0.795	146.8	0.843	117.8	0.020	43.2	0.942	158.6
1 830.000	0.794	145.3	0.767	114.1	0.018	42.6	0.945	157.8
1 840.000	0.794	144.0	0.695	111.7	0.017	42.9	0.946	157.1
1 850.000	0.793	142.5	0.632	110.6	0.016	43.1	0.948	156.3
1 860.000	0.791	141.3	0.584	110.5	0.016	43.3	0.950	155.6
1 870.000	0.790	140.0	0.552	110.9	0.016	42.6	0.952	154.8
1 880.000	0.788	138.8	0.534	111.2	0.015	41.1	0.954	154.1
1 890.000	0.784	137.5	0.522	110.2	0.015	38.3	0.956	153.4

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