

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 43.5dBm (typ.) @ P_{sat}
- Power Gain : 18dB (typ.) @ $f=2.60GHz$
- Proven Reliability

DESCRIPTION

SEI's GaN-HEMT offers high efficiency, ease of matching, greater consistency and broad bandwidth for high power L-band amplifiers with 50V operation, and gives you higher gain.

This new product is ideally suited for use in 2.6GHz WiMAX and LTE design requirements as it offers high gain, long term reliability and ease of use.



ABSOLUTE MAXIMUM RATINGS (Case Temperature $T_c=25deg.C$)

Item	Symbol	Condition	Rating	Unit
Operating Voltage	V_{DS}	$V_{GS}=-8V$	55	V
Drain-Source Voltage	V_{DS}		160	V
Gate-Source Voltage	V_{GS}		-15	V
Total Power Dissipation	P_t		32.1	W
Storage Temperature	T_{stg}		-65 to +175	deg.C
Channel Temperature	T_{ch}		250	deg.C

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}	$RG=15ohm$	≤ 55	V
Forward Gate Current	I_{GF}		≤ 46	mA
Reverse Gate Current	I_{GR}		≥ -0.7	mA
Channel Temperature	T_{ch}		≤ 180	deg.C
Average Output Power	$P_{ave.}$		≤ 42.0	dBm

ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25deg.C$)

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V, I_{DS}=5.2mA$	-1.0	-1.5	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	42.5	43.5	-	dBm
Drain Efficiency	$\eta_d *2$	$I_{DS}(DC)=100mA$	10.5	12.5	-	%
Power Gain	$G_p *2$	$f=2.60GHz$	17.0	18.0	-	dB
Thermal Resistance	R_{th}	Channel to Case at 21W PDC	-	6.0	7.0	deg.C/W

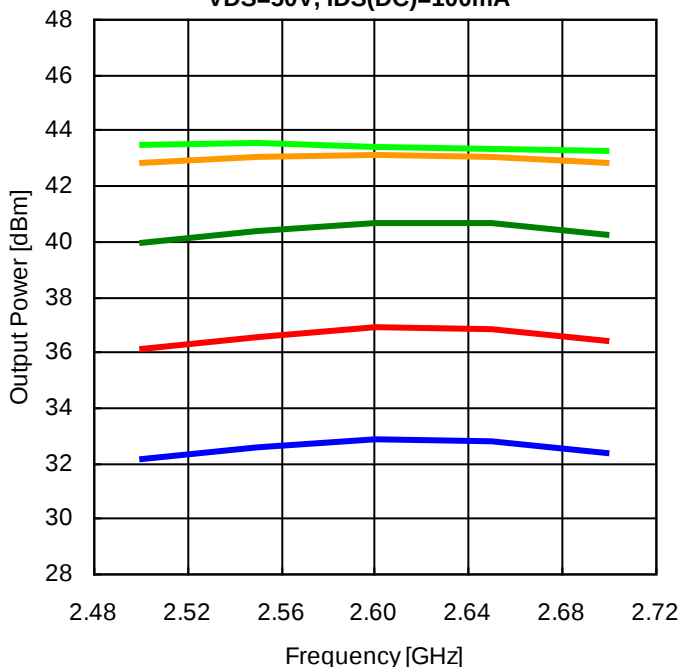
*1 : 10%-duty RF pulse (DC supply constant)

*2 : $P_{out}=30dBm$, CW

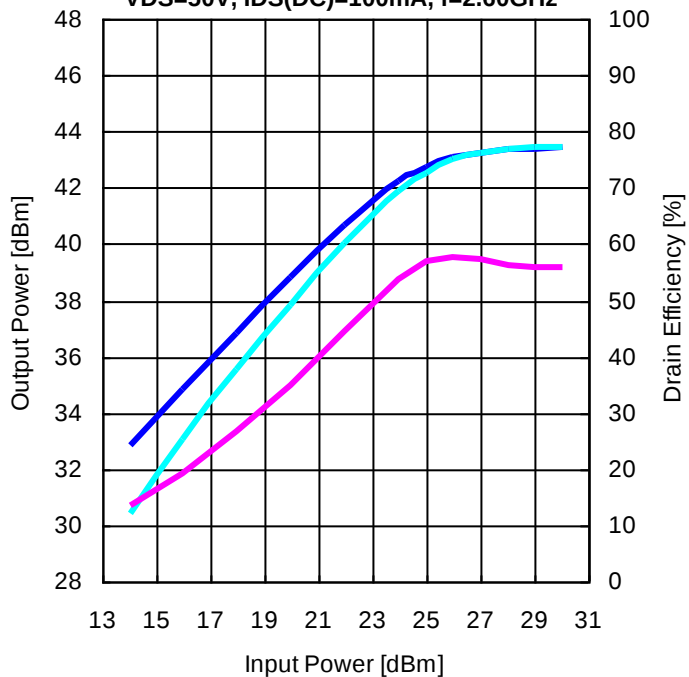
RoHS COMPLIANCE	Yes
-----------------	-----

RF characteristics @f=2.6GHz fine tuned

Output Power vs. Frequency
VDS=50V, IDS(DC)=100mA



Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=100mA, f=2.60GHz

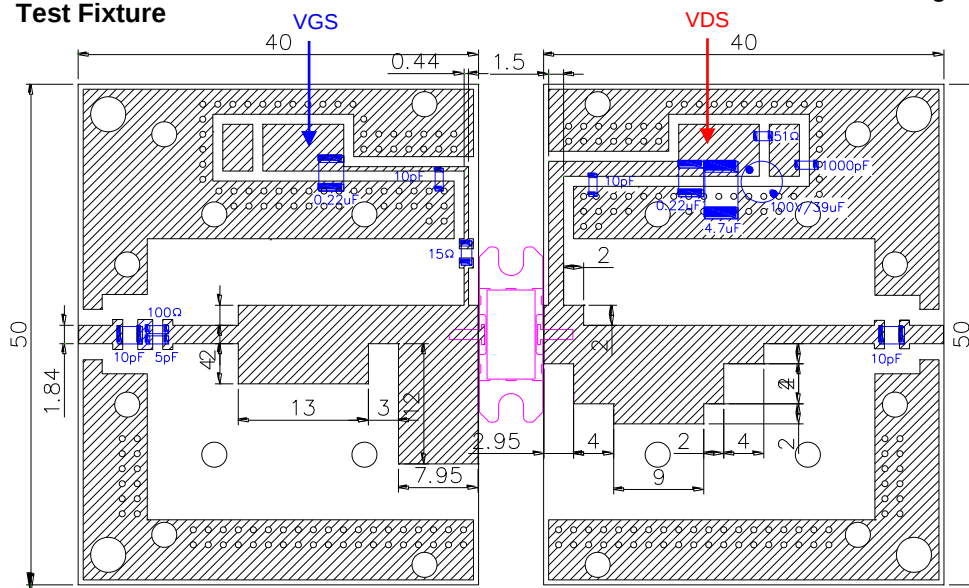


Pin=16dBm Pin=20dBm Pin=24dBm
Pin=28dBm Pin=32dBm

Pout (class AB) Pout (class B) Nd (class B)

Pulse Signal (10%-duty, DC : constant)

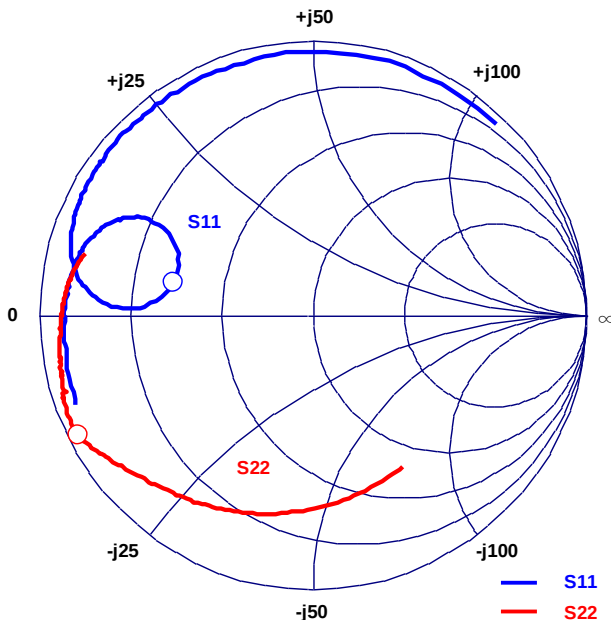
Test Fixture



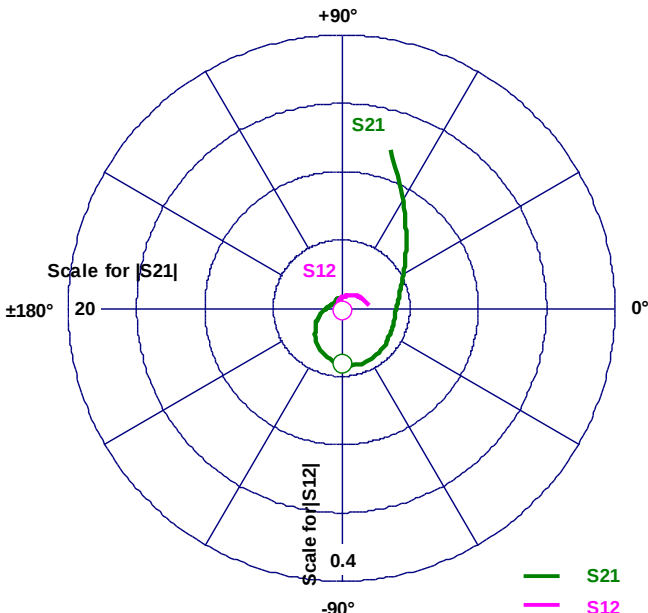
h=0.8mm $\epsilon_r=3.5$
Cu=18um Unit:mm

S-Parameters @VDS=50V, IDS(DC)=100mA, f=0.5 to 5.5GHz
Zl = Zs = 50ohm Marker : 2.60GHz

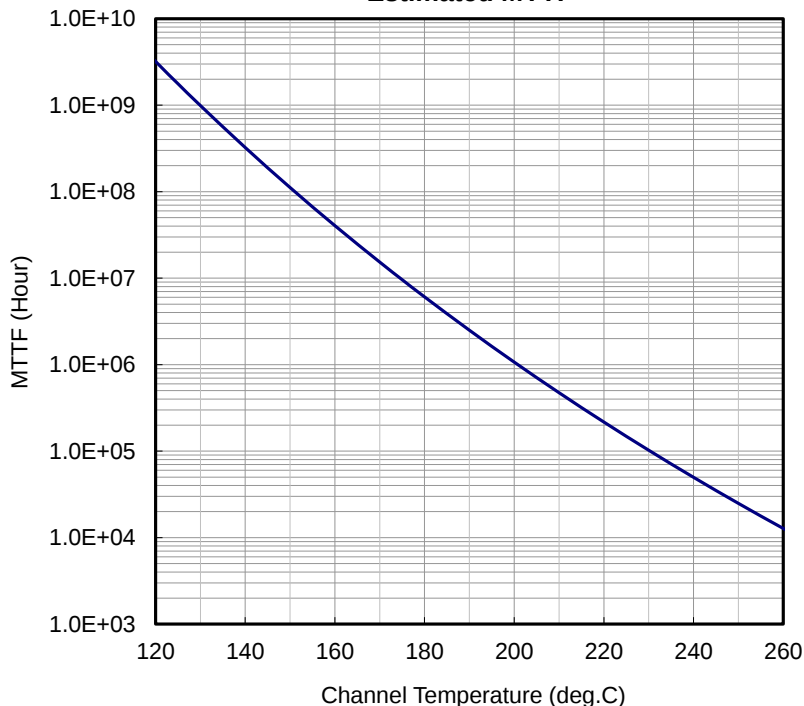
- Reference DATA -



Freq. GHz	S11			S21			S12			S22		
	MAG	ANG		MAG	ANG		MAG	ANG		MAG	ANG	
0.50	0.93	-159.19		12.05	72.67		0.008	-1.13		0.64	-59.21	
0.60	0.92	-165.19		10.07	65.04		0.008	-11.24		0.66	-67.21	
0.70	0.91	-170.03		8.67	57.83		0.008	-8.32		0.67	-74.91	
0.80	0.91	-173.90		7.54	51.35		0.007	-13.73		0.69	-82.34	
0.90	0.91	-177.61		6.75	44.25		0.007	-17.97		0.71	-89.43	
1.00	0.91	-179.17		6.02	38.72		0.006	-20.17		0.72	-96.01	
1.10	0.91	-176.62		5.53	32.42		0.006	-18.84		0.74	-101.74	
1.20	0.90	-173.93		5.12	27.12		0.006	-22.89		0.76	-106.96	
1.30	0.89	-171.13		4.78	21.57		0.005	-17.63		0.77	-111.83	
1.40	0.89	-168.68		4.50	16.00		0.005	-13.48		0.79	-116.38	
1.50	0.88	-166.23		4.31	10.24		0.005	-6.36		0.80	-120.49	
1.60	0.88	-163.99		4.17	4.86		0.005	-11.42		0.82	-124.57	
1.70	0.86	-161.37		4.06	-1.20		0.005	-16.52		0.83	-128.11	
1.80	0.84	-159.01		4.00	-6.69		0.005	-6.58		0.84	-131.45	
1.90	0.82	-156.48		3.99	-13.77		0.005	-3.32		0.85	-134.45	
2.00	0.79	-154.01		4.01	-20.46		0.005	-7.37		0.87	-137.45	
2.10	0.76	-152.16		4.09	-28.21		0.006	-12.59		0.88	-139.70	
2.20	0.71	-149.99		4.18	-36.76		0.006	-15.90		0.90	-142.36	
2.30	0.65	-149.92		4.27	-47.32		0.006	-16.52		0.91	-144.90	
2.40	0.58	-151.61		4.39	-58.58		0.007	-25.56		0.93	-147.07	
2.50	0.53	-157.38		4.37	-72.92		0.009	-38.70		0.95	-149.76	
2.60	0.52	-167.15		4.20	-87.72		0.007	-52.32		0.96	-152.89	
2.70	0.58	-174.87		3.88	-102.47		0.008	-69.96		0.97	-155.81	
2.80	0.65	-177.98		3.42	-116.09		0.006	-80.21		0.97	-158.23	
2.90	0.74	-177.73		2.98	-128.93		0.006	-99.78		0.96	-160.60	
3.00	0.80	-175.15		2.53	-138.41		0.005	-119.97		0.96	-162.49	
3.10	0.85	-172.80		2.16	-147.75		0.004	-141.80		0.95	-164.16	
3.20	0.88	-170.45		1.85	-154.40		0.003	-149.33		0.95	-165.84	
3.30	0.90	-167.38		1.61	-161.06		0.003	-148.32		0.94	-167.06	
3.40	0.92	-164.78		1.40	-167.06		0.002	-170.04		0.94	-168.50	
3.50	0.93	-162.21		1.25	-171.97		0.004	-154.83		0.94	-169.83	
3.60	0.94	-160.05		1.10	-175.94		0.004	-152.92		0.94	-170.97	
3.70	0.94	-157.64		1.00	-179.26		0.005	-138.47		0.94	-172.18	
3.80	0.95	-155.78		0.90	-176.14		0.006	-132.27		0.93	-173.24	
3.90	0.95	-153.40		0.84	-171.68		0.007	-123.62		0.93	-174.53	
4.00	0.95	-151.26		0.77	-168.54		0.007	-123.57		0.93	-175.56	
4.10	0.95	-148.89		0.73	-164.98		0.008	-110.61		0.92	-176.60	
4.20	0.96	-146.32		0.68	-161.09		0.009	-107.64		0.92	-177.84	
4.30	0.95	-143.92		0.66	-157.85		0.011	-96.89		0.92	-178.79	
4.40	0.95	-140.71		0.63	-154.07		0.012	-94.01		0.92	-179.95	
4.50	0.96	-137.18		0.61	-150.11		0.013	-88.39		0.92	-178.92	
4.60	0.96	-133.23		0.61	-146.45		0.015	-82.84		0.92	-177.68	
4.70	0.95	-129.21		0.60	-142.40		0.016	-74.42		0.91	-176.35	
4.80	0.95	-124.24		0.60	-137.31		0.018	-66.72		0.91	-175.22	
4.90	0.96	-118.27		0.61	-132.50		0.021	-59.95		0.90	-173.83	
5.00	0.96	-111.62		0.62	-126.80		0.022	-54.30		0.90	-172.54	
5.10	0.95	-103.04		0.65	-120.94		0.025	-47.20		0.90	-171.14	
5.20	0.96	-92.99		0.67	-113.37		0.027	-38.78		0.89	-169.67	
5.30	0.96	-80.30		0.70	-105.36		0.032	-28.47		0.88	-168.11	
5.40	0.96	-65.14		0.74	-94.28		0.036	-16.94		0.87	-166.53	
5.50	0.97	-45.94		0.78	-83.11		0.041	-4.00		0.86	-164.91	



MTTF Calculation - Estimated MTTF -



Ea=1.6eV
Confidence Level=90%

Channel Temp. (deg.C)	MTTF (Hours)
160	4.05 x 10 ⁷
180	6.07 x 10 ⁶
200	1.07 x 10 ⁶

$$AF = \exp[(-Ea / k)(1/T_{stress} - 1/T_{use})]$$

$$MTTF_{use} = MTTF_{stress} \times AF$$

Where;

AF : acceleration factor

Ea : activation energy (1.6eV)

k : Boltzmann's constant (8.62x10⁻⁵eV/K)

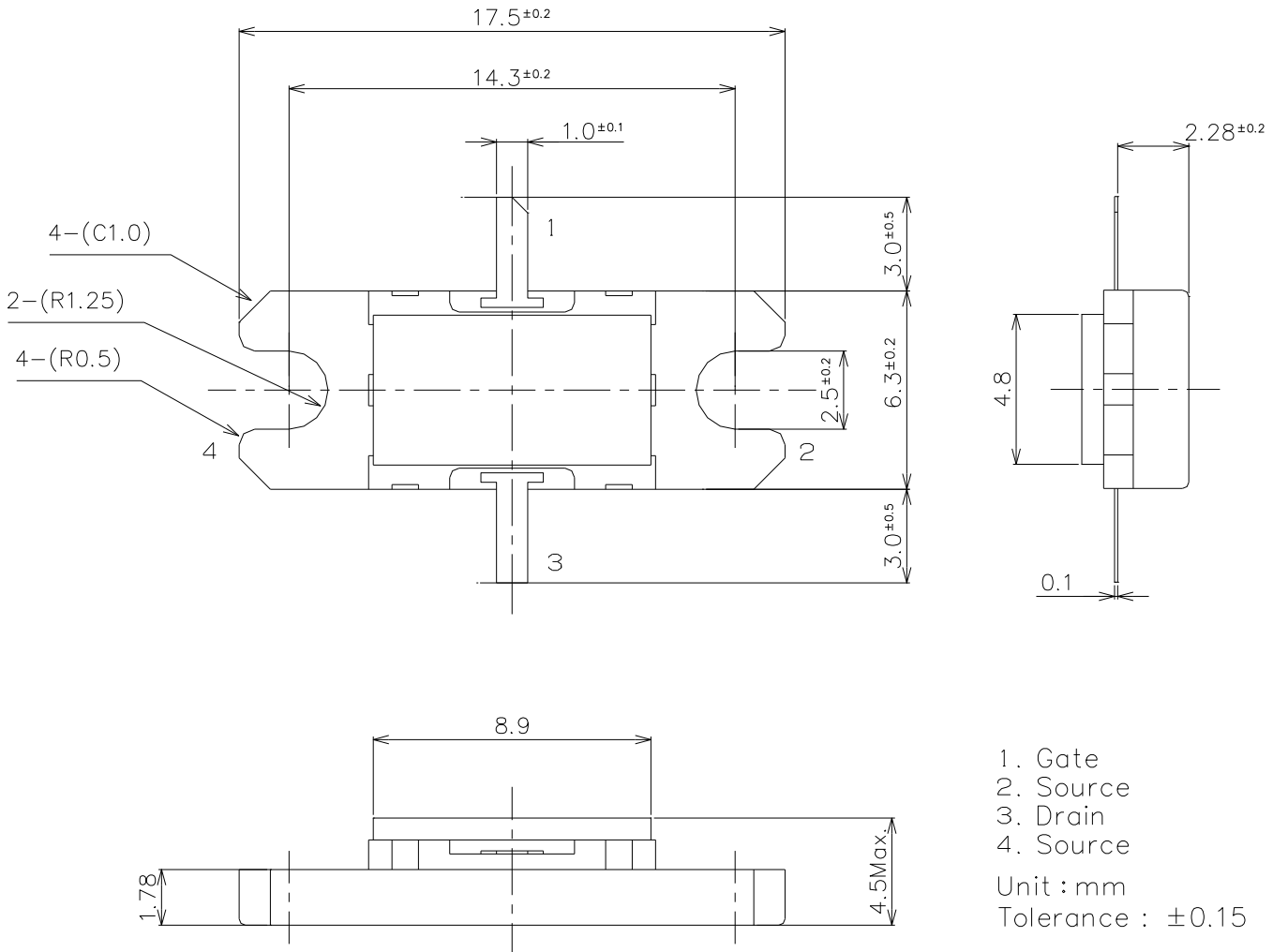
T_{stress} : stress temperature (K)

T_{use} : use temperature (K)

ESD characteristic

Test Methodology	Class
Human Body Model (per JESD22-A114)	0
Machine Model (per JEIA/ESD22-A115)	A

MK Package Outline Metal-Ceramic Hermetic Package





EGN26C020MK

High Voltage - High Power GaN-HEMT

For further information please contact:

<http://global-sei.com/Electro-optic/about/office.html>