

FEATURES

- High Voltage Operation : VDS=50V
- High Power : 45.0dBm (typ.) @ Psat
- Power Gain : 16.5dB (typ.) @ f=3.5GHz
- Proven Reliability

DESCRIPTION

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

This new product is ideally suited for use in 3.5GHz WiMAX design requirements as it offers high gain, long term reliability and ease of use.



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

Item	Symbol	Condition	Rating	Unit
Operating Voltage	VDS		55	V
Drain-Source Voltage	VDS	VGS=-8V	160	V
Gate-Source Voltage	VGS		-15	V
Total Power Dissipation	Pt		37.5	W
Storage Temperature	Tstg		-65 to +175	deg.C
Channel Temperature	Tch		250	deg.C

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	VDS		≤ 55	V
Forward Gate Current	IGF	RG=15ohm	≤ 69	mA
Reverse Gate Current	IGR	RG=15ohm	≥ -1.1	mA
Channel Temperature	Tch		≤ 180	deg.C
Average Output Power	Pave.		≤ 42.0	dBm

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25deg.C)

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	Vp	VDS=50V, IDS=7.8mA	-1.0	-1.5	-2.0	V
Saturated Power	Psat *1	VDS=50V	44.0	45.0	-	dBm
Drain Efficiency	ηd *2	IDS(DC)=150mA	9.0	11.0	-	%
Power Gain	Gp *2	f=3.50GHz	15.5	16.5	-	dB
Thermal Resistance	Rth	Channel to Case at 24W PDC	-	5.0	6.0	deg.C/W

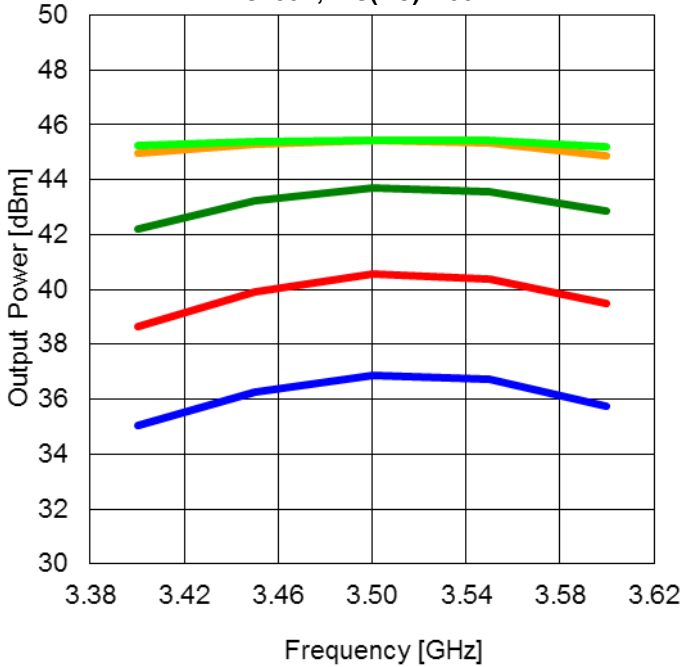
*1 : 10%-duty RF pulse (DC supply constant)

*2 : Pout=31.5dBm, CW

RoHS COMPLIANCE	Yes
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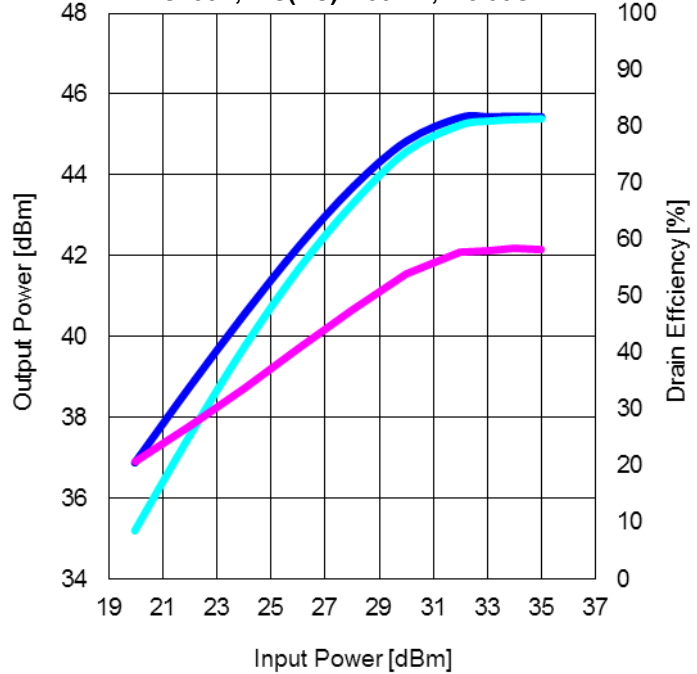
RF characteristics @f=3.5GHz fine tuned

Output Power vs. Frequency
VDS=50V, IDS(DC)=150mA



— Pin=20dBm — Pin=24dBm — Pin=28dBm
— Pin=32dBm — Pin=34dBm

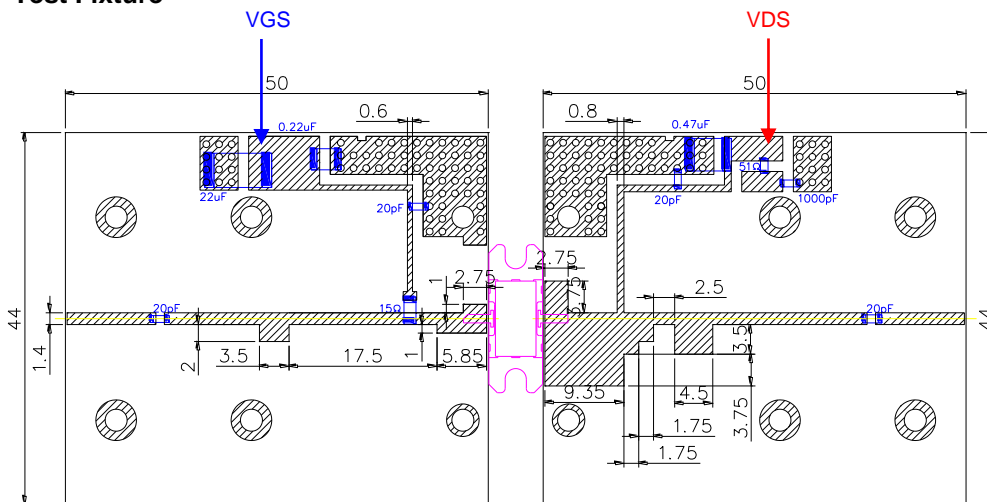
Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=150mA, f=3.5GHz



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

Test Fixture

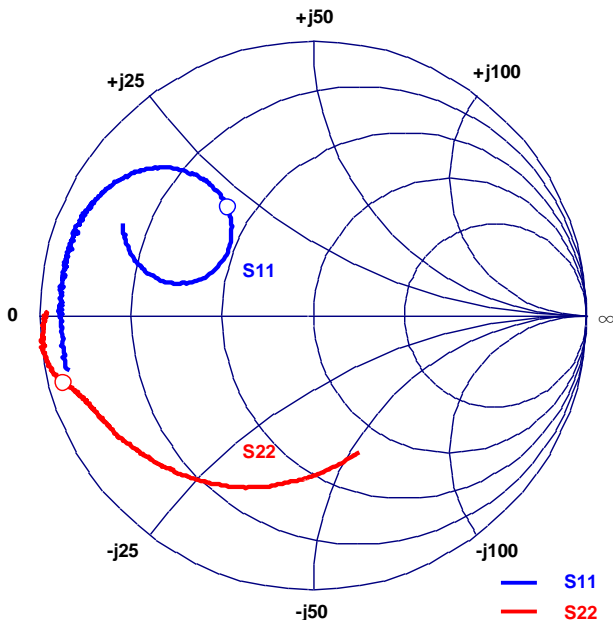
Pulse Signal (10%-duty, DC : constant)



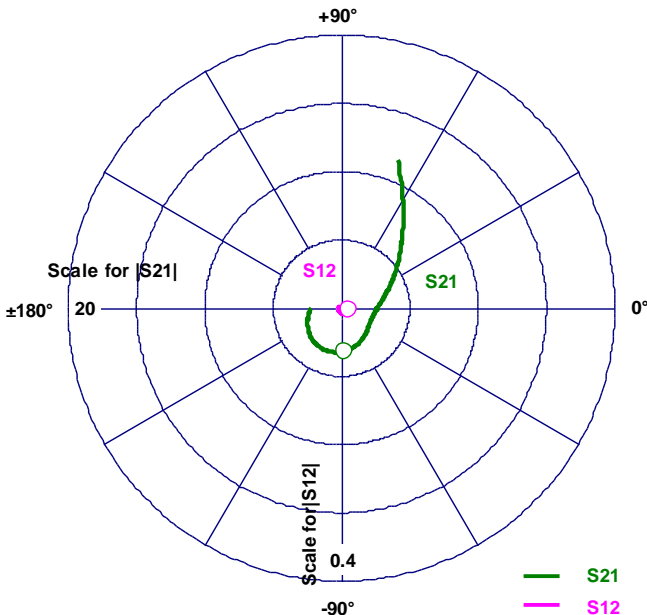
h=0.6mm εr=3.5
Cu=35μm Unit:mm

S-Parameters @VDS=50V, IDS(DC)=150mA, f=0.5 to 4.5GHz
 ZI = Zs = 50ohm Marker : 3.50GHz

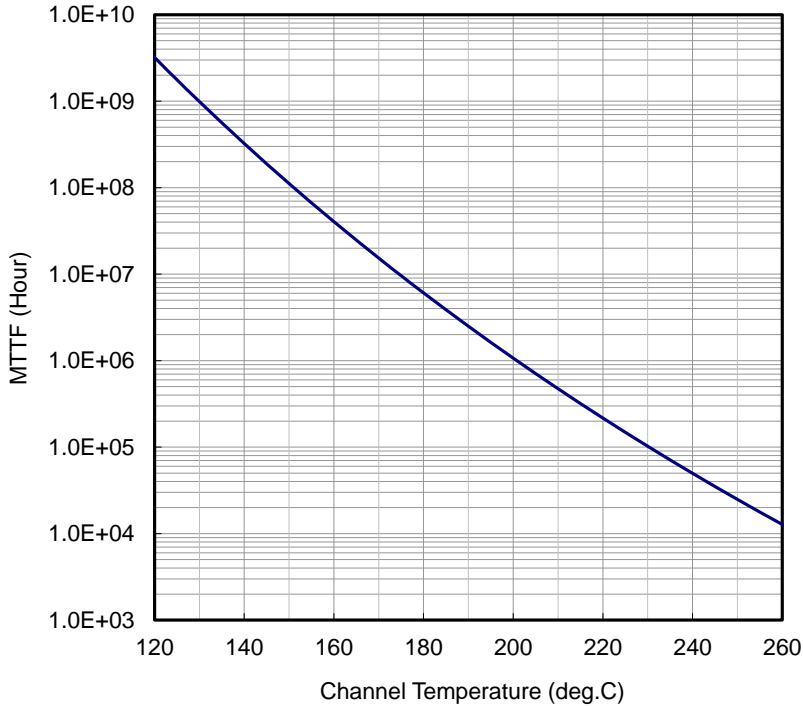
- Reference DATA -



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.91	-167.14	11.61	68.89	0.008	-6.03	0.53	-71.18
0.60	0.92	-171.60	9.57	61.82	0.007	-9.26	0.55	-79.90
0.70	0.92	-175.48	8.03	55.27	0.007	-10.66	0.58	-87.59
0.80	0.92	-178.48	6.94	49.43	0.006	-15.34	0.60	-94.62
0.90	0.93	-179.06	6.08	43.95	0.006	-13.78	0.63	-101.09
1.00	0.93	-176.26	5.36	38.67	0.005	-18.00	0.65	-106.85
1.10	0.92	-173.62	4.85	33.48	0.005	-14.38	0.68	-112.27
1.20	0.93	-171.84	4.36	28.74	0.005	-16.58	0.70	-117.26
1.30	0.92	-169.49	3.97	24.07	0.004	-12.14	0.72	-121.63
1.40	0.92	-167.77	3.64	20.28	0.004	-6.47	0.74	-125.38
1.50	0.93	-165.81	3.39	15.94	0.004	1.59	0.75	-129.24
1.60	0.92	-164.45	3.16	11.67	0.004	5.47	0.77	-132.66
1.70	0.91	-162.88	2.97	8.03	0.004	10.46	0.78	-135.94
1.80	0.91	-161.08	2.83	4.37	0.004	10.89	0.79	-138.72
1.90	0.91	-158.93	2.70	0.56	0.004	22.66	0.81	-141.31
2.00	0.92	-157.55	2.59	-3.12	0.004	24.96	0.82	-143.70
2.10	0.91	-155.70	2.53	-7.36	0.005	29.67	0.83	-145.62
2.20	0.91	-154.01	2.47	-10.88	0.004	28.85	0.84	-147.70
2.30	0.90	-152.08	2.42	-15.06	0.005	33.51	0.84	-149.88
2.40	0.89	-150.19	2.40	-18.43	0.006	30.33	0.85	-151.97
2.50	0.88	-148.17	2.39	-22.44	0.006	32.26	0.86	-153.36
2.60	0.87	-146.19	2.40	-26.84	0.007	32.03	0.86	-154.78
2.70	0.85	-143.82	2.43	-31.18	0.007	27.75	0.87	-156.43
2.80	0.83	-141.42	2.48	-35.91	0.008	30.27	0.88	-157.56
2.90	0.81	-139.07	2.54	-40.98	0.009	27.38	0.88	-158.62
3.00	0.78	-136.35	2.63	-46.57	0.009	24.42	0.89	-159.89
3.10	0.74	-133.70	2.73	-52.99	0.010	16.37	0.90	-161.16
3.20	0.70	-131.34	2.85	-59.74	0.011	11.69	0.90	-161.94
3.30	0.64	-128.79	2.98	-67.53	0.011	5.10	0.92	-162.63
3.40	0.57	-127.71	3.11	-75.94	0.012	-0.22	0.93	-163.88
3.50	0.50	-128.41	3.23	-85.76	0.013	-9.93	0.94	-164.79
3.60	0.43	-133.72	3.31	-96.03	0.013	-23.25	0.96	-166.05
3.70	0.39	-142.80	3.33	-106.86	0.012	-32.19	0.97	-167.37
3.80	0.39	-155.13	3.27	-118.49	0.011	-46.00	0.98	-169.22
3.90	0.44	-163.56	3.16	-129.43	0.010	-61.37	0.99	-171.01
4.00	0.51	-167.26	3.02	-140.07	0.008	-73.73	0.99	-172.70
4.10	0.58	-166.67	2.80	-149.74	0.007	-90.41	0.99	-174.73
4.20	0.65	-164.91	2.63	-158.13	0.006	-120.14	0.99	-176.13
4.30	0.70	-161.90	2.45	-166.16	0.005	-136.89	0.99	-177.84
4.40	0.74	-158.14	2.29	-173.45	0.004	-165.04	0.98	-179.35
4.50	0.77	-154.26	2.16	-179.91	0.004	171.95	0.97	179.16



**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

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

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

Where;

AF : acceleration factor

Ea : activation energy (1.6eV)

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

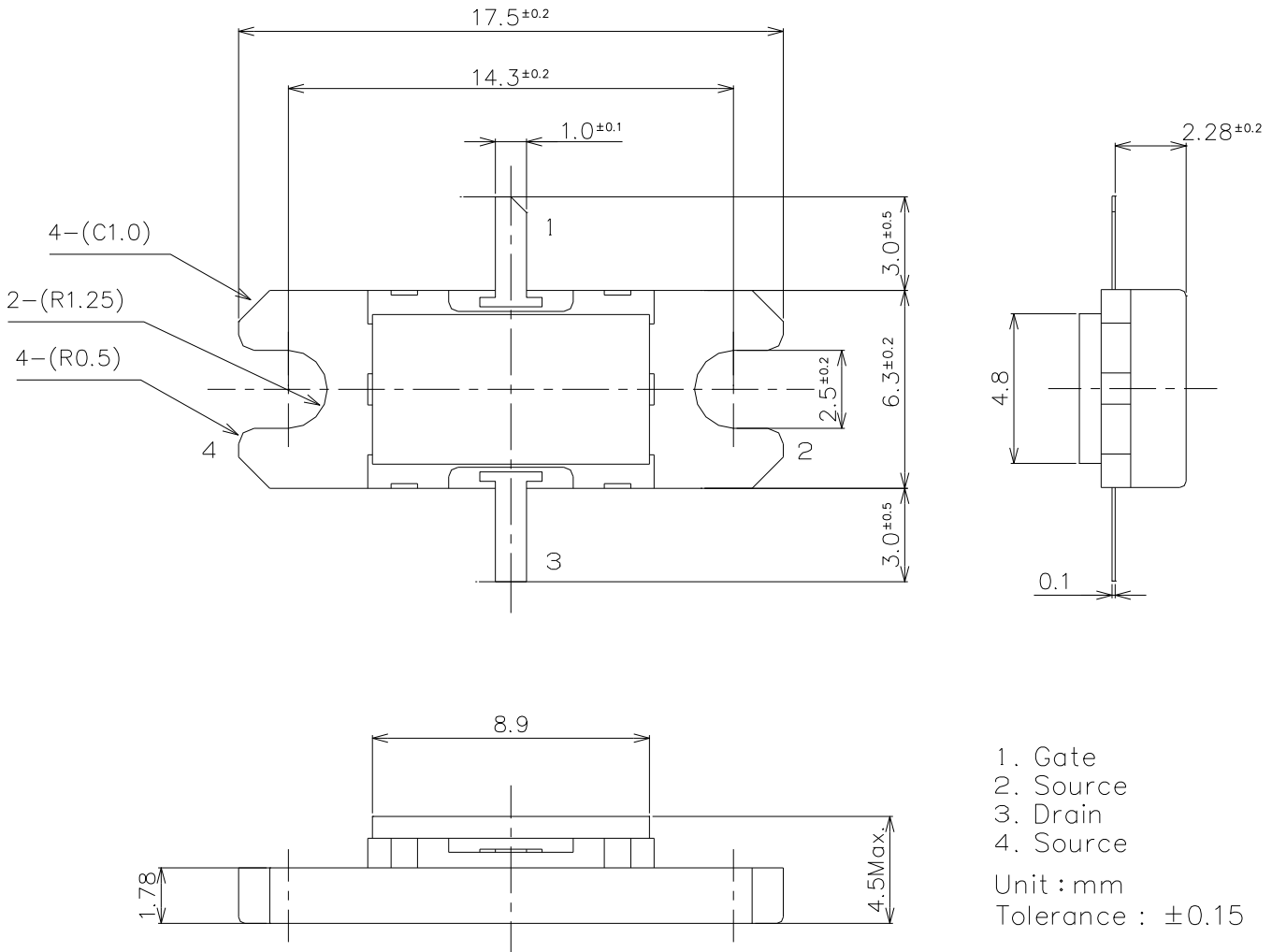
T_{stress} : stress temperature (K)

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





EGN35C030MK

High Voltage - High Power GaN-HEMT

For further information please contact:

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