

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 48.8dBm (typ.) @ P_{sat}
- High Efficiency : 60% (typ.) @ P_{sat}
- Power Gain : 16.5dB (typ.) @ $f=2.6GHz$
- 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 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		75	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}		≤ 55	V
Forward Gate Current	I_{GF}	$R_G=50\Omega$	≤ 76	mA
Reverse Gate Current	I_{GR}	$R_G=50\Omega$	≥ -2.6	mA
Channel Temperature	T_{ch}		≤ 180	deg.C
Average Output Power	P_{ave}		≤ 45.8	dBm

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

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V, I_{DS}=18mA$	-1.0	-1.5	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	48.0	48.8	-	dBm
Drain Efficiency	$\eta_d *2$	$I_{DS}(DC)=300mA$	25.0	30.0	-	%
Power Gain	$G_p *2$	$f=2.6GHz$	15.5	16.5	-	dB
Thermal Resistance	R_{th}	Channel to Case at 48W PDC	-	2.5	3.0	deg.C/W

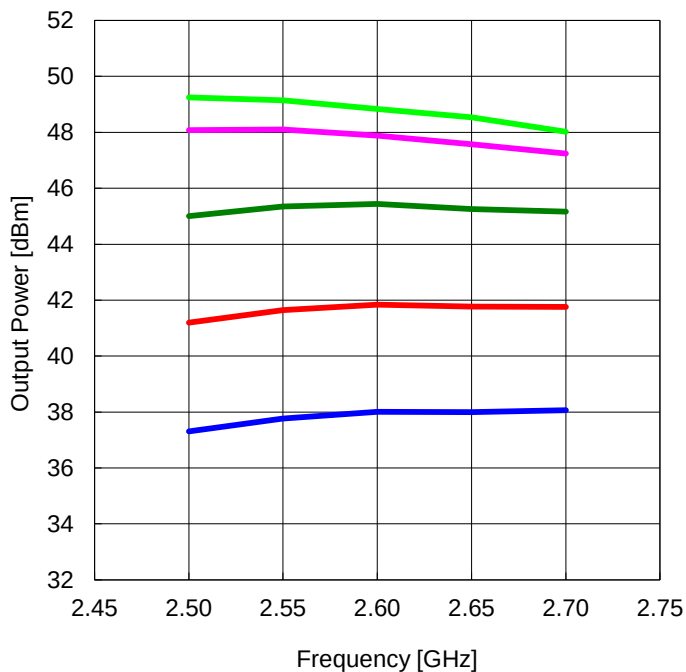
*1 : 10%-duty RF pulse (DC supply constant)

*2 : $P_{out}=40.8dBm$, CW modulation Signal (W-CDMA)

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

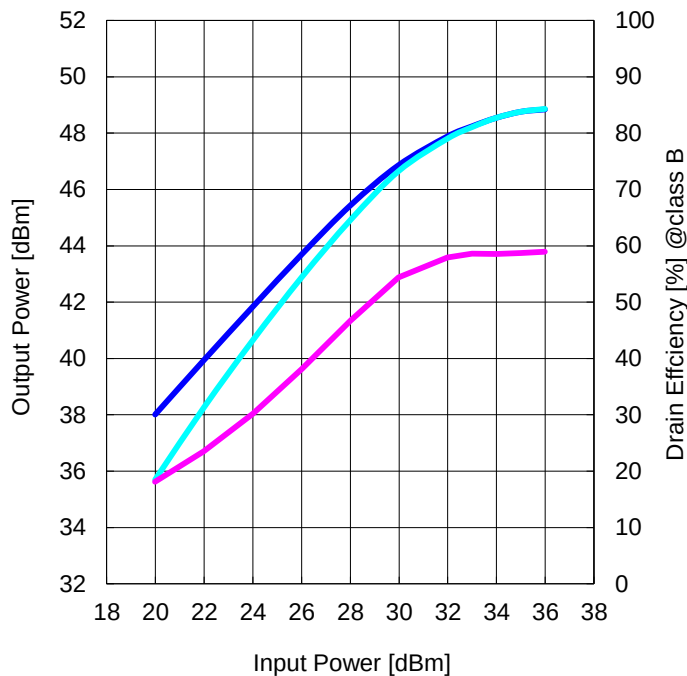
RF characteristics @f=2.6GHz fine tuned

Output Power vs. Frequency



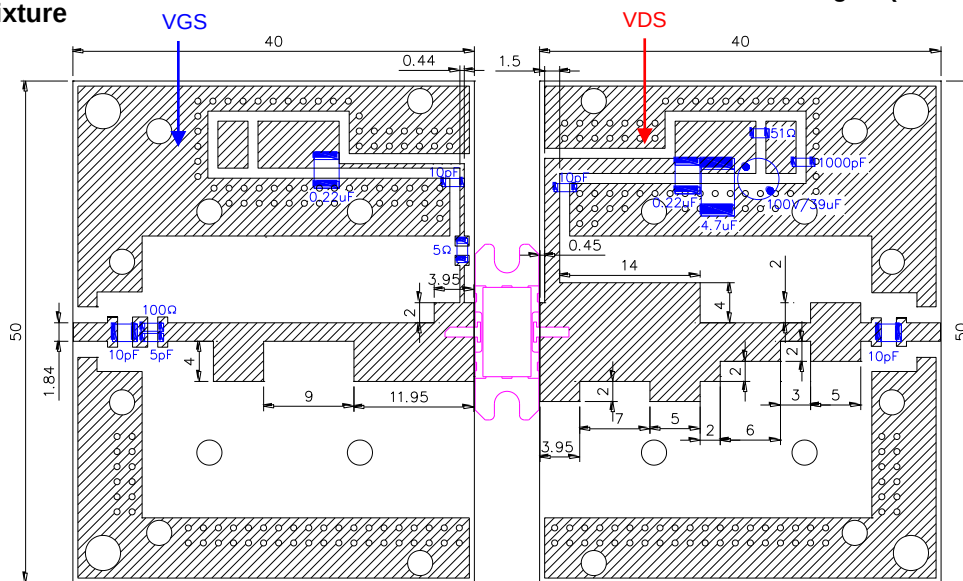
Pin=20dBm Pin=24dBm Pin=28dBm
Pin=32dBm Pin=36dBm

Output Power and Drain Efficiency vs. Input Power



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

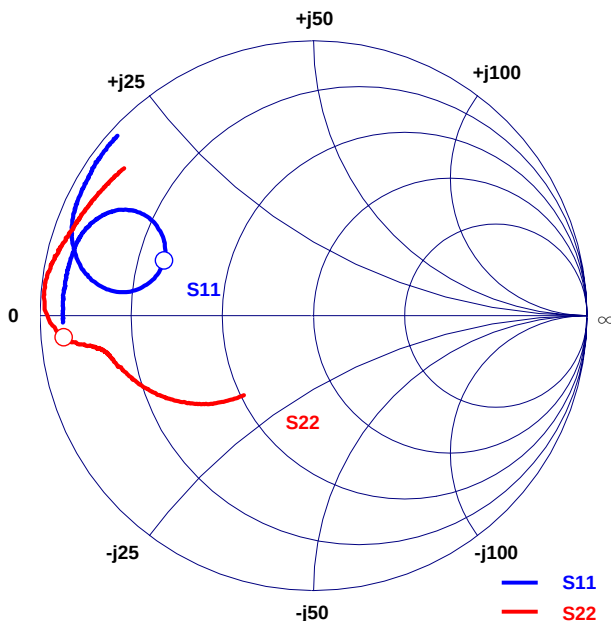
Test Fixture



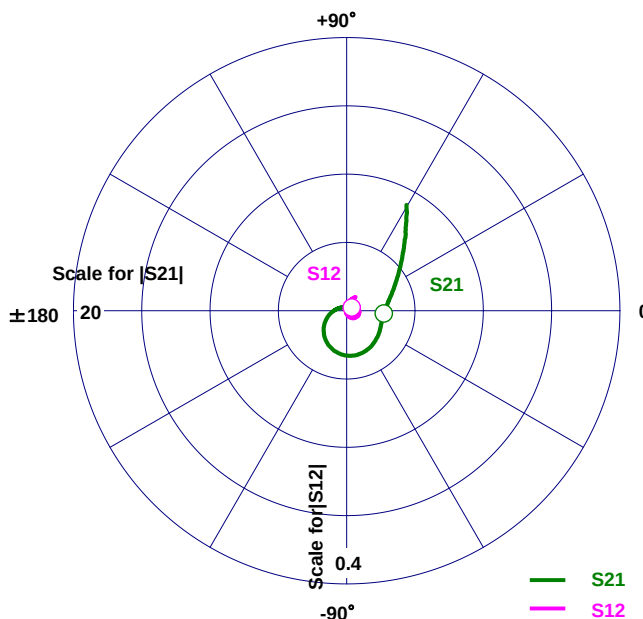
h=0.8mm
Cu=18μm

S-Parameters @VDS=50V, IDS(DC)=300mA, f=0.5 to 4.5GHz
Zl = Zs = 50ohm Marker : 2.6GHz

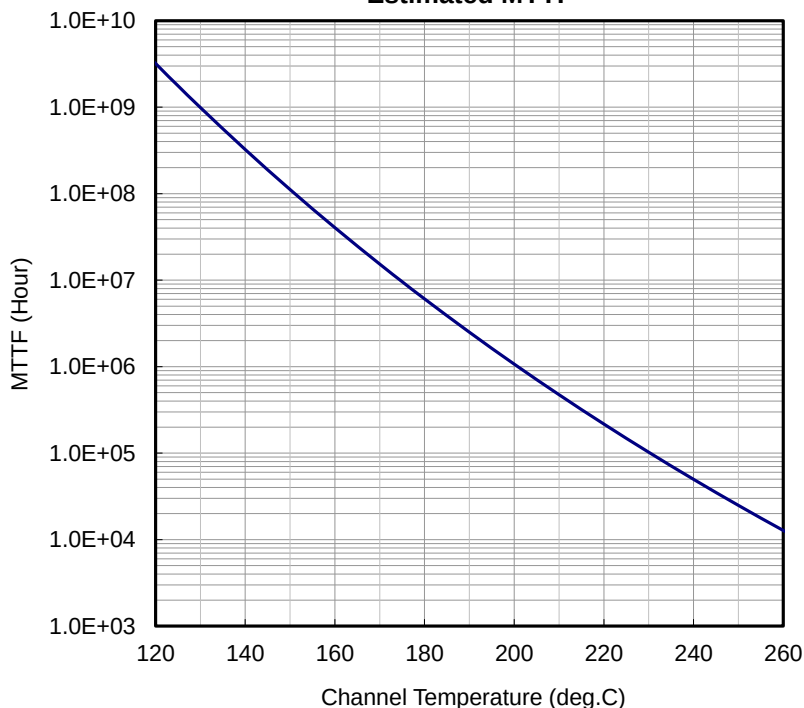
- Reference DATA -



Freq. GHz	S11			S21			S12			S22		
	MAG	ANG		MAG	ANG		MAG	ANG		MAG	ANG	
0.50	0.92	-178.40		8.90	60.55		0.007	-1.89		0.39	-131.35	
0.60	0.92	178.91		7.33	53.84		0.006	1.13		0.43	-134.83	
0.70	0.92	176.67		6.21	47.58		0.006	5.64		0.48	-138.15	
0.80	0.92	174.65		5.35	41.77		0.006	7.79		0.52	-141.44	
0.90	0.92	172.67		4.71	35.85		0.006	9.09		0.55	-144.66	
1.00	0.92	170.91		4.21	30.71		0.006	13.06		0.58	-147.73	
1.10	0.91	169.14		3.83	25.36		0.006	17.19		0.61	-150.65	
1.20	0.91	167.54		3.51	20.24		0.006	21.31		0.64	-153.20	
1.30	0.91	165.85		3.25	15.36		0.006	28.76		0.66	-156.17	
1.40	0.91	164.25		3.06	10.37		0.007	31.03		0.68	-158.52	
1.50	0.91	162.78		2.91	5.75		0.007	33.02		0.70	-160.81	
1.60	0.90	161.09		2.80	0.83		0.008	34.69		0.72	-163.00	
1.70	0.89	159.45		2.72	-4.20		0.009	34.03		0.73	-165.03	
1.80	0.88	157.86		2.68	-9.94		0.010	33.49		0.75	-166.83	
1.90	0.87	156.17		2.69	-15.15		0.011	32.21		0.76	-168.34	
2.00	0.85	154.31		2.71	-21.13		0.012	29.94		0.77	-169.56	
2.10	0.82	152.35		2.79	-28.14		0.013	26.27		0.78	-170.50	
2.20	0.79	150.71		2.90	-36.53		0.014	21.44		0.79	-171.44	
2.30	0.74	149.57		3.03	-45.73		0.016	14.39		0.81	-172.00	
2.40	0.69	149.63		3.18	-57.25		0.017	6.35		0.84	-172.43	
2.50	0.62	152.47		3.30	-71.13		0.019	-3.74		0.87	-173.18	
2.60	0.58	159.82		3.30	-87.49		0.018	-19.49		0.92	-175.09	
2.70	0.61	168.39		3.11	-104.72		0.017	-34.57		0.96	-178.20	
2.80	0.68	172.72		2.76	-121.17		0.014	-49.84		0.98	-178.42	
2.90	0.76	172.81		2.34	-135.44		0.011	-62.90		0.99	-174.86	
3.00	0.83	170.57		1.96	-147.17		0.008	-72.62		0.98	-171.84	
3.10	0.87	168.01		1.64	-156.90		0.005	-84.83		0.98	-169.07	
3.20	0.90	165.37		1.38	-164.71		0.003	-94.32		0.97	-167.12	
3.30	0.92	162.74		1.17	-171.58		0.001	-123.85		0.96	-165.02	
3.40	0.94	160.43		1.01	-177.18		0.001	133.93		0.95	-163.21	
3.50	0.95	158.21		0.88	-177.53		0.003	111.92		0.94	-161.35	
3.60	0.96	156.00		0.78	-172.72		0.005	99.21		0.94	-159.89	
3.70	0.96	153.90		0.69	-167.92		0.006	95.72		0.93	-157.88	
3.80	0.96	151.87		0.63	-163.43		0.009	87.74		0.92	-156.27	
3.90	0.96	149.93		0.57	-159.60		0.011	82.68		0.92	-154.47	
4.00	0.97	148.01		0.52	-155.53		0.012	77.58		0.91	-152.67	
4.10	0.97	145.98		0.48	-151.34		0.015	73.01		0.90	-150.81	
4.20	0.97	144.00		0.45	-147.40		0.016	68.92		0.90	-148.86	
4.30	0.97	141.99		0.43	-143.39		0.019	64.93		0.89	-146.81	
4.40	0.97	140.03		0.41	-139.23		0.021	61.09		0.88	-144.61	
4.50	0.97	137.63		0.39	-134.88		0.024	57.12		0.88	-142.26	



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)

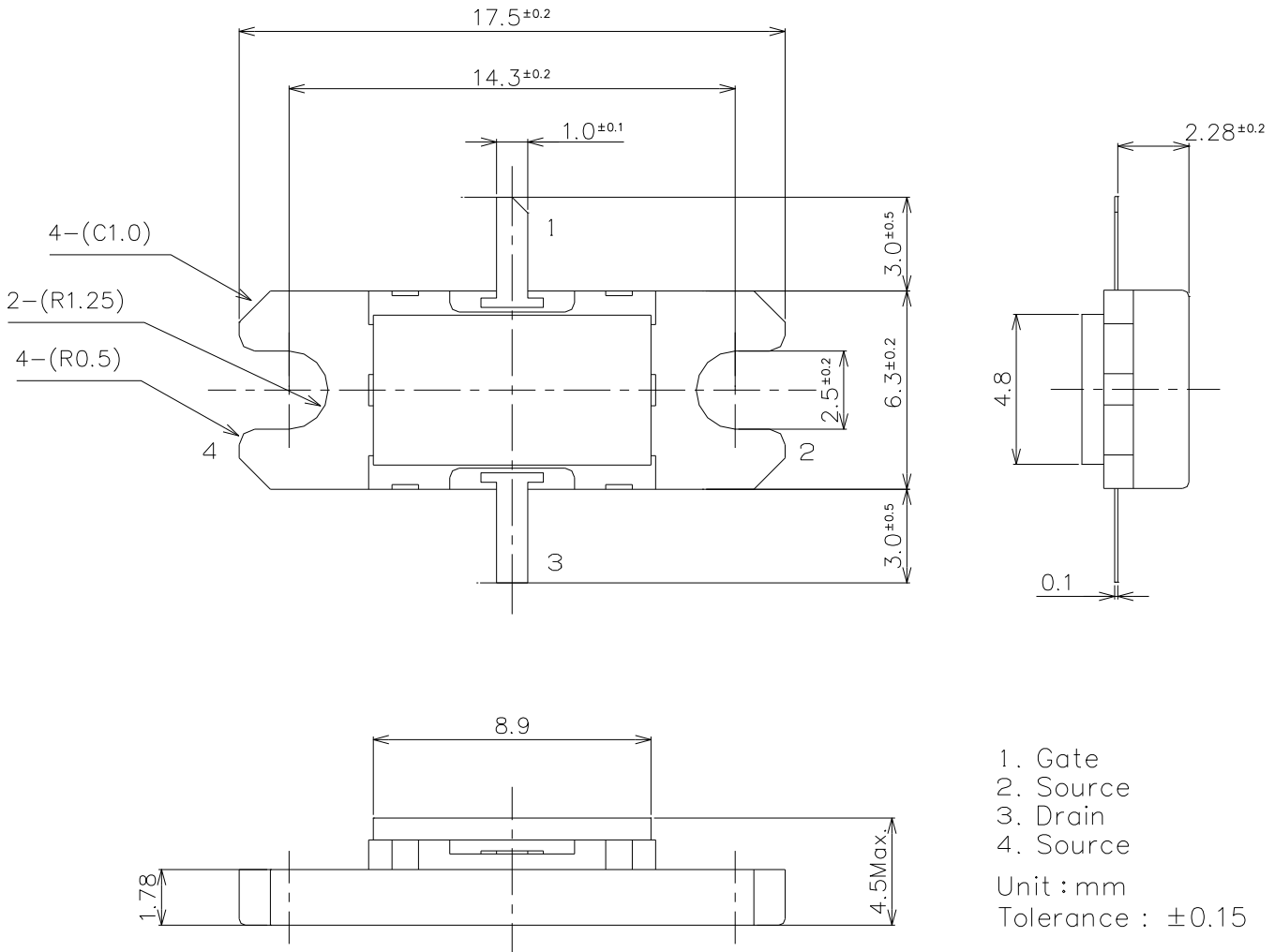
T_{stress} : stress temperature (K)

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





EGN26C070MK

High Voltage - High Power GaN-HEMT

For further information please contact:

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