EGN21C070MK

GaN-HEMT 75W

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : V_{DS}=50V
- High Power : 49.5dBm (typ.) @ Psat
- High Efficiency: 70%(typ.) @ Psat
- Power Gain : 17.0dB(typ.) @ f=2.14GHz
- Proven Reliability

DESCRIPTION

SEDI'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 2.1GHz W-CDMA & LTE design requirements as it offers high gain, long term reliability and ease of use.

ABSOLUTE MAXIMUM RATINGS (Case Temperature Tc=25ºC)

Item	Symbol	Condition	Rating	Unit
Operating-Voltage	V_{DS}		55	V
Drain-Source Voltage	V_{DS}	V_{GS}=-8V	160	V
Gate-Source Voltage	V_{GS}		-15	V
Total Power Dissipation	P_t		75	W
Storage Temperature	T_{stg}		-65 to +175	ºC
Channel Temperature	T_{ch}		250	ºC

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		$\leq$ 50	V
Forward Gate Current	I_{GF}	R_G=5Ω	$\leq$ 76	mA
Reverse Gate Current	I_{GR}	R_G=5Ω	$\geq$ -2.6	mA
Channel Temperature	T_{ch}		$\leq$ 180	ºC
Average Output Power	Pave.		$\leq$ 46.5	dBm

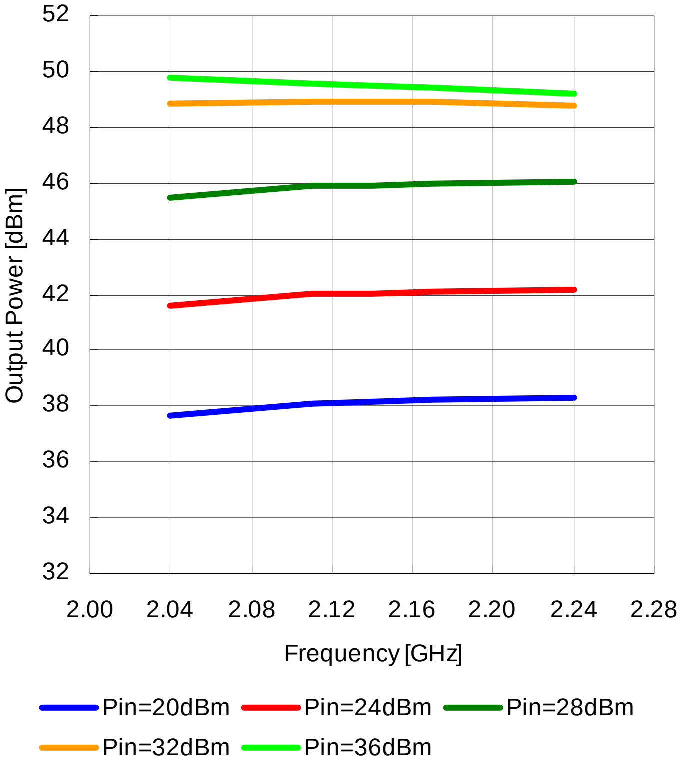
ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25ºC)

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	Psat *1	V_{DS}=50V	48.5	49.5	-	dBm
Drain Efficiency	ηd *2	$I_{DS(DC)}$=300mA	28	33	-	%
Power Gain	Gp *2	f=2.14GHz	16.0	17.0	-	dB
Thermal Resistance	R_{th}	Channel to Case at 48W P_{DC}	-	2.5	3.0	ºC/W

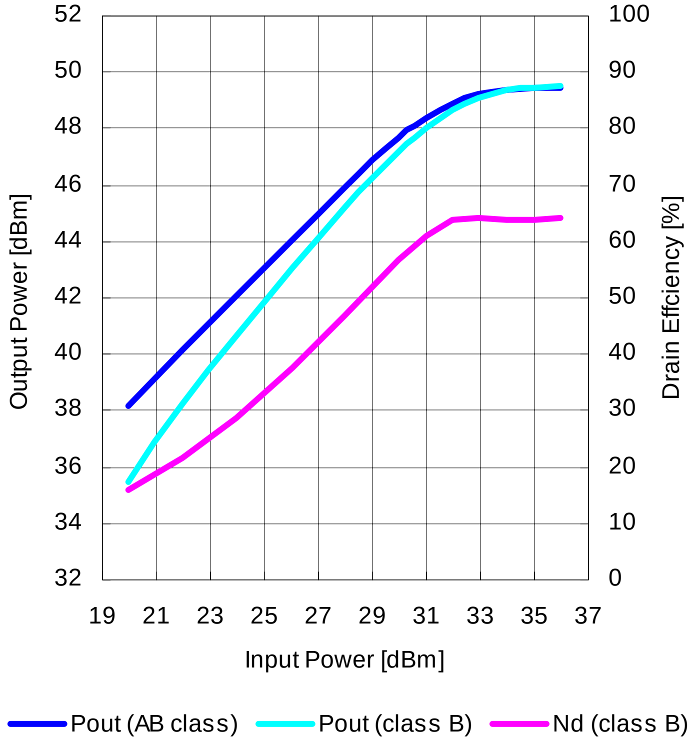
*1 : 10%-duty RF pulse (DC supply constant)
*2 : Pout = 41.5dBm, CW modulation Signal (W-CDMA or WiMAX)

RF characteristics @f=2.14GHz fine tuned

Output Power vs. Frequency
VDS=50V, IDS(DC)=300mA

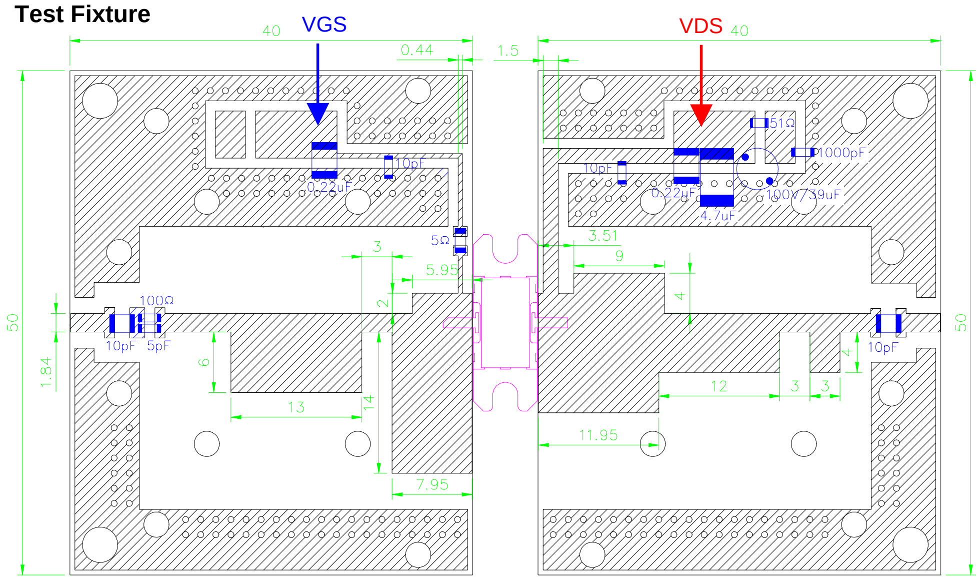


Output Power and Drain Efficiency vs. Input Power
VDS=50V, IDS(DC)=300mA, f=2.14GHz



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

Test Fixture



h=0.8mm εr=3.5
Cu=18um Unit: mm

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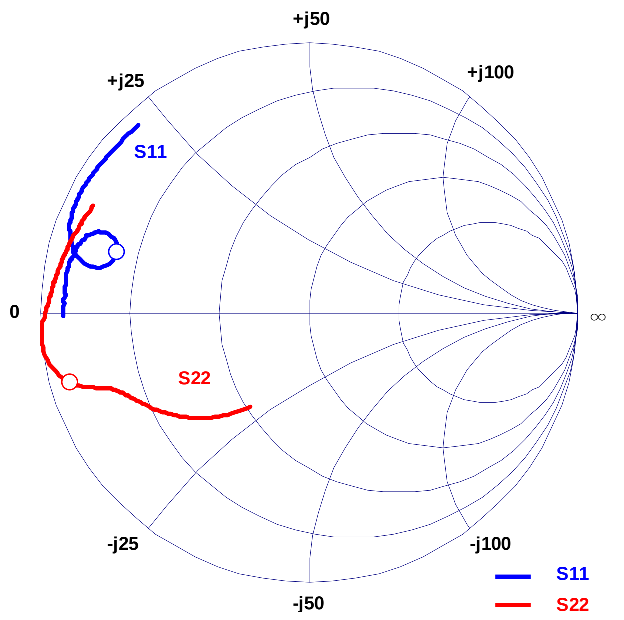
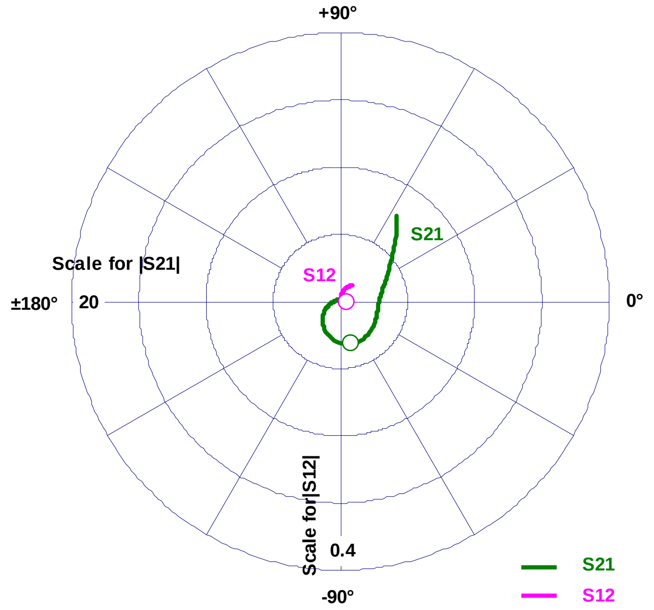
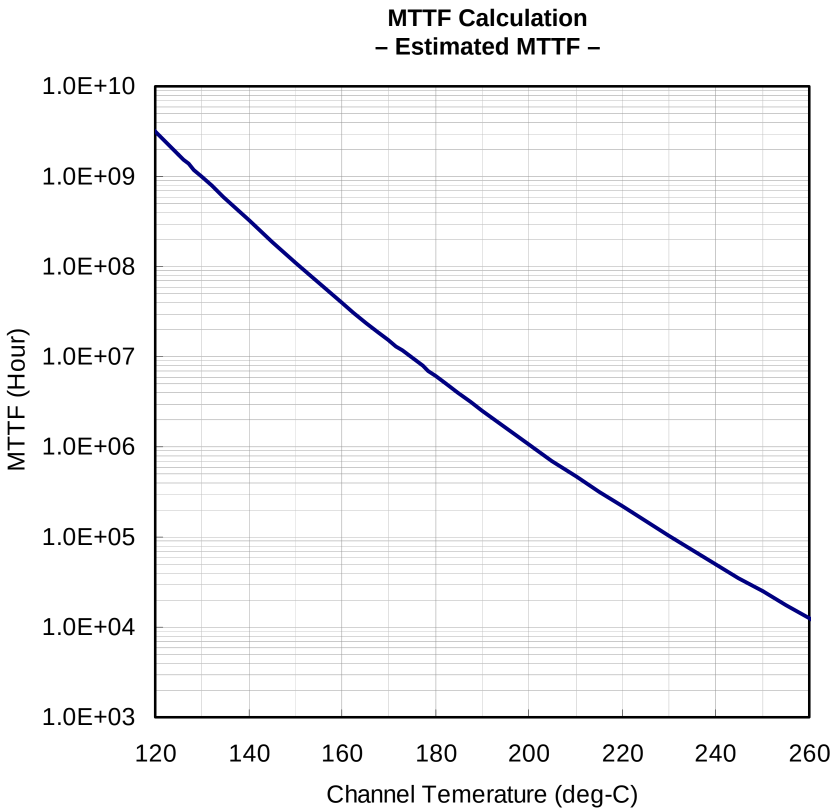
- Reference DATA -

S-Parameters @VDS=50V, IDS(DC)=300mA, f=0.5 to 4.5GHz
ZI = Zs = 50 ohm Marker : 2.14GHz





Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.91	-179.23	7.69	56.69	0.006	-2.67	0.41	-122.21
0.60	0.91	177.91	6.42	50.11	0.005	-1.92	0.46	-126.68
0.70	0.91	176.02	5.43	43.58	0.005	-0.36	0.51	-131.08
0.80	0.91	174.22	4.70	37.42	0.005	3.29	0.55	-135.21
0.90	0.91	172.42	4.16	31.36	0.005	8.37	0.59	-138.75
1.00	0.91	170.84	3.75	25.54	0.005	13.50	0.62	-142.33
1.10	0.91	169.28	3.44	19.86	0.005	18.33	0.65	-145.39
1.20	0.91	167.64	3.20	14.24	0.005	23.07	0.68	-148.25
1.30	0.90	166.22	3.02	8.52	0.006	26.76	0.70	-150.92
1.40	0.90	164.71	2.90	2.67	0.006	30.16	0.72	-153.11
1.50	0.89	163.24	2.84	-3.63	0.007	30.41	0.74	-155.01
1.60	0.88	161.96	2.83	-10.51	0.007	29.17	0.76	-156.77
1.70	0.87	160.61	2.86	-18.20	0.008	28.02	0.77	-158.17
1.80	0.85	159.39	2.94	-26.80	0.009	24.55	0.79	-159.34
1.90	0.82	158.68	3.06	-37.43	0.010	17.37	0.82	-160.05
2.00	0.79	159.01	3.19	-50.50	0.011	8.66	0.85	-160.99
2.10	0.75	161.02	3.25	-66.55	0.011	-4.63	0.90	-162.39
2.20	0.75	164.57	3.13	-84.83	0.010	-18.95	0.95	-165.14
2.30	0.78	167.53	2.81	-103.34	0.008	-32.83	0.98	-168.74
2.40	0.83	168.17	2.37	-119.84	0.006	-43.42	1.00	-172.47
2.50	0.88	167.02	1.93	-133.65	0.003	-51.49	1.00	-175.80
2.60	0.91	165.14	1.56	-144.20	0.001	-47.71	0.99	-178.47
2.70	0.93	163.16	1.27	-152.61	0.001	60.61	0.98	179.54
2.80	0.94	161.41	1.05	-159.36	0.002	81.73	0.97	177.82
2.90	0.95	159.76	0.88	-164.86	0.003	85.79	0.97	176.27
3.00	0.95	158.10	0.75	-169.68	0.005	84.33	0.96	174.88
3.10	0.96	156.57	0.64	-173.64	0.006	84.67	0.96	173.60
3.20	0.96	155.09	0.56	-177.30	0.007	82.60	0.95	172.38
3.30	0.96	153.53	0.50	179.17	0.008	80.20	0.95	171.04
3.40	0.96	152.09	0.44	176.28	0.009	80.97	0.95	169.83
3.50	0.96	150.34	0.40	172.88	0.010	78.65	0.94	168.59
3.60	0.96	148.87	0.36	170.32	0.011	78.49	0.94	167.38
3.70	0.96	147.10	0.33	167.30	0.012	78.87	0.93	166.07
3.80	0.95	145.64	0.30	164.49	0.014	78.39	0.93	164.82
3.90	0.95	143.85	0.28	161.79	0.016	75.48	0.93	163.46
4.00	0.95	142.27	0.26	158.64	0.018	73.73	0.92	162.04
4.10	0.95	140.52	0.25	155.80	0.021	69.88	0.92	160.66
4.20	0.95	138.76	0.23	152.06	0.023	65.91	0.91	159.05
4.30	0.95	136.81	0.22	149.15	0.025	61.63	0.91	157.44
4.40	0.94	134.73	0.21	145.25	0.028	58.85	0.90	155.68
4.50	0.94	132.56	0.20	141.37	0.031	54.83	0.90	153.75



Ea=1.6eV
Confidence Level=90%

Channel Temp (deg-C)	MTTF (Hours)
160	4.05×10^{7}
180	6.07×10^{6}
200	1.07×10^{6}

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

$MTTF_{use}=MTTF_{stress}*AF$

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

k: Boltzman's constant (8.62×10^{-5} eV/K)

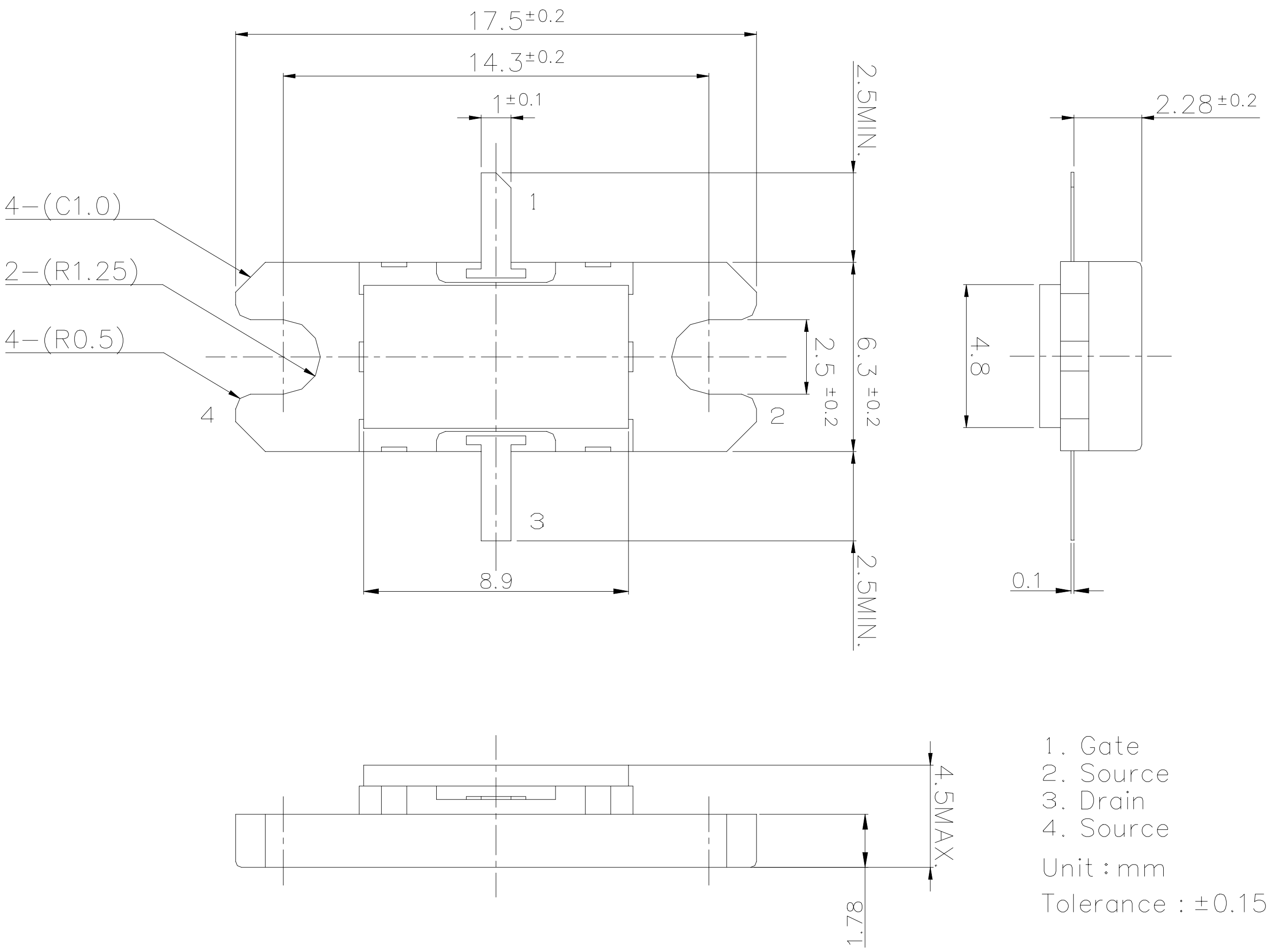
T_{stress}: stress temperature (K)

T_{use}: use temperature (K)

ESD characteristic

Test Methodology	Class
Human Body Model (per JESD22-A114)	1A
Machine Model (per JEIA/ESD22-A115)	A

MK Package Outline
Metal-Ceramic Hermetic Package



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

Unit : mm
Tolerance : ±0.15