GaN-HEMT 20W

EGN26C020MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : V_{DS}=50V
- High Power : 43.5dBm (typ.) @ Psat
- Power Gain : 18dB(typ.) @ f=2.60GHz
- 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 2.6GHz WiMAX 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		32.1	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}		≤ 55	V
Forward Gate Current	I_{GF}	R_G=15Ω	≤ 46	mA
Reverse Gate Current	I_{GR}	R_G=15Ω	≥ -0.7	mA
Channel Temperature	T_{ch}		≤ 180	ºC
Average Output Power	Pave.		≤ 42.0	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}=5.2mA	-1.0	-1.5	-2.0	V
Saturated Power	Psat *1	V_{DS}=50V	42.5	43.5	-	dBm
Drain Efficiency	ηd *2	$I_{DS(DC)}$=100mA	10.5	12.5	-	%
Power Gain	Gp *2	f=2.60GHz	17.0	18.0	-	dB
Thermal Resistance	R_{th}	Channel to Case at 21W P_{DC}	-	6.0	7.0	ºC/W

*1 : 10%-duty RF pulse (DC supply constant)
*2 : Pout = 30dBm, CW

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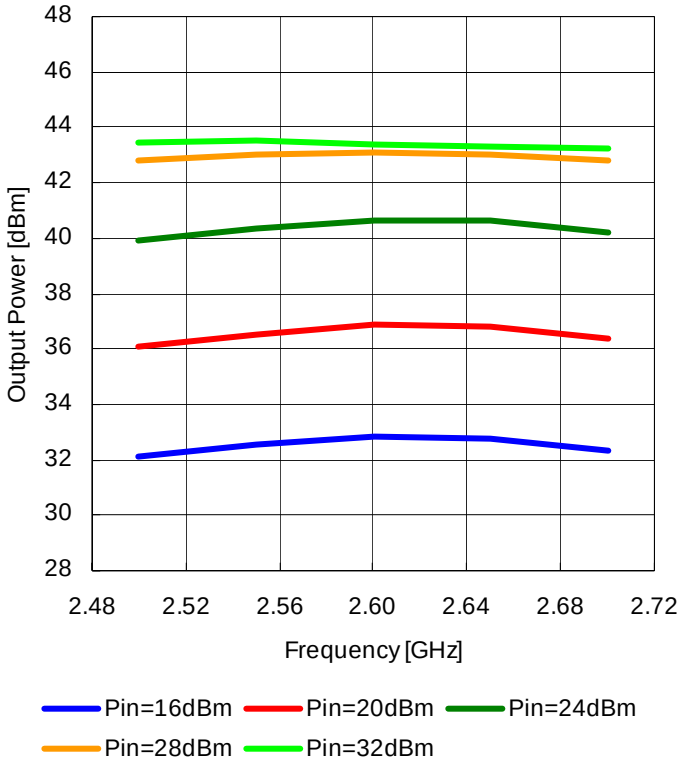
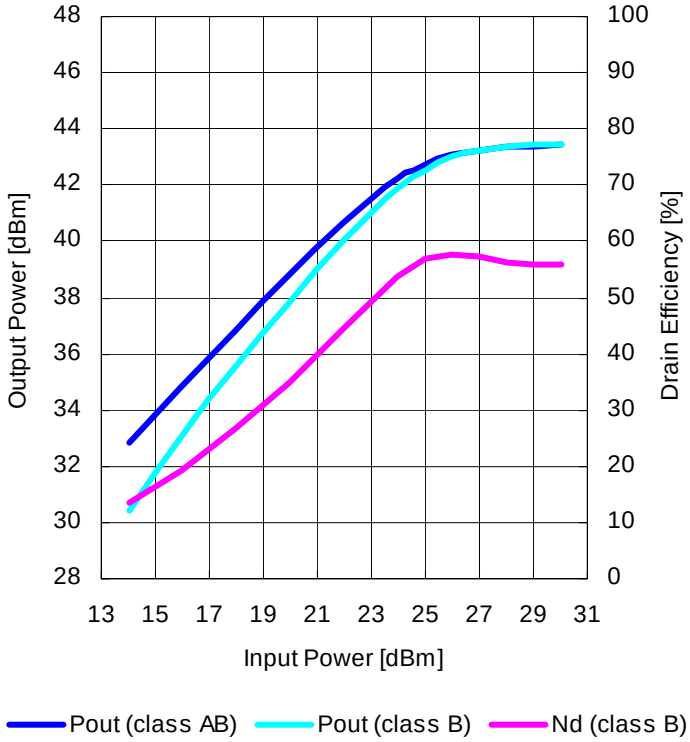
RF characteristics @f=2.6GHz fine tuned

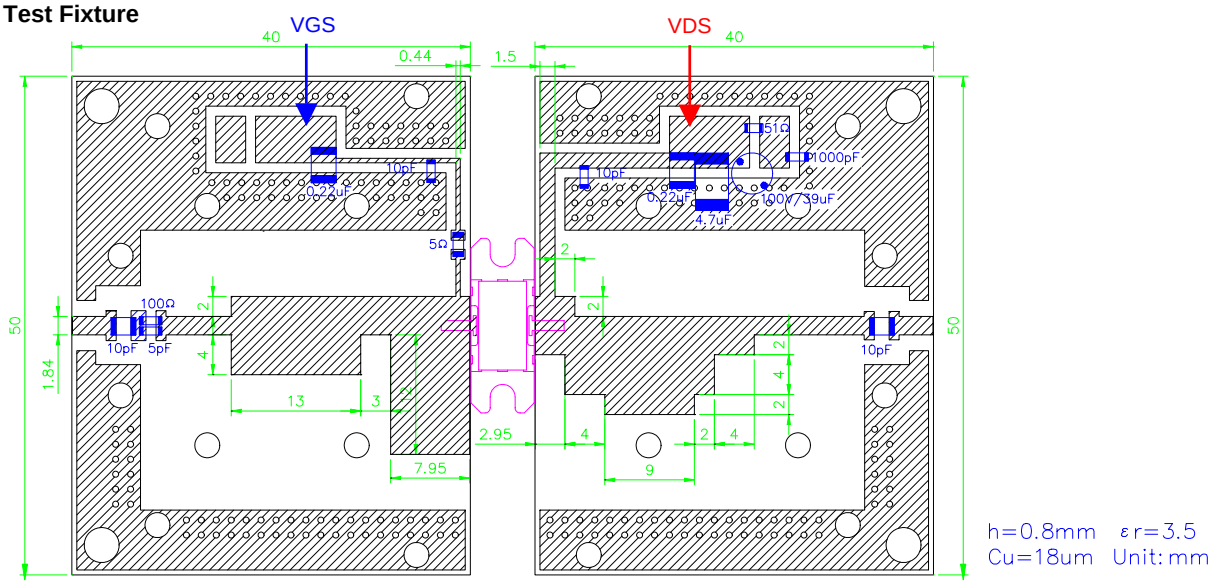
Output Power vs. Frequency
V_{DS}=50V, $I_{DS(DC)}$=100mA



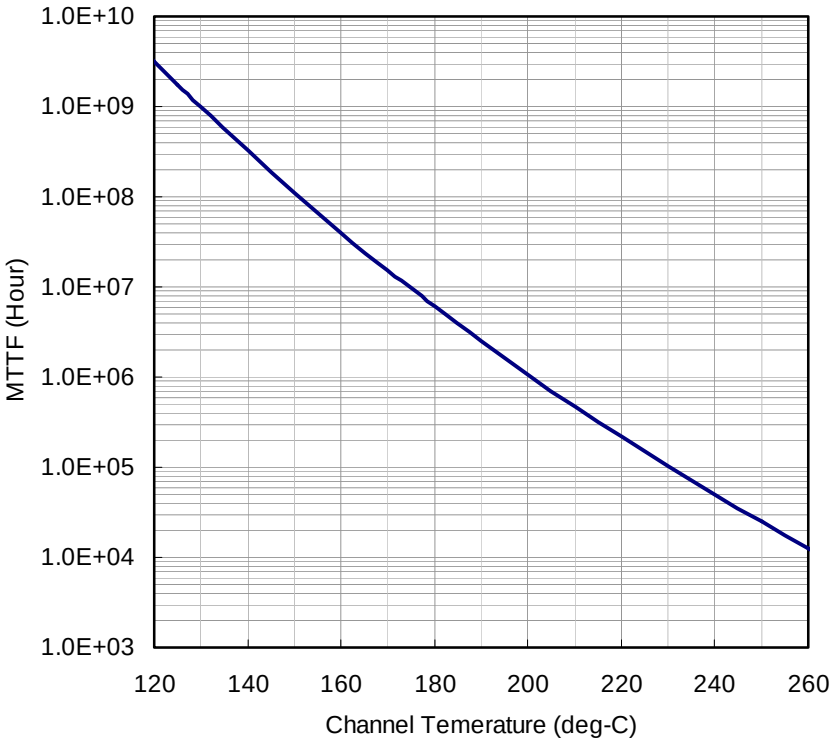
Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V, $I_{DS(DC)}$=100mA, f=2.60GHz



Test Fixture



MTTF Calculation
– Estimated MTTF –



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)

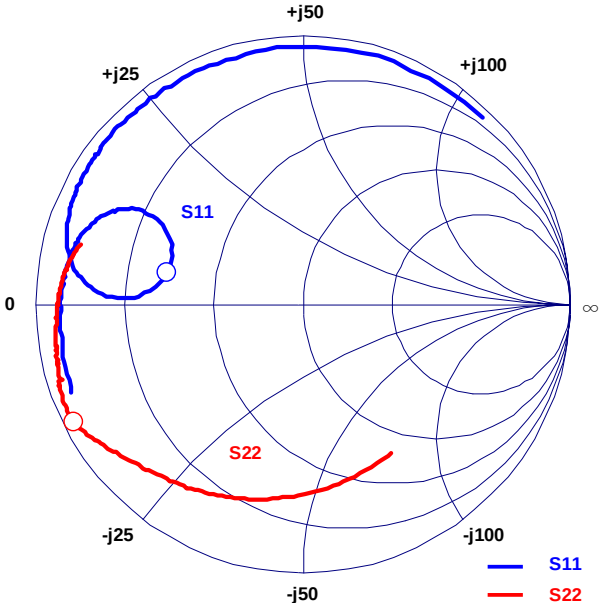
T_{use}: use temperature (K)

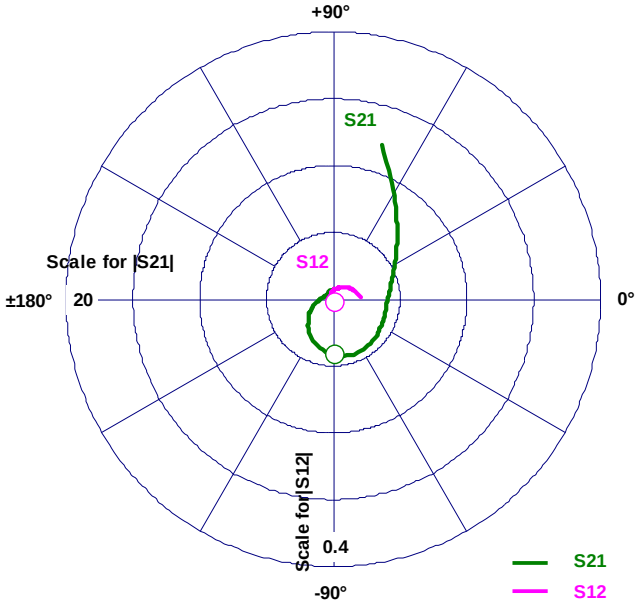
ESD characteristic

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

- Reference DATA -

S-Parameters @V_{DS}=50V, $I_{DS(DC)}$=100mA, f=0.5 to 5.5GHz
$Z_l = Z_s$ = 50 ohm Marker : 2.60GHz





Freq.	S11		S21		S12		S22	
GHz	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

MK Package Outline
Metal-Ceramic Hermetic Package