



GaN-HEMT 30W

EGN26C030MK

High Voltage - High Power GaN-HEMT

FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 45.0dBm (typ.) @ P_{sat}
- 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 $T_c=25^{\circ}C$)

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		37.5	W
Storage Temperature	T_{stg}		-65 to +175	$^{\circ}C$
Channel Temperature	T_{ch}		250	$^{\circ}C$

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
DC Input Voltage	V_{DS}		≤ 55	V
Forward Gate Current	I_{GF}	$R_G=15\Omega$	≤ 69	mA
Reverse Gate Current	I_{GR}	$R_G=15\Omega$	≥ -1.1	mA
Channel Temperature	T_{ch}		≤ 180	$^{\circ}C$
Average Output Power	$P_{ave.}$		≤ 42.0	dBm

ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25^{\circ}C$)

Item	Symbol	Condition	Limit			Unit
			min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V$ $I_{DS}=7.8mA$	-1.0	-1.5	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	44.0	45.0	-	dBm
Drain Efficiency	$\eta_d *2$	$I_{DS}(DC)=150mA$	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 24W P_{DC}	-	5.0	6.0	$^{\circ}C/W$

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

*2 : $P_{out} = 31.5dBm$, CW



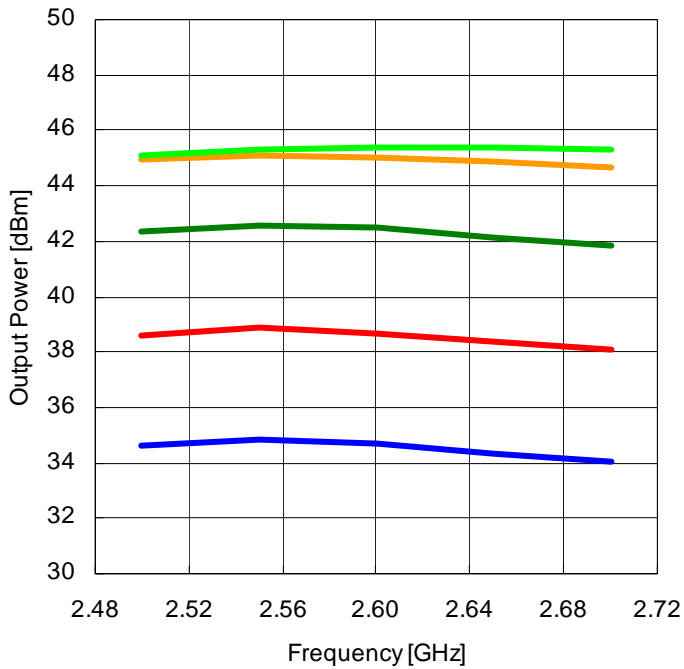
GaN-HEMT 30W

EGN26C030MK

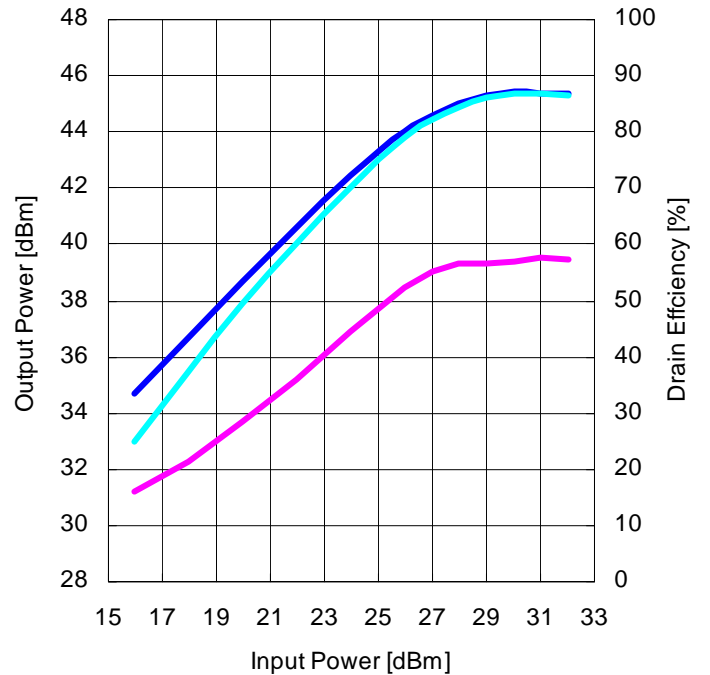
RF characteristics @f=2.6GHz fine tuned

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Output Power vs. Frequency
V_{DS}=50V, I_{DS(DC)}=150mA



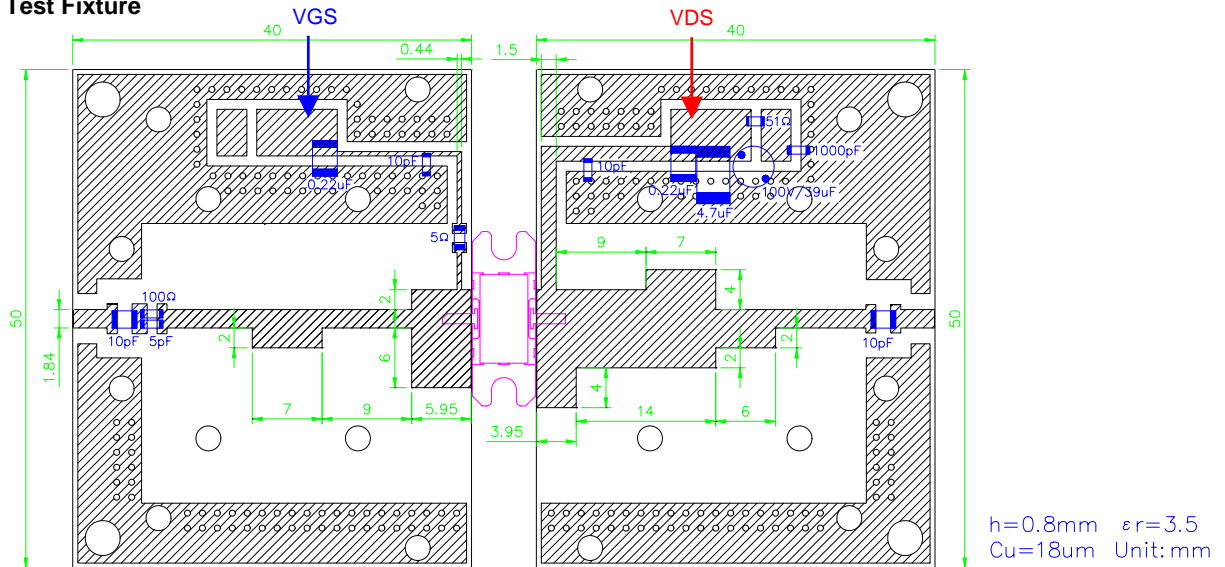
Output Power and Drain Efficiency vs. Input Power
V_{DS}=50V, I_{DS(DC)}=150mA, f=2.6GHz



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

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

Test Fixture



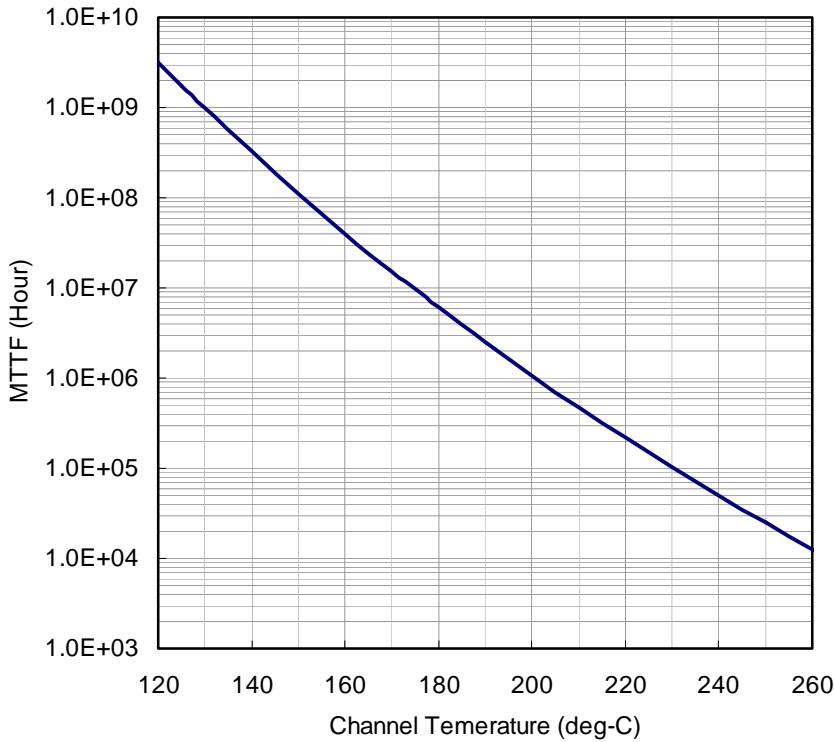


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MTTF Calculation
- Estimated MTTF -



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

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

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

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

k: Boltzman's constant (8.62 x 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 JEI/ESD22-A115)	A



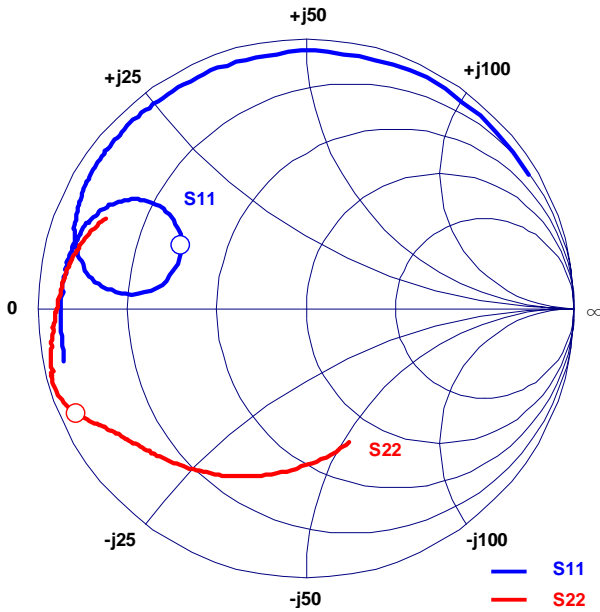
GaN-HEMT 30W

EGN26C030MK

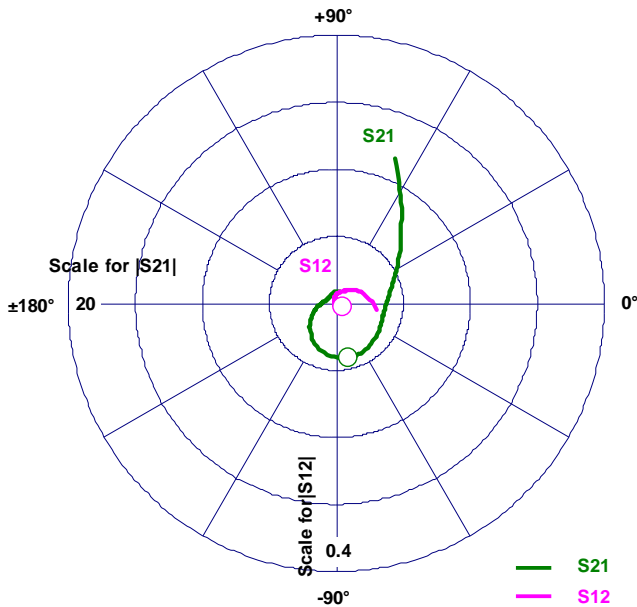
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- Reference DATA -

S-Parameters @V_{DS}=50V, I_{DS(DC)}=150mA, f=0.5 to 5.5GHz
Z_I = Z_S = 50 ohm Marker : 2.60GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.92	-167.59	11.70	67.79	0.008	-3.61	0.52	-72.04
0.60	0.92	-172.48	9.72	60.78	0.007	-7.90	0.55	-80.15
0.70	0.92	-176.60	8.30	54.02	0.008	-7.03	0.58	-87.84
0.80	0.92	-179.44	7.19	47.93	0.007	-12.96	0.60	-95.06
0.90	0.91	177.63	6.39	41.13	0.007	-12.66	0.63	-101.89
1.00	0.91	174.88	5.69	35.94	0.006	-9.94	0.65	-107.94
1.10	0.91	172.55	5.19	29.99	0.006	-16.19	0.68	-113.18
1.20	0.91	170.24	4.79	24.93	0.005	-14.65	0.70	-117.85
1.30	0.90	167.97	4.45	19.72	0.005	-5.79	0.72	-122.32
1.40	0.90	165.69	4.17	14.42	0.005	-0.55	0.74	-126.16
1.50	0.89	163.35	3.98	9.17	0.005	6.30	0.75	-129.89
1.60	0.89	161.40	3.82	4.20	0.005	9.66	0.77	-133.34
1.70	0.88	158.96	3.71	-1.39	0.005	10.74	0.78	-136.35
1.80	0.86	156.89	3.63	-6.27	0.006	16.54	0.80	-139.23
1.90	0.85	154.47	3.61	-12.70	0.006	11.11	0.81	-141.64
2.00	0.82	152.07	3.62	-18.57	0.006	10.52	0.83	-144.05
2.10	0.80	149.99	3.68	-25.34	0.008	11.04	0.84	-145.93
2.20	0.76	147.55	3.77	-32.53	0.009	5.39	0.86	-147.84
2.30	0.71	146.24	3.86	-41.62	0.009	1.33	0.87	-149.71
2.40	0.65	145.27	4.03	-51.19	0.010	-3.21	0.89	-151.12
2.50	0.58	147.18	4.13	-63.84	0.012	-13.71	0.92	-153.08
2.60	0.52	153.63	4.14	-77.53	0.011	-24.72	0.94	-155.54
2.70	0.51	163.84	4.01	-92.37	0.011	-44.31	0.96	-158.18
2.80	0.56	172.23	3.69	-106.85	0.010	-53.14	0.98	-160.88
2.90	0.65	175.72	3.31	-121.41	0.009	-69.37	0.99	-163.63
3.00	0.73	174.59	2.85	-132.69	0.007	-85.79	0.98	-166.06
3.10	0.80	172.88	2.46	-143.63	0.006	-91.42	0.97	-168.12
3.20	0.84	170.30	2.11	-151.48	0.005	-110.01	0.97	-169.98
3.30	0.87	166.92	1.82	-159.19	0.005	-122.98	0.96	-171.46
3.40	0.90	163.95	1.59	-165.58	0.003	-153.13	0.96	-172.89
3.50	0.91	161.43	1.40	-171.42	0.003	-171.61	0.95	-174.25
3.60	0.92	159.07	1.24	-175.62	0.004	174.53	0.95	-175.43
3.70	0.93	156.66	1.12	178.88	0.004	149.65	0.94	-176.73
3.80	0.93	154.41	1.01	175.55	0.005	140.15	0.94	-177.75
3.90	0.94	151.86	0.94	171.20	0.006	127.27	0.94	-179.05
4.00	0.94	149.46	0.86	167.38	0.007	120.23	0.93	179.79
4.10	0.95	146.93	0.82	163.80	0.008	111.19	0.92	178.90
4.20	0.95	144.31	0.77	159.87	0.010	102.85	0.92	177.49
4.30	0.95	141.61	0.75	156.19	0.011	97.08	0.92	176.59
4.40	0.95	138.10	0.72	152.29	0.014	90.28	0.91	175.25
4.50	0.95	134.43	0.70	147.74	0.015	81.75	0.91	174.02
4.60	0.95	130.16	0.70	143.86	0.017	75.18	0.91	172.64
4.70	0.95	125.66	0.69	139.07	0.018	69.23	0.91	171.22
4.80	0.95	120.21	0.70	133.73	0.022	61.37	0.90	169.71
4.90	0.95	113.90	0.72	128.40	0.024	54.72	0.89	168.18
5.00	0.95	106.02	0.74	122.06	0.027	47.23	0.88	166.48
5.10	0.95	96.55	0.78	115.40	0.033	38.00	0.88	164.63
5.20	0.95	85.01	0.82	106.59	0.038	28.89	0.87	162.71
5.30	0.96	70.36	0.87	97.12	0.044	17.89	0.85	160.56
5.40	0.96	52.81	0.93	84.44	0.051	6.14	0.84	158.35
5.50	0.97	30.93	0.97	71.24	0.060	-8.37	0.82	155.95





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MK Package Outline Metal-Ceramic Hermetic Package

