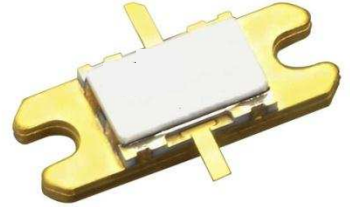


### FEATURES

- High Voltage Operation :  $V_{DS}=50V$
- High Power : 47dBm (typ.) @  $P_{sat}$
- High Efficiency: 65%(typ.) @  $P_{sat}$
- Power Gain :18.5dB(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 LTE design requirements as it offers high gain, long term reliability and ease of use.

### ABSOLUTE MAXIMUM RATINGS (Case Temperature $T_c=25\text{ deg.C}$ )

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	$P_t$		62.5	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	$V_{DS}$		$\leq 50$	V
Forward Gate Current	$I_{GF}$	$R_G=10\text{ ohm}$	$\leq 51$	mA
Reverse Gate Current	$I_{GR}$	$R_G=10\text{ ohm}$	$\geq -1.7$	mA
Channel Temperature	$T_{ch}$		$\leq 180$	deg.C
Average Output Power	$P_{ave.}$		$\leq 44$	dBm

### ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25\text{ deg.C}$ )

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	$V_p$	$V_{DS}=50V\ I_{DS}=12mA$	-1.0	-1.5	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	46.0	47.0	-	dBm
Drain Efficiency	$\eta_d *2$	$I_{DS}(DC)=200mA$	28	33	-	%
Power Gain	$G_p *2$	$f=2.14GHz$	17.5	18.5	-	dB
Thermal Resistance	$R_{th}$	Channel to Case at $39W\ P_{DC}$	-	3.0	3.6	deg.C/W

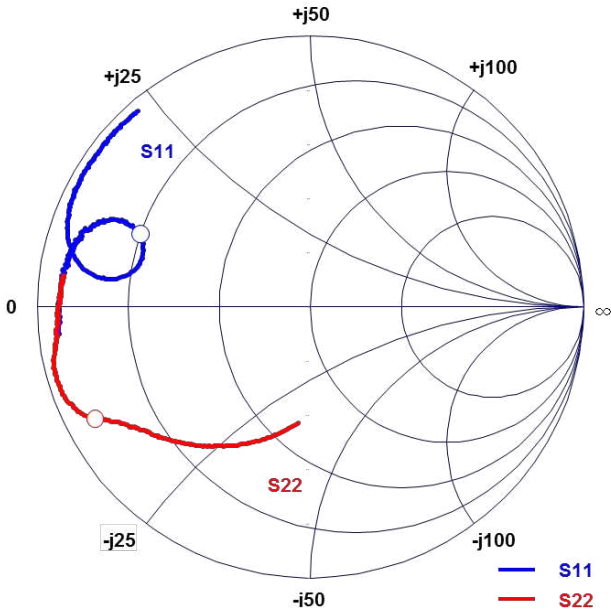
\*1 : 10%-duty RF pulse (DC supply constant)

\*2 :  $P_{out} = 39.0dBm$ , CW modulation Signal (W-CDMA)

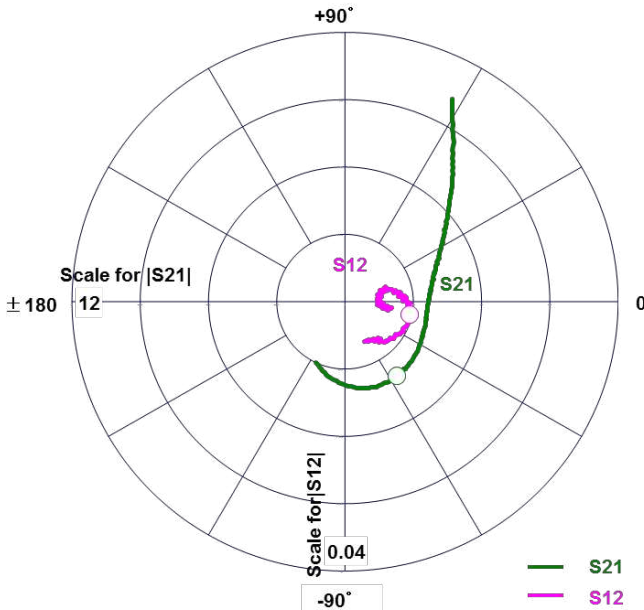
RoHS COMPLIANCE	Yes
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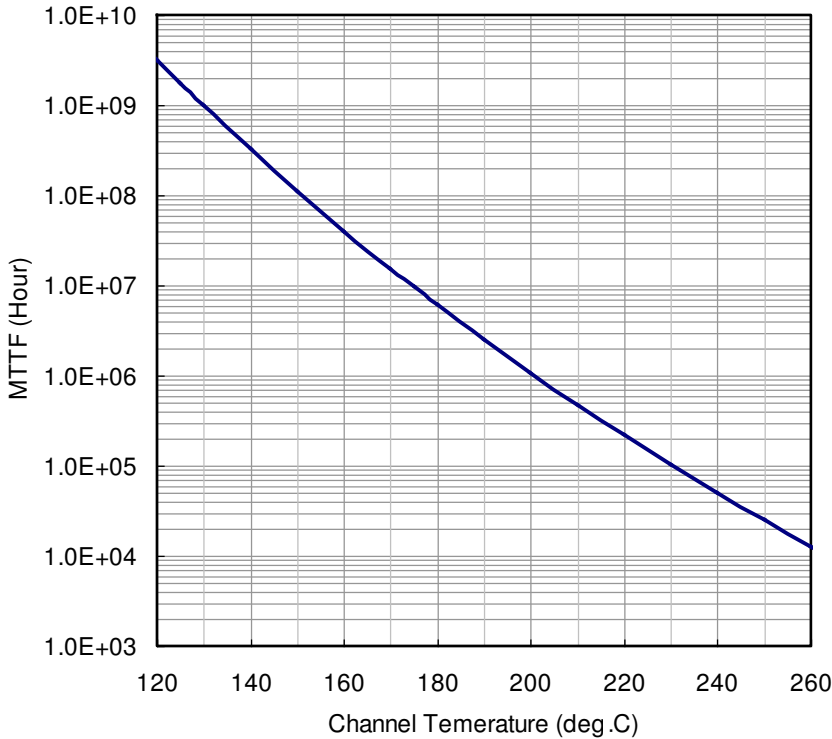
S-Parameters @V<sub>DS</sub>=50V, I<sub>DS(DC)</sub>=200mA, f=0.5 to 4.5GHz  
 Z<sub>i</sub> = Z<sub>s</sub> = 50 ohm      Marker : 2.14GHz



Freq. GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.50	0.92	-173.77	10.17	62.44	0.007	-7.59	0.43	-95.67
0.60	0.93	-176.93	8.42	55.58	0.007	-8.14	0.47	-102.68
0.70	0.92	-179.58	7.19	48.93	0.006	-8.12	0.52	-109.01
0.80	0.92	177.49	6.19	42.61	0.006	-8.27	0.56	-114.83
0.90	0.92	175.33	5.52	36.56	0.005	-7.65	0.59	-119.83
1.00	0.91	173.50	4.97	31.18	0.005	-3.39	0.62	-124.36
1.10	0.92	171.36	4.57	25.07	0.005	-3.68	0.65	-128.34
1.20	0.91	169.35	4.23	19.88	0.005	3.73	0.68	-131.80
1.30	0.91	167.27	4.02	14.58	0.005	10.60	0.70	-135.18
1.40	0.89	165.49	3.83	8.99	0.005	7.28	0.73	-137.98
1.50	0.88	163.64	3.70	2.89	0.006	14.03	0.74	-140.66
1.60	0.87	161.55	3.64	-3.15	0.006	17.92	0.76	-143.06
1.70	0.85	159.65	3.65	-9.80	0.007	15.33	0.78	-145.06
1.80	0.83	157.63	3.69	-17.84	0.008	12.85	0.80	-147.01
1.90	0.80	155.25	3.76	-26.51	0.008	9.77	0.82	-148.81
2.00	0.75	155.05	3.89	-37.32	0.009	4.57	0.84	-149.87
2.10	0.69	156.30	3.98	-49.27	0.010	-7.14	0.87	-151.56
2.20	0.65	159.77	4.01	-64.64	0.010	-17.61	0.91	-153.56
2.30	0.64	165.62	3.88	-82.16	0.009	-33.38	0.94	-156.63
2.40	0.69	170.56	3.48	-99.41	0.008	-48.27	0.96	-159.60
2.50	0.76	172.28	2.99	-115.33	0.007	-63.96	0.97	-162.72
2.60	0.83	170.95	2.47	-128.58	0.005	-74.19	0.96	-165.41
2.70	0.87	168.66	2.00	-139.68	0.003	-91.00	0.96	-167.56
2.80	0.90	165.85	1.64	-148.55	0.002	-101.05	0.95	-169.67
2.90	0.92	163.76	1.36	-155.64	0.001	-149.57	0.94	-170.80
3.00	0.94	161.32	1.14	-161.78	0.001	166.47	0.94	-172.42
3.10	0.94	159.08	0.96	-167.13	0.002	132.38	0.93	-173.39
3.20	0.95	157.17	0.82	-171.64	0.003	113.28	0.93	-174.57
3.30	0.96	155.22	0.72	-176.23	0.003	118.78	0.93	-175.64
3.40	0.97	153.42	0.63	-179.86	0.004	109.42	0.93	-176.64
3.50	0.96	151.54	0.56	-176.50	0.005	104.45	0.92	-177.54
3.60	0.97	149.92	0.50	-173.37	0.006	105.43	0.92	-178.62
3.70	0.97	147.95	0.45	-169.97	0.007	99.66	0.93	-179.45
3.80	0.96	146.15	0.41	-166.31	0.008	100.08	0.92	-179.33
3.90	0.96	144.43	0.38	-163.62	0.009	100.44	0.92	-178.55
4.00	0.96	142.86	0.35	-159.76	0.011	92.79	0.92	-177.69
4.10	0.96	140.65	0.33	-157.20	0.013	89.53	0.91	-176.63
4.20	0.96	138.55	0.31	-153.86	0.014	81.99	0.91	-175.61
4.30	0.96	136.33	0.29	-150.84	0.015	77.14	0.91	-174.60
4.40	0.96	133.82	0.28	-147.16	0.016	75.46	0.92	-173.80
4.50	0.96	131.19	0.26	-144.01	0.018	70.87	0.91	-172.76



### MTTF Calculation - Estimated MTTF -



Ea=1.6eV  
Confidence Level=90%

Channel Temp (deg.C)	MTTF (Hours)
160	4.05 x 10 <sup>7</sup>
180	6.07 x 10 <sup>6</sup>
200	1.07 x 10 <sup>6</sup>

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

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

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

k: Boltzman's constant (8.62 x 10<sup>-5</sup> eV/K)

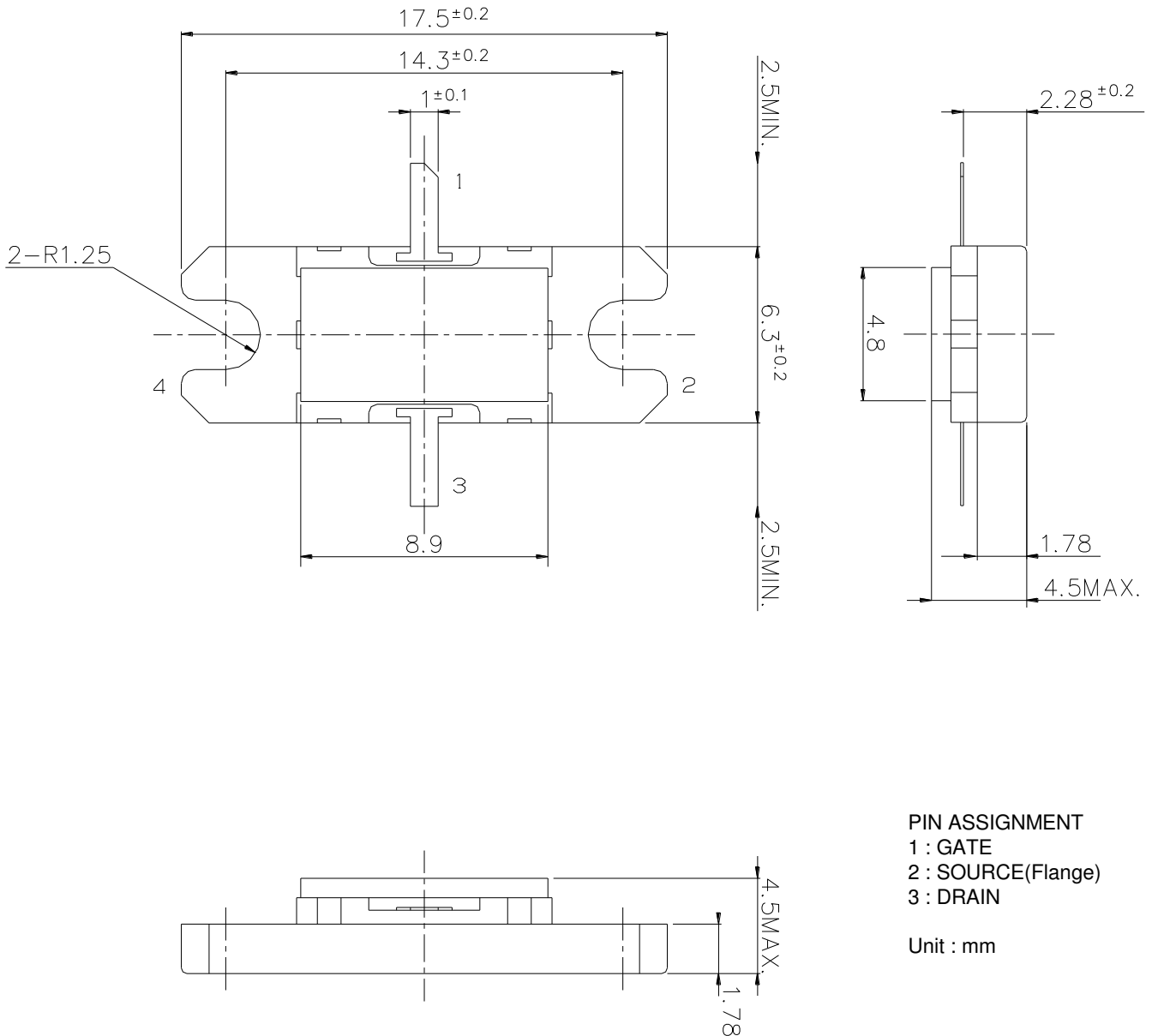
T<sub>stress</sub>: stress temperature (K)

T<sub>use</sub>: 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





**SGN21C050MK**

*High Voltage - High Power GaN-HEMT*

**For further information please contact:**

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