

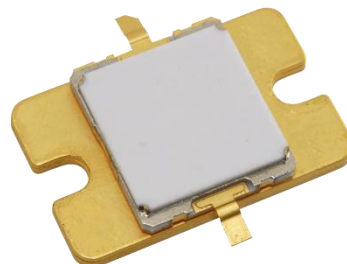
FEATURES

- High Voltage Operation : $V_{DS}=50V$
- High Power : 52.5dBm (typ.) @ P_{sat}
- High Efficiency: 65%(typ.) @ P_{sat}
- Power Gain : 16.3dB(typ.) @ $f=2.655GHz$
- 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 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}		55	V
Drain-Source Voltage	V_{DS}	$V_{GS}=-8V$	160	V
Gate-Source Voltage	V_{GS}		-15	V
Total Power Dissipation	P_t		132	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}	$R_G=5\text{ ohm}$	≤ 153	mA
Reverse Gate Current	I_{GR}	$R_G=5\text{ ohm}$	≥ -5.8	mA
Channel Temperature	T_{ch}		≤ 180	deg.C
Average Output Power	$P_{ave.}$		≤ 49.5	dBm

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

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Pinch-Off Voltage	V_p	$V_{DS}=50V$ $I_{DS}=40.8mA$	-1.0	-1.5	-2.0	V
Saturated Power	$P_{sat} *1$	$V_{DS}=50V$	51.7	52.5	-	dBm
Drain Efficiency	$\eta_d *2$	$I_{DS}(DC)=600mA$	25	30	-	%
Power Gain	$G_p *2$	$f=2.655GHz$	15.3	16.3	-	dB
Thermal Resistance	R_{th}	Channel to Case at 78W P_{DC}	-	1.4	1.6	deg.C/W

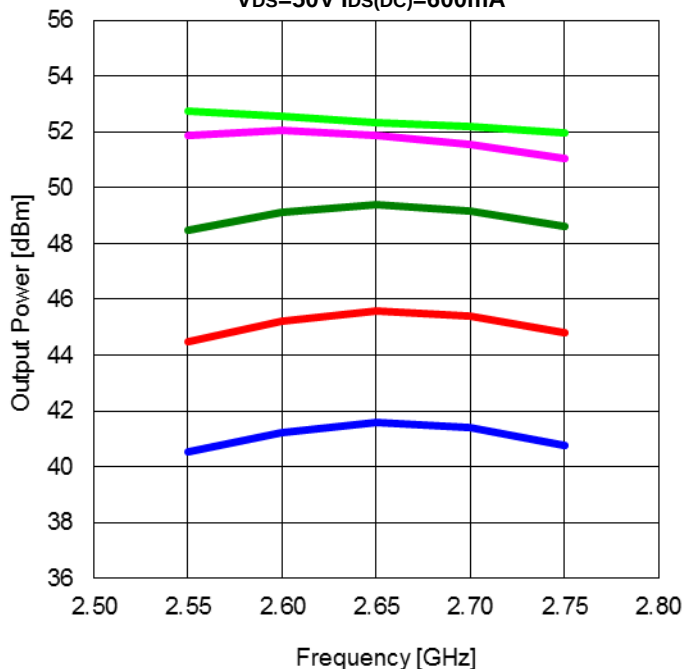
*1 : 10%-duty RF pulse (DC supply constant)

*2 : $P_{out} = 44.5dBm$, CW modulation Signal (W-CDMA)

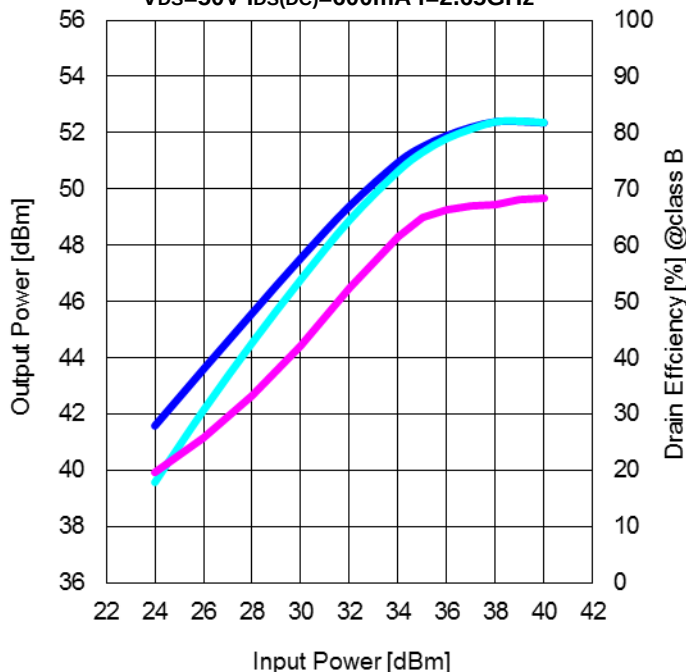
RoHS COMPLIANCE	Yes
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RF characteristics @ $f=2.65\text{GHz}$ fine tuned

Output Power vs. Frequency
 $V_{DS}=50\text{V}$ $I_{DS(DC)}=600\text{mA}$



Output Power and Drain Efficiency vs. Input Power
 $V_{DS}=50\text{V}$ $I_{DS(DC)}=600\text{mA}$ $f=2.65\text{GHz}$

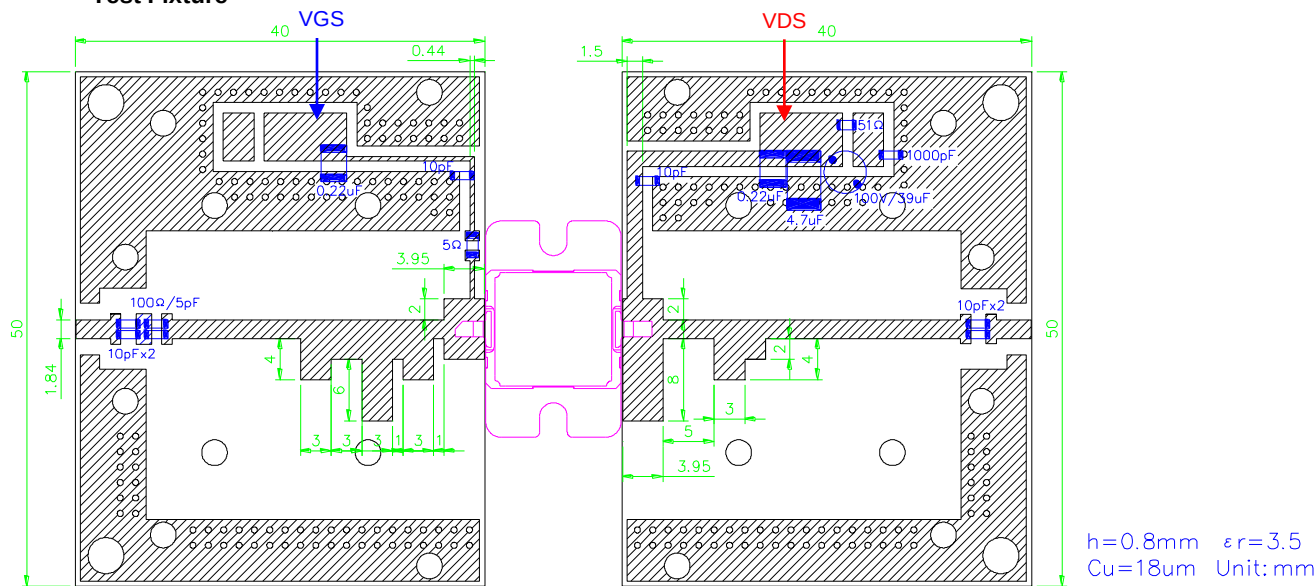


— Pin=24dBm — Pin=28dBm — Pin=32dBm
— Pin=36dBm — Pin=40dBm

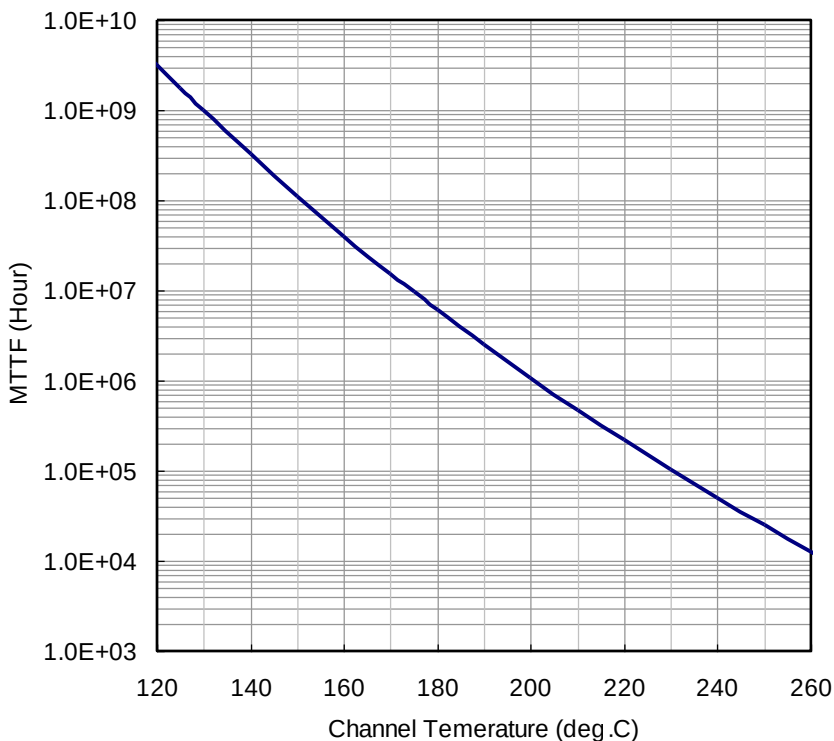
— Pout (class AB) — Pout (class B) — Nd (class B)

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

Test Fixture



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

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

$$MTTF_{\text{use}} = MTTF_{\text{stress}} \cdot AF$$

Where;

AF: acceleration factor

Ea: activation energy (1.6 eV)

k: Boltzman's constant (8.62 x 10⁻⁵ eV/K)

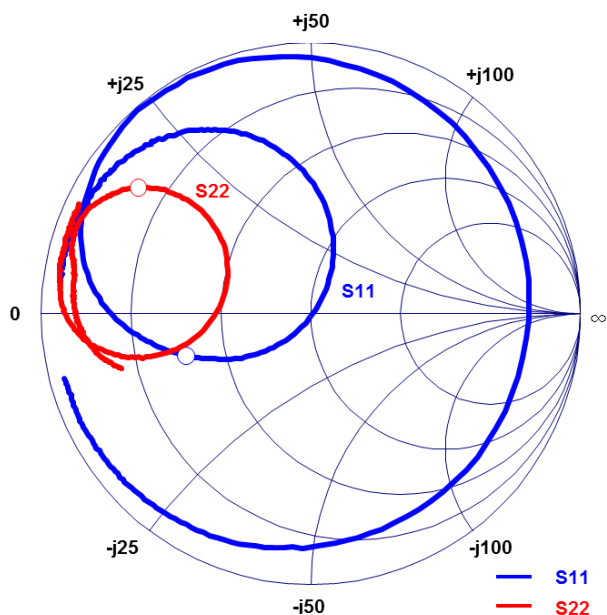
T_{stress}: stress temperature (K)

T_{use}: use temperature (K)

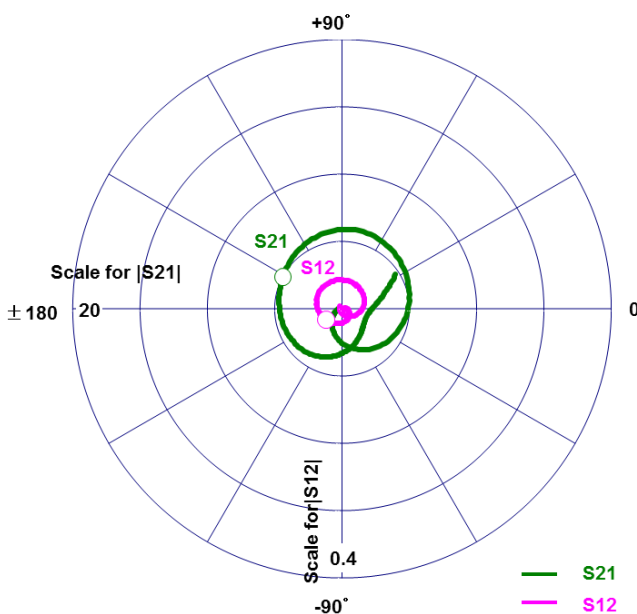
ESD Characteristics

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

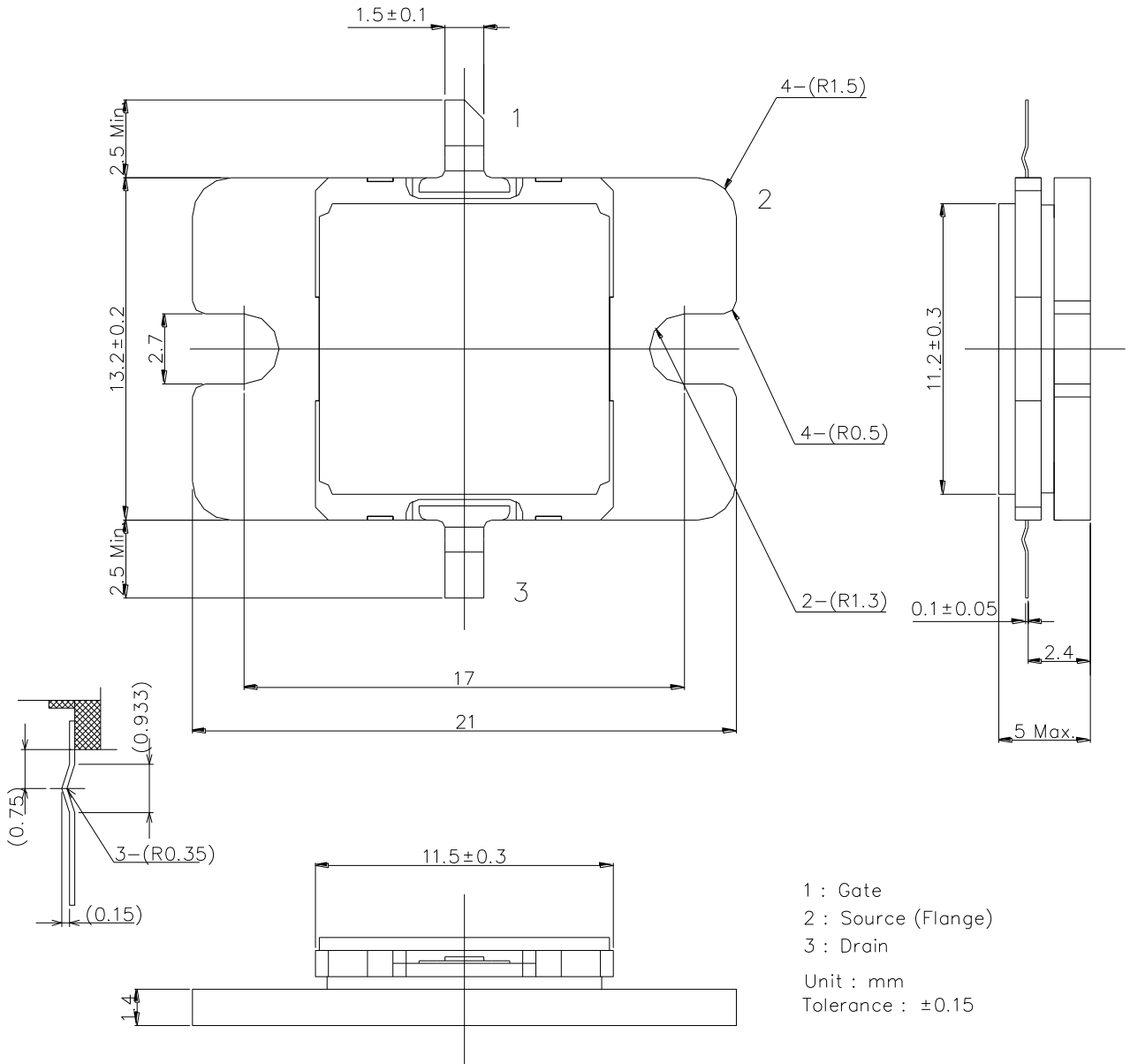
S-Parameters @V_{DS}=50V, I_{DS(DC)}=600mA, f=0.5 to 4.5 GHz
Z_I = Z_S = 50 ohm Marker : 2.65GHz



Freq.	S11		S21		S12		S22	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.5	0.94	172.71	4.72	32.73	0.003	-22.81	0.73	-163.94
0.6	0.94	169.77	3.74	24.42	0.003	-23.11	0.77	-166.65
0.7	0.94	166.86	3.11	16.64	0.003	-16.61	0.80	-169.01
0.8	0.94	164.19	2.68	9.80	0.002	-13.35	0.82	-171.84
0.9	0.94	161.36	2.36	3.09	0.002	-2.90	0.84	-174.05
1.0	0.94	158.48	2.15	-2.90	0.003	-2.73	0.85	-176.23
1.1	0.93	155.05	2.01	-9.13	0.003	4.07	0.87	-178.15
1.2	0.92	151.67	1.93	-15.05	0.003	11.18	0.87	-179.93
1.3	0.92	147.65	1.90	-21.01	0.004	12.10	0.88	-178.23
1.4	0.90	143.75	1.92	-27.46	0.004	11.99	0.88	-176.57
1.5	0.89	138.77	1.97	-35.02	0.005	11.83	0.88	-174.93
1.6	0.86	133.37	2.09	-42.66	0.006	6.09	0.89	-173.45
1.7	0.83	127.21	2.27	-51.06	0.007	2.26	0.89	-172.19
1.8	0.78	119.41	2.53	-61.58	0.008	-8.02	0.89	-170.63
1.9	0.71	109.92	2.86	-73.35	0.010	-18.27	0.89	-169.21
2.0	0.59	98.52	3.25	-87.80	0.013	-29.26	0.90	-168.20
2.1	0.43	84.74	3.68	-104.37	0.015	-44.64	0.91	-166.33
2.2	0.23	68.82	4.08	-123.08	0.018	-62.74	0.92	-164.01
2.3	0.02	39.11	4.33	-142.83	0.020	-83.30	0.93	-160.67
2.4	0.17	-136.93	4.50	-161.88	0.022	-100.25	0.92	-156.51
2.5	0.32	-148.68	4.63	-179.68	0.024	-116.85	0.89	-152.12
2.6	0.43	-157.85	4.84	-161.08	0.027	-135.53	0.83	-146.65
2.7	0.54	-165.16	5.14	-141.70	0.031	-154.80	0.74	-141.40
2.8	0.65	-172.99	5.53	-120.18	0.035	-175.19	0.61	-137.26
2.9	0.78	-177.04	5.86	-95.83	0.040	-161.40	0.43	-140.26
3.0	0.90	-161.75	5.92	-68.66	0.043	-135.25	0.33	-165.50
3.1	0.97	-142.40	5.62	-41.65	0.044	-109.72	0.42	-169.80
3.2	0.98	-117.76	5.18	-14.91	0.043	-84.12	0.57	-164.85
3.3	0.94	-85.97	4.66	-12.53	0.041	-57.67	0.71	-167.06
3.4	0.86	-43.95	4.04	-41.31	0.037	-29.29	0.81	-171.57
3.5	0.81	-6.55	3.18	-70.85	0.030	-1.27	0.88	-176.84
3.6	0.82	-53.42	2.27	-97.14	0.022	-27.52	0.93	-177.78
3.7	0.86	-86.81	1.56	-117.43	0.015	-51.56	0.94	-173.71
3.8	0.89	-109.22	1.07	-132.66	0.010	-75.76	0.94	-170.66
3.9	0.91	-124.83	0.76	-144.13	0.006	-92.22	0.95	-167.86
4.0	0.93	-135.98	0.56	-153.81	0.004	-118.85	0.95	-165.38
4.1	0.93	-144.32	0.43	-160.94	0.003	-149.38	0.95	-163.29
4.2	0.94	-151.34	0.33	-167.59	0.003	-167.16	0.95	-161.06
4.3	0.94	-156.62	0.27	-173.23	0.003	-156.38	0.95	-159.01
4.4	0.94	-161.43	0.22	-178.59	0.004	-141.60	0.95	-156.96
4.5	0.95	-165.25	0.19	-176.56	0.004	-133.10	0.95	-154.69



I2D Package Outline Metal-Ceramic Hermetic Package





SGN27C160I2D

High Voltage - High Power GaN-HEMT

For further information please contact:

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