

FEATURES

- High Output Power: $P_{5dB}=50.5dBm$ (Typ.)
- High Gain: $GL=13.5dB$ (Typ.)
- High Power Added Efficiency: $PAE=45\%$ (Typ.)
- Broad Band: 5.85 to 6.75GHz
- Hermetically Sealed Package

DESCRIPTION

The SGK5867-100A/001 is a high power GaN-HEMT that is internally matched for standard communication bands to provide optimum power and gain in a 50ohm system.



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

Item	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	26	V
Gate-Source Voltage	V_{GS}	-10	V
Total Power Dissipation	P_T	212	W
Storage Temperature	T_{stg}	-55 to +125	deg.C
Channel Temperature	T_{ch}	+250	deg.C
Case Temperature	T_{case}	-40 to +125	deg.C

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
Drain-Source Voltage	V_{DS}		≤ 24	V
Forward Gate Current	I_{GF}	$R_g=150\Omega$	≤ 24.4	mA
Reverse Gate Current	I_{GR}	$R_g=150\Omega$	≥ -12.8	mA
Channel Temperature	T_{ch}		$< +192$	deg.C

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

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	$V_{DS}=10V, V_{GS}=0V$		26		A
Trans Conductance	G_m	$V_{DS}=24V, I_{DS}=5.3A$	-	12	-	S
Pinch-off Voltage	V_P	$V_{DS}=10V, I_{DS}=5.3mA$	-	-3	-	V
Frequency Range	f	$V_{DS}=24V$ (Typ.) $I_{DS(DC)}=4.0A$ (Typ.) V_{gs} -constant	5.85	-	6.75	GHz
Output Power at 5dB G.C.P.	P_{5dB}		49.5	50.5	-	dBm
Linear Gain at $P_{in}=26.5dBm$	GL		12.5	13.5	-	dB
Drain Current at 5dB G.C.P.	I_{DSR}		-	10	14	A
Power Added Efficiency at 3dB G.C.P.	PAE		-	45	-	%
Gain Flatness	ΔG				1.6	dB
3 rd Order Inter modulation Distortion	IM_3	$f=5.85GHz, 6.75GHz$ $\Delta f=10MHz, 2\text{-tone Test}$ $P_{out}=44.0dBm$ (S.C.L.)	-25.0	-	-	dBc
Thermal Resistance	R_{th}	Channel to Case ($T_c=25\text{deg.C}, P_{diss}=96W$)	-	0.55	0.75	deg.C/W
Channel Temperature Rise	ΔT_{ch}	$(V_{DS} \times I_{DSR} - P_{out} + P_{in}) \times R_{th}$	-	85	140	deg.C

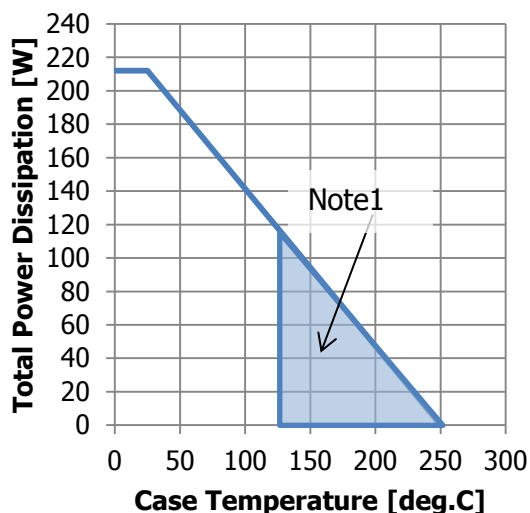
G.C.P. : Gain Compression Point, S.C.L. : Single Carrier Level

CASE STYLE	I2F	
RoHS Compliance	YES	
ESD	Class 1C	1000V to <2000V

Note : Based on ANSI/ESDA/JEDEC JS-001-2012(C=100pF, R=1.5kohm)

● RF Characteristics

Power Derating Curve

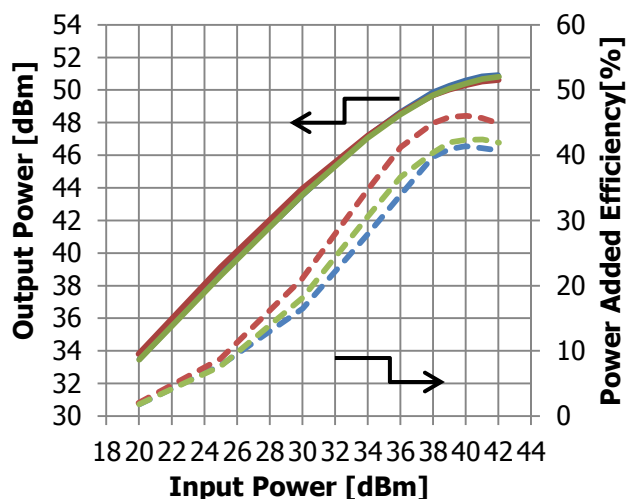


Note 1: Shaded area exceeds Maximum Case Temperature (See Page1)

Input Power vs. Output Power and

Power Added Efficiency

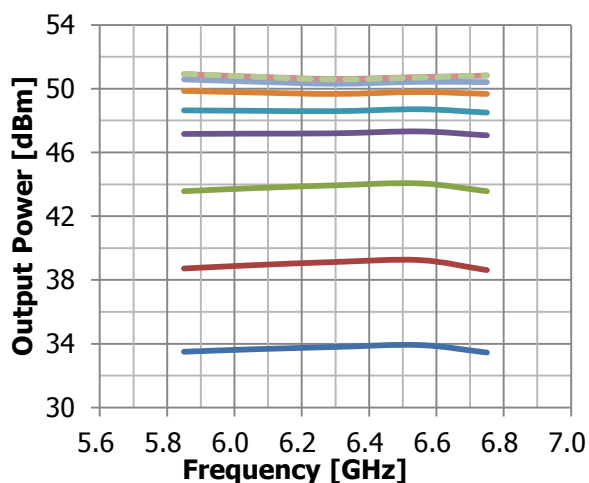
$V_{DS}=24V, I_{DS(DC)}=4000mA$



— 5.85[GHz] — 6.3[GHz] — 6.75[GHz]

Output Power vs. Frequency

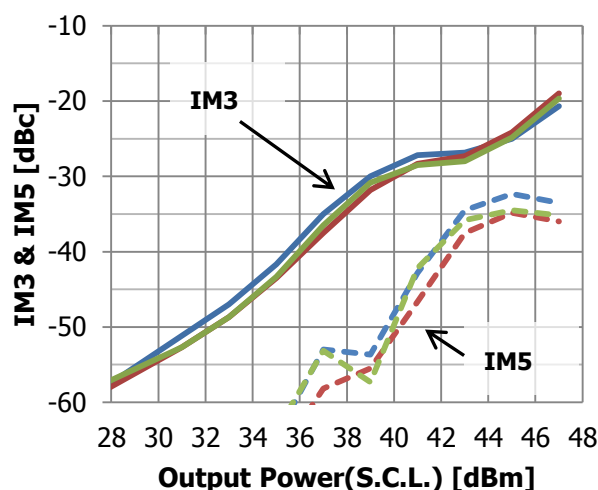
$V_{DS}=24V, I_{DS(DC)}=4000mA$



— 20dBm — 25dBm — 30dBm
— 34dBm — 36dBm — 38dBm
— 40dBm — 42dBm — P5dB

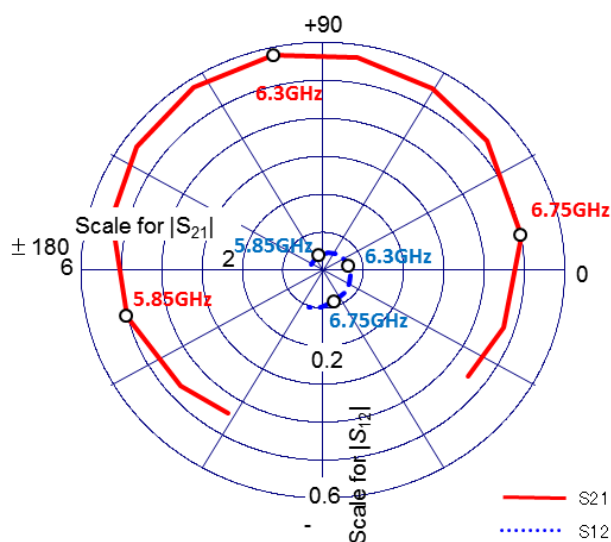
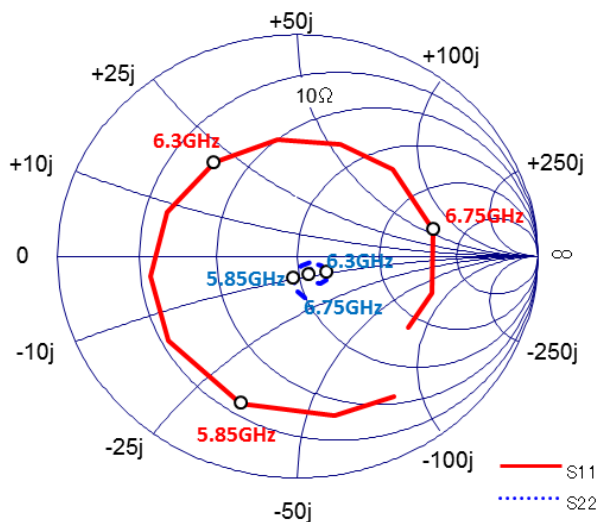
IMD vs. Output Power

$V_{DS}=24V, I_{DS(DC)}=4000mA$



— 5.85[GHz] — 6.3[GHz] — 6.75[GHz]

● S-parameter

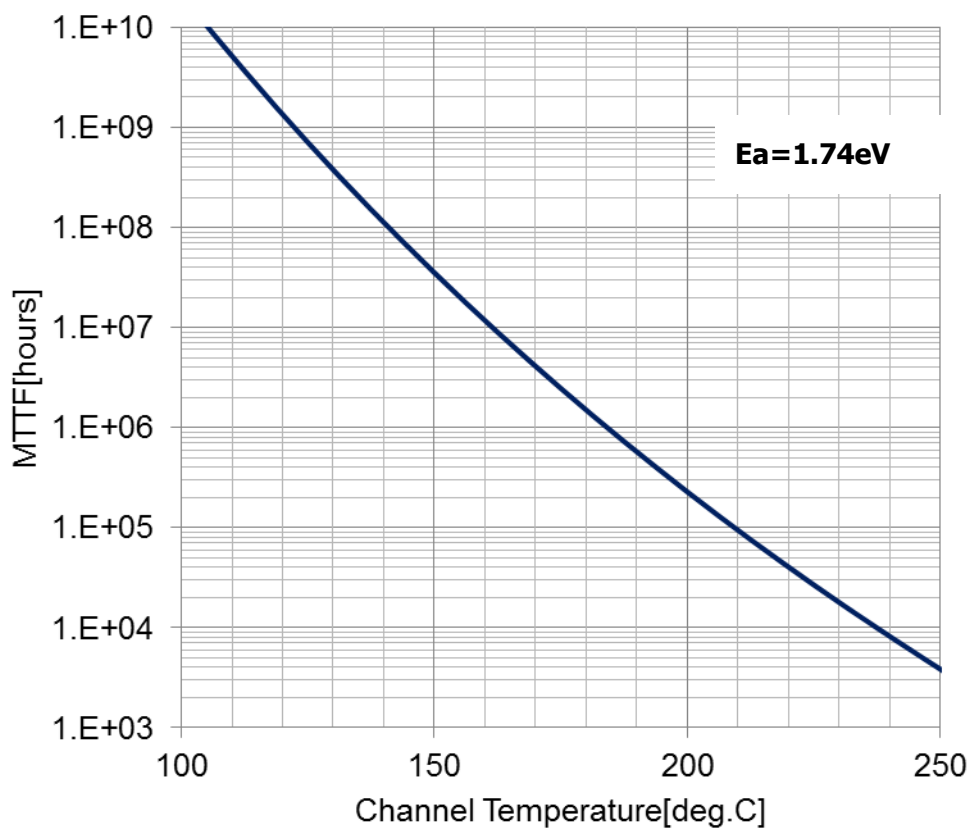


Freq.	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
5600 MHz	0.746	-57.6	4.452	-121.9	0.033	151.9	0.190	-81.4
5700 MHz	0.736	-77.9	4.653	-139.3	0.035	132.6	0.157	-90.8
5850 MHz	0.704	-109.6	5.021	-166.0	0.040	103.8	0.098	-100.8
6000 MHz	0.657	-144.9	5.425	165.3	0.047	73.5	0.044	-71.4
6100 MHz	0.617	-171.5	5.652	144.9	0.053	52.3	0.063	-25.8
6200 MHz	0.579	159.6	5.781	123.7	0.059	31.1	0.107	-22.5
6300 MHz	0.548	129.4	5.789	102.3	0.065	10.2	0.140	-31.2
6400 MHz	0.531	99.2	5.684	81.2	0.070	-10.1	0.157	-41.8
6500 MHz	0.535	70.4	5.510	60.4	0.075	-29.0	0.153	-51.9
6600 MHz	0.556	44.7	5.310	40.2	0.080	-46.6	0.135	-59.5
6750 MHz	0.579	12.0	4.994	10.6	0.087	-71.2	0.095	-59.8
6900 MHz	0.582	-16.3	4.716	-18.4	0.097	-94.1	0.080	-47.1
7000 MHz	0.560	-35.0	4.552	-37.7	0.105	-109.9	0.078	-58.1

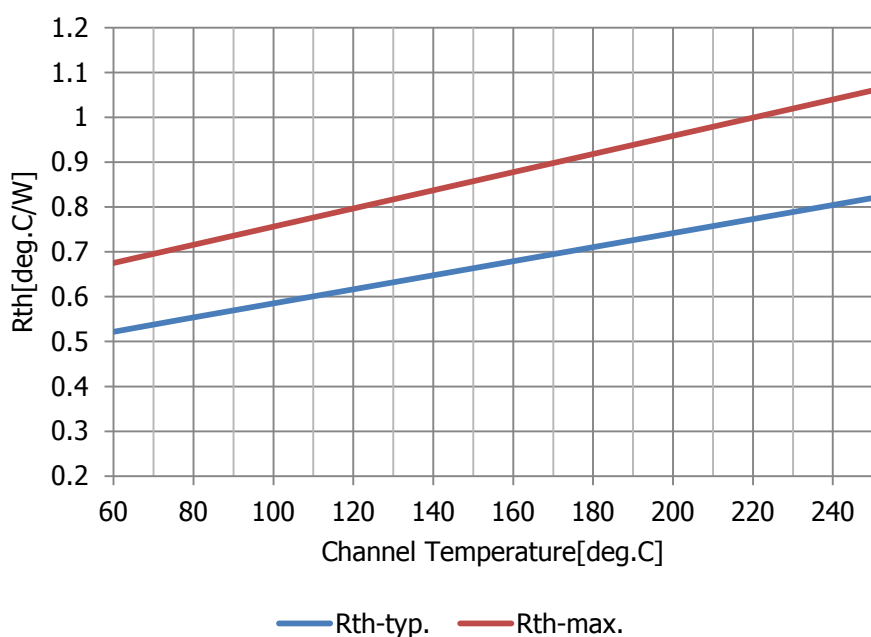
Rth of 100W class IM-GaN device at CW operation

Condition: $W_{diss}=96W$, $R_{th-typ.}=0.55deg.C/W$ @ $T_c=25deg.C$, $R_{th-max.}=0.75deg.C/W$ @ $T_c=25deg.C$

● MTTF vs. Tch

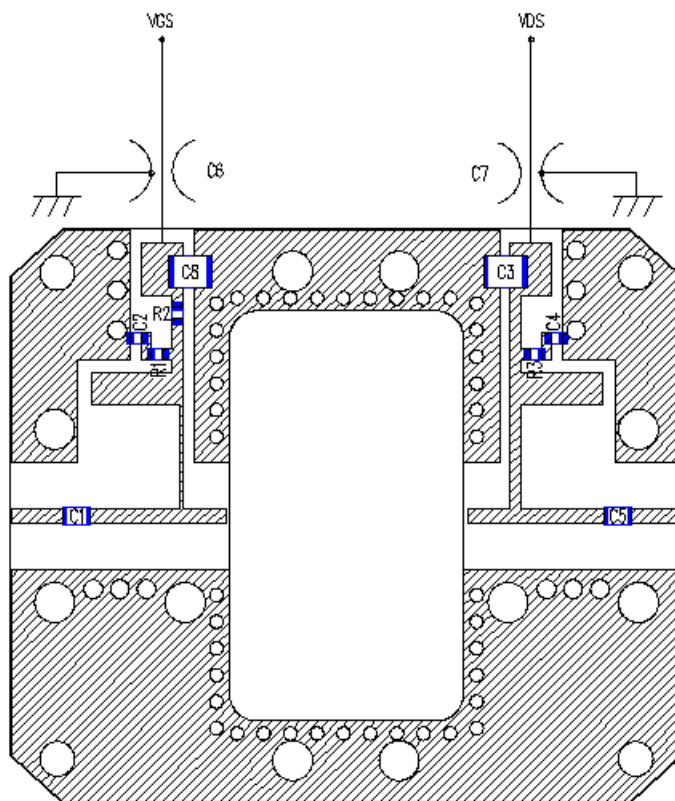


Rth vs. Tch



● Amplifier Circuit Outline

SGK5867-100A/001



C1	3.0pF
C2	1000pF
C3	0.1uF
C4	1000pF
C5	3.0pF
C6	1000pF
C7	1000pF
C8	0.1uF
R1	51ohm
R2	15ohm
R3	51ohm

Substrate : Rogers RO4003C

h=0.542mm, $\epsilon_r=3.38$

Cu=18um

C1, C5 : ATC600L(size:0805), +/- 0.1pF

C6, C7 : EMI FILTER MARUWA(FTA352AR102S-S)

● Package Outline

Case Style : I2F

