

## ■ Features

- High Output Power: P5dB=50.5dBm (Typ.)
- High Linear 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 $T_c=25$ 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	$T_c$	-40 to +125	deg.C

### RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
Drain-Source Voltage	$V_{DS}$		$\leq 24$	V
Forward Gate Current	$I_{GF}$	$R_g=15\text{ohm}$	$\leq 24.4$	mA
Reverse Gate Current	$I_{GR}$	$R_g=15\text{ohm}$	$\geq -12.8$	mA
Channel Temperature	$T_{ch}$		$< +192$	deg.C

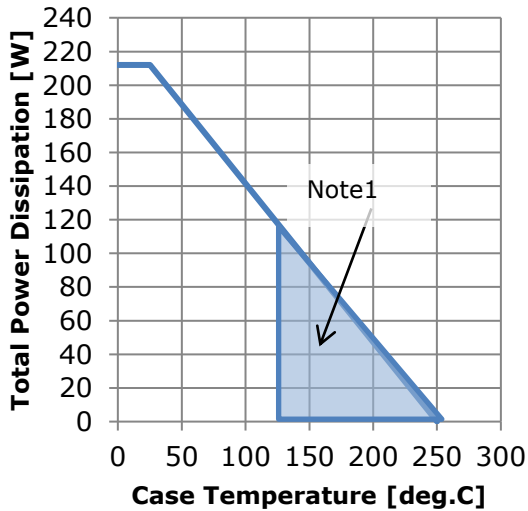
### ELECTRICAL CHARACTERISTICS (Case Temperature $T_c=25$ deg.C)

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	$V_P$	$V_{DS}=24V, I_{DS}=5.3mA$	-	-3	-	V
Output Power at 5dB G.C.P.	$P_{5dB}$	$V_{DS}=24V(\text{typ.})$ $I_{DS(DC)}=4.0A(\text{typ.})$ $f=5.85$ to $6.75$ GHz $V_{gs}$ -constant	49.5	50.5	-	dBm
Linear Gain at Pin=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	$\Delta G$		-	-	1.6	dB
3rd Order Inter Modulation Distortion	$IM_3$		$f=5.85\text{GHz}, 6.75\text{GHz}$ $\Delta f=10\text{MHz}, 2\text{-tone Test}$ $P_{out}=44.0\text{dBm (S.C.L.)}$	-25.0	-	-
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	$\Delta T_{ch}$	$(V_{DS} \times I_{DSR} - P_{out} + P_{in}) \times R_{th}$	-	85	140	deg.C

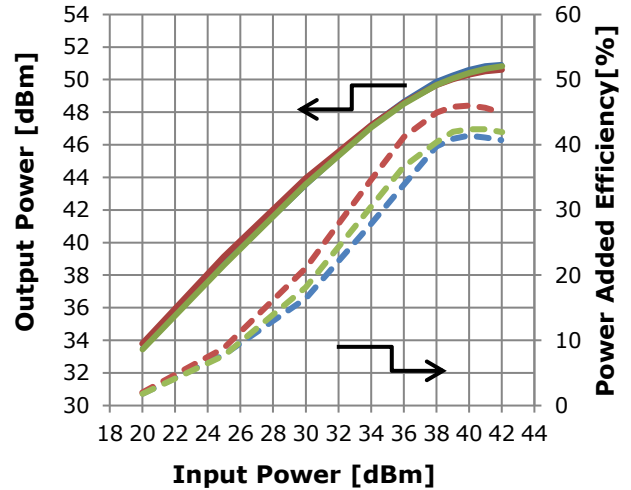
G.C.P. : Gain Compression Point, S.C.L. : Single Carrier Level

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

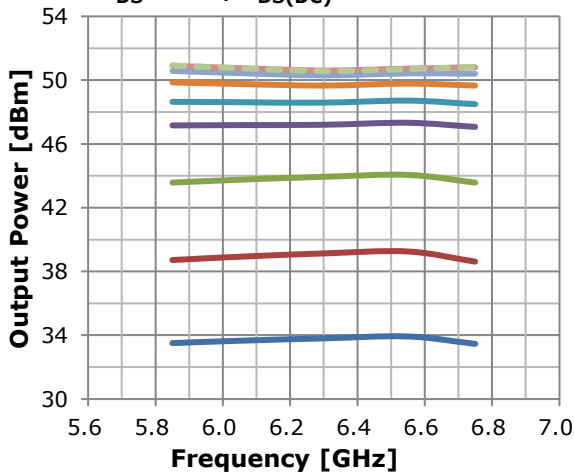
Note : Based on ANSI/ESDA/JEDEC JS-001-2012(C=100pF, R=1.5kohm)

**● RF Characteristics**
**Power Derating Curve**


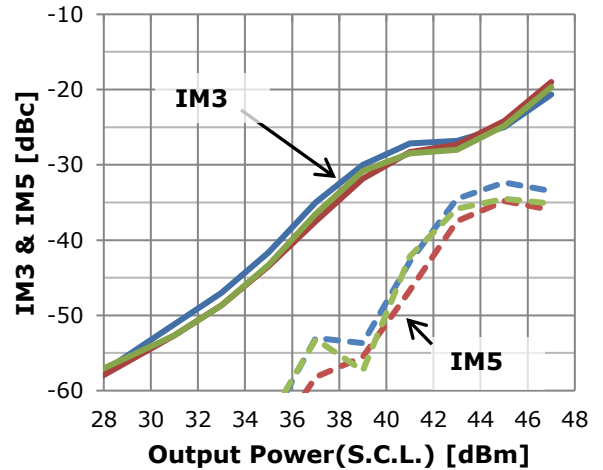
Note 1: Shaded area exceeds Maximum Case Temperature (See Page1)

**Input Power vs. Output Power and Power Added Efficiency**
 $V_{DS}=24V, I_{DS(DC)}=4000mA$ 


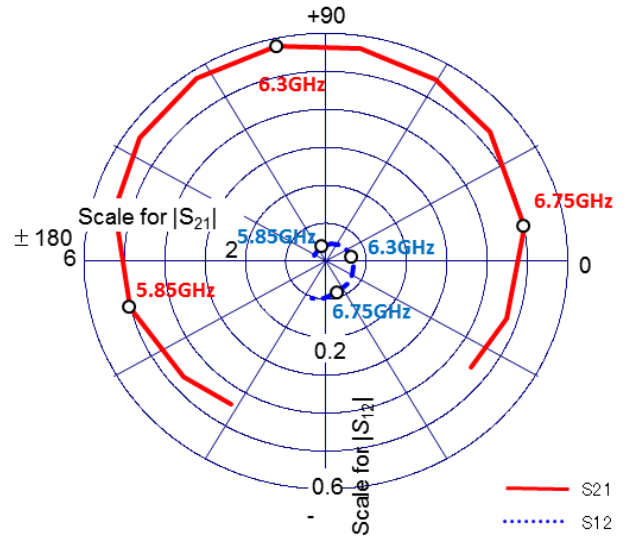
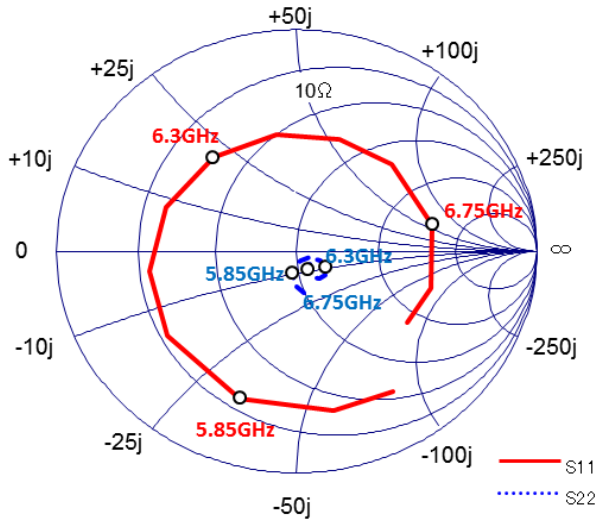
— 5.85[GHz] — 6.3[GHz] — 6.75[GHz]

**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]

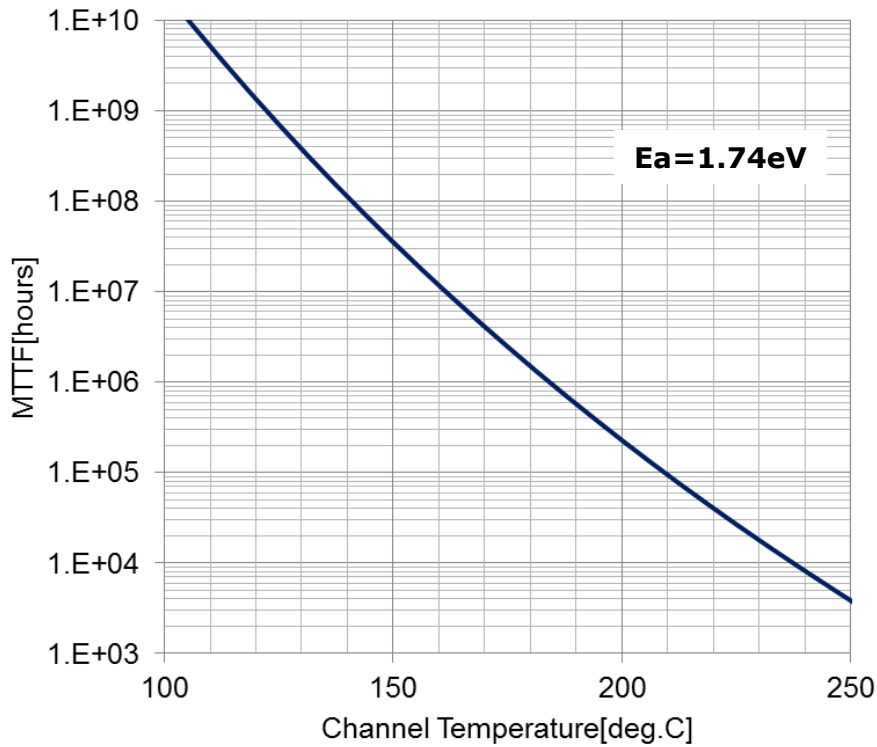
**● S-Parameter**


Freq.	S11 MAG	ANG	S21 MAG	ANG	S12 MAG	ANG	S22 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

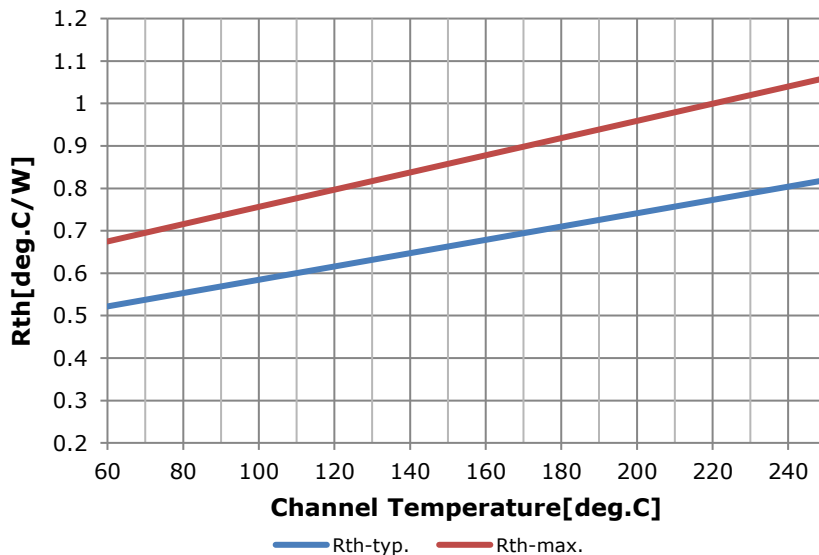
- **Rth of 100W class IM-GaN device at CW operation**

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**

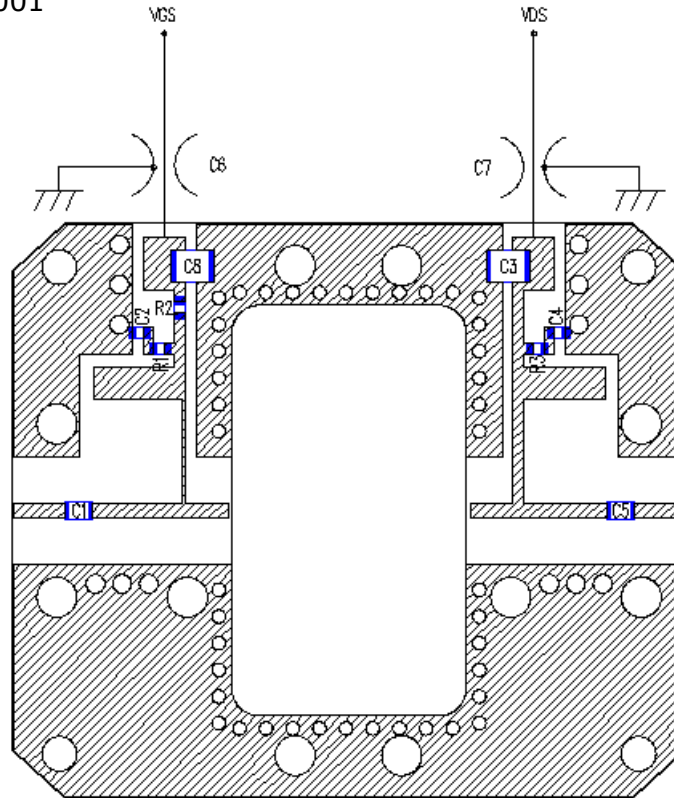


**Rth vs. Tch**



**● Amplifier Circuit Outline**

SGK5867-100A/001



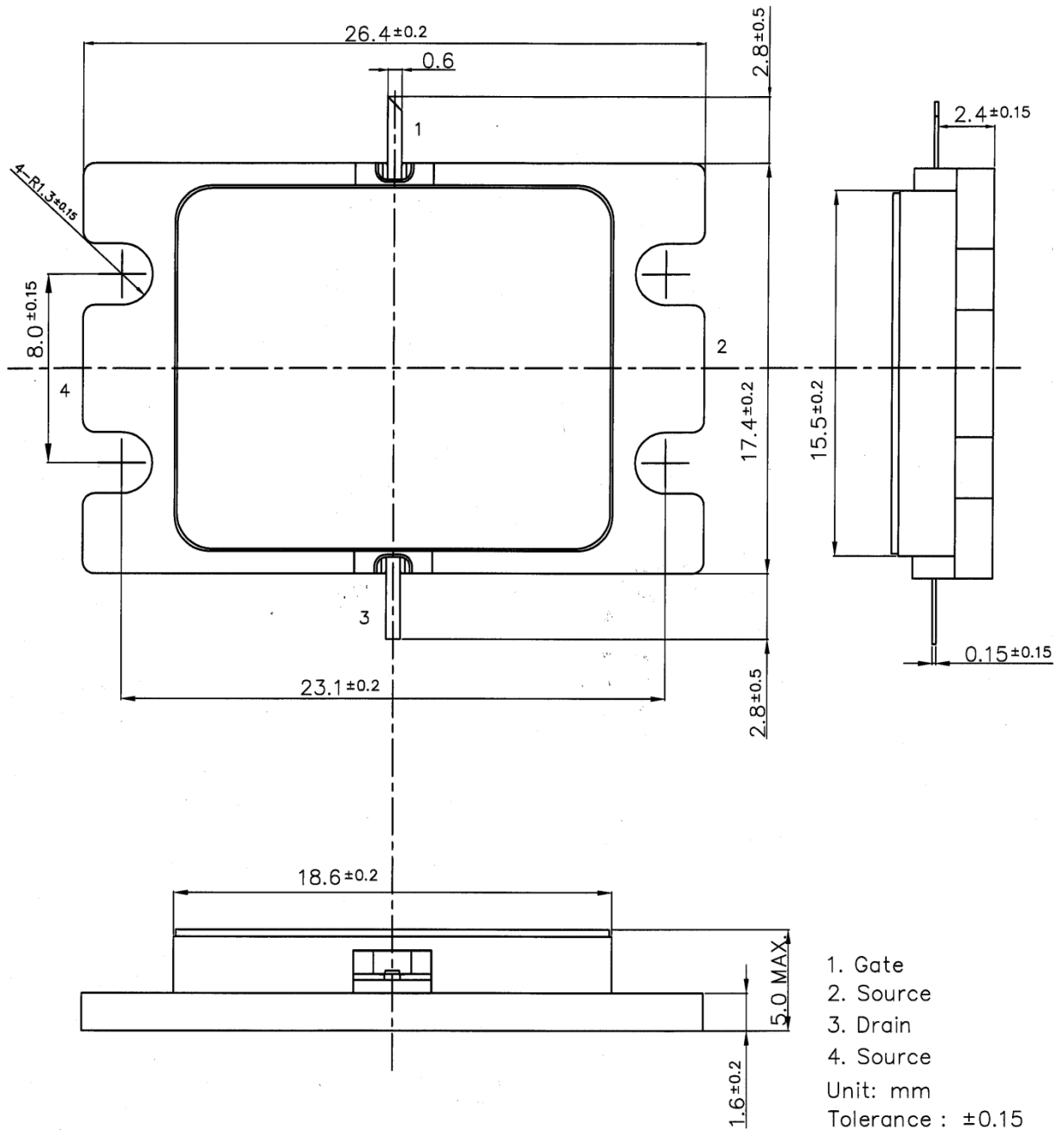
C1	3.0pF
C2	1000pF
C3	0.1uF
C4	1000pF
C5	3.0pF
C6	1000pF
C7	1000pF
C8	0.1uF
R1	51ohm
R2	15ohm
R3	51ohm

 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



## **For Safety, Observe the Following Procedures Environmental Management**

- Do not put this product into the mouth.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Respect all applicable laws of the country when discarding this product.  
This product must be disposed in accordance with methods specified by applicable hazardous waste procedures.

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