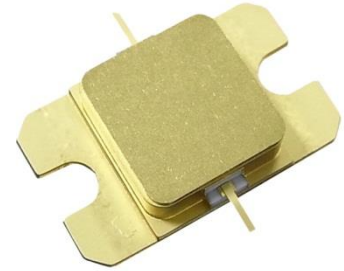


FEATURES

- High Output Power: $P_{5dB}=48.0dBm$ (Typ.)
- High Gain: $GL=12.5dB$ (Typ.)
- High Power Added Efficiency: $PAE=40\%$ (Typ.)
- Broad Band: 5.85 to 6.75GHz
- Hermetically Sealed Package

DESCRIPTION

The SGK5867-60A 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	112	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}		≤ 24	V
Forward Gate Current	I_{GF}	$R_g=51\text{ohm}$	≤ 12.2	mA
Reverse Gate Current	I_{GR}	$R_g=51\text{ohm}$	≥ -6.4	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}	$V_{DS}=10V, V_{GS}=0V$	-	13	-	A
Trans Conductance	G_m	$V_{DS}=24V, I_{DS}=2.6A$	-	6.0	-	S
Pinch-off Voltage	V_p	$V_{DS}=10V, I_{DS}=2.6mA$	-	-3	-	V
Frequency Range	f	$V_{DS}=24V\text{-typ.}$ $I_{DS(DC)}=2.6A\text{-typ.}$ $V_{GS}\text{-constant}$	5.85	-	6.75	GHz
Output Power at 5dB G.C.P.	P_{5dB}		47.0	48.0	-	dBm
Linear Gain at $P_{in}=25.5dBm$	GL		11.5	12.5	-	dB
Drain Current at 5dB G.C.P.	I_{DSR}		-	5.4	7.0	A
Power Added Efficiency at 3dB G.C.P.	PAE		-	40	-	%
Gain Flatness	ΔG		-	-	1.6	dB
3 rd Order Inter modulation Distortion	IM_3	$f=5.85GHz, 6.75GHz$ $\Delta f=10MHz, 2\text{-tone Test}$ $P_{out}=32.0dBm$ (S.C.L.)	-40.0	-	-	dBc
Thermal Resistance	R_{th}	Channel to Case ($T_c=25\text{deg.C}, P_{diss}=62.4W$)	-	1.3	1.5	deg.C/W
Channel Temperature Rise	ΔT_{ch}	$(V_{DS} \times I_{DSR} - P_{out} + P_{in}) \times R_{th}$	-	100	150	deg.C

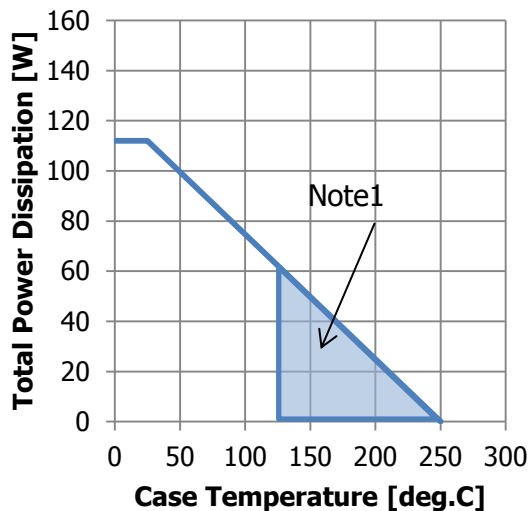
G.C.P. : Gain Compression Point, S.C.L. : Single Carrier Level

CASE STYLE	IBK	
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

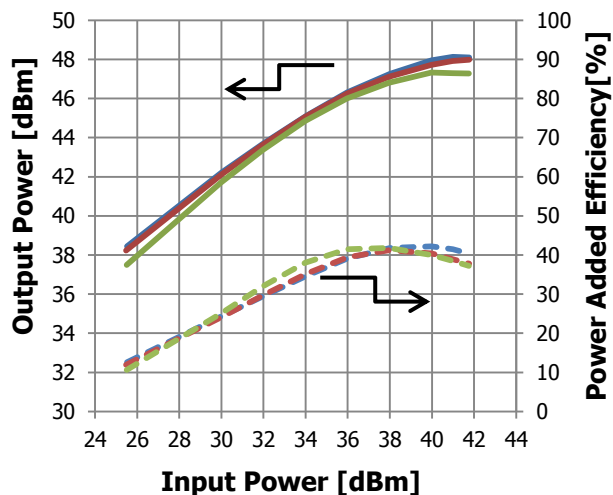
Power Derating Curve



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

Input Power vs. Output Power and Power Added Efficiency

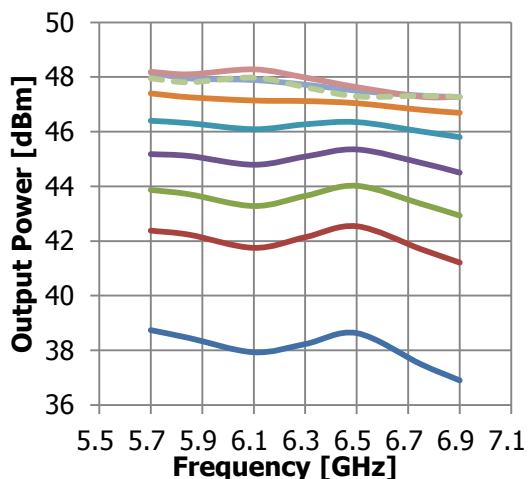
$V_{DS}=24V$, $I_{DS(DC)}=2600mA$



— 5.85[GHz] — 6.3[GHz] — 6.75[GHz]

Output Power vs. Frequency

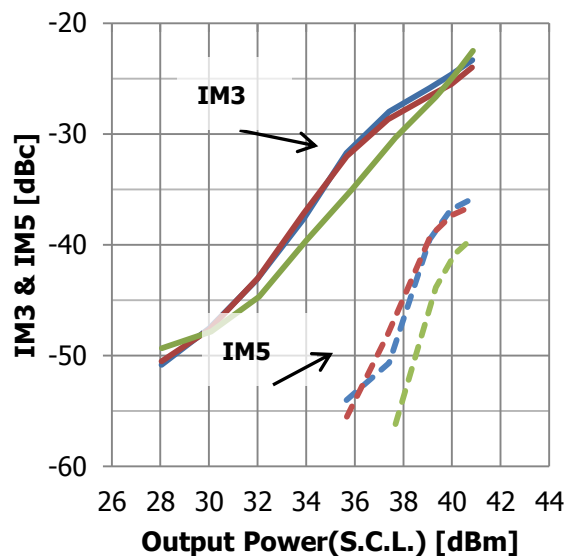
$V_{DS}=24V$, $I_{DS(DC)}=2600mA$



— Pin=26[dBm] — Pin=30[dBm]
 — Pin=32[dBm] — Pin=34[dBm]
 — Pin=36[dBm] — Pin=38[dBm]
 — Pin=40[dBm] — Pin=42[dBm]
 - - - P5dB

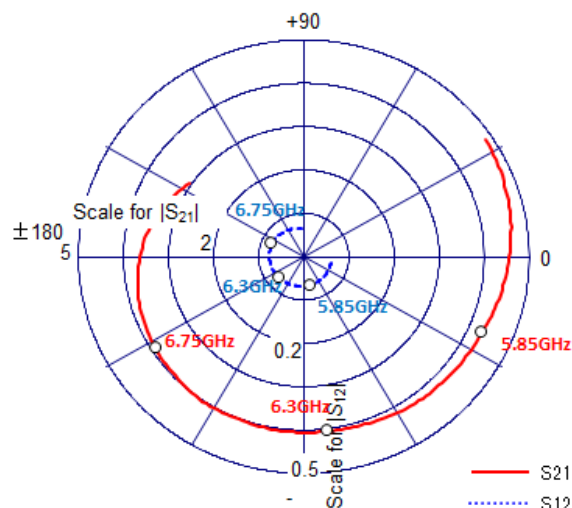
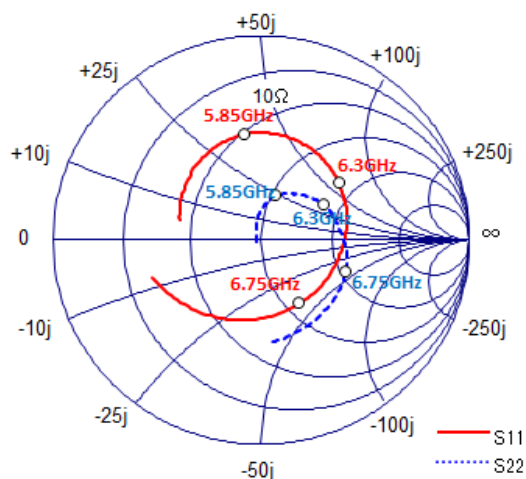
IMD vs. Output Power

$V_{DS}=24V$, $I_{DS(DC)}=2600mA$



— 5.85[GHz] — 6.3[GHz] — 6.75[GHz]

● S-Parameter



Bias Condition $V_{DS}=24V$, $I_{DS(DC)}=2.6A$

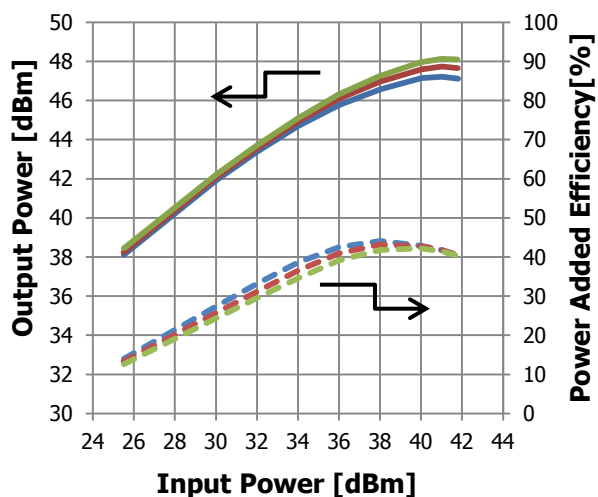
$R_g = 51\Omega$

Freq.	S11		S21		S12		S22	
	mag	phase	mag	phase	mag	phase	mag	phase
5600MHz	0.467	136.5	4.684	11.2	0.063	-39.3	0.101	99.9
5700MHz	0.498	120.3	4.533	-3.1	0.065	-55.2	0.162	86.8
5850MHz	0.524	98.3	4.311	-23.7	0.066	-77.3	0.226	72.1
6000MHz	0.523	78.2	4.223	-43.3	0.068	-98.2	0.271	56.8
6100MHz	0.511	64.9	4.170	-56.2	0.070	-111.6	0.301	46.7
6200MHz	0.492	51.1	4.097	-69.4	0.071	-124.9	0.328	37.3
6300MHz	0.465	36.3	4.059	-82.5	0.073	-138.4	0.349	28.8
6400MHz	0.435	20.2	4.049	-96.0	0.074	-151.9	0.365	19.5
6500MHz	0.402	1.5	4.023	-109.7	0.076	-165.5	0.379	9.3
6600MHz	0.376	-19.9	4.022	-124.2	0.077	179.7	0.402	-2.0
6750MHz	0.363	-59.4	3.919	-147.2	0.077	157.3	0.436	-20.6
6900MHz	0.401	-102.1	3.724	-171.8	0.074	133.8	0.456	-42.5
7000MHz	0.454	-128.1	3.533	171.6	0.071	117.9	0.472	-59.3

- RF Characteristics—V_{DS} dependence

Input Power vs. Output Power and Power Added Efficiency

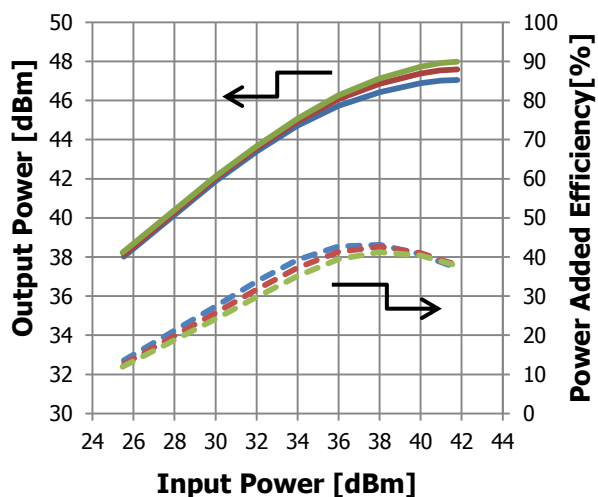
I_{DS(DC)}=2600mA, freq.=5.85GHz



— V_{DS}=20V — V_{DS}=22V — V_{DS}=24V

Input Power vs. Output Power and Power Added Efficiency

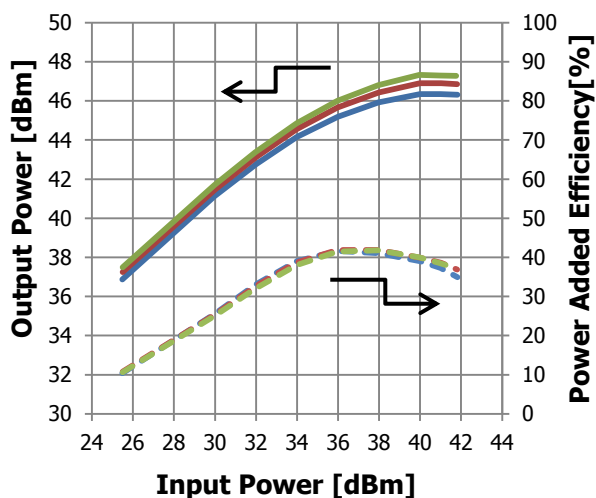
I_{DS(DC)}=2600mA, freq.=6.3GHz



— V_{DS}=20V — V_{DS}=22V — V_{DS}=24V

Input Power vs. Output Power and Power Added Efficiency

I_{DS(DC)}=2600mA, freq.=6.75GHz

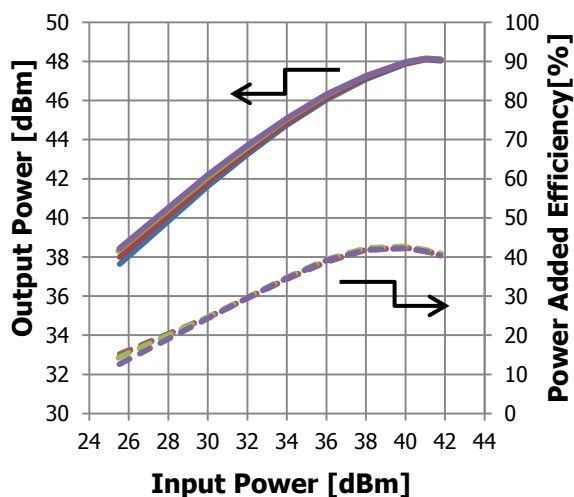


— V_{DS}=20V — V_{DS}=22V — V_{DS}=24V

- RF Characteristics— $I_{DS}(DC)$ dependence

**Input Power vs. Output Power and
Power Added Efficiency**

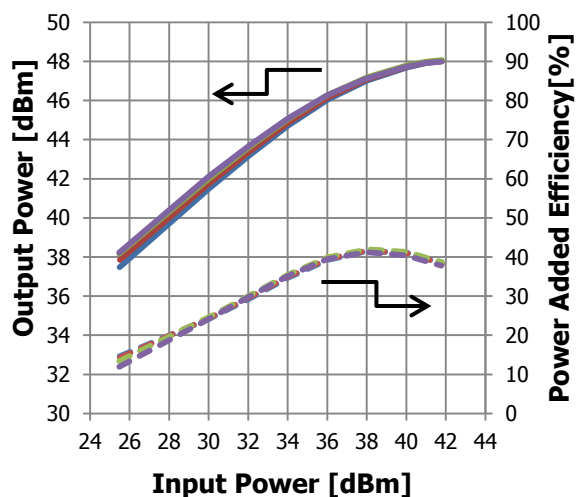
$V_{DS}=24V$, freq.=5.85GHz



IDS=1200mA IDS=1700mA
IDS=2200mA IDS=2600mA

**Input Power vs. Output Power and
Power Added Efficiency**

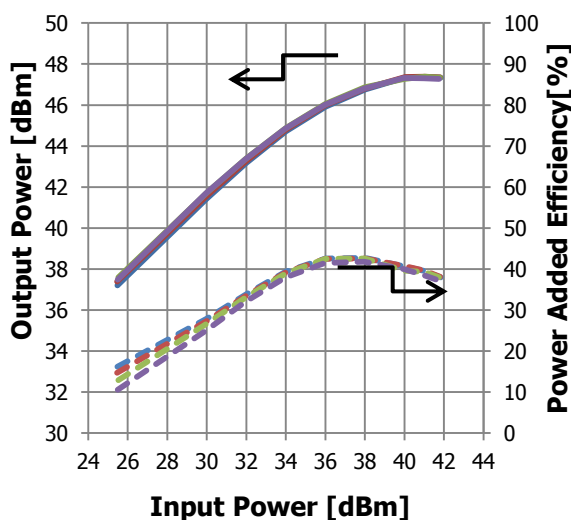
$V_{DS}=24V$, freq.=6.3GHz



IDS=1200mA IDS=1700mA
IDS=2200mA IDS=2600mA

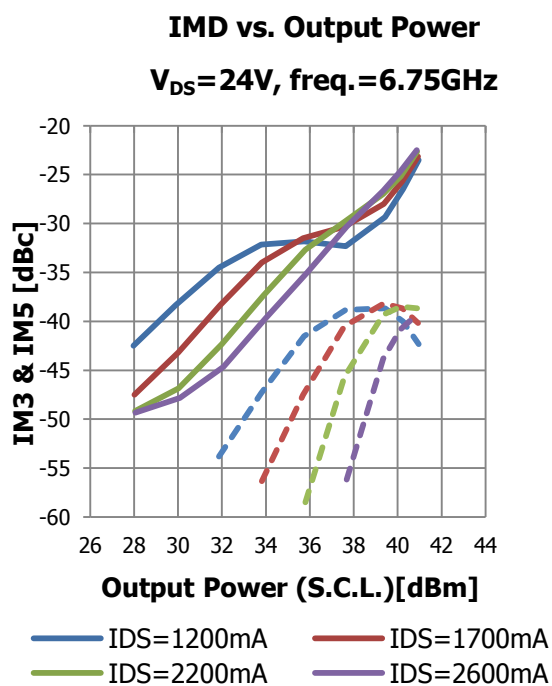
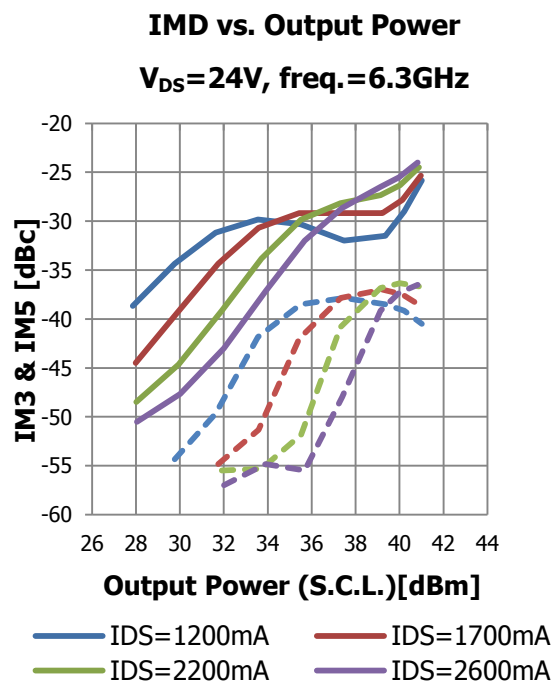
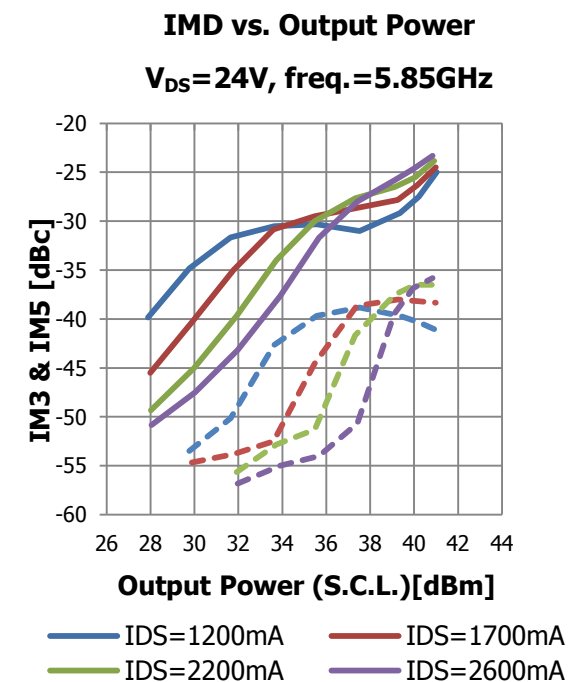
**Input Power vs. Output Power and
Power Added Efficiency**

$V_{DS}=24V$, freq.=6.75GHz

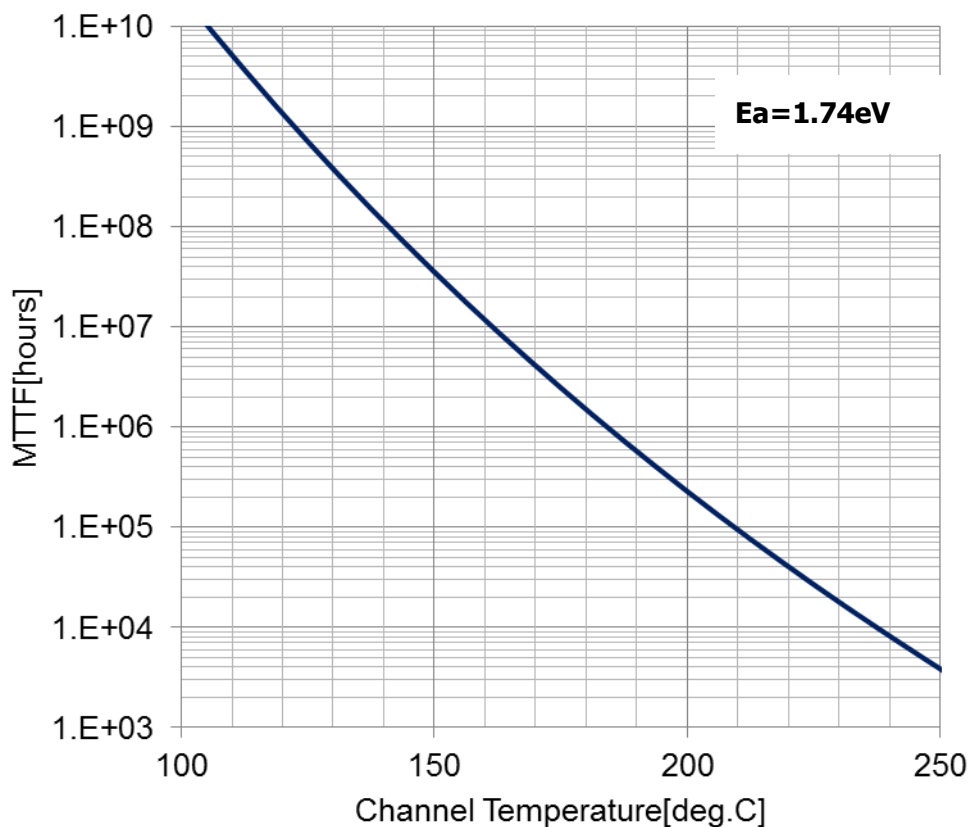


IDS=1200mA IDS=1700mA
IDS=2200mA IDS=2600mA

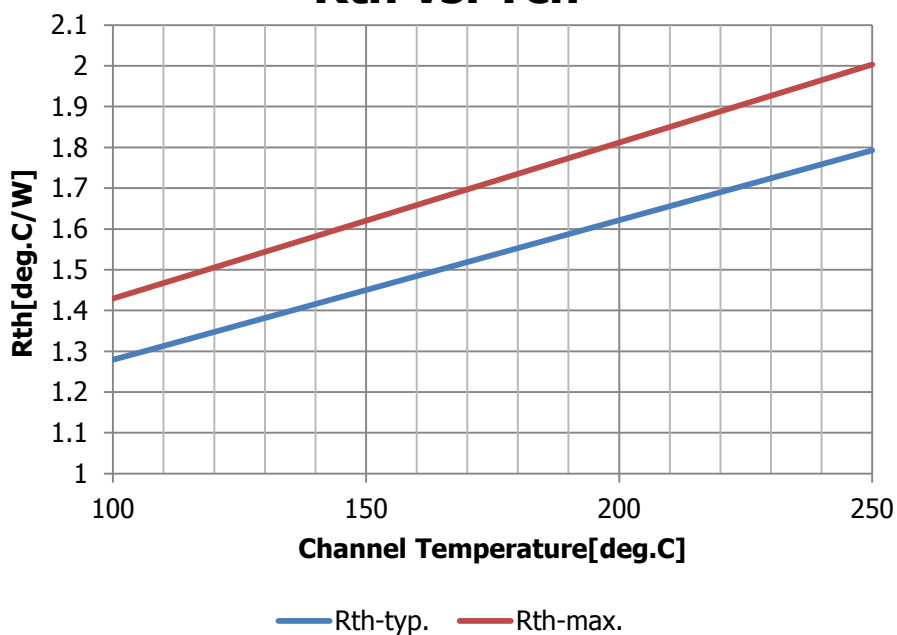
- RF Characteristics— $I_{DS}(DC)$ dependence



- **MTTF vs. Tch**

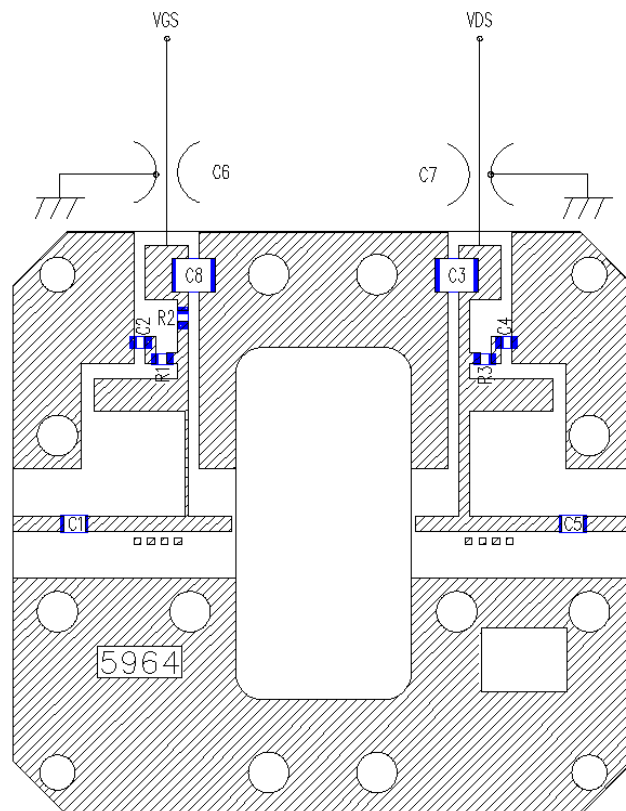


Rth vs. Tch



● Amplifier Circuit Outline

SGK5867-60A



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

Substrate : Rogers RO4003C

h=0.542mm, $\epsilon_r=3.38$

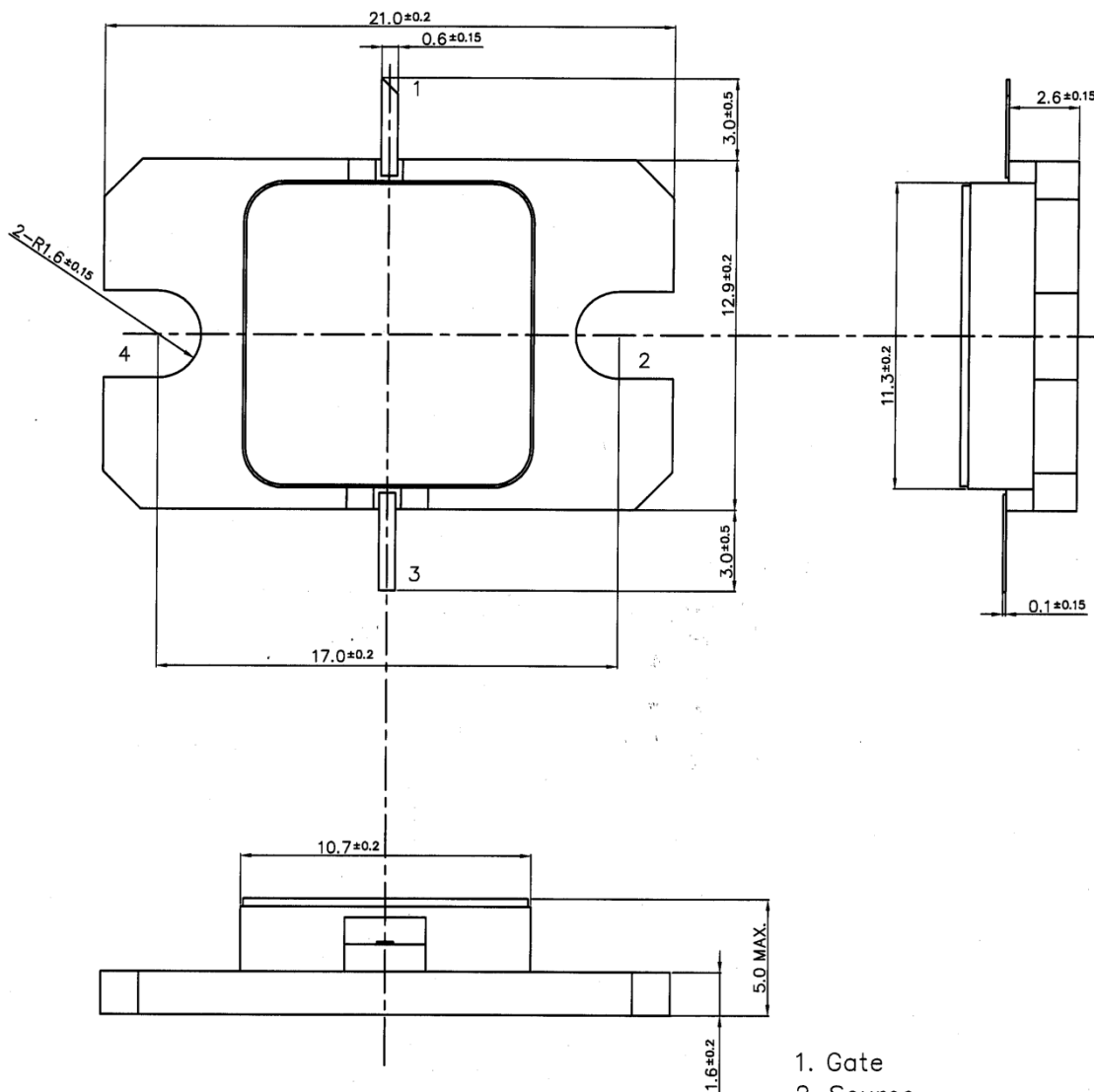
Cu=18um

C1, C5 : ATC600F(size:0805), +/- 0.1pF

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

● Package Outline

Case Style : IBK



1. Gate
 2. Source
 3. Drain
 4. Source
- Unit: mm
Tolerance : ± 0.15