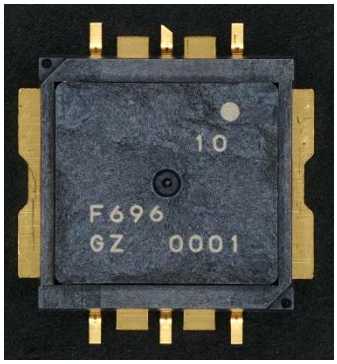
Preliminary

■ Features

- High Output Power: P5dB=43.0dBm (Typ.)
- High Gain: GL=14.0 to 15.0dB (Typ.)
- High Power Added Efficiency: PAE=41% (Typ.)
- Broad Band: Frequency=5.85 to 7.2GHz
- Internally Matched
- Plastic Package for SMT applications



■ Description

The F696 is a high power GaN-HEMT that is internally matched for standard communication bands to provide optimum power and linearity.

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	66.2	W
Storage Temperature	T_{stg}	-40 to +125	deg.C
Channel Temperature	T_{ch}	250	deg.C
Input Power	Pin	37	dBm

RECOMMENDED OPERATING CONDITION

Item	Symbol	Condition	Limit	Unit
Drain-Source Voltage	V_{DS}		<=24	V
Forward Gate Current	I_{GF}	Rg=100ohm	<=3.1	mA
Reverse Gate Current	I_{GR}	Rg=100ohm	>=-1.5	mA
Channel Temperature	T_{ch}		<+193	deg.C

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

Item	Symbol	Condition	Limit			Unit
			Min.	Typ.	Max.	
Saturated Drain Current	I_{DSS}	Vds=10V, Vgs=0V	-	5.0	-	A
Trans Conductance	g_m	Vds=24V, Ids=0.6A	-	1.5	-	S
Pinch-off Voltage	V_P	Vds=24V, Ids=0.6mA	-2.5	-4.0	-5.5	V
Frequency Range	f	Vds=24V-typ. Ids(DC)=1.0A-typ. Vgs-constant *1:f=5.85 to 6.53 GHz *2:f=6.53 to 7.2 GHz	5.85	-	7.2	GHz
Output Power at 5dB G.C.P.	P_{5dB}		41.5	43.0	-	dBm
Linear Gain at Pin=20dBm	GL		11.0*1	15.0*1	-	dB
			11.0*2	14.0*2	-	dB
Drain Current at 5dB G.C.P.	I_{DSR}		-	2.0	2.4	A
Power Added Efficiency at 3dB G.C.P.	PAE		-	41	-	%
3rd Order Inter Modulation Distortion	IM_3	f=5.85GHz, 7.2GHz Δf=10MHz, 2-tone Test Pout=27.5dBm (S.C.L.)	-40.0	-43.0	-	dBc
Thermal Resistance	R_{th}	Channel to Case (Tc=25deg.C, Pdiss=24W)	-	2.7	3.4	deg.C/W
Channel Temperature Rise	ΔT_{ch}	(V_{DS} x I_{DSR} – Pout + Pin) x R_{th}	-	61	150	deg.C

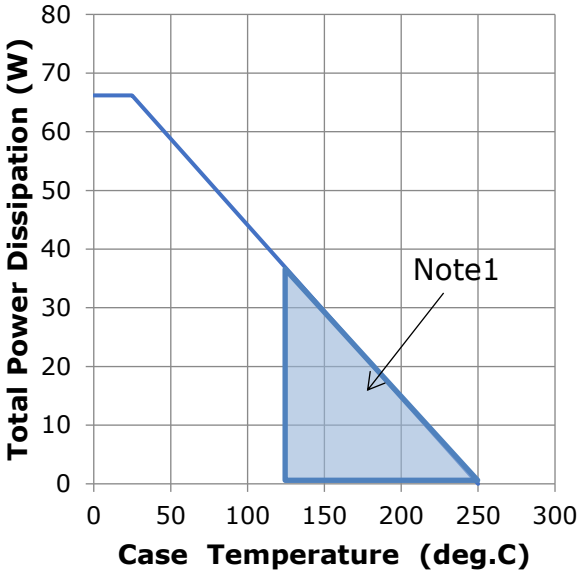
G.C.P. : Gain Compression Point, S.C.L. : Single Carrier Level

CASE STYLE	I3C	
RoHS Compliance	YES	
ESD *3	Class 1C	1000V to <2000V
MSL	2	One year after opening the packing

Note : *3 Based on ANSI/ESDA/JEDEC JS-001-2012(C=100pF, R=1.5kohm)

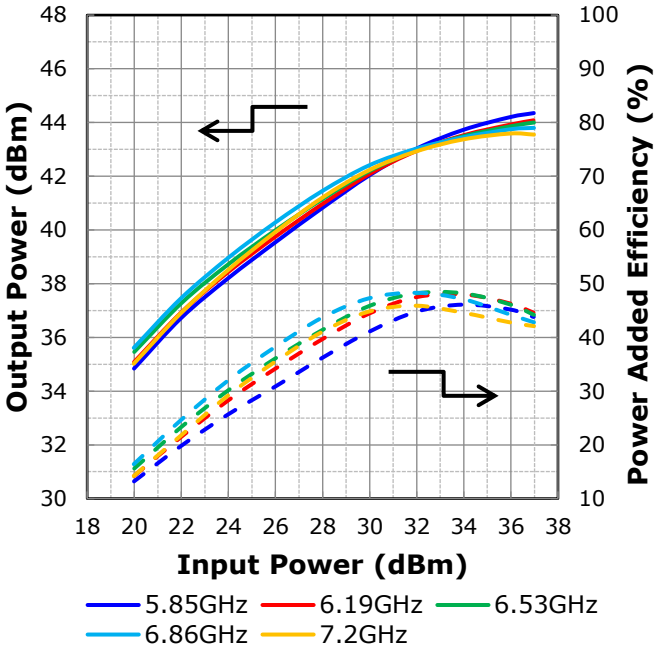
● RF Characteristics

Power Derating Curve

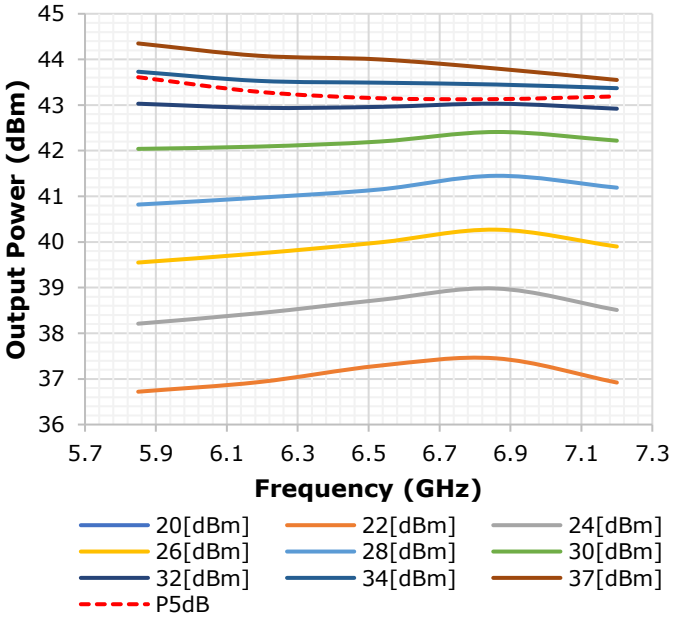


Note 1: Shaded area exceeds Maximum Case Operating Temperature (See Page1)

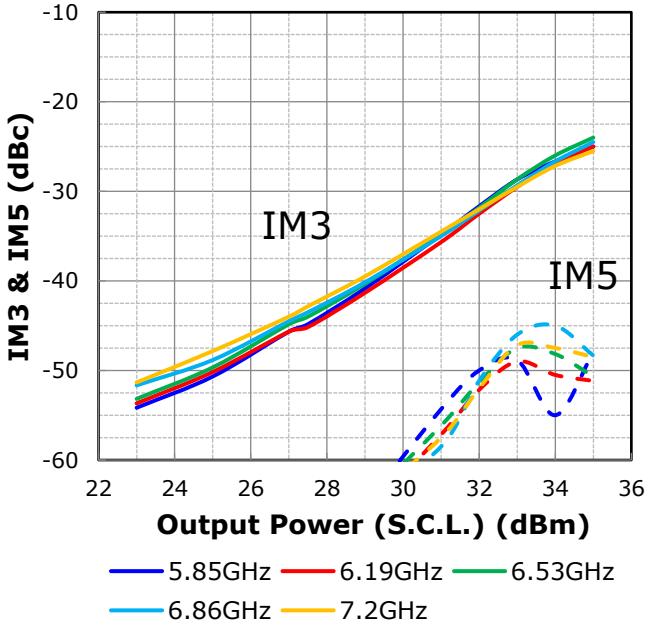
Input Power vs. Output Power and Power Added Efficiency
V_{DS}=24V, $I_{DS(DC)}$=1.0A



Output Power vs. Frequency
V_{DS}=24V, $I_{DS(DC)}$=1.0A

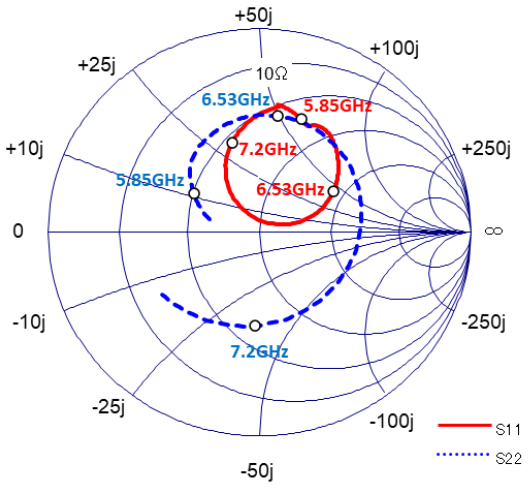


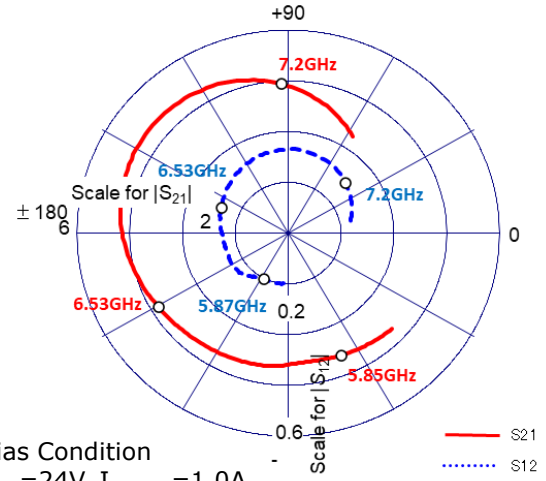
IMD vs. Output Power (S.C.L.)
V_{DS}=24V, $I_{DS(DC)}$=1.0A, Δf=10MHz



Preliminary

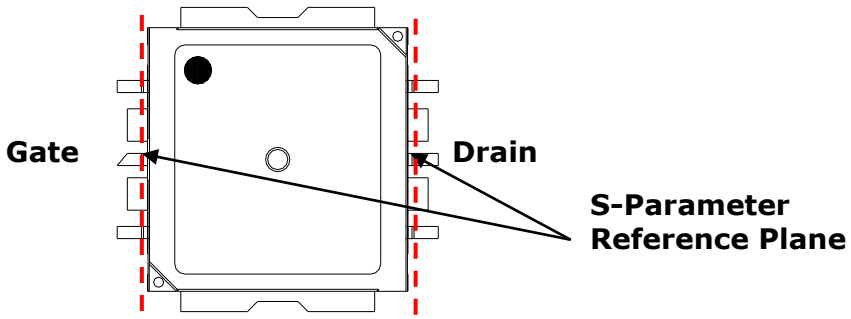
● S-Parameter



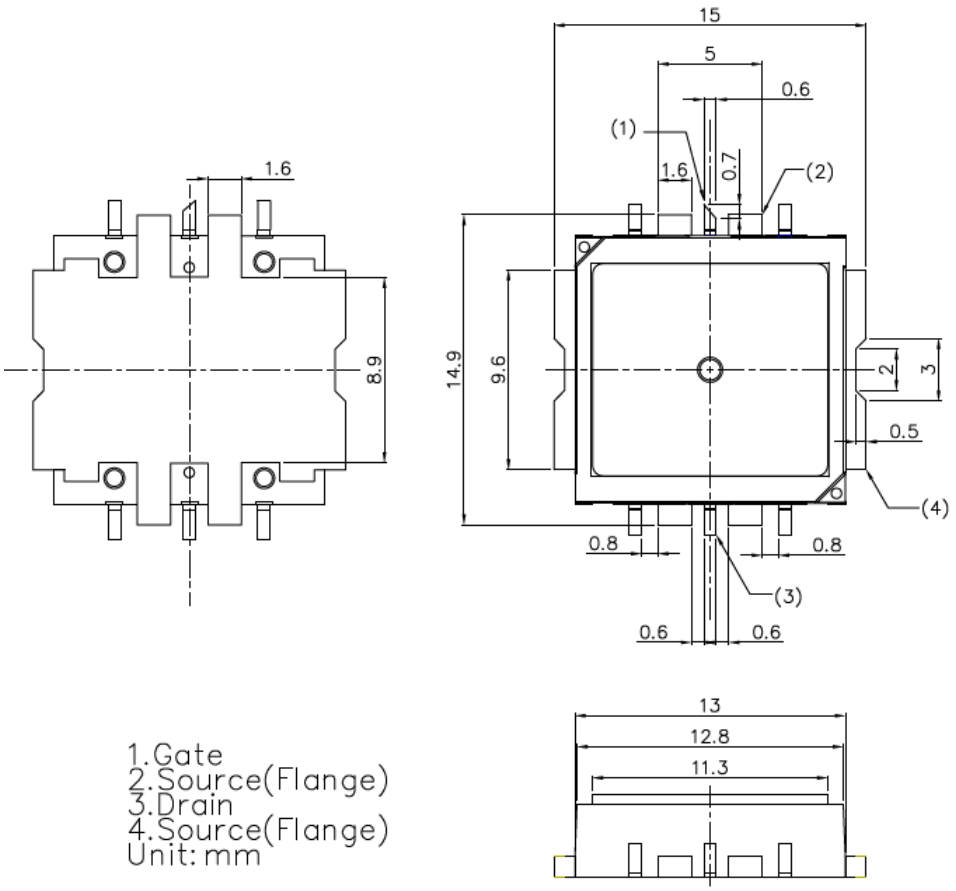


Bias Condition
V_{DS}=24V, $I_{DS(DC)}$=1.0A
Rg = 100ohm

Freq.	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
5.65GHz	0.634	82.0	5.447	-43.6	0.050	-95.1	0.245	165.2
5.7GHz	0.624	78.8	5.385	-49.7	0.050	-100.9	0.277	160.4
5.85GHz	0.592	70.6	5.227	-67.4	0.051	-116.8	0.365	148.2
6.0GHz	0.574	65.9	5.127	-83.8	0.056	-131.9	0.459	135.6
6.1GHz	0.594	59.6	5.253	-94.9	0.062	-147.3	0.507	124.8
6.2GHz	0.564	51.4	5.328	-107.5	0.060	-161.4	0.530	115.6
6.3GHz	0.523	44.7	5.400	-120.0	0.062	-173.4	0.555	106.5
6.4GHz	0.475	38.4	5.493	-132.5	0.064	174.8	0.569	96.4
6.5GHz	0.422	32.1	5.651	-145.3	0.068	161.4	0.576	84.8
6.6GHz	0.355	25.2	5.879	-158.8	0.071	148.5	0.577	71.4
6.7GHz	0.268	18.2	6.161	-173.5	0.075	133.8	0.564	55.4
6.8GHz	0.160	15.5	6.436	170.1	0.079	117.8	0.534	35.3
6.9GHz	0.057	60.8	6.633	152.1	0.082	100.1	0.492	10.2
7.0GHz	0.161	125.3	6.638	132.6	0.082	80.7	0.452	-20.9
7.1GHz	0.320	119.7	6.390	112.4	0.080	61.2	0.439	-57.0
7.2GHz	0.460	106.5	5.885	92.4	0.073	41.9	0.459	-92.6
7.3GHz	0.561	92.9	5.216	73.9	0.065	23.2	0.503	-122.8
7.4GHz	0.631	80.3	4.545	57.4	0.058	7.8	0.553	-146.7

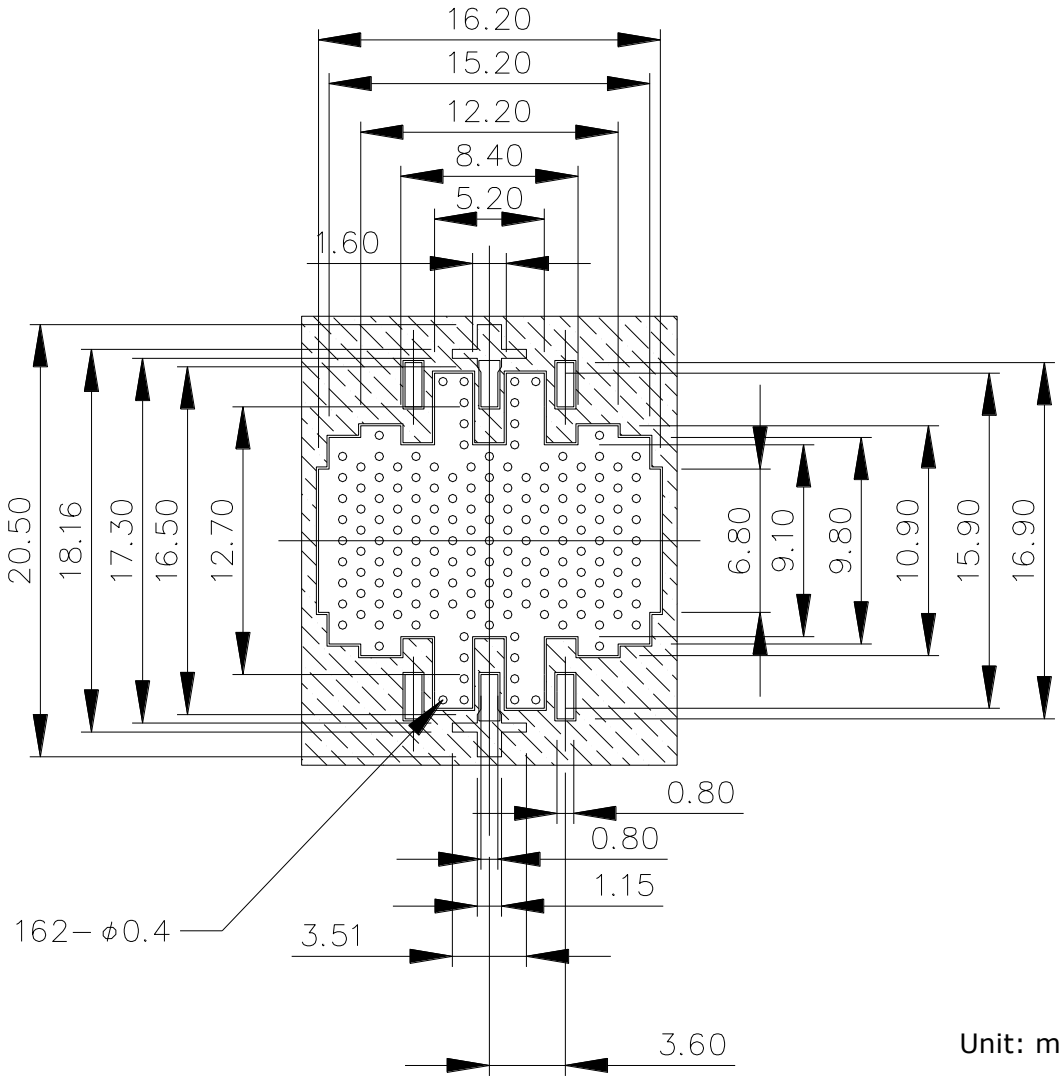


- **Package Out line**
  Case Style : I3C



1.Gate
2.Source(Flange)
3.Drain
4.Source(Flange)
Unit: mm

● PCB Pads and Solder-Resist Pattern



Unit: mm

Notes :
1. Laminate : Rogers Corporation RO4003, Thickness t=0.508mm, Cu Foil 18um.
   Finish to copper foil : Ni 0.1um min. / Au 0.1um (Both side).
2. ▨ : Resist

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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