

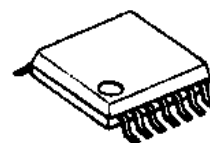
MEDIUM POWER AMPLIFIER GaAs MMIC

■GENERAL DESCRIPTION

NJG1301V is a medium power amplifier which is designed for use of output stage of Japanese PHS and digital wireless phone.

NJG1301V features low operating voltage, high efficiency, and comes with, internal input and output matching circuit and very small SSOP package. This amplifier is operated up to 21dBm output level with very low noise generation.

■PACKAGE OUTLINE

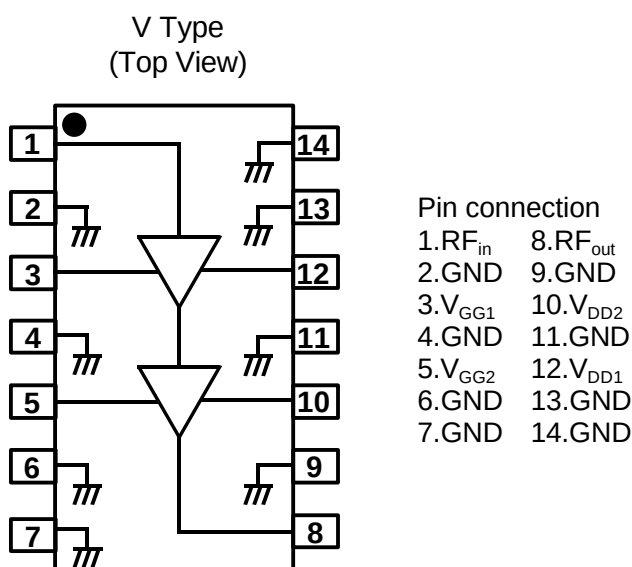


NJG1301V

■FEATURES

- Low operating voltage +3.0V typ.
- Low current consumption 185mA typ. @f=1.9GHz, $P_{out}=21\text{dBm}$
- Low distortion (ACP) -60dBc typ. @f=1.9GHz, $P_{out}=21\text{dBm}$
- Reduction of redact parasitic oscillation
- Input and output internal matching circuits
- Package SSOP14

■PIN CONFIGURATION



NJG1301V

■ABSOLUTE MAXIMUM RATINGS

($T_a=+25^{\circ}\text{C}$, $Z_s=Z_i=50\Omega$)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNITS
Drain Voltage	V_{DD1}, V_{DD2}	$V_{GG1}, V_{GG2} = -0.9\text{V}$	6	V
Gate Voltage	V_{GG1}, V_{GG2}	$V_{DD1}, V_{DD2} = 3.0\text{V}$	-4	V
Input Power	P_{in}	$V_{DD1}, V_{DD2} = 3.0\text{V}$, $V_{GG1}, V_{GG2} = -0.9\text{V}$	10	dBm
Power Dissipation	P_D	At on PCB board	600	mW
Operating Temperature	T_{opr}		-30~+85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-40~+150	$^{\circ}\text{C}$

■ELECTRICAL CHARACTERISTICS

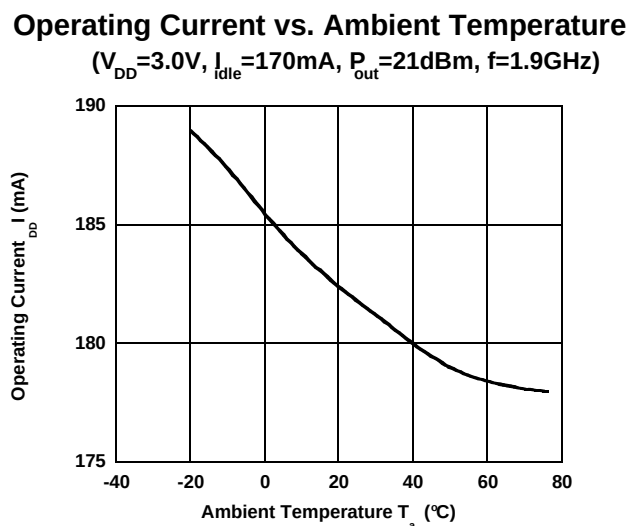
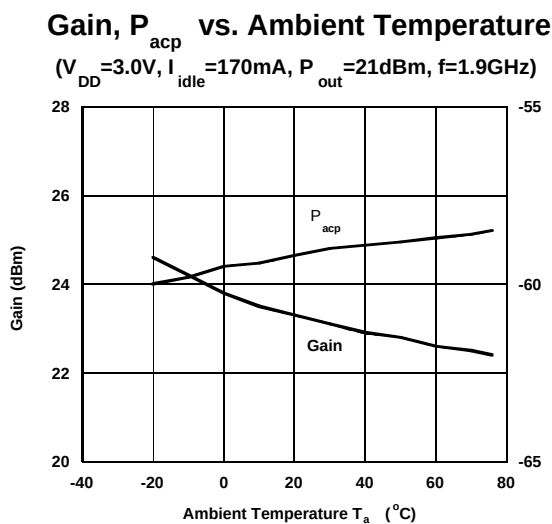
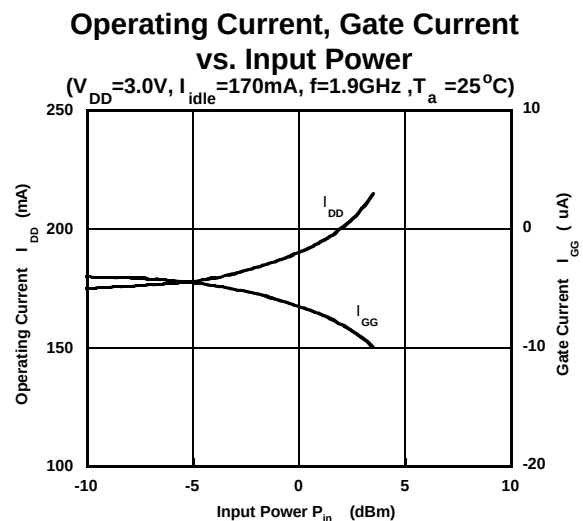
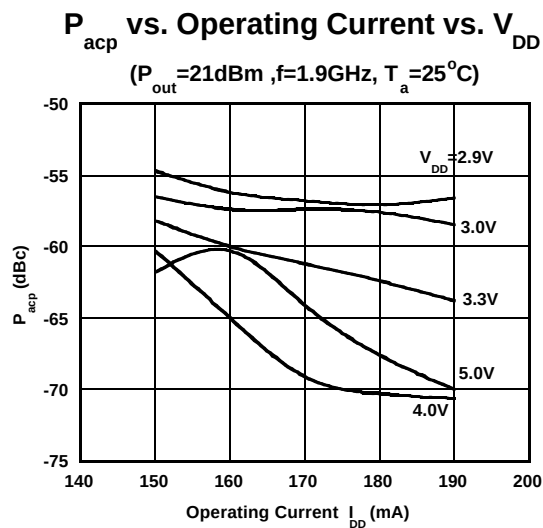
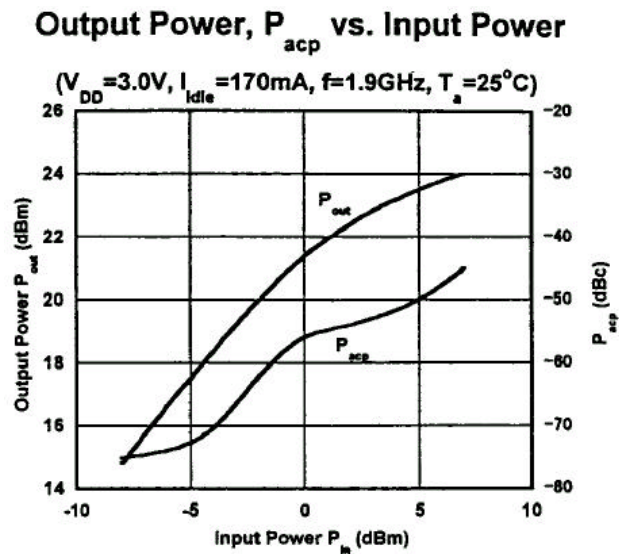
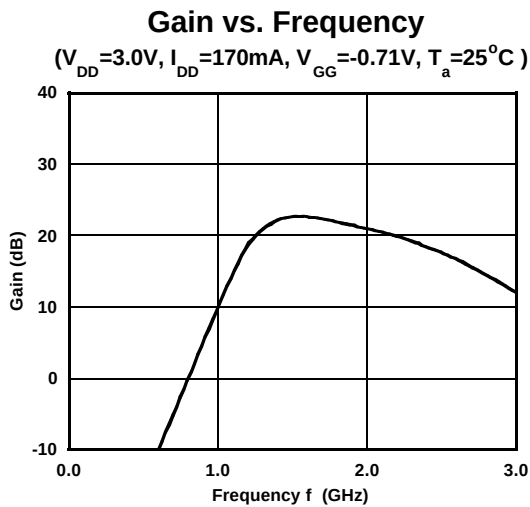
($T_a=25^{\circ}\text{C}$, $Z_s=Z_i=50\Omega$)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating Freq.	freq	$V_{DD1,2} = 3.0\text{V}$	1.89	-	1.92	GHz
Drain Voltage	$V_{DD1,2}$		2.9	3.0	5.0	V
Gate Voltage	$V_{GG1,2}$	$V_{DD1,2} = 3.0\text{V}$, $I_{idle} = 170\text{mA}$	-1.25	-0.9	-0.6	V
Idle Current *1	I_{idle}	$V_{DD1,2} = 3.0\text{V}$, RF No signal	165	170	175	mA
Operating Current *1	I_{DD}	$V_{DD1,2} = 3.0\text{V}$, $P_{out} = 21\text{dBm}$	170	185	195	mA
Gate Current *2	I_{GG}	$V_{DD1,2} = 3.0\text{V}$, $P_{out} = 21\text{dBm}$	-150	-70	-	μA
Small Signal Gain	Gain	$V_{DD1,2} = 3.0\text{V}$, $I_{idle} = 170\text{mA}$	20	23	26	dB
Gain Flatness	G_{flat}	$V_{DD1,2} = 3.0\text{V}$, $I_{idle} = 170\text{mA}$	0	0.5	1.0	dB
Pout at 1dB Gain Compression point	P_{-1dB}	$V_{DD1,2} = 3.0\text{V}$	21	22	-	dBm
Adjacent Channel Leakage Power 1	P_{acp1}	$V_{DD1,2} = 3.0\text{V}$, $P_{out} = 21\text{dBm}$ offset=600kHz, P_{in} : $\pi/4$ DQPSK	-	-60	-55	dBc
Adjacent Channel Leakage Power 2	P_{acp2}	$V_{DD1,2} = 3.0\text{V}$, $P_{out} = 21\text{dBm}$ offset=900kHz, P_{in} : $\pi/4$ DQPSK	-	-65	-60	dBc
Input VSWR	$VSWR_i$	$V_{DD1,2} = 3.0\text{V}$	-	-	2.2	
Load VSWR Tolerance	-	$V_{DD1,2} = 3.0\text{V}$, $P_{out} = 21\text{dBm}$ Load VSWR=4:1, All phase	Parasitic Osc. vs Fundamental Signal Level -60dBc Max.			

*1: Total current of V_{DD1} terminal and V_{DD2} terminal

*2: Total current of V_{GG1} terminal and V_{GG2} terminal

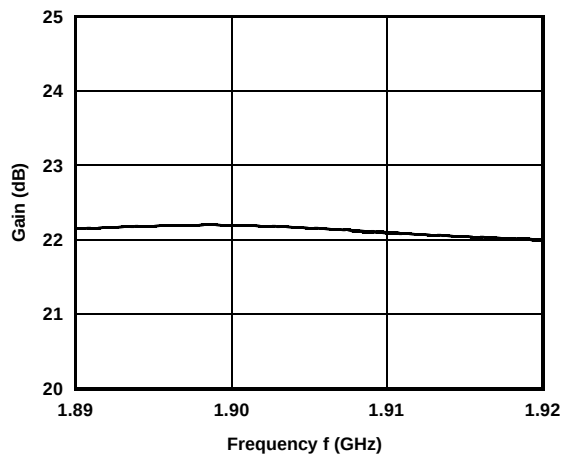
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS

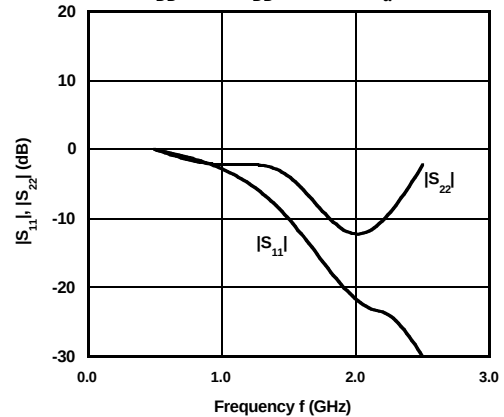
Gain vs. PHS Band Frequency

($V_{DD}=3.0V$, $I_{DD}=170mA$, $V_{GG}=-0.71V$, $T_a=25^\circ C$)



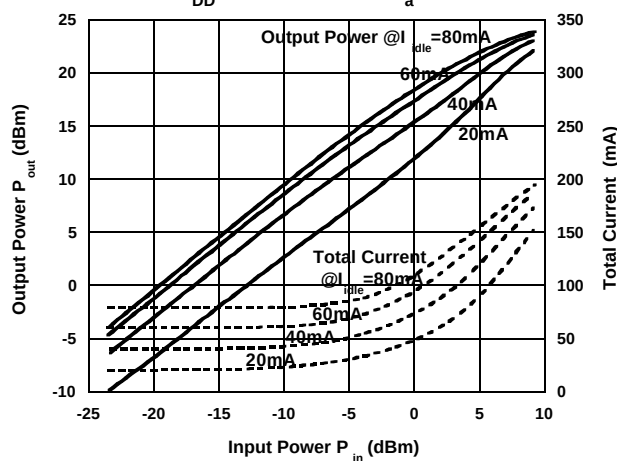
$|S_{11}|$, $|S_{22}|$ vs. Frequency

($V_{DD}=3.0V$, $I_{DD}=170mA$, $T_a=25^\circ C$)



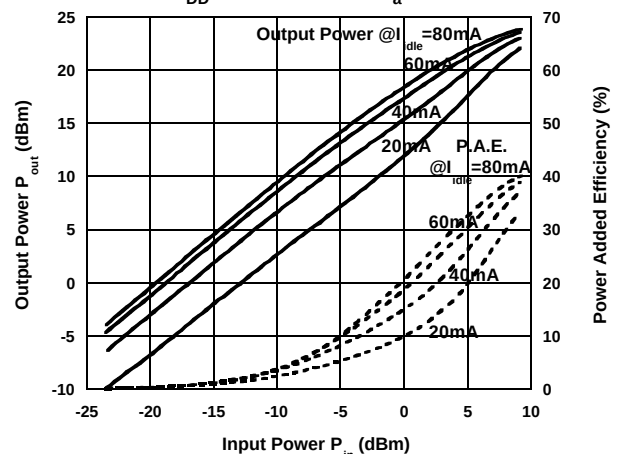
Output Power, Total Current vs. Input Power

($V_{DD}=3V$, $f=1.9GHz$, $T_a=25^\circ C$)



Output Power, P.A.E. vs. Input Power

($V_{DD}=3V$, $f=1.9GHz$, $T_a=25^\circ C$)

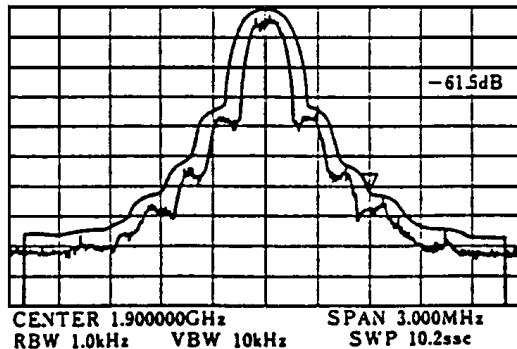


Output Spectrum

($V_{DD}=3.0V$, $I_{diss}=170mA$, $P_{out}=21dBm$, $T_a=25^\circ C$)

ATTEN 10dB

RL 0dBm



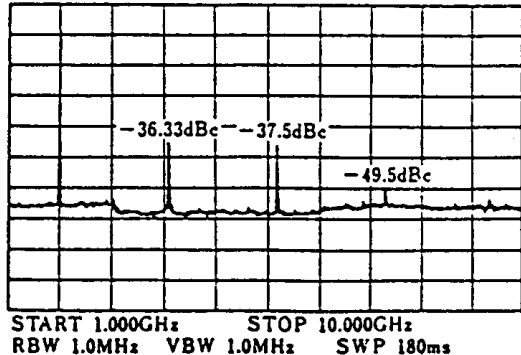
Harmonic Spectrum

(Suppressed Level for Fundamental Signal Level)

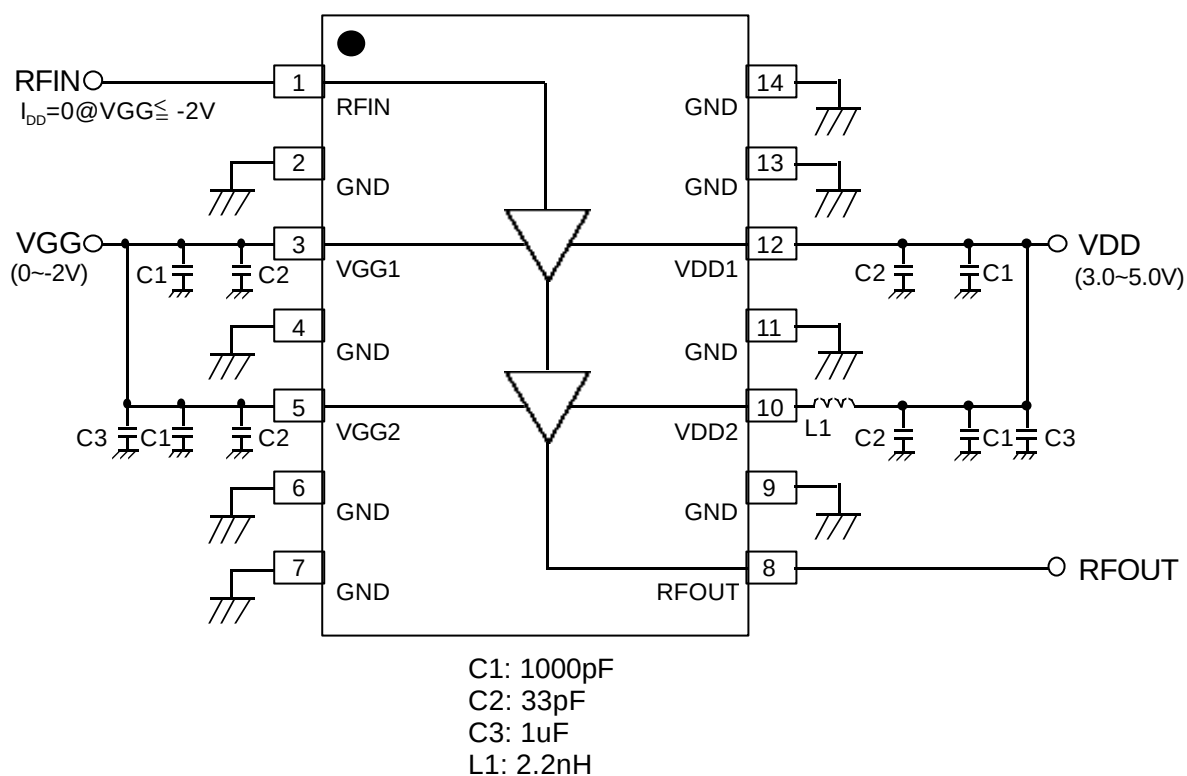
($P_{out}=21dBm$, $V_{DD}=3.0V$, $I_{diss}=170mA$, $T_a=25^\circ C$)

ATTEN 30dB

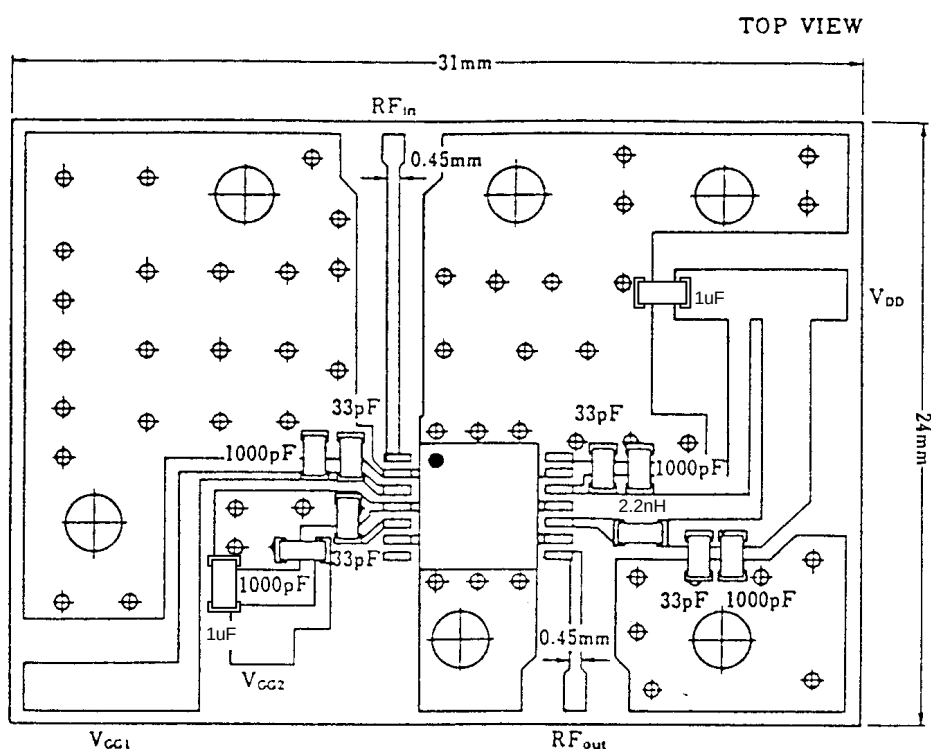
RL 20.0dBm



RECOMMENDED CIRCUIT



RECOMMENDED PCB DESIGN



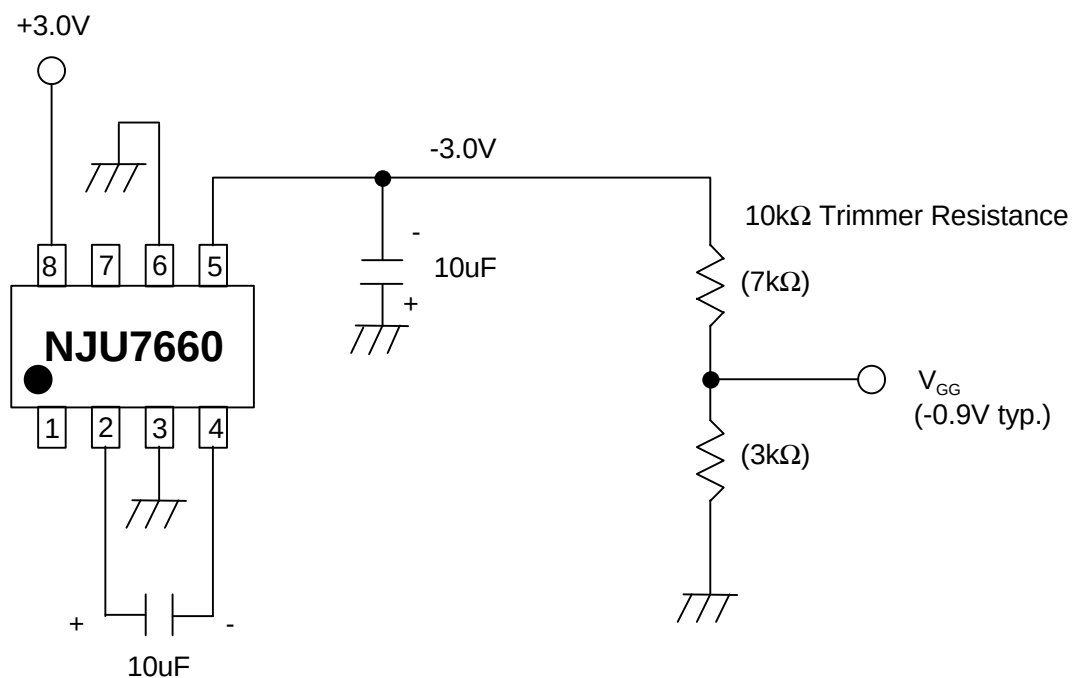
PCB: FR4, t=0.2mm

CAPACITOR
 MURATA GRM39 Series

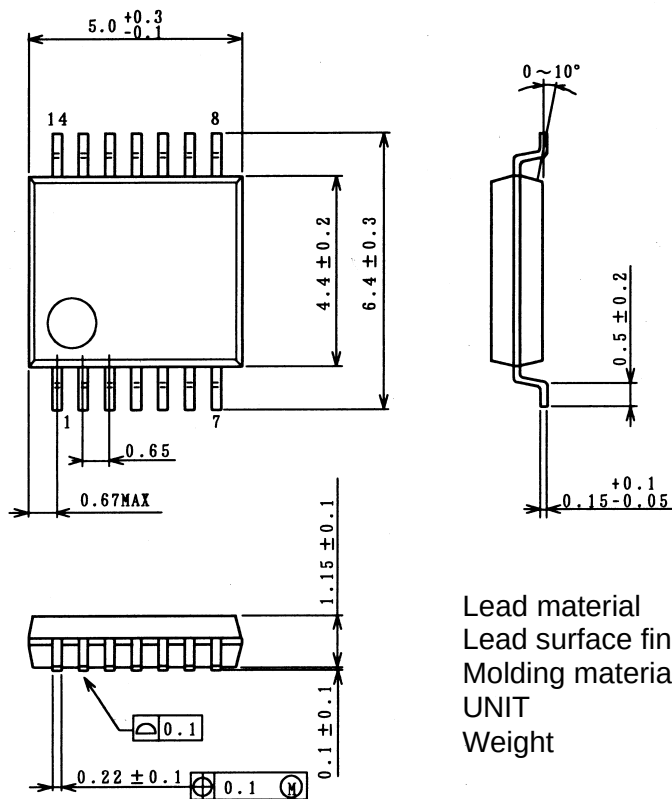
INDUCTOR
 TAIYO-YUDEN HK1608 Series

NJG1301V

■APPLICATION CIRCUIT (NEGATIVE VOLTAGE GENERATOR)



■PACKAGE OUTLINE (SSOP14)



Cautions on using this product

This product contains Gallium-Arsenide (GaAs) which is a harmful material.

- Do NOT eat or put into mouth.
- Do NOT dispose in fire or break up this product.
- Do NOT chemically make gas or powder with this product.
- To waste this product, please obey the relating law of your country.

[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.

This product may be damaged with electric static discharge (ESD) or spike voltage. Please handle with care to avoid these damages.