

L-BAND PA DRIVER AMPLIFIER

DESCRIPTION

The μ PG2135TK is GaAs MMIC for PA driver amplifier which were developed for mobile phone and another L-band application.

This device can operate with 3.0 V TYP., having the high gain and low distortion. This device is housed in a 6-pin lead-less minimold package. And this package is able to high-density surface mounting.

FEATURES

- Operation frequency : $f_{opt} = 1\,429$ to $1\,453$ MHz (1 441 MHz TYP.)
- Supply voltage : $V_{DD1} = 2.7$ to 3.3 V (3.0 V TYP.)
: $V_{DD2} = 3.0$ to 4.2 V (3.5 V TYP.)
- Circuit current : $I_{DD} = 35$ mA TYP. @ $V_{DD1} = 3.0$ V, $V_{DD2} = 3.5$ V, $V_{AGC} = 2.5$ V, $P_{in} = -16$ dBm
- Power gain : $G_P = 30$ dB TYP. @ $V_{DD1} = 3.0$ V, $V_{DD2} = 3.5$ V, $V_{AGC} = 2.5$ V, $P_{in} = -16$ dBm
- Gain control range : $GCR = 42$ dB TYP. @ $V_{DD1} = 3.0$ V, $V_{DD2} = 3.5$ V, $V_{AGC} = 0.5$ to 2.5 V, $P_{in} = -16$ dBm
- Low distortion : $P_{adj1} = -60$ dBc TYP. @ $V_{DD1} = 3.0$ V, $V_{DD2} = 3.5$ V, $V_{AGC} = 2.5$ V, $P_{out} = +12$ dBm, $\Delta f = \pm 50$ kHz, 21 kHz Bandwidth
- High-density surface mounting : 6-pin lead-less minimold package ($1.5 \times 1.1 \times 0.55$ mm)

APPLICATION

- Digital Cellular: PDC 1.5 GHz etc.

ORDERING INFORMATION

Part Number	Package	Marking	Supplying Form
μ PG2135TK-E2	6-pin lead-less minimold (1511)	G3C	<ul style="list-style-type: none"> • Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • Qty 5 kpcs/reel

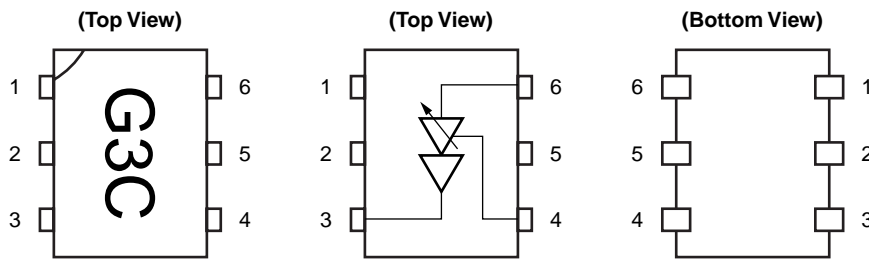
Remark To order evaluation samples, contact your nearby sales office.

Part number for sample order: μ PG2135TK

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM



Pin No.	Pin Name
1	V _{DD1}
2	GND
3	OUTPUT/V _{DD2}
4	V _{AGC}
5	GND
6	INPUT

ABSOLUTE MAXIMUM RATINGS (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Supply Voltage 1, 2	V _{DD1, 2}	6.0	V
Gain Control Voltage	V _{AGC}	6.0	V
Input Power	P _{in}	-8	dBm
Power Dissipation	P _D	140 ^{Note}	mW
Operating Ambient Temperature	T _A	-30 to +90	°C
Storage Temperature	T _{stg}	-35 to +150	°C

Note Mounted on double-sided copper-clad 50 × 50 × 1.6 mm epoxy glass PWB, T_A = +85°C

RECOMMENDED OPERATING RANGE (T_A = +25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f _{opt}	1 429	1 441	1 453	MHz
Supply Voltage 1	V _{DD1}	2.7	3.0	3.3	V
Supply Voltage 2	V _{DD2}	3.0	3.5	4.2	V
Gain Control Voltage	V _{AGC}	0	-	2.5	V
Input Power	P _{in}	-	-16	-10	dBm

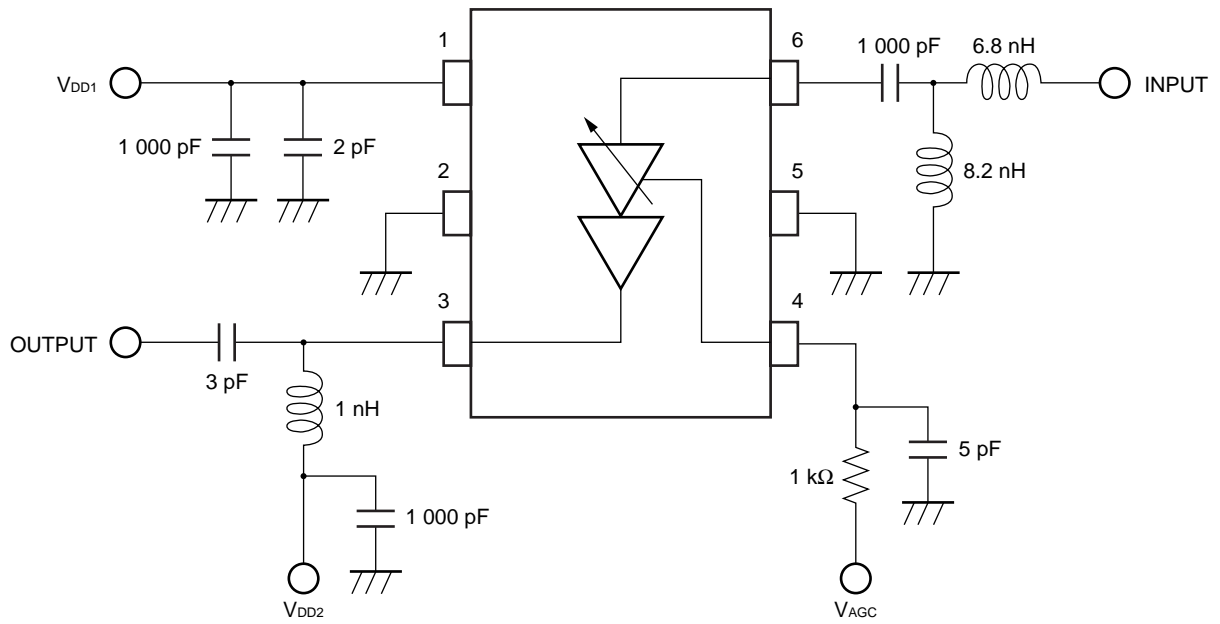
ELECTRICAL CHARACTERISTICS

($T_A = +25^{\circ}\text{C}$, $V_{DD1} = 3.0\text{ V}$, $V_{DD2} = 3.5\text{ V}$, $\pi/4\text{DQPSK}$ modulated signal input, with external input and output matching, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Operating Frequency	f_{opt}		1 429	1 441	1 453	MHz
Circuit Current	I_{DD}	$P_{in} = -16\text{ dBm}$, $V_{AGC} = 2.5\text{ V}$	–	35	45	mA
Power Gain	G_P	$P_{in} = -16\text{ dBm}$, $V_{AGC} = 2.5\text{ V}$	28	30	–	dB
Adjacent Channel Power Leakage 1	P_{adj1}	$P_{out} = +12\text{ dBm}$, $V_{AGC} = 2.5\text{ V}$, $\Delta f = \pm 50\text{ kHz}$, 21 kHz Bandwidth	–	–60	–55	dBc
Adjacent Channel Power Leakage 2	P_{adj2}	$P_{out} = +12\text{ dBm}$, $V_{AGC} = 2.5\text{ V}$, $\Delta f = \pm 100\text{ kHz}$, 21 kHz Bandwidth	–	–70	–65	dBc
Gain Control Range	GCR	$P_{in} = -16\text{ dBm}$, $V_{AGC} = 0.5\text{ to }2.5\text{ V}$	37	42	–	dB
Gain Control Current	I_{AGC}	$V_{AGC} = 0.5\text{ to }2.5\text{ V}$	–	250	500	μA

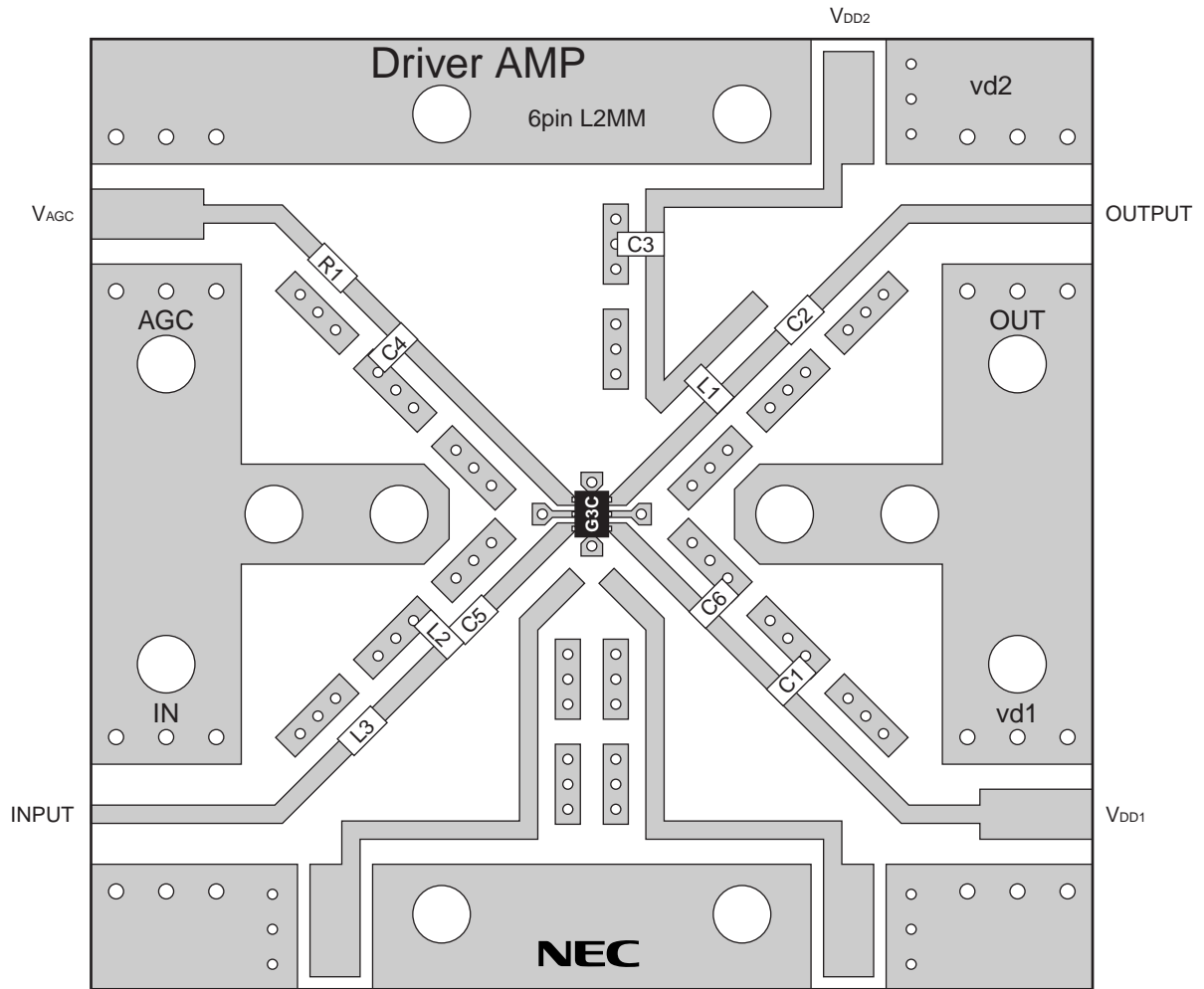
EVALUATION CIRCUIT

$f = 1\,429$ to $1\,453$ MHz, $V_{DD1} = 3.0$ V, $V_{DD2} = 3.5$ V



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD

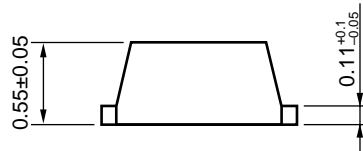
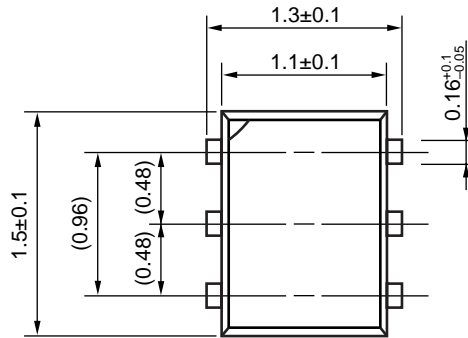


USING THE NEC EVALUATION BOARD

Symbol	Values
C1, C3, C5	1 000 pF
C2	3 pF
C4	5 pF
C6	2 pF
L1	1.0 nH
L2	8.2 nH
L3	6.8 nH
R1	1 kΩ

PACKAGE DIMENSIONS

6-PIN LEAD-LESS MINIMOLD (1511) (UNIT: mm)



Remark (): Reference value

RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

Soldering Method	Soldering Conditions	Condition Symbol
Infrared Reflow	Peak temperature (package surface temperature) : 260°C or below Time at peak temperature : 10 seconds or less Time at temperature of 220°C or higher : 60 seconds or less Preheating time at 120 to 180°C : 120±30 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	IR260
VPS	Peak temperature (package surface temperature) : 215°C or below Time at temperature of 200°C or higher : 25 to 40 seconds Preheating time at 120 to 150°C : 30 to 60 seconds Maximum number of reflow processes : 3 times Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	VP215
Wave Soldering	Peak temperature (molten solder temperature) : 260°C or below Time at peak temperature : 10 seconds or less Preheating temperature (package surface temperature) : 120°C or below Maximum number of flow processes : 1 time Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	WS260
Partial Heating	Peak temperature (pin temperature) : 350°C or below Soldering time (per side of device) : 3 seconds or less Maximum chlorine content of rosin flux (% mass) : 0.2%(Wt.) or below	HS350

Caution Do not use different soldering methods together (except for partial heating).

- **The information in this document is current as of March, 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
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SAFETY INFORMATION ON THIS PRODUCT

<p>Caution</p>	<p>GaAs Products</p>	<p>The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
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► For further information, please contact

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