

LOG AMPLIFIER

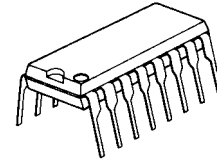
■ GENERAL DESCRIPTION

The **NJM2204A** is an integrated IF limiting amplifier which contains temperature compensated reference power supply, 6 stage differential limiting amplifier and 6 stage logarithmic suppression circuit.

Its voltage gain is 58dB and linearity is ± 1 dB within 50dB log dynamic range. The voltage gain and log dynamic range are enlarged by connecting multiple stages.

The **NJM2204A** is suitable to telecommunication equipment.

■ PACKAGE OUTLINE



NJM2204AD

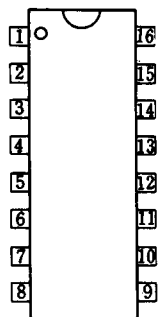
■ FEATURES

- Wide log dynamic range (50dB)
- Wide linearity range (± 1 dB)
- Large Voltage Gain (60dB)
- Wide stable operating supply voltage range (8 to 12V)
- Wide stable operating temperature range (-20 to 85°C)
- Package Outline DIP16
- Bipolar Technology

■ APPLICATION

- Cellular
- Personal wireless Radio
- Business wireless Radio
- Handy talky

■ PIN CONFIGURATION

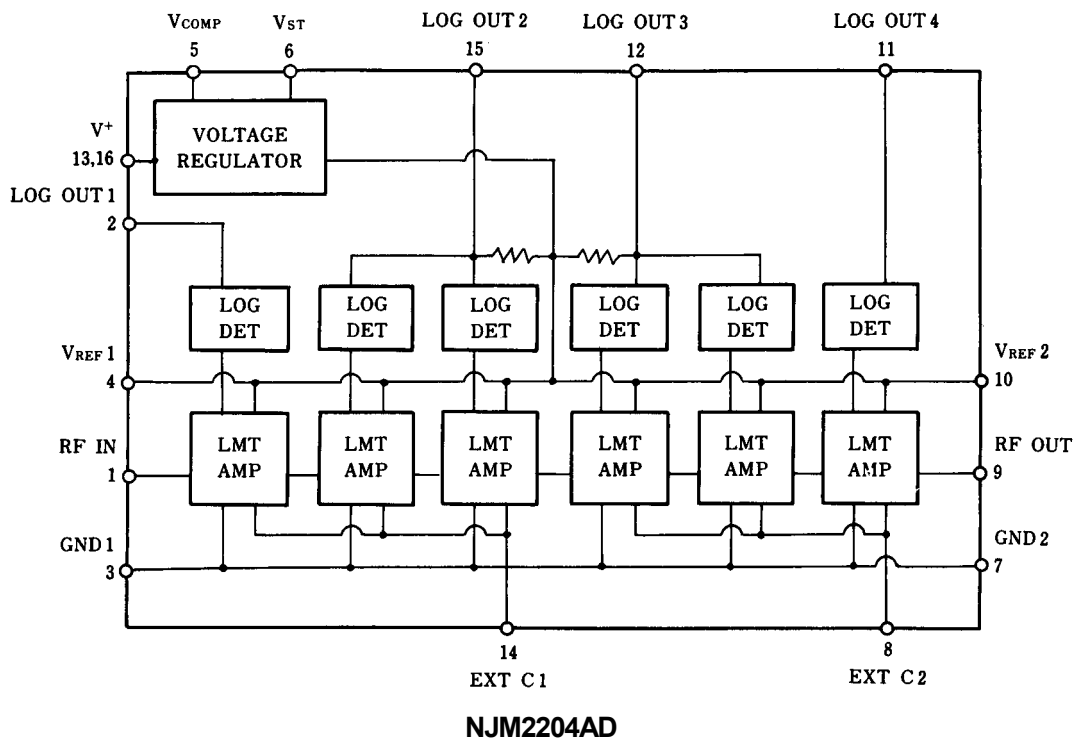


NJM2204AD

Pin No.	Pin Name	Function
1	RF IN	AC Signal Input (C-coupling)
2	LOG OUT 1	LOG Detector Output (from 1st stage)
3	GND1	Ground 1
4	V _{REF1}	Internal Reference Voltage 1
5	V _{COMP}	Compensation Input to Reference Voltage
6	V _{st}	Compensated Output of Reference Voltage
7	GND2	Ground 2
8	EXT C2	Terminate with C
9	RF OUT	Limited AC Output
10	V _{REF2}	Internal Reference Voltage2
11	LOG OUT 4	LOG Detector Output (from 6th stage)
12	LOG OUT 3	LOG Detector Output (from 4th and 5th stage)
13	V ⁺ 2	Supply Voltage Input 2
14	EXT C1	Terminate with C
15	LOG OUT 2	LOG Detector Output (from 2nd and 3rd stage)
16	V ⁺ 1	Supply Voltage Input 1

NJM2204A

■ BLOCK DIAGRAM



■ LOG DETECTOR OUTPUT CHARACTERISTICS(EXAMPLE)

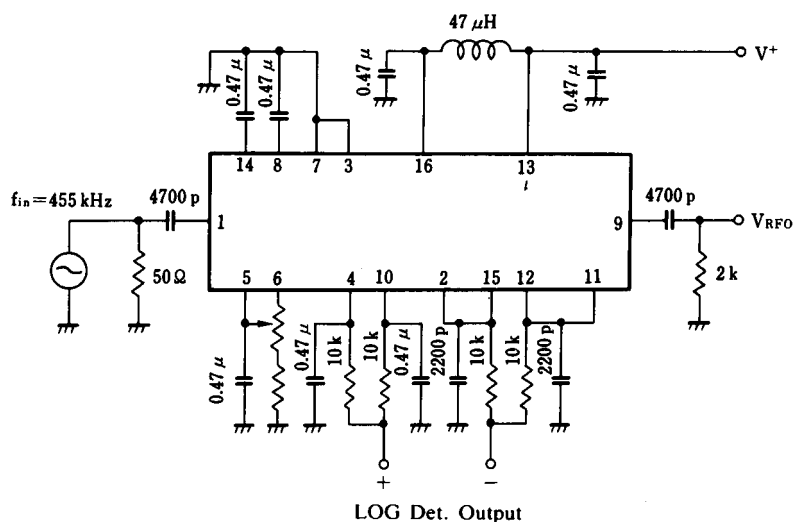
($T_a=25^\circ\text{C}$, $V^+=9\text{V}$, $V_{\text{REF}}=6.0\text{V}$)

PARAMETER	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Log Detector Output	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=8\text{dB}$ (50 Ω termination)	0.976	1.004	1.032	V
	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=-2\text{dB}$ (50 Ω termination)	0.868	0.896	0.924	V
	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=-12\text{dB}$ (50 Ω termination)	0.727	0.755	0.783	V
	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=-22\text{dB}$ (50 Ω termination)	0.586	0.614	0.642	V
	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=-32\text{dB}$ (50 Ω termination)	0.446	0.474	0.502	V
	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=-42\text{dB}$ (50 Ω termination)	0.305	0.333	0.361	V
	$f_{\text{IN}}=455\text{kHz}$, $V_{\text{IN}}=-52\text{dB}$ (50 Ω termination)	0.164	0.192	0.202	V
Log Detector Linearity	$T_a=-20^\circ\text{C}$ to 85°C , $V_{\text{IN}}=-2$ to -52dBm	-	-	± 1	dB

* Log Detection Linearity : It is error between RF input level and ideal input level to straight line connected two detection output points of two input level (-2dBm, -52dBm).

* Temperature coefficient of Log detection output voltage : approximately $90\mu\text{V}/^\circ\text{C}$ Typ. (-20 to +85 $^\circ\text{C}$).

■ TEST CIRCUIT



■ RECOMMENDED OPERATING CONDITION

(T_a=-20 to 85°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V ⁺	8.0	9.0	16.0	V
Output Load Impedance	B _{RFO}	1	2	-	kΩ
	B _{LOGO}	100	-	-	kΩ
Stabilized Voltage	V _{VR}	-	6.0	-	V

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V ⁺	-0.5 to 16.0	V
Input Voltage	V _{IN}	-0.5 to V ⁺	V
Output Current	I _{LR}	5	mA
	I _{RFO}	2	mA
Operating Temperature	T _{opr}	-20 to 85	°C
Storage Temperature	T _{stg}	-55 to 125	°C

(note):The **NJM2204A** is produced by high frequency wafer process and so destrutive voltage against surge pulse is lower than low frequency product.

■ ELECTRICAL CHARACTERISTICS

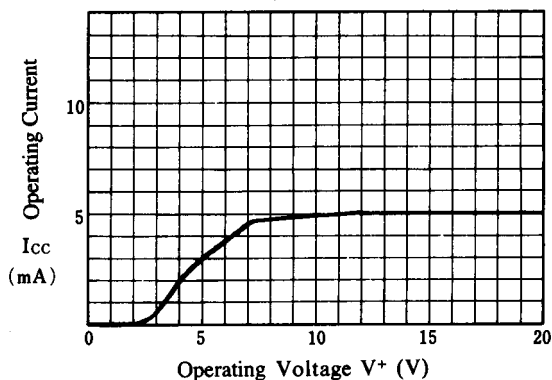
(T_a=25°C, V⁺=9V, V_{REF}=6.0V)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I _{CC}		-	6	10.0	mA
Maximum Operating Frequency	f _{max}		0.5	3	-	MHz
Output Voltage Swing	V _{RFO}	Input : +8dBm (50Ω termination)	-	2.0	-	V _{P-P}
Log Detection Output	V _{LOG}	Input : +8dBm (50Ω termination)	-	1.0	-	V
Log Detection Linearity	L _{IN}	V _{IN} =-2dBm to -52dBm (50Ω termination)	-	-	±1	dB
Limiter Amp Gain	G _V		60	-	-	dB

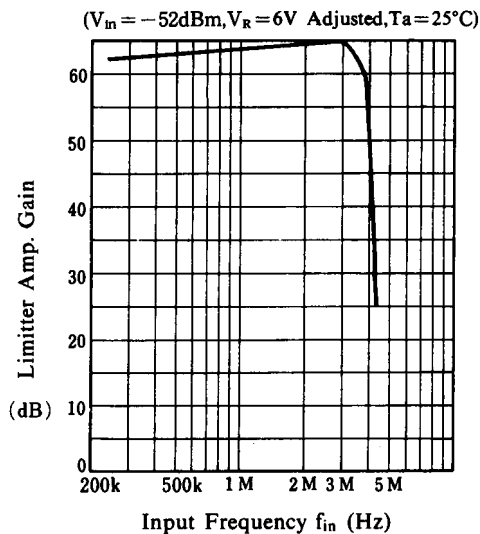
NJM2204A

■ TYPICAL CHARACTERISTICS

Operating Current vs. Operating Voltage
($T_a = 25^\circ\text{C}$)

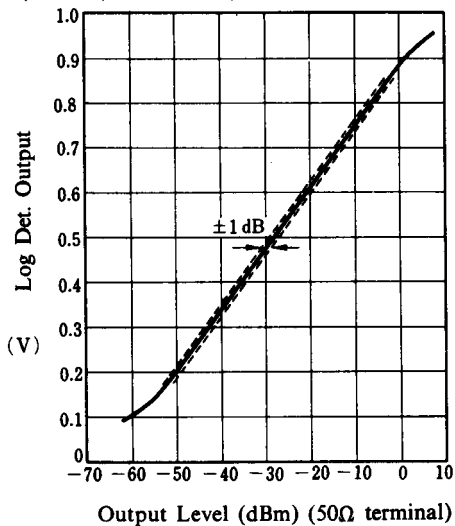


Limiter Amp Gain



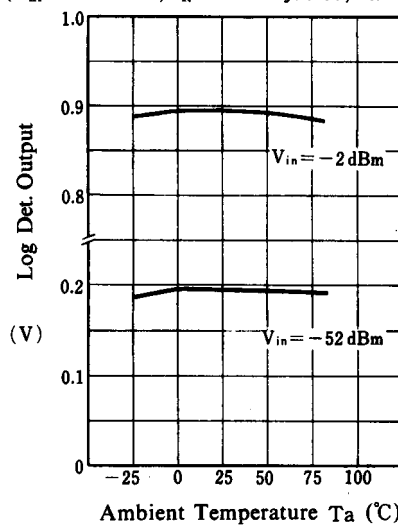
Log Detector Output

($V^+ = 9\text{V}, V_R = 6\text{V Adjusted}, f_{in} = 455\text{kHz}, T_a = 25^\circ\text{C}$)



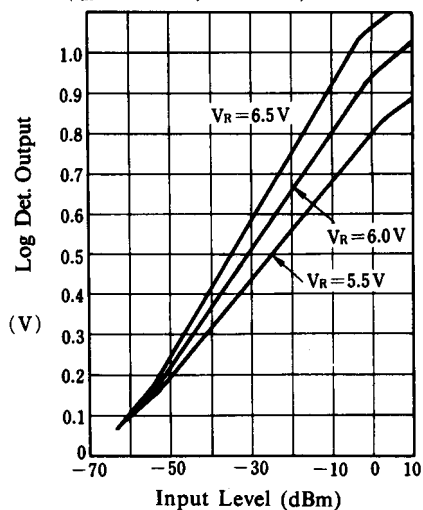
Log Detector Output

($V_{in} = -52\text{dBm}, V_R = 6\text{V Adjusted}, T_a = 25^\circ\text{C}$)

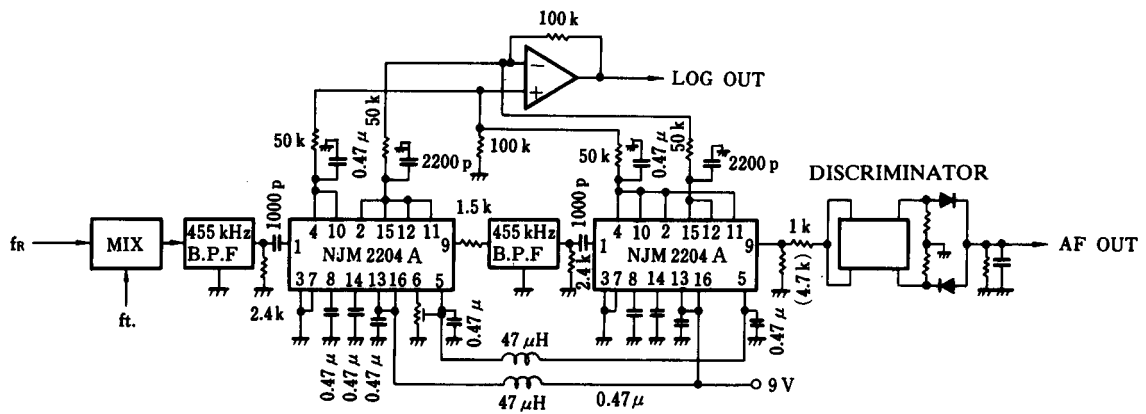


Log Detector Output V_R

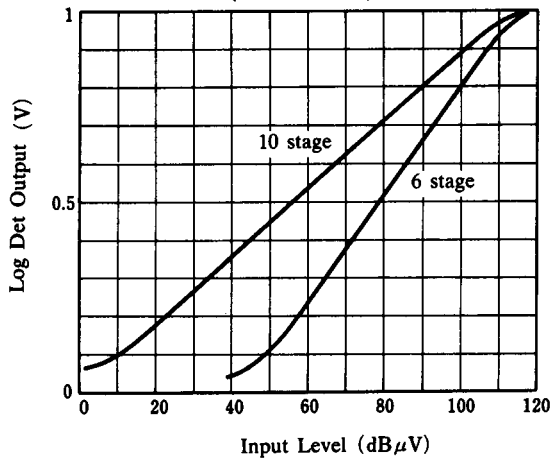
($f_{in} = 455\text{kHz}, T_a = 25^\circ\text{C}, 50\Omega$ Terminal)



■ TYPICAL APPLICATION & CHARACTERISTICS (10 synthesized stage)



Log Det Output Voltage
(50Ω terminate)



[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.

AMEYA360

Components Supply Platform

Authorized Distribution Brand :



Website :

Welcome to visit www.ameya360.com

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype [ameyasales1](#) [ameyasales2](#)

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com