

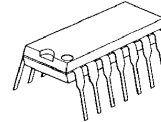
SRS Dialog Clarity Processor

■GENERAL DESCRIPTION

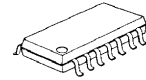
The **NJM2194** is a SRS Dialog Clarity Processor to enhance the dialog in a stereo signal by extracting the dialog information, augmenting it using a proprietary dialog clarity algorithm, and mixing it back in to the final stereo audio signal. When this stereo audio is played, the speech dialog becomes much easier to clearly hear while leaving the ambient information unchanged and the volume at a normal, more comfortable level for others in the room at the time.

The **NJM2194** is suitable for audio applications such as TV, DVD and others.

■PACKAGE OUTLINE



NJM2194D

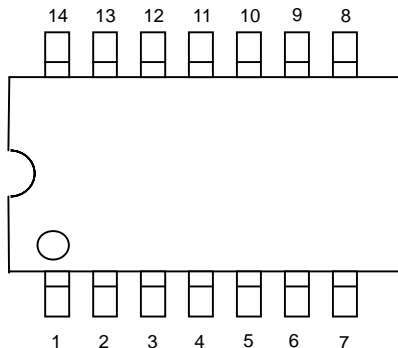


NJM2194M

■FEATURES

- Operating Voltage +4.7 to +13V
- Low Output Noise 10 μ Vrms typ. (Dialog Clarity mode, VR:MAX)
- Adjustable Dialog Clarity Effect
- Internal Mode Control Switch
- Bipolar Technology
- Package Outline DIP14, DMP14

■PIN CONFIGURATION



- | | |
|-----------|---------|
| 1.VROUT | 8.SW |
| 2.VRIN | 9.CIN |
| 3.TP | 10.COUT |
| 4.VREFOUT | 11.ROUT |
| 5.VREFIN | 12.LOUT |
| 6.V+ | 13.RIN |
| 7.GND | 14.LIN |

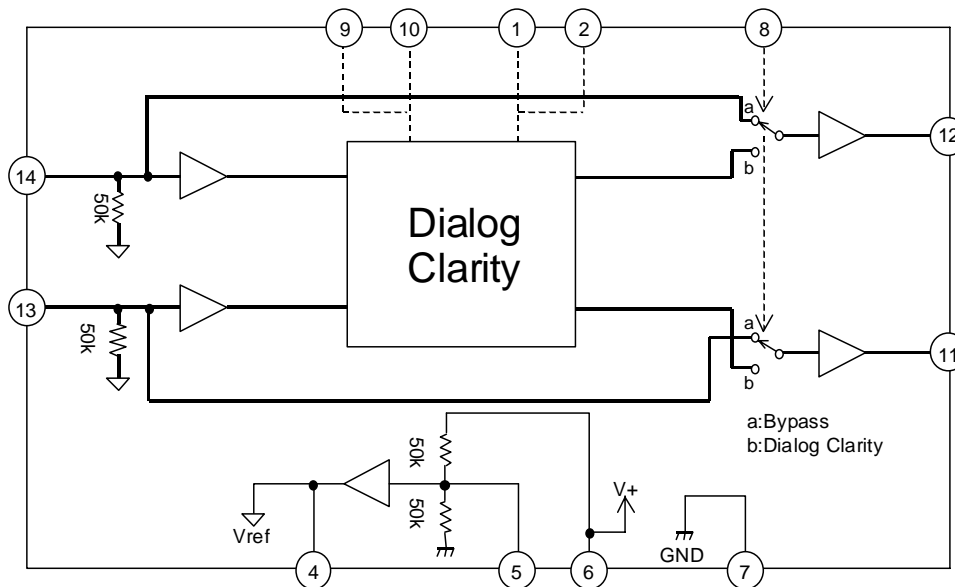
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SRS Labs requires all set makers to comply with all rules and regulations as outlined in the SRS Trademark Usage Manual separately provided.

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 Tel: 949-442-1070 Fax: 949-852-1099 <http://www.srslabs.com>

NJM2194

■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	14	V
Power Dissipation	P _D	(DIP14) 500 (DMP14) 350	mW
Operating Temperature Range	T _{opr}	-40 to +85	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

■OPERATING VOLTAGE

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V ⁺	-	4.7	12.0	13.0	V

■ELECTRICAL CHARACTERISTICS (Ta=25°C, V⁺=12V unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION						MIN.	TYP.	MAX.	UNIT
		INPUT		OUTPUT	MODE	VR					
		L	R								
Operating Current	I _{CC}	No Signal	0	0	-	Bypass	-	-	5.7	8.6	mA
			0	0	-	DC	MAX	-	-	5.7	
Reference Voltage	V _{REF}	No Signal	0	0	-	-	-	5.8	6.0	6.2	V

● AC CHARACTERISTICS

($T_a=25^\circ\text{C}$, $V^+=12\text{V}$, $V_{IN}=-10\text{dBV}$ (=316mVrms), $f=1\text{kHz}$, $R_L=4.7\text{k}\Omega$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION						MIN.	TYP.	MAX.	UNIT		
		INPUT		OUTPUT	MODE	VR							
		L	R										
Maximum Input Voltage	V_{IM}	$f=1\text{kHz}$ THD=3%	V_{IN} 0	0 V_{IN}	L R	Bypass	-	100 (3.1)	12.0 (3.9)	-	dBV (Vrms)		
		$f=1\text{kHz}$ THD=3%	V_{IN} 0	0 V_{IN}	L R	DC	MAX	34 (1.5)	5.4 (1.9)	-			
Output Noise	V_{NO}	$R_g=0\Omega$ A-Weighted	0	0	L R	Bypass	-	-	-112 (2.5)	-106 (5.0)	dBV (μVrms)		
		$R_g=0\Omega$ A-Weighted	0	0	L R	DC	MAX	-	-100 (10)	-94 (20)			
Total Harmonic Distortion	THD	$f=1\text{kHz}$	V_{IN} 0	0 V_{IN}	L R	Bypass	-	-	0.005	0.01	%		
		$f=1\text{kHz}$ $V_{IN}=-20\text{dBV}$	V_{IN} 0	0 V_{IN}	L R	DC	MAX	-	0.1	0.5			
Bypass Gain	G_{VBYP}	$f=1\text{kHz}$	V_{IN} 0	0 V_{IN}	L R	Bypass	-	-1.0	0.0	1.0	dB		
Dialog Clarity Gain	G_{VDC}	$f=1\text{kHz}$ $V_{IN}=-20\text{dBV}$	V_{IN} 0	0 V_{IN}	L R	DC	MAX	4.4	6.4	8.4	dB		
		$f=1\text{kHz}$ $V_{IN}=-20\text{dBV}$	0 V_{IN}	V_{IN} 0	L R	DC	MAX	-0.4	1.6	3.6			
		$f=1\text{kHz}$ $V_{IN}=-20\text{dBV}$	V_{IN} 0	0 V_{IN}	L R	DC	MIN	-1.0	0.0	1.0			

● CONTROL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $V^+=12\text{V}$ unless otherwise specified)

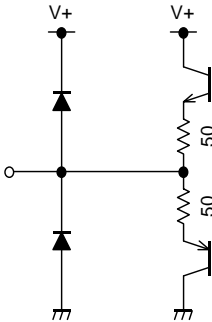
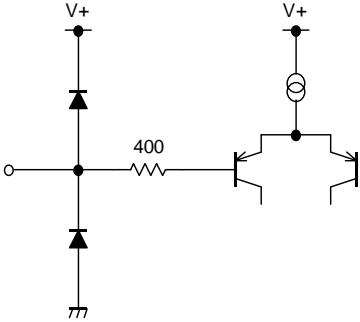
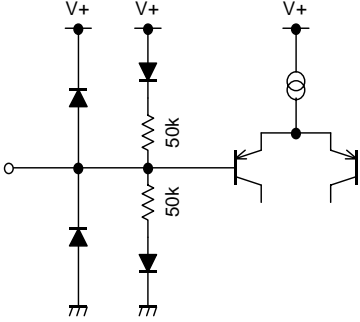

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Mode Select Control Voltage	V_{MODE}	$V_{IN}=\text{High Level}$	2.0	-	V^+	V
		$V_{IN}=\text{Low Level}$	0.0	-	0.7	

■ MODE SWITCH


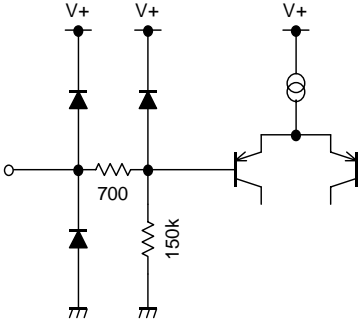
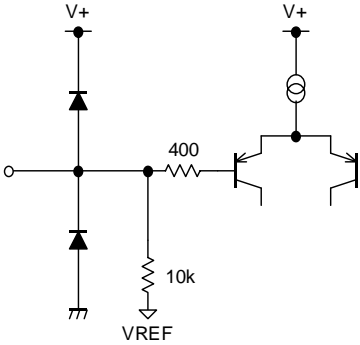
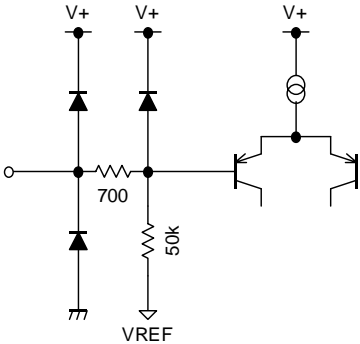
MODE	SW	NOTES
Bypass	L or Open	Input Through
Dialog Clarity (DC)	H	Dialog Clarity mode

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■ TERMINAL DESCRIPTION

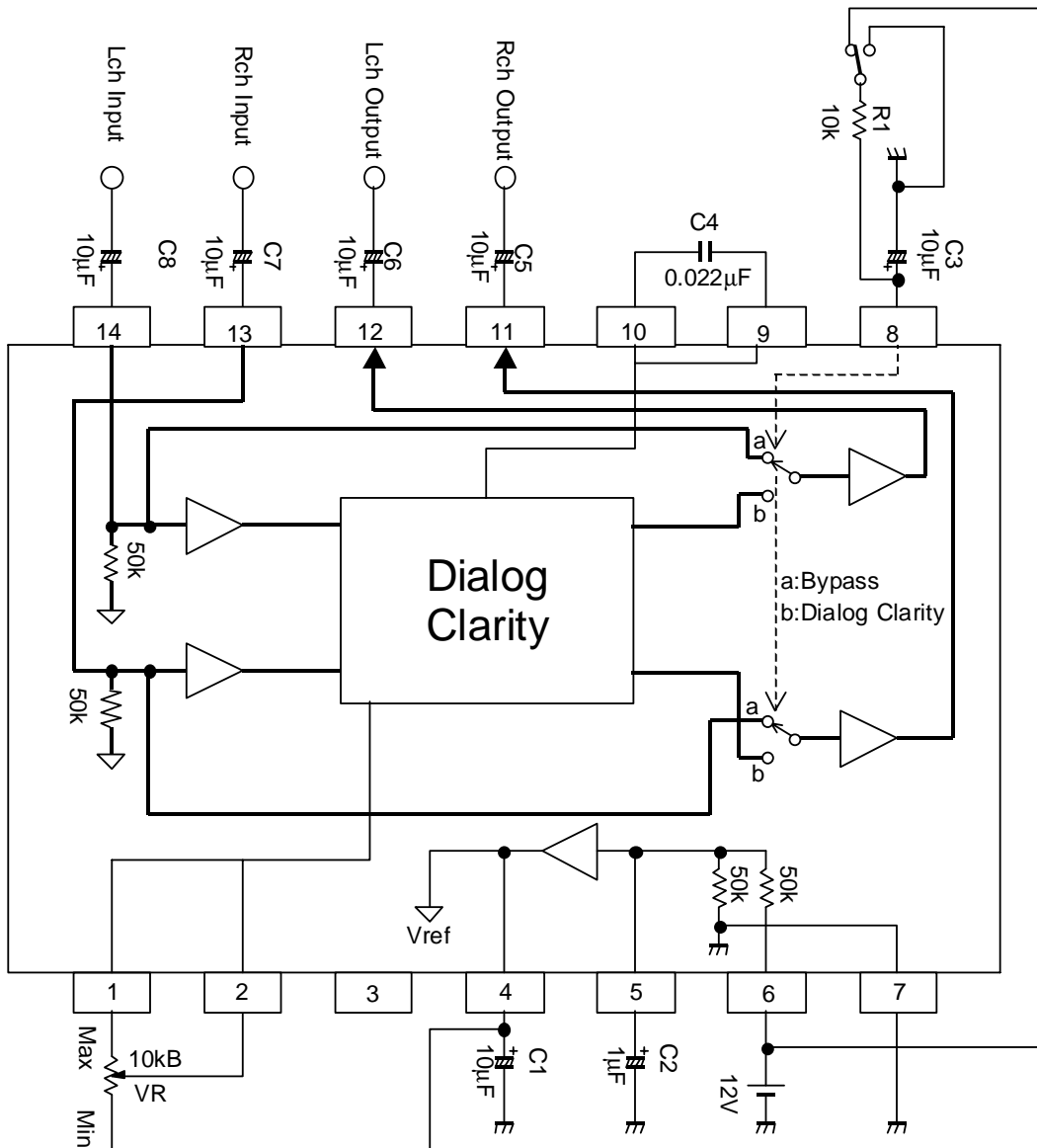
PIN No.	SYMBOL	EQUIVALENT CIRCUIT	VOLTAGE	NOTE
1 4 10 11 12	VROUT VREFOUT COUT ROUT LOUT		$V^+/2$	
2 3	VRIN TP		$V^+/2$	
5	VREFIN		$V^+/2$	
6	V^+		V^+	

■ TERMINAL DESCRIPTION

PIN No.	SYMBOL	EQUIVALENT CIRCUIT	VOLTAGE	NOTE
7	GND		0V	
8	SW		0V	
9	CIN		$V^+/2$	
13 14	RIN LIN		$V^+/2$	

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APPLICATION CIRCUIT

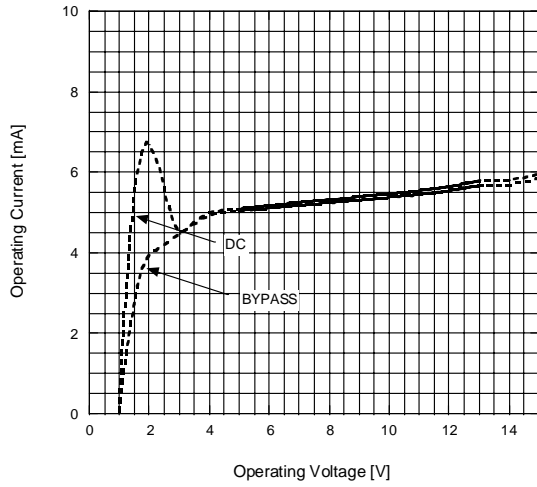


*) Dialog Clarity Effect is adjustable with the VR

TYPICAL CHARACTERISTICS

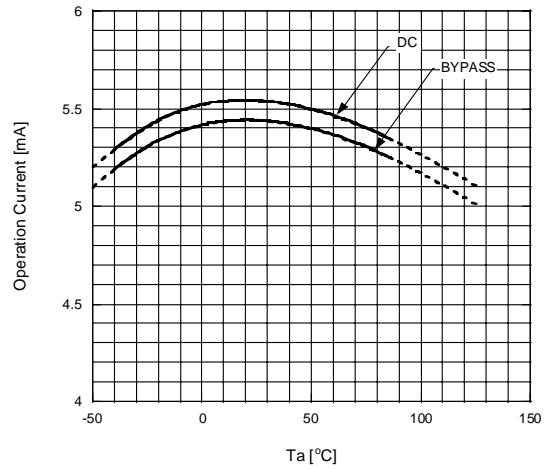
Operating Current vs. Operating Voltage

$V_+ = 1$ to $15V$, $T_a = 25^\circ C$



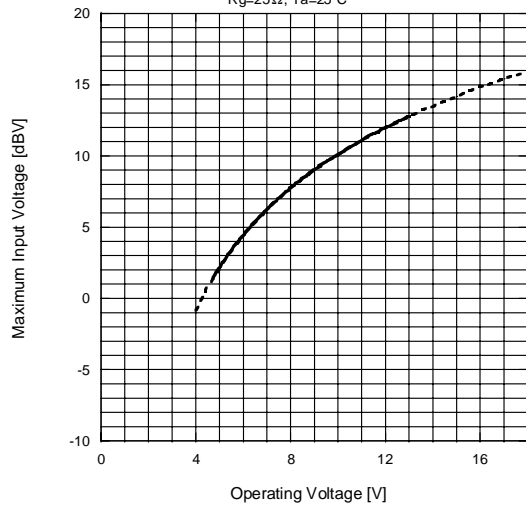
Operating Current vs. Temperature

$V_+ = 12V$



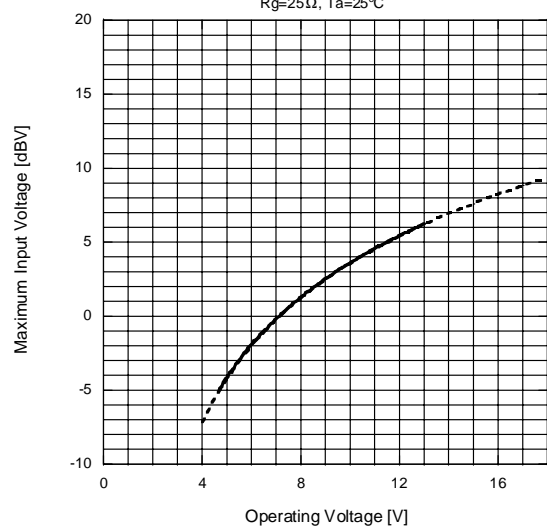
Maximum Input Voltage vs. Operating Voltage (BYPASS)

$V_{in} = Lch$, $V_{out} = Lch$, $f = 1kHz$, $R_L = 4.7k\Omega$,
 $R_g = 25\Omega$, $T_a = 25^\circ C$



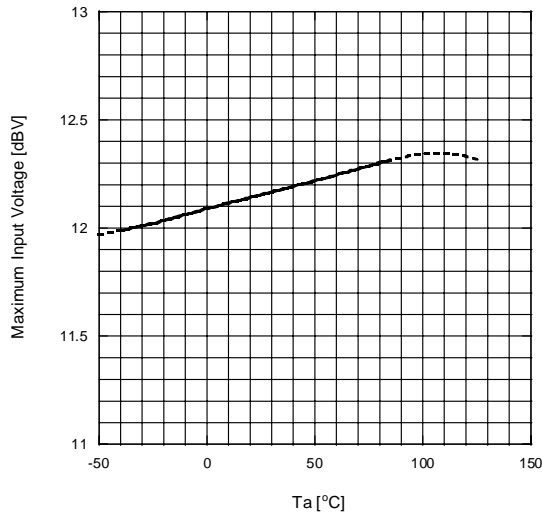
Maximum Input Voltage vs. Operating Voltage (DC)

$V_{in} = Lch$, $V_{out} = Lch$, $f = 1kHz$, $R_L = 4.7k\Omega$,
 $R_g = 25\Omega$, $T_a = 25^\circ C$



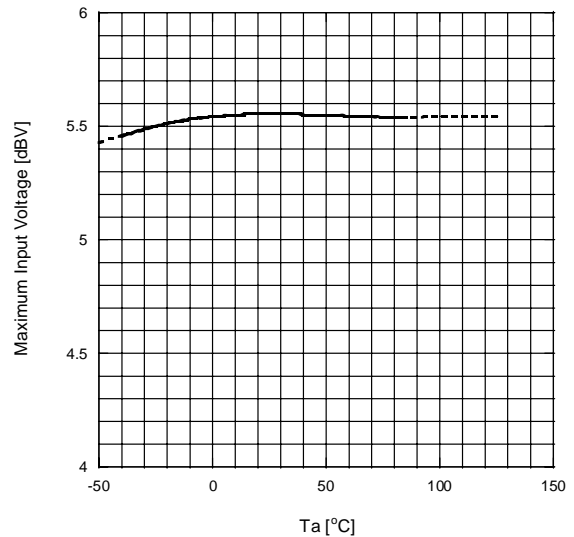
Maximum Input Voltage vs. Temperature (BYPASS)

$V_+ = 12V$, $V_{in} = Lch$, $V_{out} = Lch$, $f = 1kHz$, $R_L = 4.7k\Omega$,
 $R_g = 25\Omega$



Maximum Input Voltage vs. Temperature (DC)

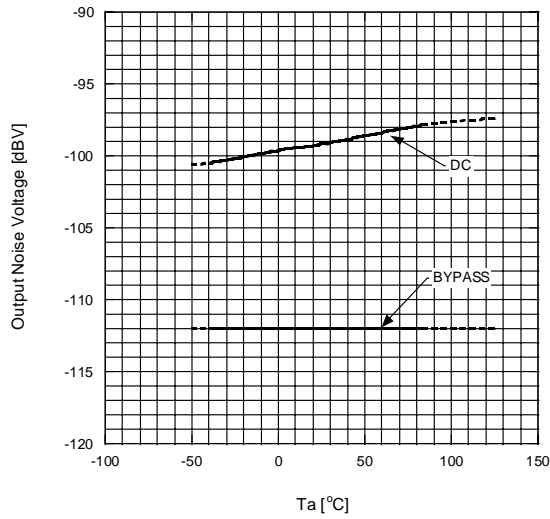
$V_+ = 12V$, $V_{in} = Lch$, $V_{out} = Lch$, $f = 1kHz$, $R_L = 4.7k\Omega$,
 $R_g = 25\Omega$



TYPICAL CHARACTERISTICS

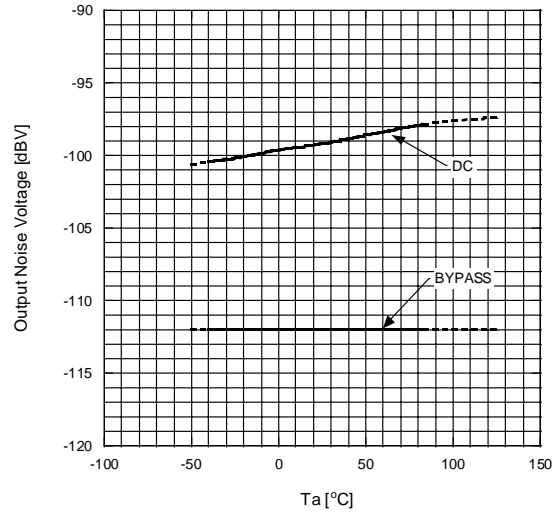
Output vs. Temperature

V+=12V, Vin=GND, Vout=Lch



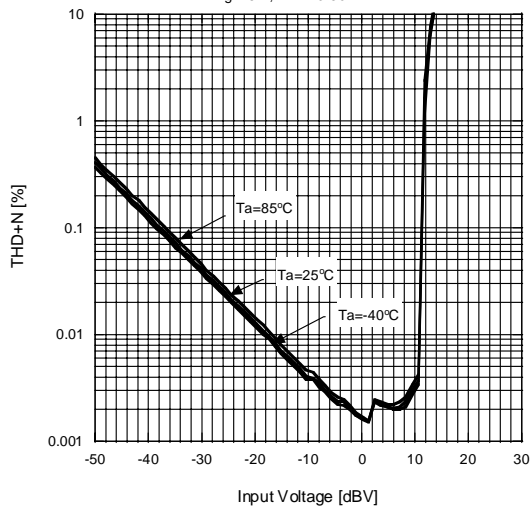
Output Noise Voltage vs. temperature

V+=12V, Vin=GND, Vout=Rch



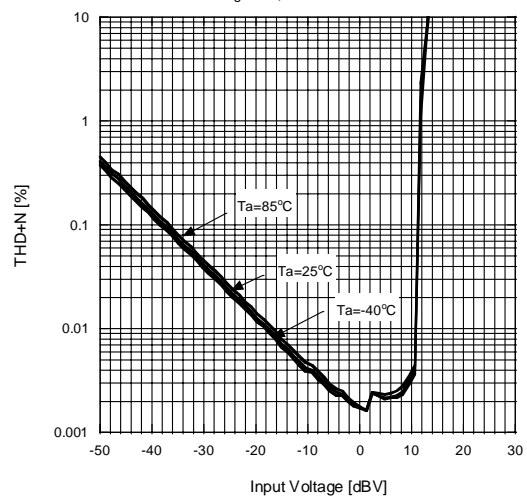
Total Harmonic Distortion vs. Input Voltage (BYPASS)

V+=12V, Vin=Lch, Vout=Lch, f=100Hz, RL=4.7kΩ
Rg=25Ω, BW=10-80kHz



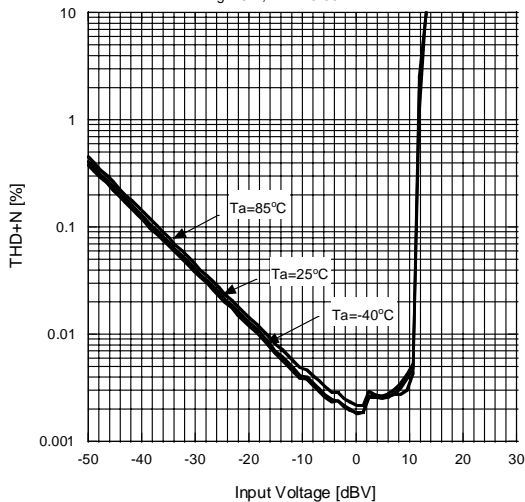
Total Harmonic Distortion vs. Input Voltage (BYPASS)

V+=12V, Vin=Lch, Vout=Lch, f=1kHz, RL=4.7kΩ
Rg=25Ω, BW=10-80kHz



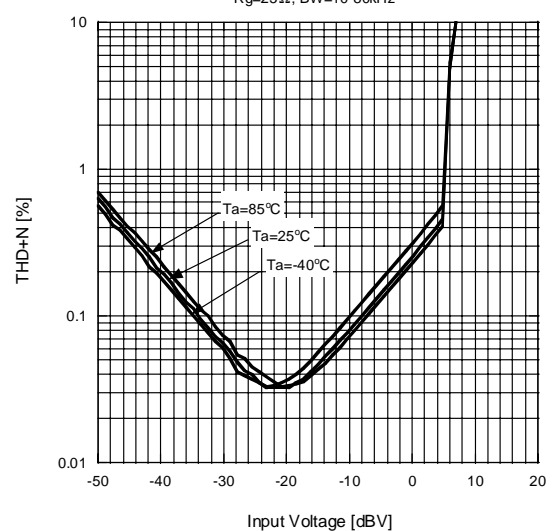
Total Harmonic Distortion vs. Input Voltage (BYPASS)

V+=12V, Vin=Lch, Vout=Lch, f=10kHz, RL=4.7kΩ
Rg=25Ω, BW=10-80kHz



Total Harmonic Distortion vs. Input Voltage (DC)

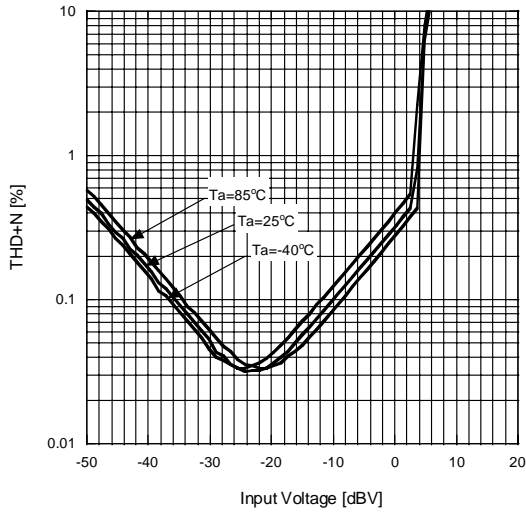
V+=12V, Vin=Lch, Vout=Lch, f=1kHz, RL=4.7kΩ
Rg=25Ω, BW=10-80kHz



TYPICAL CHARACTERISTICS

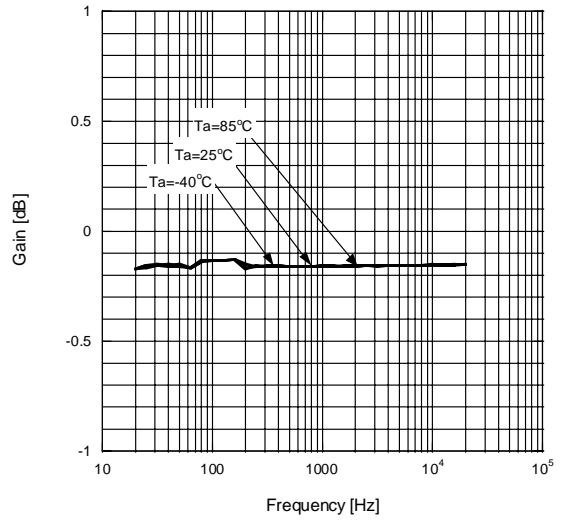
Total Harmonic Distortion vs. Input Voltage (DC)

$V_+ = 12V$, $V_{in} = Lch$, $V_{out} = Lch$, $f = 10kHz$, $R_L = 4.7k\Omega$,
 $R_g = 25\Omega$, $BW = 10-80kHz$



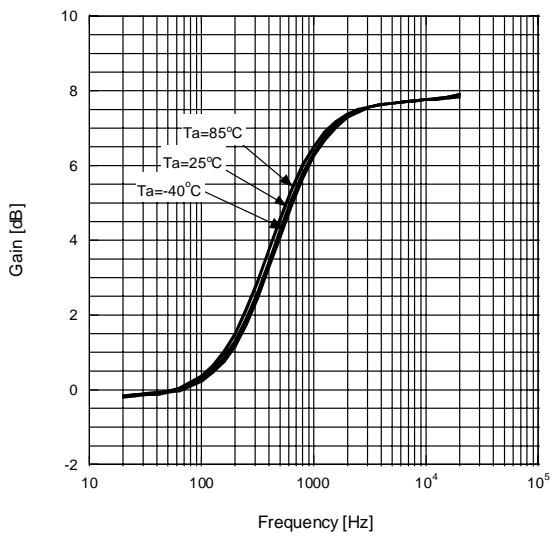
Frequency Response (BYPASS)

$V_+ = 12V$, $V_{in} = 10dBV$ Lch, $V_{out} = Lch$, $R_L = 4.7k\Omega$,
 $R_g = 25\Omega$



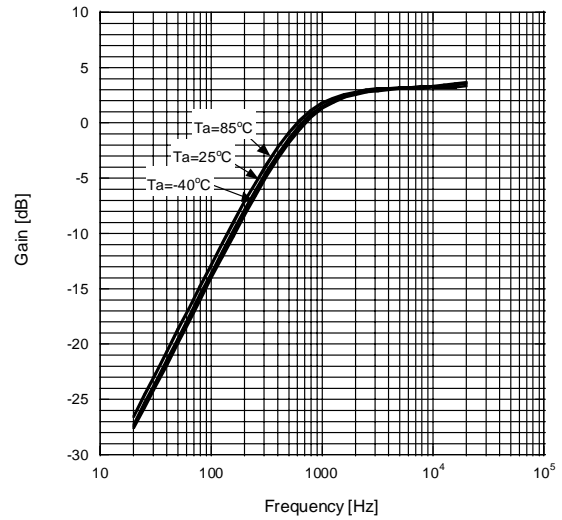
Frequency Response (DC)

$V_+ = 12V$, $V_{in} = 20dBV$ Lch, $V_{out} = Lch$, $R_L = 4.7k\Omega$, $R_g = 25\Omega$



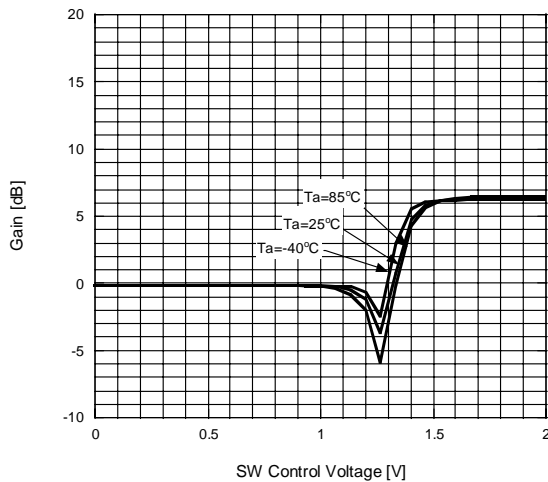
Frequency Response (DC)

$V_+ = 12V$, $V_{in} = 20dBV$ Lch, $V_{out} = Rch$, $R_L = 4.7k\Omega$, $R_g = 25\Omega$



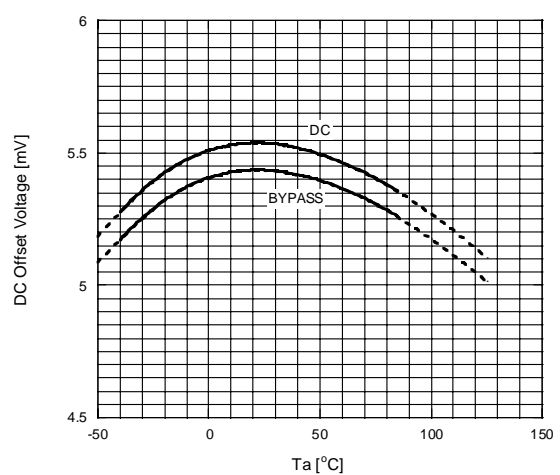
Gain vs. SW Control Voltage

$V_+ = 12V$, $V_{in} = 20dBV$ Lch, $V_{out} = Lch$, $f = 1kHz$,
BYPASS \rightarrow DC

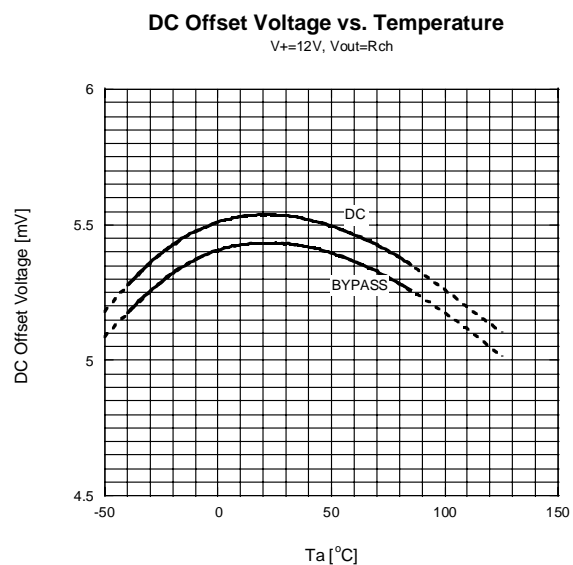


DC Offset Voltage vs. Temperature

$V_+ = 12V$, $V_{out} = Lch$



■ TYPICAL CHARACTERISTICS



[CAUTION]

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