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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

LOW VOLTAGE AUDIO POWER AMPLIFIER

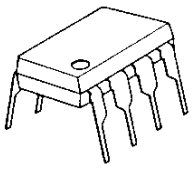
■ GENERAL DESCRPTION

The **NJM2149** is an audio power amplifier designed for telephone applications.
No external coupling capacitors are required because of the differential outputs. The closed loop gain is adjusted by two external resistors, and a CD pin permit powering down with muting the input signal.

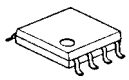
The **NJM2149** improves the tern noise reduction in switching Power Down mode and external high band noise reduction, compared with **NJM2135**.

It is suitable for portable telephone , wireless telephone, button telephone, and other speaker amplifier applications.

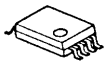
■ PACKAGE OUTLENE



NJM2149D



NJM2149M



NJM2149V

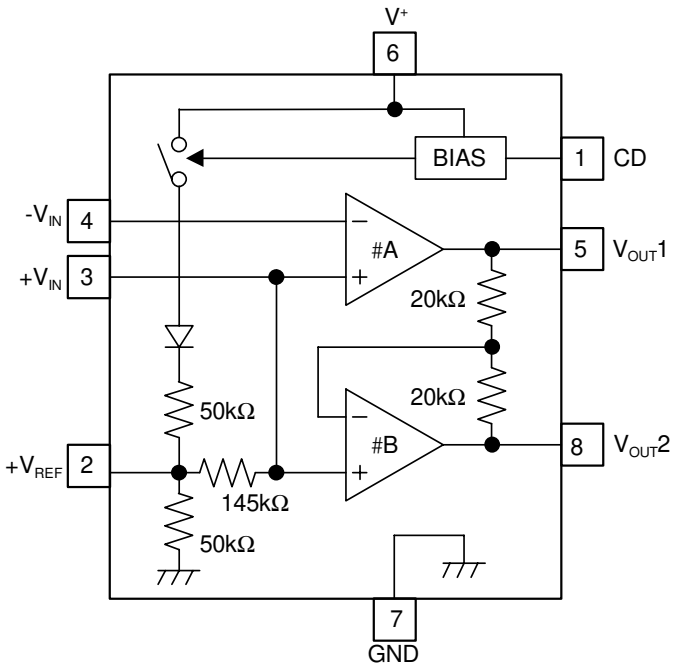
NJM2149R

NJM2149RB1

■ FEATURES

●Operating Voltage	+2 - +6V
●Operating Current	2.2mA typ., at V^+=3V
●Supply Current in Power Down Mode	0.1μA typ
●Output Power Exceeds250mW	V^+=6V,R_L=32Ω
●Gain Range	GVD=0-43dB,Voise Band
●Load Impedance	R_L=8-200Ω
●Bipolar Technology	
●Package Outline	DIP8,DMP8,SSOP8,VSP8,TVSP8

■ PIN CONFIGURATION



PIN FUNCTION
1.CD
2.+V_{REF}
3.+V_{IN}
4.-V_{IN}
5.V_{OUT}1
6.V^+
7.GND
8.V_{OUT}2

■ ABSOLUTE MAXMUM RANGE (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	+7	V
Power Dissipation	P_D	(DIP8) 500 (DMP8) 500 (note1) (SSOP8) 360 (note1) (VSP8/TVSP8) 320	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +125	°C

(note1)Mounted on PC Board

■ ELECTRICAL CHARACTERISTICS (V^+=6.0V, 1pin=2V, Ta=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+		2.0	-	6.0	V
Operating Current	I_{CC}	V^+=3.0V, R_L=∞, No Signal	-	2.2	3.5	mA
Operating Current at Power Down Mode	I_{CCD}	V^+=3.0V, R_L=∞, 1pin=0.8V, No Signal	-	0.1	1.0	μA
Open Loop Gain	A_V1	Amp#A, f<100Hz	84	90	-	dB
Closed Loop Gain	A_V2	Amp#B, f=1kHz, R_L=32Ω	-0.35	0	+0.35	dB
Output Power	P_O1	V^+=3.0V, R_L=16Ω, THD≤10% (note2)	55	-	-	mW
	P_O2	V^+=6.0V, R_L=32Ω, THD≤10% (note2)	250	-	-	mW
Total Harmonic Distortion	THD1	V^+=6V, R_L=32Ω, P_O=125mW, f =1kHz, G_{VD}=34dB	-	0.5	1.0	%
	THD2	V^+≥3V, R_L=8Ω, P_O=20mW, f=1kHz, G_{VD}=12dB	-	0.5	-	%
Power Supply Rejection Ratio	SVR1	C1=∞, C2=0.01μF, DC	50	-	-	dB
	SVR2	C1=0.1μF, C2=0, f=1kHz	-	12	-	dB
(V^+=3.0V-6.0V)	SVR3	C1=1.0μF, C2=5.0μF, f=1kHz	-	47	-	dB
Mute Attenuation	MAT	f =1kHz-20kHz, 1pin=0.8V	-	70	-	dB
Output Voltage	V_O1	V^+=3.0V, R_L=16Ω	1.00	1.15	1.25	V
(R_f=75kΩ, DC)	V_O2	V^+=6.0V	-	2.60	-	V
Output High Level	V_{OH}	I_{OUT}=-75mA, V^+=2.0-6.0V	-	V^+-1.1	-	V
Output Low Level	V_{OL}	I_{OUT}=75mA, V^+=2.0-6.0V	-30	0.21	-	V
Output DC Offset	ΔV_O	R_f=75kΩ, R_L=32Ω, 5pin-8pin	-30	0	+30	mV
Input Bias Current	I_B	4pin	-	0	-200	nA
Equivalent Resistance	R_{+IN}	3pin	100	170	220	kΩ
	R_{REF}	2pin	18	26	40	kΩ
CD Input Voltage H	V_{CDH}	1pin	2.0	-	V^+	V
CD Input Voltage L	V_{CDL}	1pin	0.0	-	0.8	V
CD Input Resistance	R_{CD}	V^+=V_{CD}=6.0V, 1pin	50	85	175	kΩ

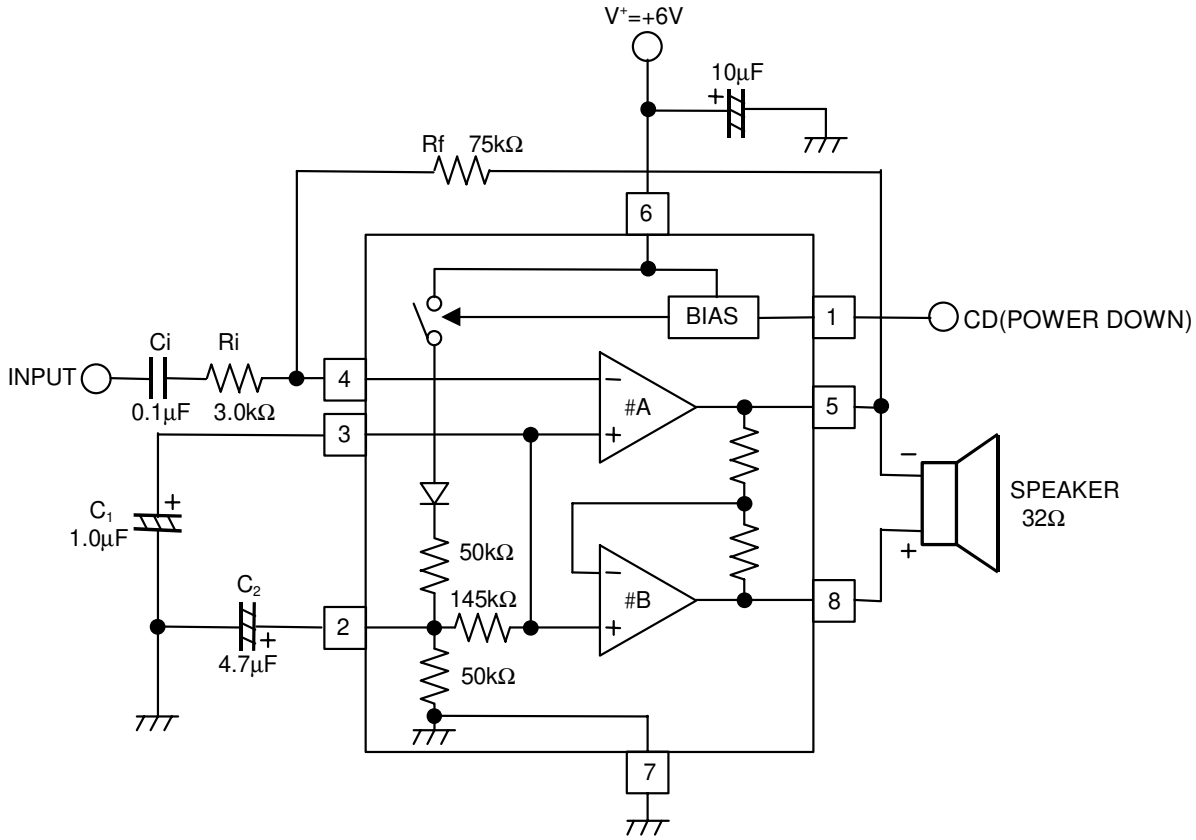
(note2) NJM2149M,NJM2149V,NJM2149R,NJM2149RB1:Mounted on PC Board

■ CONTROL TERMINAL EXPLANATION

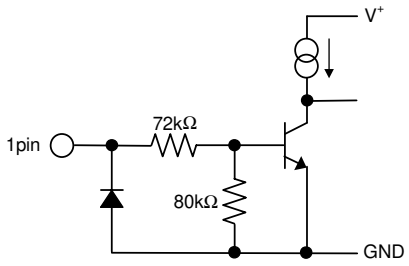
CHIP DISABLE CONTROL(CD PIN)

PARAMETER	CONTROL SIGNAL	STATUS
CD OFF	H(=V_{CDH})	IC is active.
CD ON	L(=V_{CDL})	IC is standby. (with Mute)

■ APPLICATION CURCUIT



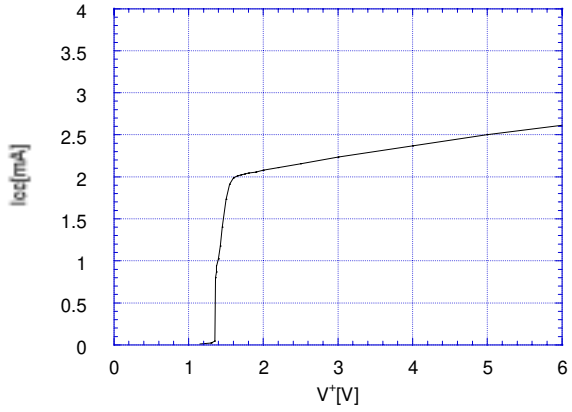
note:1.The CD terminal(1pin) should connect High level(>2.0V), when NJM2149 is active.
The standby mode, when the CD terminal is Low level(<0.8V).
2.To add the C1 and C2 capacitor, the power-supply-rejection-ratio will be improved.
When C1 is large value, C2 will be unnecessary.
3.The power-up time depend on the C1 and C2 capacitor.
4.The input current of CD terminal is as shown below figure.



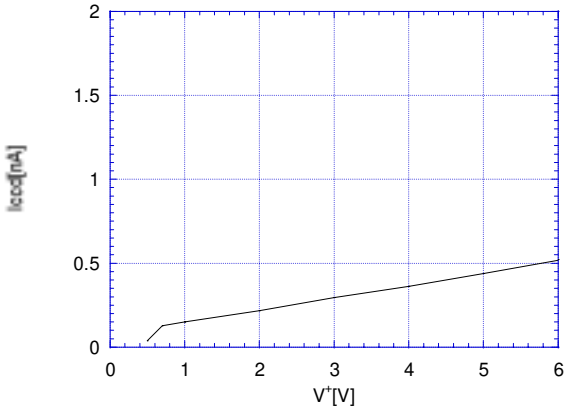
5.No connect oscillation-protect RC required.
To connect oscillation-protect RC, if the NJM2149 oscillate with PC board/stray capacitor/long speaker wire and others condition.

■ TYPCAL CHARACTERISTICS

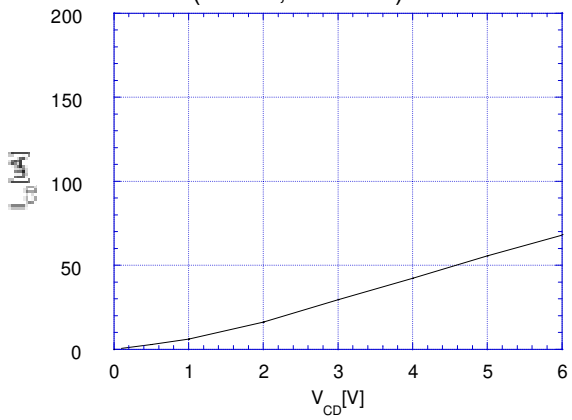
Operating Current vs. Operating Voltage
(V_{CD}=V^+,Ta=25°C)



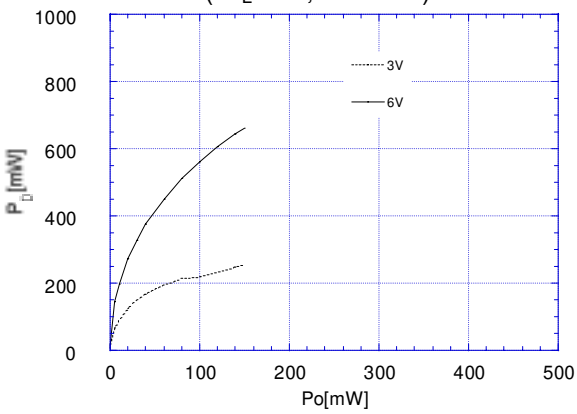
Standby Current vs. Operating Voltage
(V_{CD}=GND,Ta=25°C)



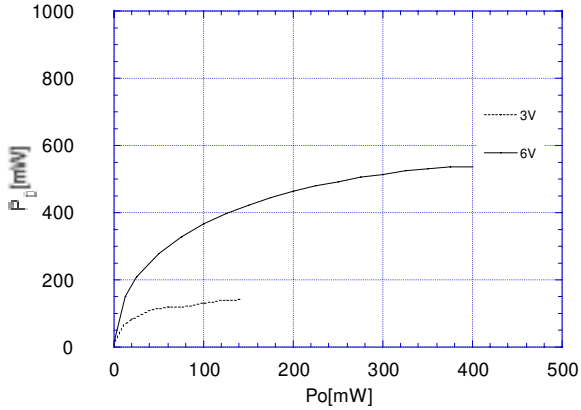
CD Sink Current vs. CD Voltage
(V^+=6V,Ta=25°C)



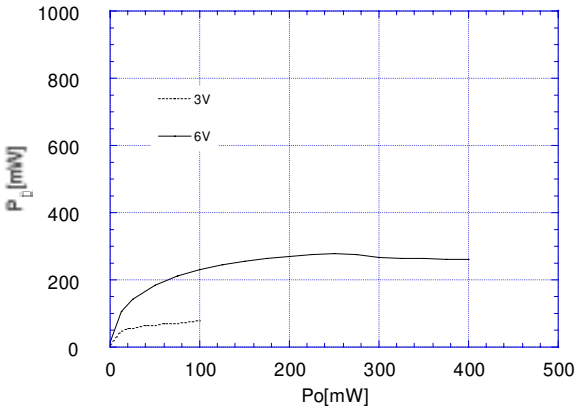
Power Dissipation vs. Output Power
(R_L=8Ω,Ta=25°C)



Power Dissipation vs. Output Power
(R_L=16Ω,Ta=25°C)

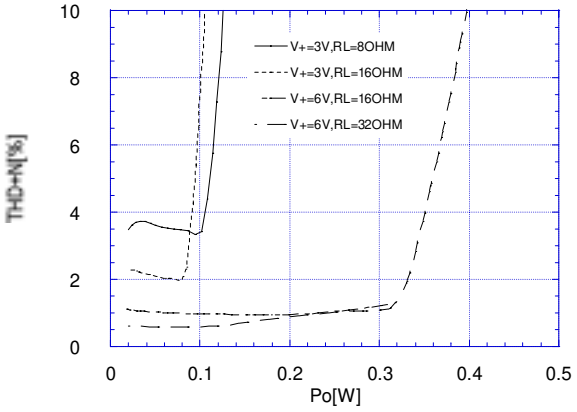


Power Dissipation vs. Output Power
(R_L=32Ω,Ta=25°C)

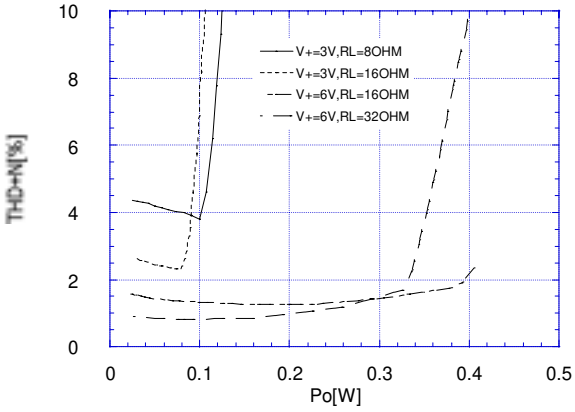


■ TYPCAL CHARACTERISTICS

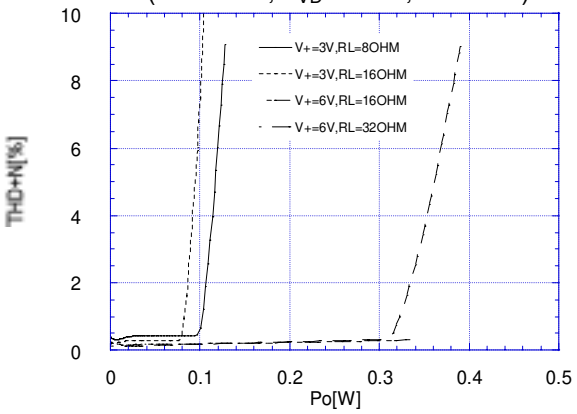
Total Harmonic Distortion vs. Output Power
(f=1kHz,G_{VD}=34dB,Ta=25°C)



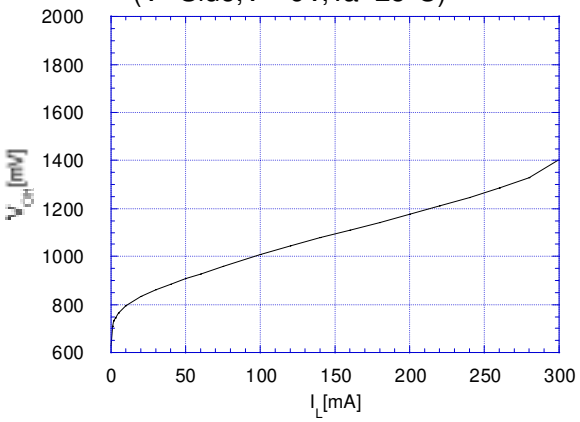
Total Harmonic Distortion vs. Output Power
(f=3kHz,G_{VD}=34dB,Ta=25°C)



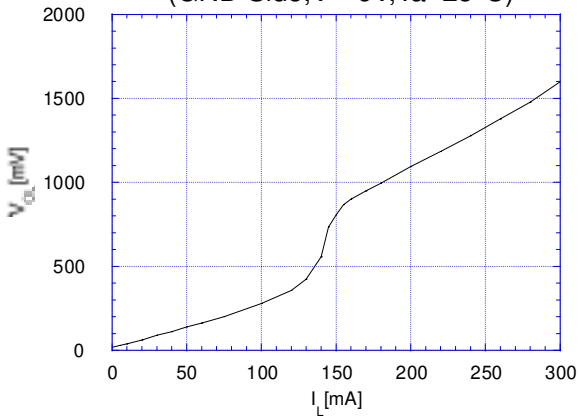
Total Harmonic Distortion vs. Output Power
(f=1.3kHz,G_{VD}=12dB,Ta=25°C)



Maximum Output Swing vs. Load Current
(V^+ Side,V^+=6V,Ta=25°C)

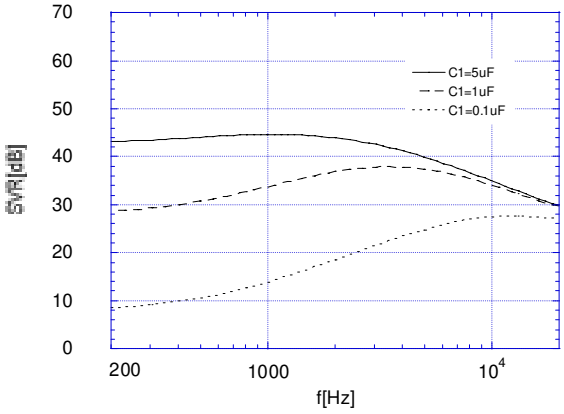


Maximum Output Swing vs. Load Current
(GND Side,V^+=6V,Ta=25°C)

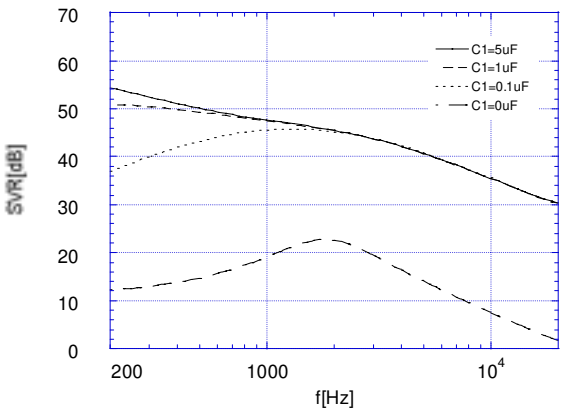


■ TYPCAL CHARACTERISTICS

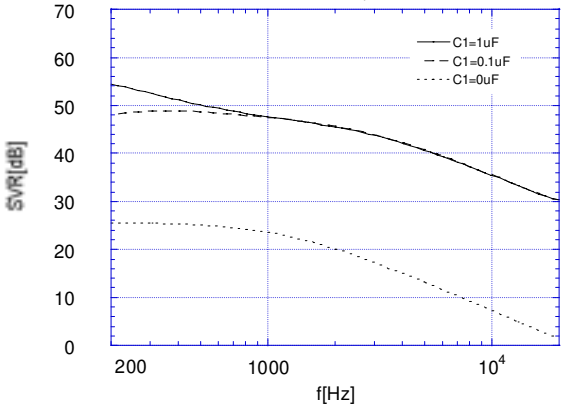
Supply Voltage Rejection Ratio vs. Frequency
(V^+=6V,G_{VD}=34dB,C2=0µF,Ta=25°C)



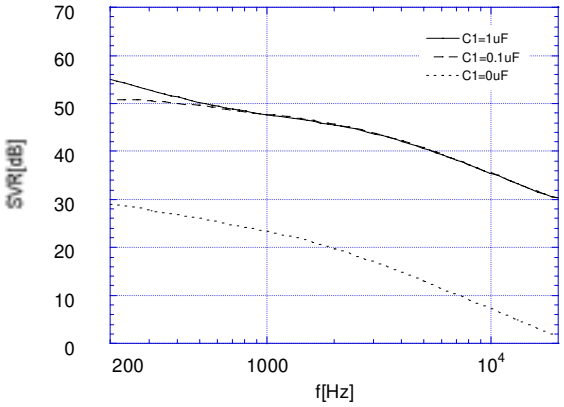
Supply Voltage Rejection Ratio vs. Frequency
(V^+=6V,G_{VD}=34dB,C2=1µF,Ta=25°C)



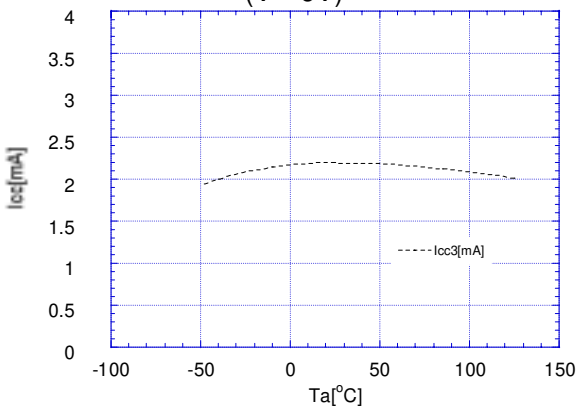
Supply Voltage Rejection Ratio vs. Frequency
(V^+=6V,G_{VD}=34dB,C2=5µF,Ta=25°C)



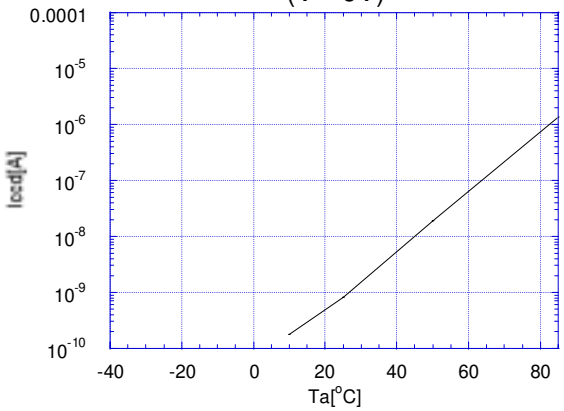
Supply Voltage Rejection Ratio vs. Frequency
(V^+=6V,G_{VD}=34dB,C2=10µF,Ta=25°C)



Operating Current vs. Temperature
(V^+=6V)

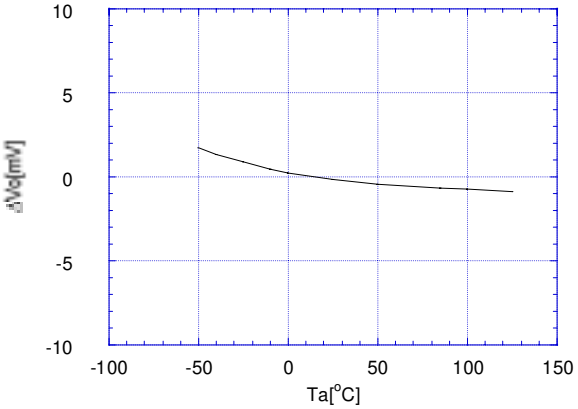


Standby Current vs. Temperature
(V^+=6V)

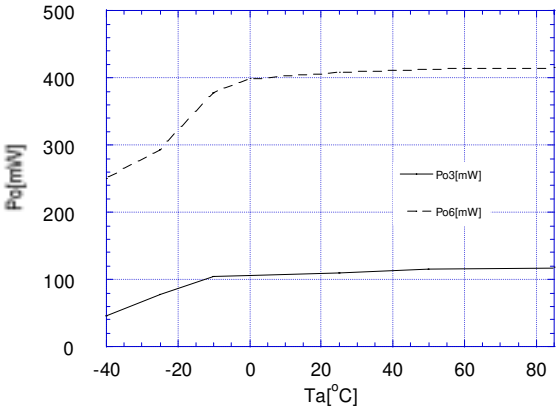


■ TYPCAL CHARACTERISTICS

Output Offset Voltage vs. Temperature
(V^+=6V)



Output Power vs. Temperature
(V^+=6V)



MEMO

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