

■ ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Power Supply Voltage	V ₊	7	V
Power Dissipation	P _D	1,330(Note1)	mW
Operating Temperature Range	Topr	-40 ~ +85	°C
Storage Temperature Range	Tstg	-40 ~ +125	°C
Maximum Input Voltage	V _{IMAX}	0 ~ V ⁺ (Note2)	V

(Note1) EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 2layer, FR-4) mounting

■ OPERATING VOLTAGE

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V ⁺	-	3.9	5.0	5.5	V

■ ELECTRICAL CHARACTERISTICS (Ta=25°C, V⁺=5V, Vin=150mVrms/1kHz, MUT=CD=SPSW= V⁺, MON=OPEN, R_{VLC}=0Ω)

●Power Supply

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current 1	I _{CC1}	RX-mode (Receive)	2.0	3.5	6.0	mA
Operating Current 2	I _{CC2}	TX-mode (Transmit)	2.0	3.5	6.0	mA
Operating Current 3	I _{CC3}	Idle-mode (Standby)	2.0	3.5	6.0	mA
Operating Current 4	I _{CC4}	Idle-mode ,SPSW=PD	1.0	2.5	4.0	mA
Operating Current 5	I _{CC5}	Idle-mode ,CD=PD,SPSW=PD	0.5	1	1.5	mA
Reference Voltage	V _{REF}	No signal, Idle-mode	2.2	2.5	2.8	V

●Receive Attenuator(RxIN=200Vrms,Receive Amplifier Gv=0dB)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Receive Attenuator Gain 1	G _{R1}	RX-mode (Receive)	3.0	6.0	9.0	dB
Receive Attenuator Gain 2	G _{R2}	TX-mode (Transmit)	-42	-46	-50	dB
Receive Attenuator Gain 3	G _{R3}	Idle-mode (Standby)	-17	-20	-23	dB
Range R to T mode	dG _R	RX-mode – TX-mode	47	52	57	dB
Dynamic DC offset	G _{RDC}	RX-mode – TX-mode (DC)	-50	-	50	mV
Volume control range	G _{RVR}	RX-mode, R _{VLC} =0Ω-100kΩ	35	45	55	dB

●Transmit Attenuator (TxIN=200Vrms,Mic.amplifier Gv=0dB)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Transmit Attenuator Gain 1	G _{T1}	TX-mode (Transmit)	3.0	6.0	9.0	dB
Transmit Attenuator Gain 2	G _{T2}	RX-mode (Receive)	-42	-46	-50	dB
Transmit Attenuator Gain 3	G _{T3}	Idle-mode (Standby)	-17	-20	-23	dB
Range R to T mode	dG _T	TX-mode – RX-mode	47	52	57	dB
Dynamic DC offset	G _{TDC}	TX-mode – RX-mode (DC)	-50	-	50	mV

●MIC Amplifier(TxIN=1mVrms, Gv=40dB, RL=5.1kΩ)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Offset Voltage	V _{MOS}	RF=300kΩ	-50	0.0	50	mV
Input Bias Current	I _{MBIAS}		-	30	-	nA
Voltage Gain 1	G _{VM1}	f=1kHz	-	40	-	dB
Voltage Gain 2	G _{VM2}	f=20kHz	-	36	-	dB
Maximum Output Voltage	V _{MMAX}	THD=1%	1.0	-	-	Vrms
Maximum Attenuation	G _{MMUTE}	MUT=MUTE	-70	-73	-	dB

●Receive Amplifier (RxIN=1mVrms, Gv=40dB, RL=5.1kΩ)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Offset Voltage	V _{ROS}	RF=300kΩ	-50	0.0	50	mV
Input Bias Current	I _{RBIAS}		-	30	-	nA
Voltage Gain 1	G _{VR1}	f=1kHz	-	40	-	dB
Voltage Gain 2	G _{VR2}	f=20kHz	-	36	-	dB
Maximum Output Voltage	V _{RMAX}	THD=1%	1.0	-	-	Vrms

●Line Amplifier (LINEIN=50mVrms, Gv=26dB, RL=1.2kΩ)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Offset Voltage	V _{LOS}	RF=51kΩ	-50	0.0	50	mV
Input Bias Current	I _{RBIAS}		-	30	-	nA
Voltage Gain 1	G _{VL1}	f=1kHz	-	26	-	nA
Voltage Gain 2	G _{VL2}	f=20kHz	-	25	-	nA
Gain Bandwidth	G _{LBW}	RL=600Ω, LIO	-	1.5	-	MHz
Closed Loop Gain	G _{LC}	RL=1.2kΩ, LIO- to LIO+	-0.5	0	0.5	dB
Maximum Output Voltage	V _{LMAX}	RL=1.2kΩ, THD=1%	2.0	-	-	Vrms
Total Harmonic Distortion	THD _{LN}	VIN=100mVrms, Gv=20dB RL=1.2Ω	-	-	0.5	%

●Speaker Amplifier (SPIN=50mVrms, Gv=26dB, RL=32Ω)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Offset Voltage	V _{SPOS}	RF=51kΩ	-50	0.0	50	mV
Voltage Gain 1	G _{VSP1}	f=1kHz	-	26	-	dB
Voltage Gain 2	G _{VSP2}	f=20kHz	-	24	-	dB
Voltage Gain 3	G _{VSP3}	f=1kHz, G _{VSP} =6dB, RL=8Ω	-	6	-	dB
Voltage Gain 4	G _{VSO4}	f=20kHz, G _{VSP} =6dB, RL=8Ω	-	4	-	dB
Closed Loop Gain	G _{LC}	SPO- to SPO+	-0.6	0	0.6	dB
Maximum Output Power	P _{OMAX1}	RL=32Ω, THD=3%	200	300	-	mW
	P _{OMAX2}	RL=8Ω, THD=3%	300	500	-	mW
Total Harmonic Distortion	THD _{SP1}	VIN=500mVrms, f=1KHz, RL=32Ω, G _{VD} =26dB		-	1.0	%
	THD _{SP2}	VIN=500mVrms, f=1KHz, RL=8Ω, G _{VD} =6dB	-	-	1.0	%

●MONITOR TERMINAL (32Pin)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rx-mode	Rx	-	$V^+ - 0.6$	-	V^+	V
Tx-mode	Tx	-	GND	-	0.6	V
Idle-mode	Idle	No Signal	2.4	2.5	2.6	V
Maximum Output Current	I_{MON}	Rx-mode / Tx-mode	-	0.9	-	mA

■ CONTROL CHARACTERISTICS (MUT)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Low Level Input Voltage	V_{IL1}	-	-	-	0.3	V
High Level Input Voltage	V_{IH1}	-	1.5	-	-	V

■ CONTROL CHARACTERISTICS (RTSW)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Low Level Input Voltage	V_{IL2}	-	-	-	0.3	V
High Level Input Voltage	V_{IH2}	-	$V^+ - 0.3$	-	-	V

■ FUNCTION

●CD

INPUT VOLTAGE	STATUS	OPERATION
V_{IH}	ACTIVE	NJW1128 is active.
V_{IL}	MUTE	NJW1128 is stand-by except Speaker Amplifier.

●MUT

INPUT VOLTAGE	STATUS	OPERATION
V_{IH}	MUTE	The microphone input is mute.
V_{IL}	ACTIVE	The microphone input is active.

●SPSW

INPUT VOLTAGE	STATUS	OPERATION
V_{IH}	ACTIVE	The Speaker Amplifier is Active.
V_{IL}	PD	The Speaker Amplifier is Stand-by.

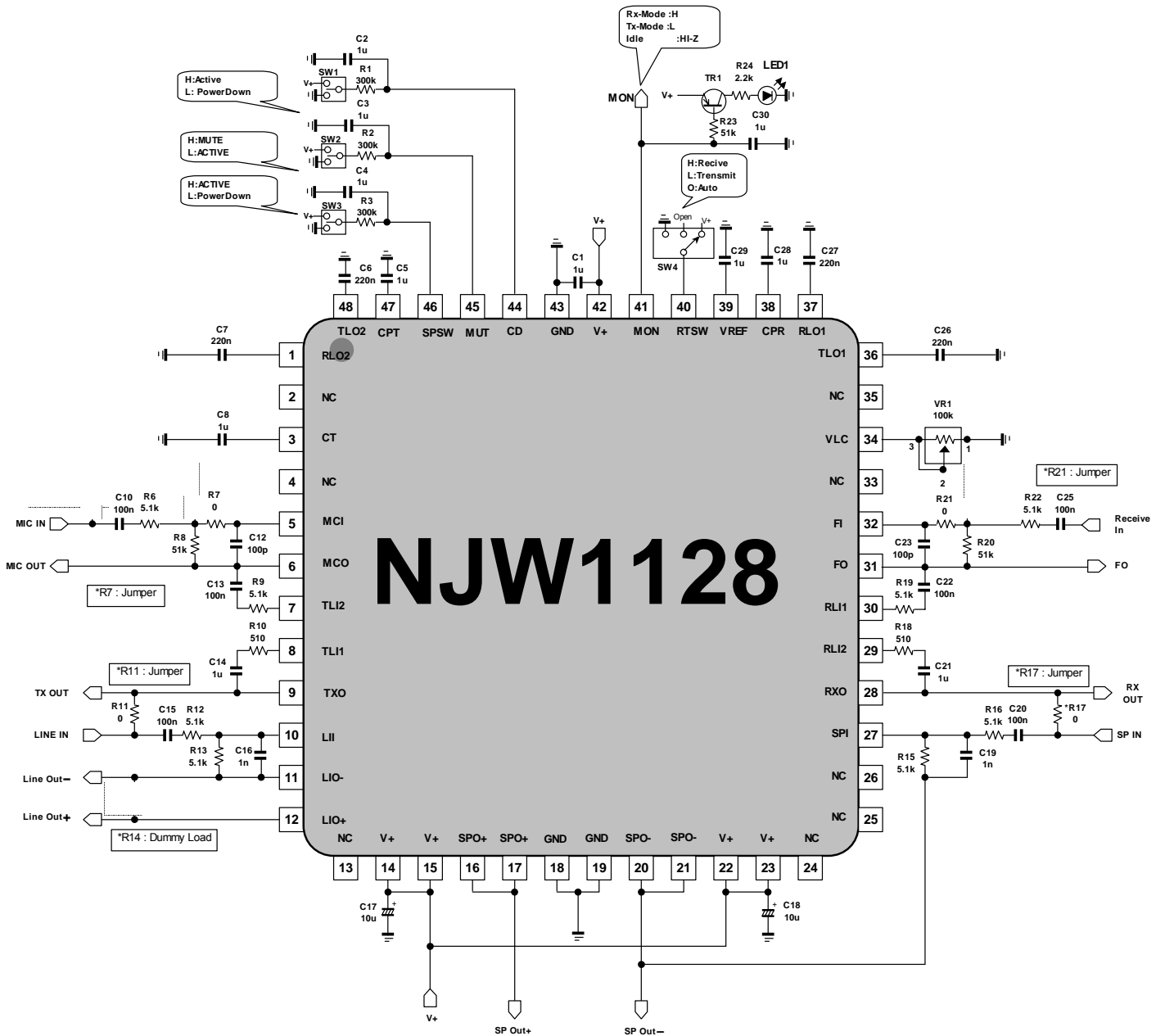
●RTSW

INPUT VOLTAGE	STATUS	OPERATION
V_{IH}	Receive	Force to Receive mode.
OPEN	AUTO	Receive mode and Transmit mode are automatically switched.
V_{IL}	Transmit	Force to Transmit mode.

● R_{VLC} (26pin)

IMPEDANCE	STATUS	OPERATION
0	Vol_{MAM}	The Receive attenuator Volume is maximum.
100k Ω	Vol_{MIN}	The Receive attenuator Volume is minimum.

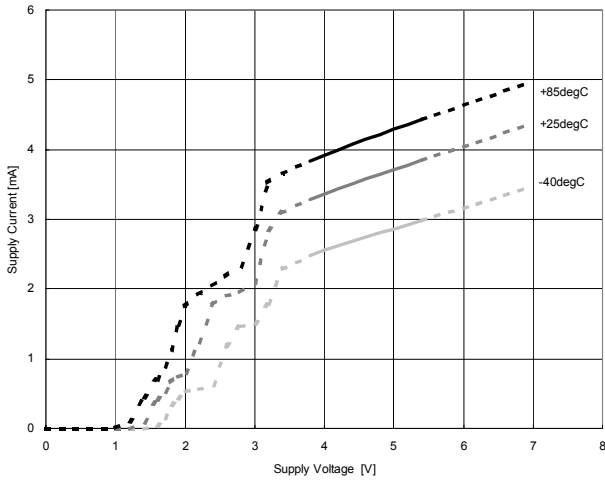
APPLICATION CIRCUIT



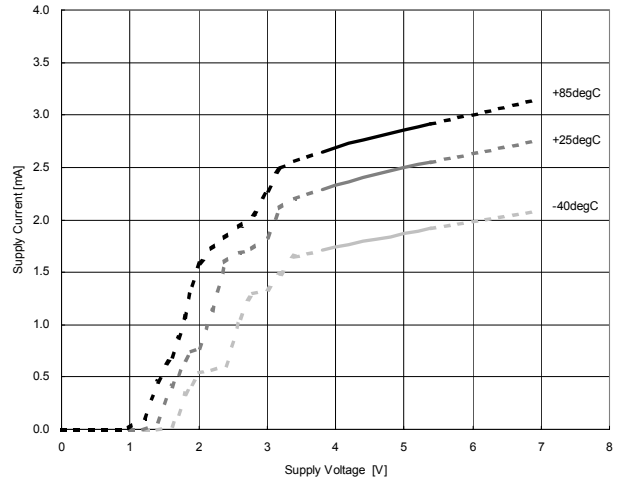
NJW1128

TYPICAL CHARACTERISTICS

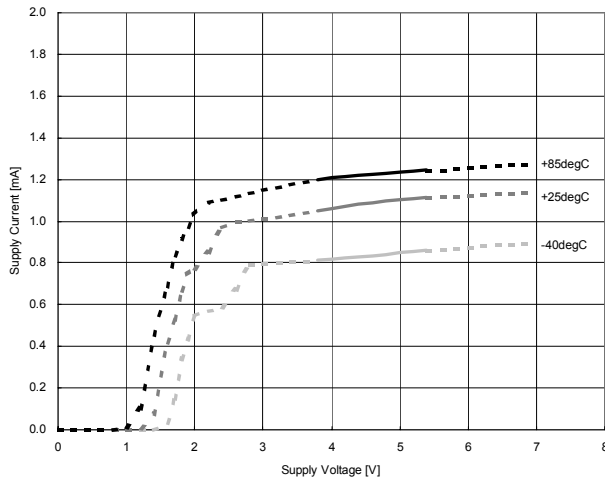
Supply Current vs Supply Voltage
No Signal, Supply Current 1



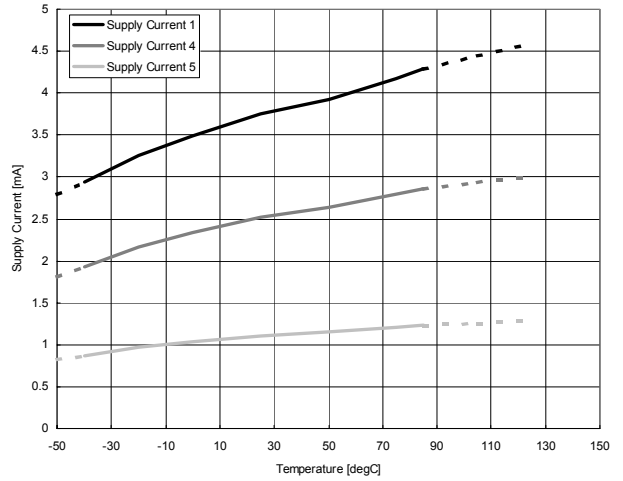
Supply Current vs Supply Voltage
No Signal, Supply Current 4



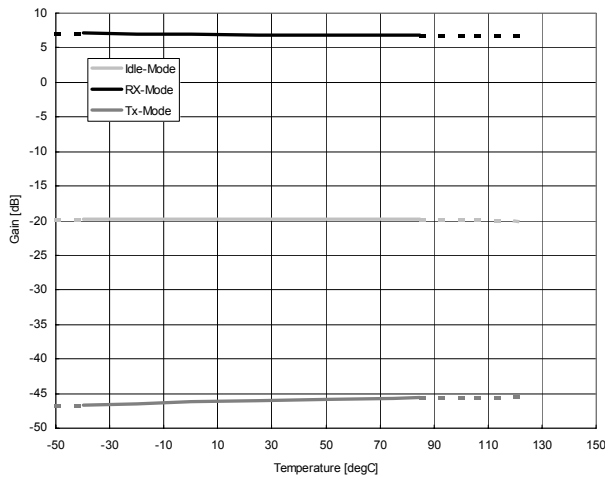
Supply Current vs Supply Voltage
No Signal, Supply Current 5



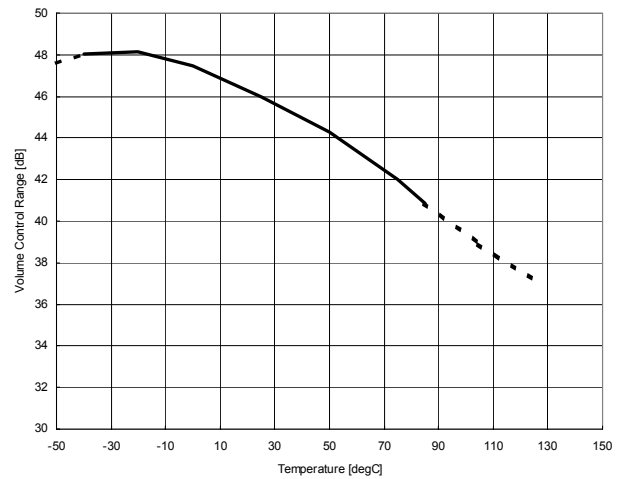
Supply Current vs Temperature
V+ =5.0V, No Signal



RxAtt Gain vs Temperature
V+ =5.0V, RecieveAmp : 0dB, RL=5.1k Ω

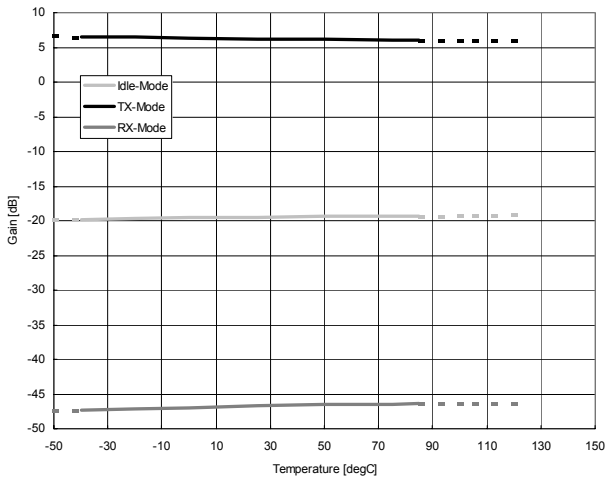


RxAtt Gain vs Temperature
V+ =5.0V, Rx-Mode, RecieveAmp : 0dB, RL=5.1k Ω

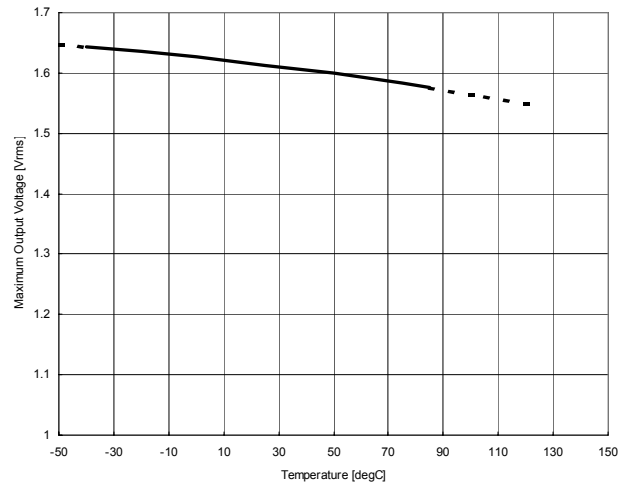


TYPICAL CHARACTERISTICS

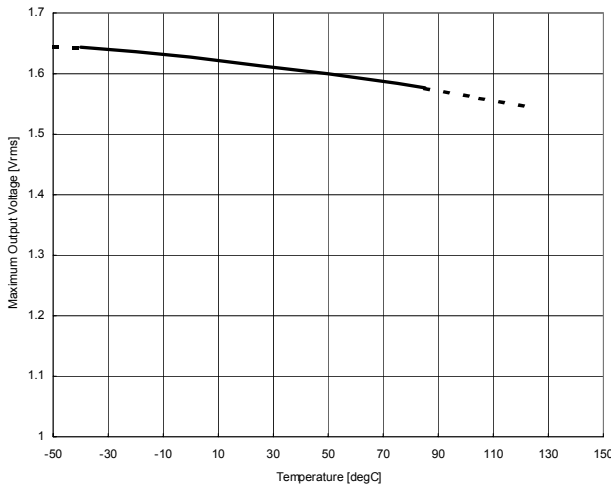
TxAmp Gain vs Temperature
 $V+ = 5.0V$, MicAmp: 0dB, $R_L = 5.1k\Omega$



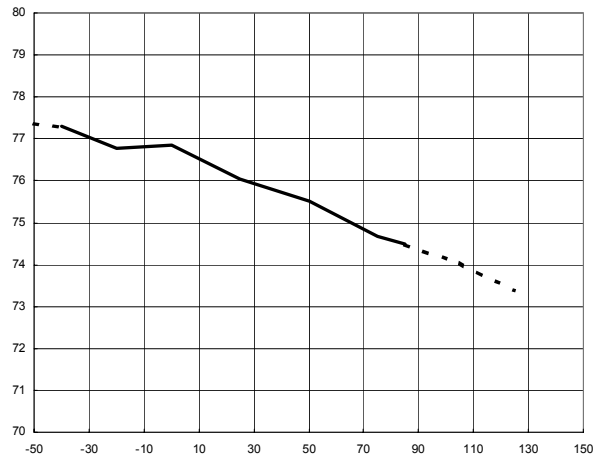
RecieveAmp Maximum Output Voltage vs Temperature
 $V+ = 5.0V$, $f = 1kHz$, $R_f = 300k\Omega$, $G_v = 40dB$, $R_L = 5.1k\Omega$, THD+N = 1%, BW=400Hz-30kHz



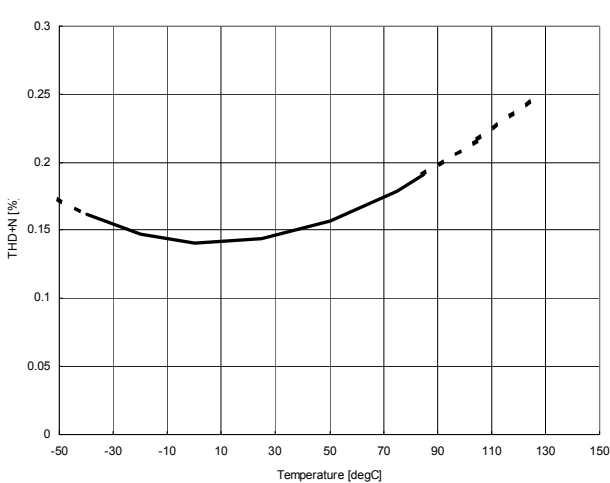
McAmp Maximum Output Voltage vs Temperature
 $V+ = 5.0V$, $f = 1kHz$, $R_f = 300k\Omega$, $G_v = 40dB$, $R_L = 5.1k\Omega$, THD+N = 1%, BW=400Hz-30kHz



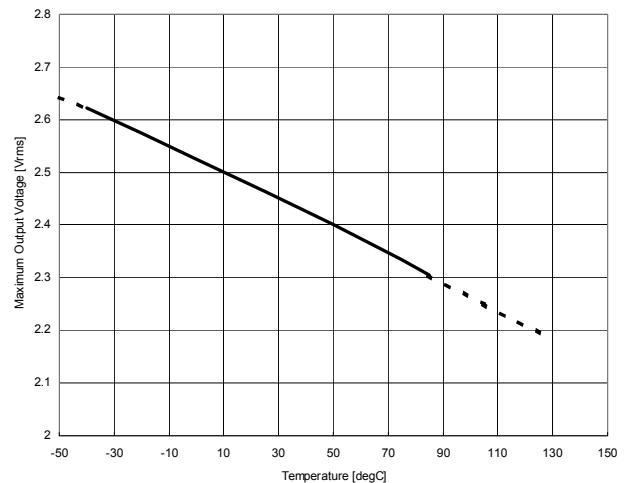
McAmp Mute Range vs Temperature
 $V+ = 5.0V$, $R_f = 300k\Omega$, $G_v = 40dB$, $R_L = 5.1k\Omega$, A-Weighting



LineAmp THD vs Temperature
 $V+ = 5.0V$, $f = 1kHz$, $R_f = 51k\Omega$, $G_v = 26dB$, $V_{in} = 50mV_{rms}$, $R_L = 1.2k\Omega$, BW=400Hz-30kHz

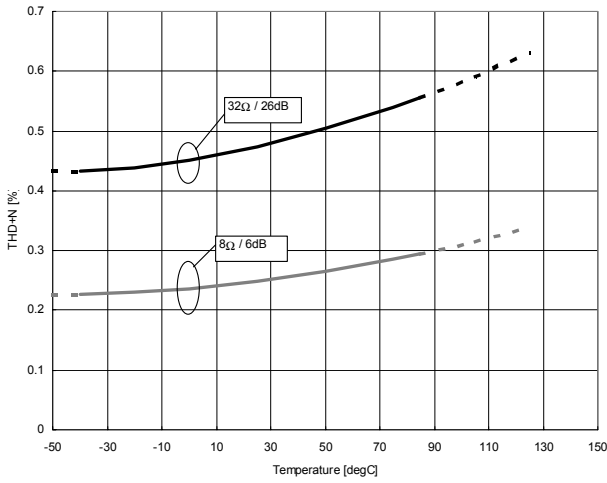


LineAmp Maximum Output Voltage vs Temperature
 $V+ = 5.0V$, $f = 1kHz$, $R_f = 51k\Omega$, $G_v = 26dB$, $R_L = 1.2k\Omega$, THD+N = 1%, BW=400Hz-30kHz

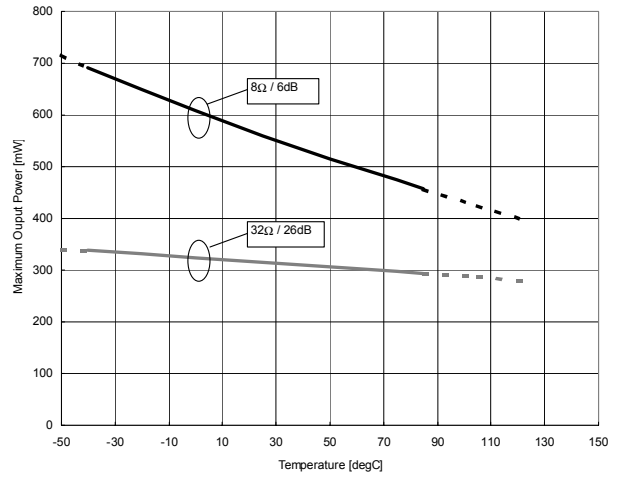


TYPICAL CHARACTERISTICS

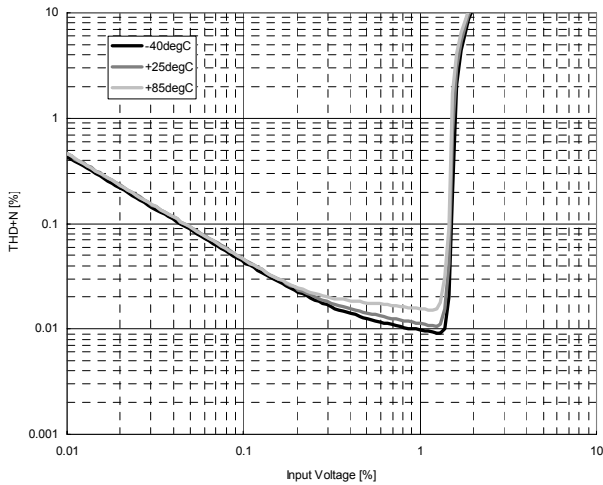
Speaker Amp THD+N vs Temperature
 $V+ = 5.0V, f = 1kHz, BW=400Hz-30kHz$



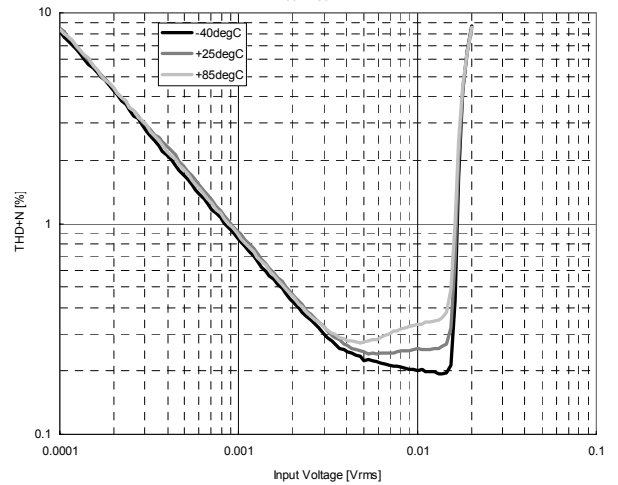
Speaker Amp Maximum Output Power vs Temperature
 $V+ = 5.0V, f = 1kHz, THD+N = 3%, BW=400Hz-30kHz$



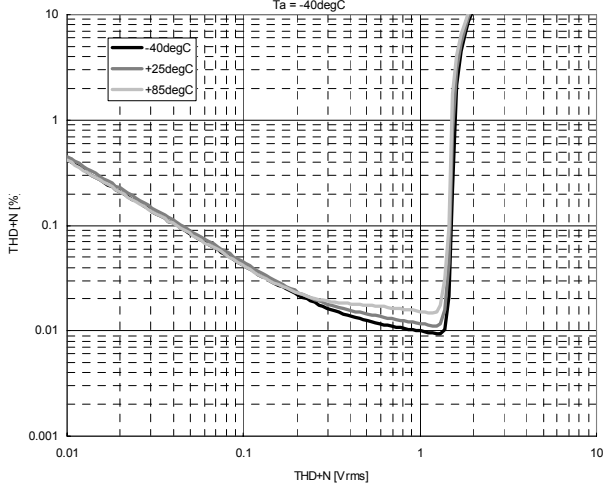
Receive Amp THD+N vs Input Voltage
 $V+ = 5.0V, f = 1kHz, Rf = 3k\Omega, Ri = 3k\Omega, Ci = 1\mu F, Gv = 0dB, RL = 5.1k\Omega, BW=400Hz-30kHz$



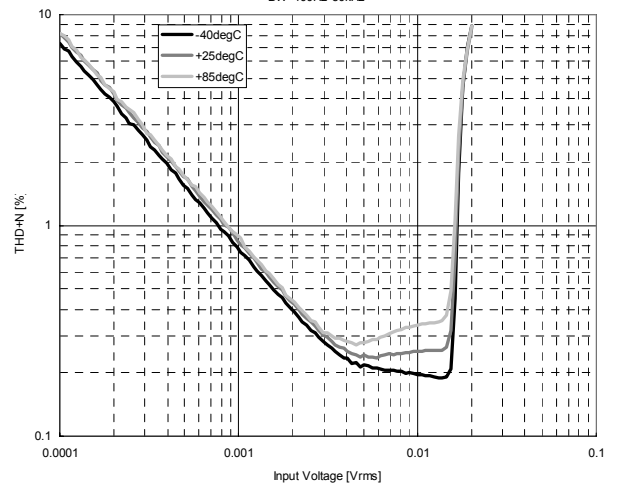
Receive Amp THD+N vs Input Voltage
 $V+ = 5.0V, f = 1kHz, Rf = 300k\Omega, Ri = 3k\Omega, Ci = 1\mu F, Gv = 40dB, RL = 5.1k\Omega, BW=400Hz-30kHz$



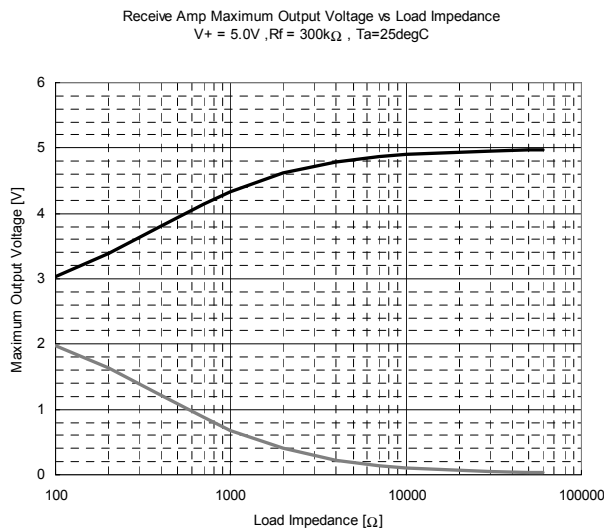
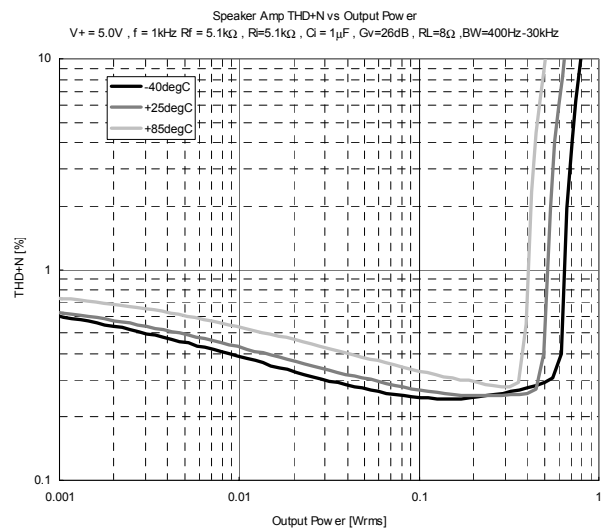
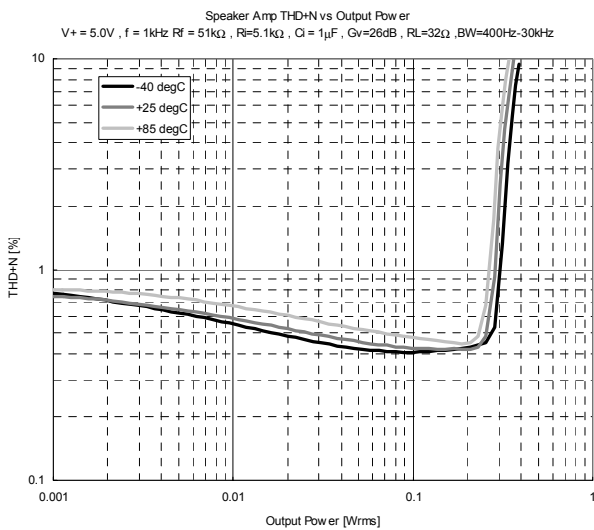
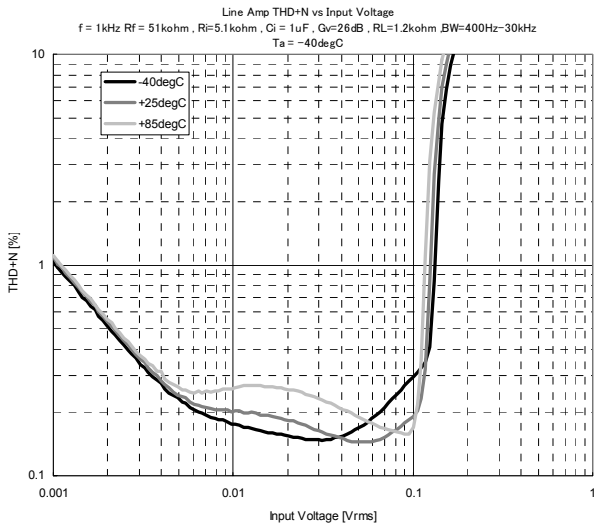
Mic Amp THD+N vs Input Voltage
 $f = 1kHz, Rf = 3k\Omega, Ri = 3k\Omega, Ci = 1\mu F, Gv = 0dB, RL = 5.1k\Omega, BW=400Hz-30kHz, Ta = -40degC$



Mic Amp THD+N vs Input Voltage
 $V+ = 5.0V, f = 1kHz, Rf = 300k\Omega, Ri = 3k\Omega, Ci = 1\mu F, Gv = 40dB, RL = 5.1k\Omega, BW=400Hz-30kHz$

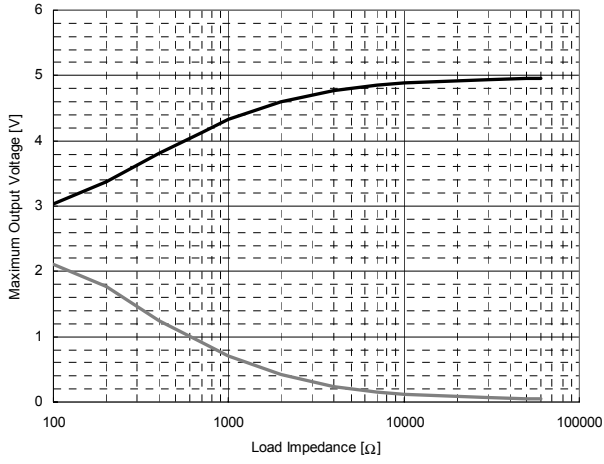


TYPICAL CHARACTERISTICS

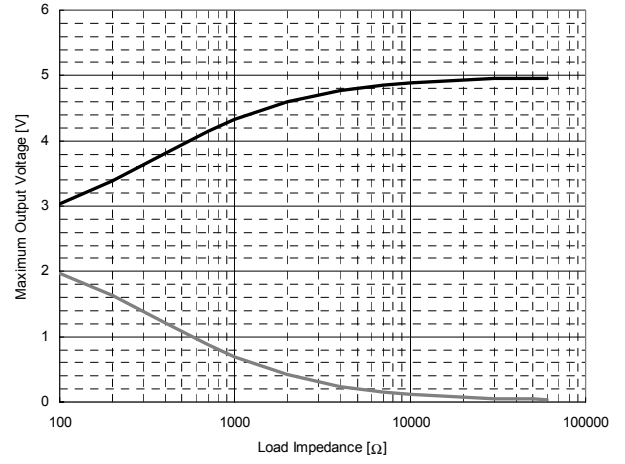


TYPICAL CHARACTERISTICS

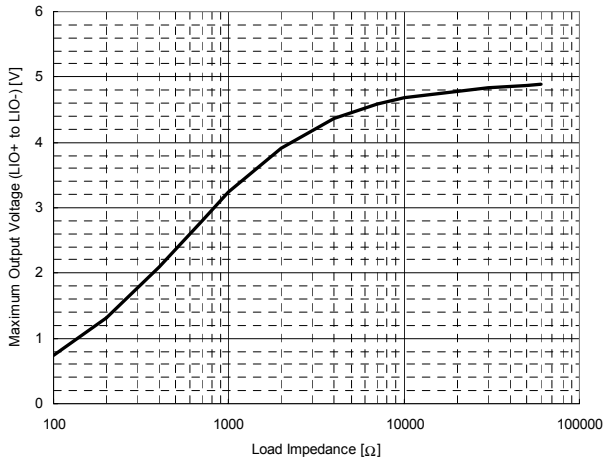
Rx Att Maximum Output Voltage vs Load Impedance
 $V+ = 5.0V$, $T_a = 25\text{degC}$



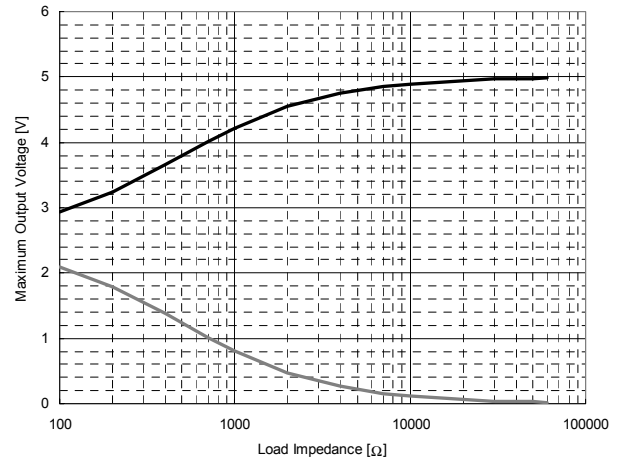
Tx Att Maximum Output Voltage vs Load Impedance
 $V+ = 5.0V$, $T_a = 25\text{degC}$



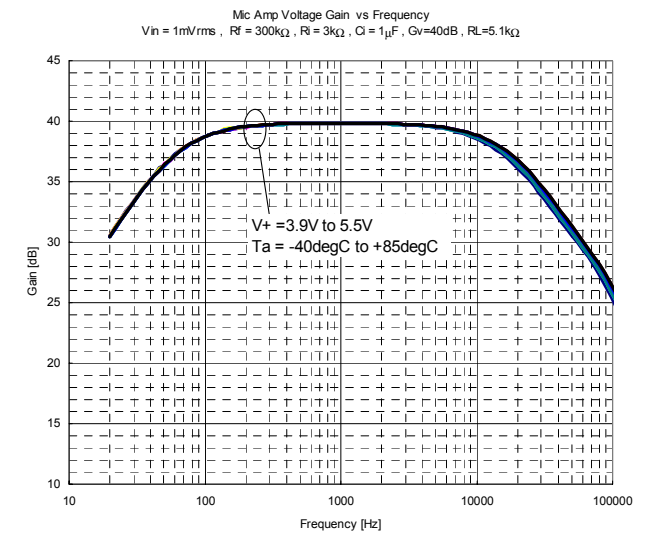
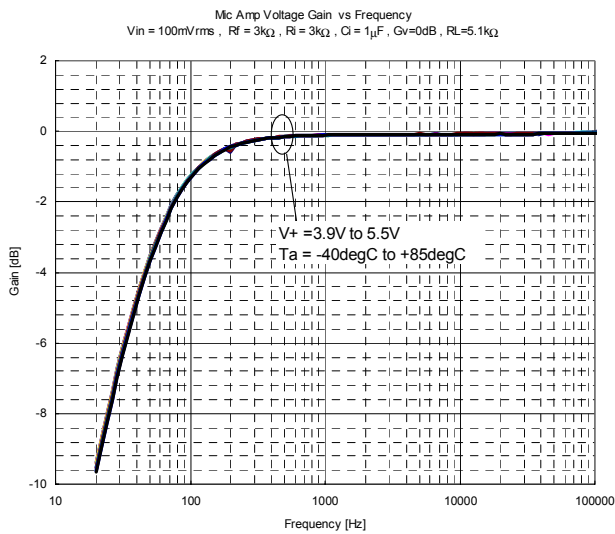
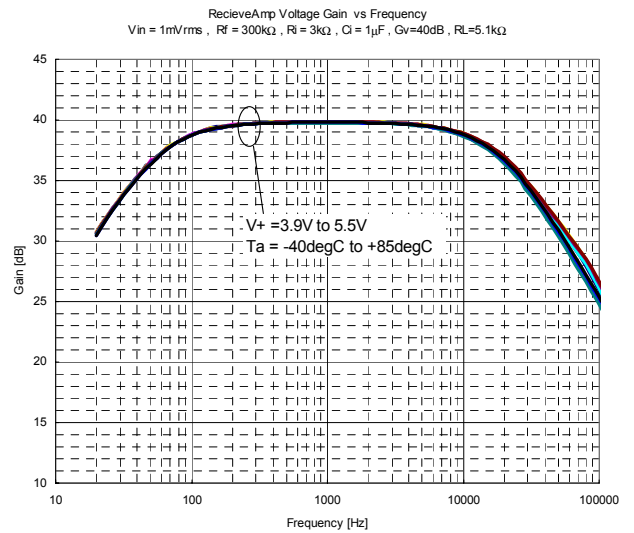
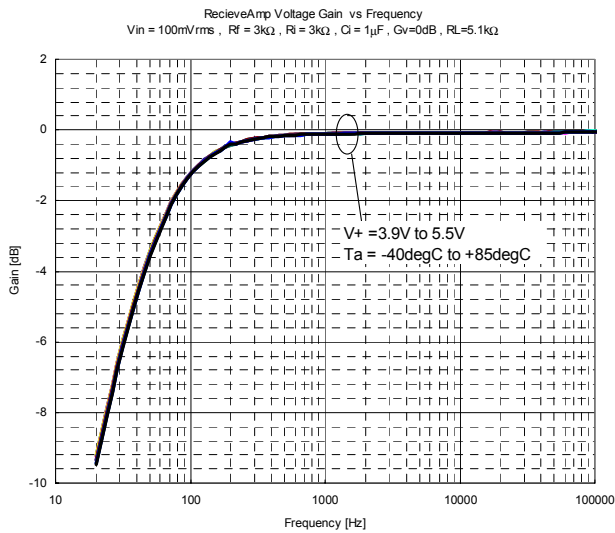
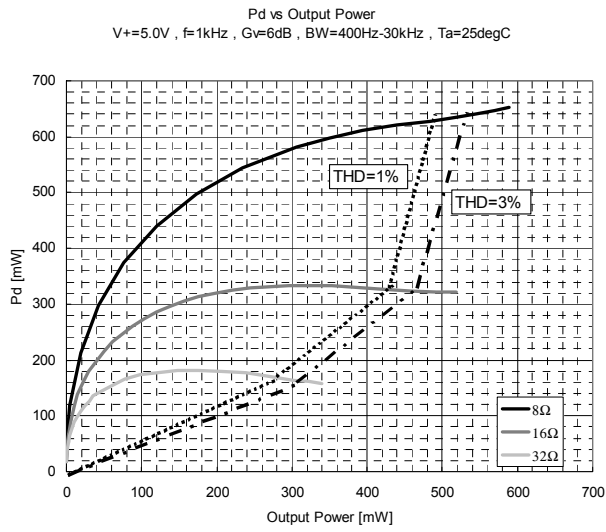
Line Amp Maximum Output Voltage vs Load Impedance
 $V+ = 5.0V$, $R_f = 51k\Omega$, $T_a = 25\text{degC}$



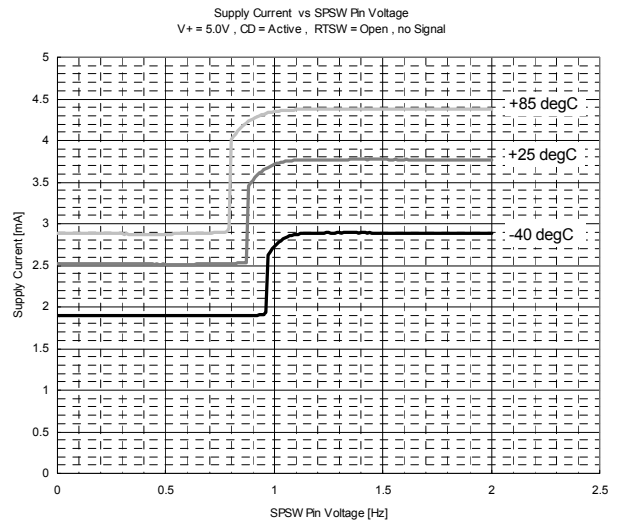
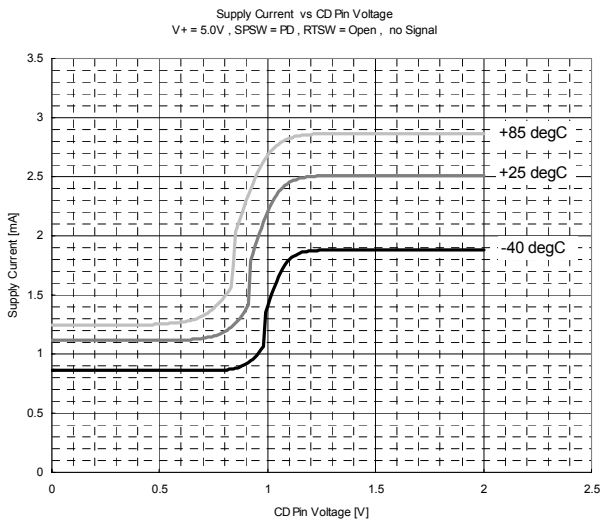
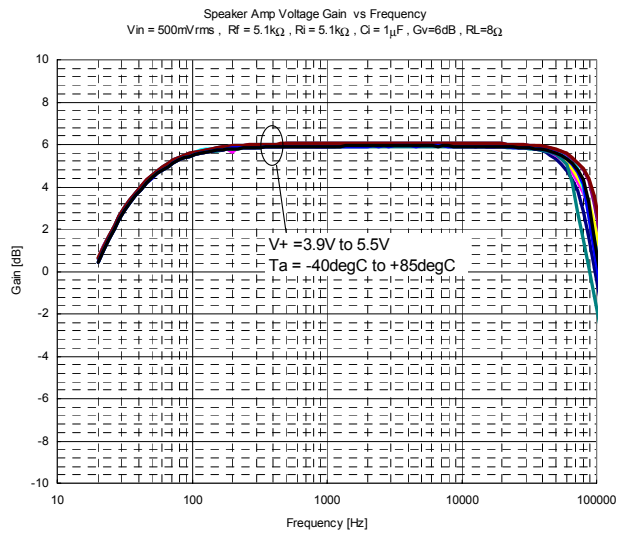
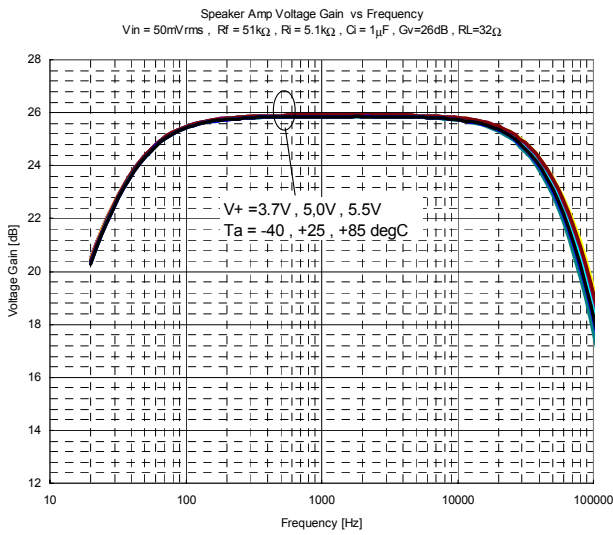
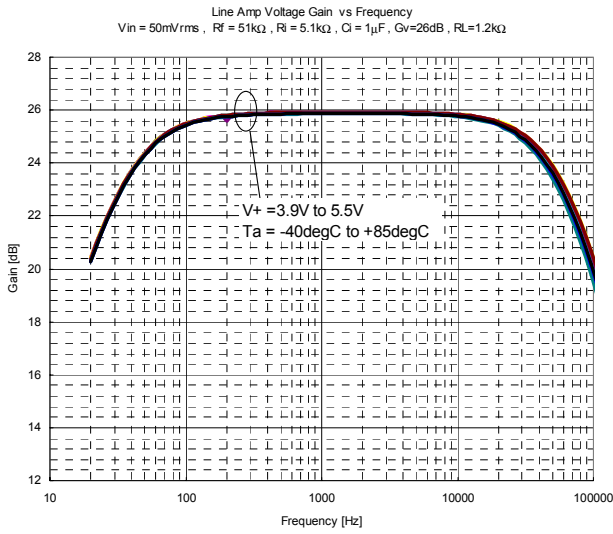
Monitor out Maximum Output Voltage vs Load Impedance
 $V+ = 5.0V$, $T_a = 25\text{degC}$



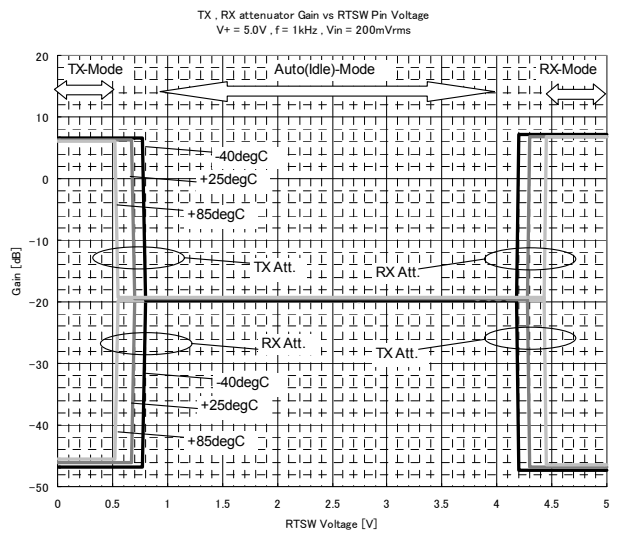
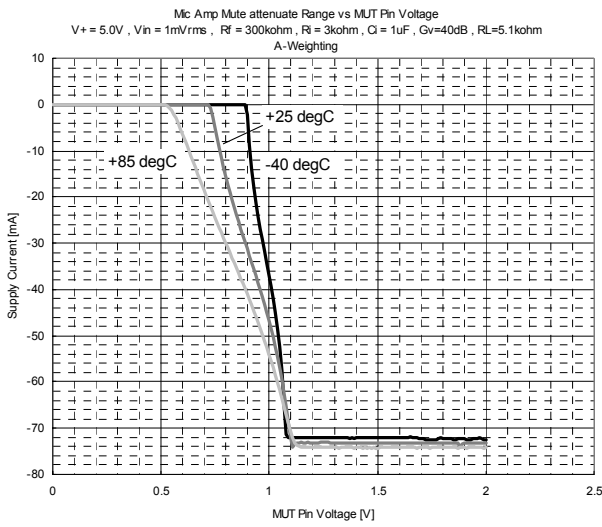
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



[CAUTION]

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