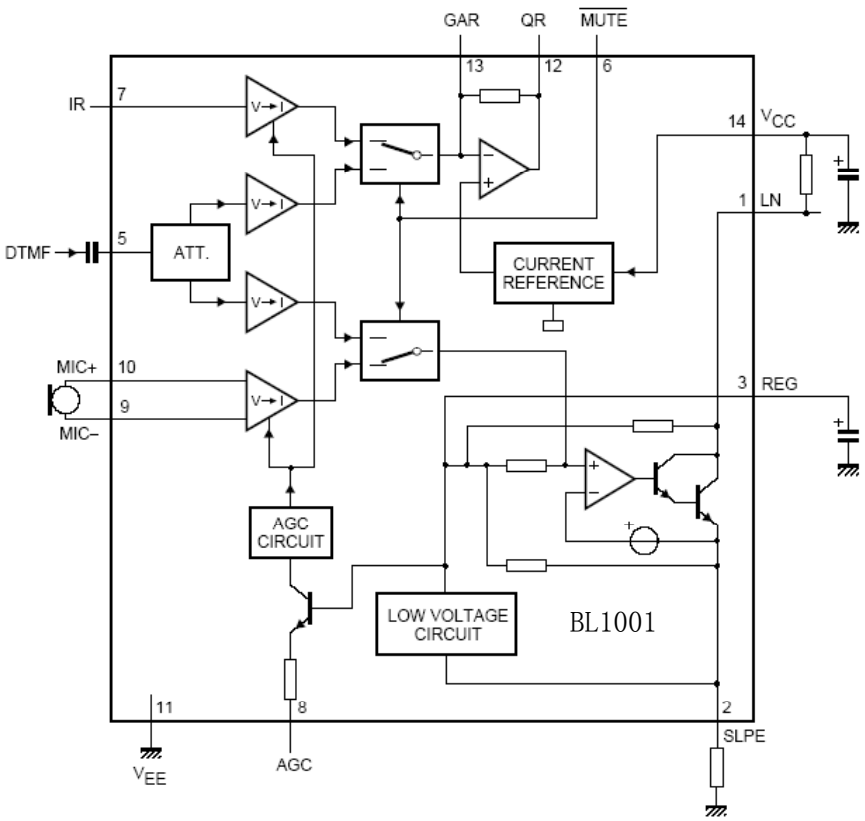
DESCRIPTION:

BL1110A(BL1001) is a low voltage versatile transmission IC. It offers the entire microphone, receive and line interface functions required in telephone sets. It performs the interface between the line and the transducers of the handset. It includes a DTMF amplifier, a microphone amplifier and a receive amplifier. The selection between the microphone amplifier and the DTMF amplifier is made with a "MUTE" function. The MUTE/input switches-off both the microphone and the receive amplifiers and switches-on the DTMF amplifier.

FEATURES

- Low DC line voltage: operates down to 1.6 V
- Voltage regulator with adjustable DC voltage
- Provides a supply for external circuits
- Symmetrical high impedance inputs (64 kW) for dynamic, magnetic or piezo-electric microphones
- Asymmetrical high impedance input (32 kW) for electrets microphones
- DTMF input with confidence tone
- MUTE input for pulse or DTMF dialing
- Receiving amplifier for dynamic, magnetic or piezo-electric earpieces
- AGC line loss compensation for microphone and earpiece amplifiers.
- Line powered telephone sets, cordless telephones, fax machines, answering machines.

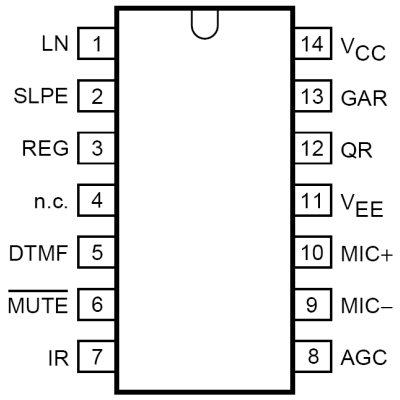
BLOCK DIAGRAM:



SELECTION GUIDE：

- DIP14：plastic dual in-line package; 14 leads (300 mil)
- SO14：plastic small outline package; 14 leads; body width 3.9 mm

PIN CONFIGURATION：



PIN DESCRIPTION：

PIN	SYMBOL	FUNCTION
1	LN	Positive line terminal
2	SLPE	Slope adjustment
3	REG	Line voltage regulator decoupling
4	nc	No function
5	DTMF	DTMF input
6	_MUTE	MUTE input
7	IR	Receive amplifier input
8	AGC	Automatic gain control
9	MIC-	Inverting microphone input
10	MIC+	Non inverting microphone input
11	VEE	Negative line terminal
12	QR	Receive amplifier output
13	GAR	Receive gain reduction adjustment
14	VCC	Supply voltage for speech and peripherals

ABSOLUTE MAXIMUM RATING:

SYMBOL	PARAMETER	VALUE	UNIT
V_{LN}	positive continuous line voltage	$(V_{EE}-0.4)\sim 12$	V
	repetitive line voltage during switch-on or line interruption	$(V_{EE}-0.4)\sim 13.2$	V
$V_{n(\max)}$	maximum voltage on all pins	$V_{EE}-0.4\sim V_{CC}+0.4$	V
$I_{line,\max}$	line current	140	mA
P_{tot}	total power dissipation（DIP14）	588	mW
	total power dissipation（SO14）	384	mW
$T_{storage}$	storage temperature	$-40\sim 125$	^oC
$T_{ambient}$	operating ambient temperature	$-25\sim 75$	^oC
T_j	junction temperature	125	^oC

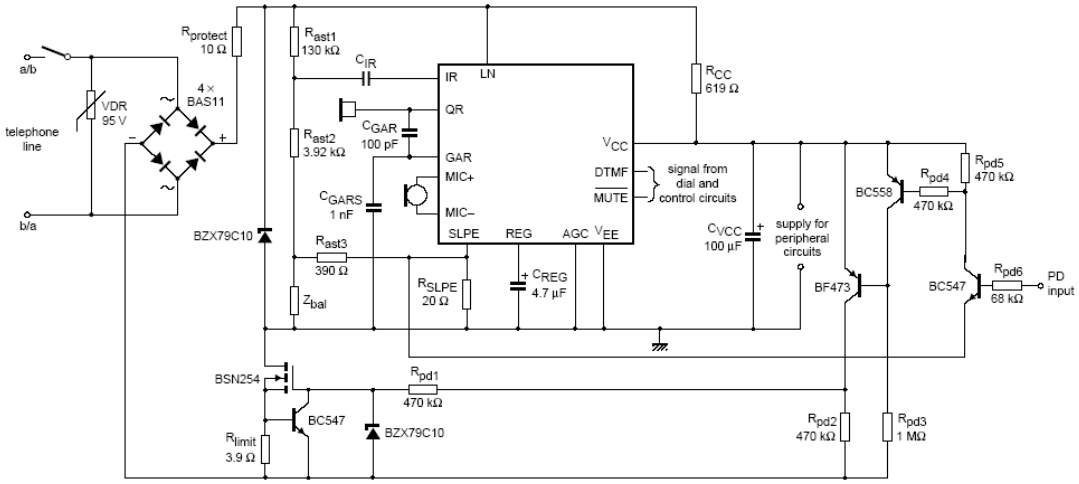
ELECTRICAL CHARACTERISTICS:

Iline = 15 mA; VEE = 0 V; RSLPE = 20 Ω; AGC pin connected to VEE; Zline = 600 Ω; f = 1 kHz; Tamb = 25 °C for TEA1110A(T); Tj = 25 °C for TEA1110AUH; unless otherwise specified.

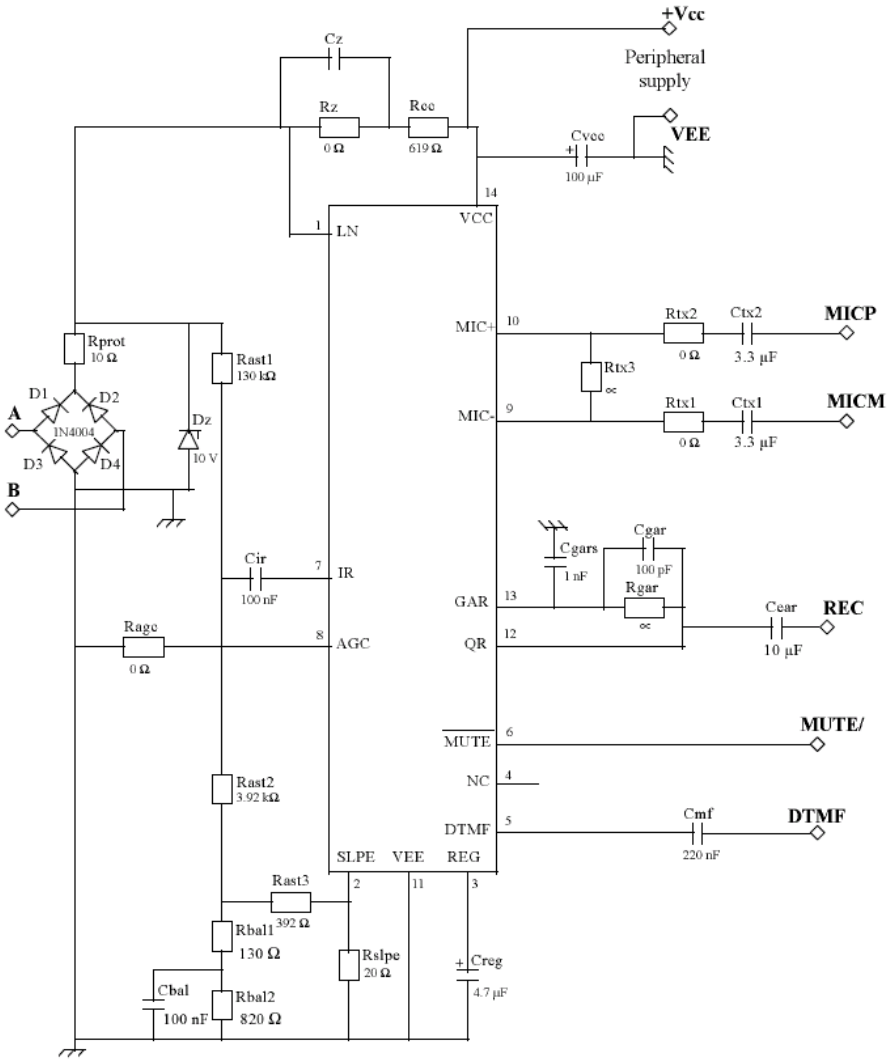
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Supplies（pins $V_{LN}, V_{CC}, SLPE, REG$）						
V_{ref}	stabilized voltage between LN and SLPE		3.1	3.35	3.6	V
V_{LN}	DC line voltage	$I_{line}=1mA$	—	1.6	—	V
		$I_{line}=4mA$	—	2.3	—	V
		$I_{line}=15mA$	3.35	3.65	3.95	V
		$I_{line}=140mA$	—	—	6.9	V
$\Delta V_{LN}(T)$	DC line voltage variation with temperature referred to 25 °C	$T_{amb}=-25^oC\sim 75^oC$	—	± 30	—	mV
I_{CC}	internal current consumption	$V_{CC}=2.9V$		1.1	1.4	mA
V_{CC}	supply voltage for peripherals	$I_{peripheral}=0mA$	—	2.9	—	V
Microphone amplifier (pins MIC+ and MIC-)						
$\lvert z_i\rvert$	input impedance differential between pins MIC+ and MIC-		—	64	—	$k\Omega$
	single-ended between pinsMIC+/MIC- and VEE		—	32	—	$k\Omega$

G_{vtx}	voltage gain from MIC+/MIC- to LN	$V_{MIC} = 4mV(RMS)$	42.7	43.7	44.7	dB
$\Delta G_{vtx}(f)$	gain variation with frequency referred to 1 kHz	$f = 300 \sim 3400$ Hz	—	± 0.2	—	dB
$\Delta G_{vtx}(T)$	gain variation with temperature referred to 25 °C	$T_{amb} = -25^{o}C \sim 75^{o}C$	—	± 0.3	—	dB
$V_{LN(\max)}$	maximum sending signal (RMS value)	$I_{line} = 15mA; THD = 2\%$	1.4	1.7	—	V
		$I_{line} = 4mA; THD = 2\%$	—	0.8	—	V
Receiving amplifier (pins IR, QR and GAR)						
$\lvert z_i \rvert$	input impedance		—	20	—	$k\Omega$
G_{vrx}	voltage gain from IR to QR	$V_{IR} = 4mV(RMS)$	32	33	34	dB
$\Delta G_{vrx}(f)$	gain variation with frequency referred to 1 kHz	$f = 300 \sim 3400$ Hz	—	± 0.2	—	dB
$\Delta G_{vtx}(T)$	gain variation with temperature referred to 25 °C	$T_{amb} = -25^{o}C \sim 75^{o}C$	—	± 0.3	—	dB
$V_{o(\max)}$	maximum receiving signal (RMS value)	$R_L = 150\Omega; THD = 2\%$	—	0.25	—	V
		$R_L = 450\Omega; THD = 2\%$	—	0.35	—	V
Automatic gain control (pin AGC)						
ΔG_{vtrx}	gain control range for microphone and receiving amplifiers with respect to Iline = 15 mA	$I_{line} = 85mA$	—	5.9	—	dB
I_{start}	highest line current for maximum gain		—	23	—	mA
I_{stop}	lowest line current for minimum gain		—	56	—	mA
DTMF amplifier (pin DTMF)						
$\lvert z_i \rvert$	input impedance		—	20	—	$k\Omega$
G_{vdtmf}	voltage gain from DTMF to LN	$\overline{MUTE} = LOW$ $V_{DTMF} = 20mV(rms)$	24.1	25.3	26.5	dB
$\Delta G_{vdtmf}(f)$	gain variation with frequency referred to 1 kHz	$f = 300 \sim 3400$ Hz	—	± 0.2	—	dB
$\Delta G_{vdtmf}(T)$	gain variation with temperature referred to 25 °C	$T_{amb} = -25^{o}C \sim 75^{o}C$	—	± 0.4	—	dB
G_{vct}	voltage gain from DTMF to QR (confidence tone)	$V_{DTMF} = 20mV(rms)$ $R_L = 150\Omega$	—	-15	—	dB
Mute function (pin MUTE)						
V_{IL}	LOW level input voltage		$V_{EE} - 0.4$	—	$V_{EE} + 0.3$	V
V_{IH}	HIGH level input voltage		$V_{EE} + 1.5$	—	$V_{CC} + 0.4$	V
$I_{\overline{MUTE}}$	input current		—	1.5	—	uA
ΔG_{vtrxm}	gain reduction for microphone and receiving amplifiers	$\overline{MUTE} = LOW$	—	80	—	dB

TYPICAL APPLICATIONS AND APPLICATION HINTS：



TEST CIRCUITS：



TYPICAL CHARACTERISTICS:

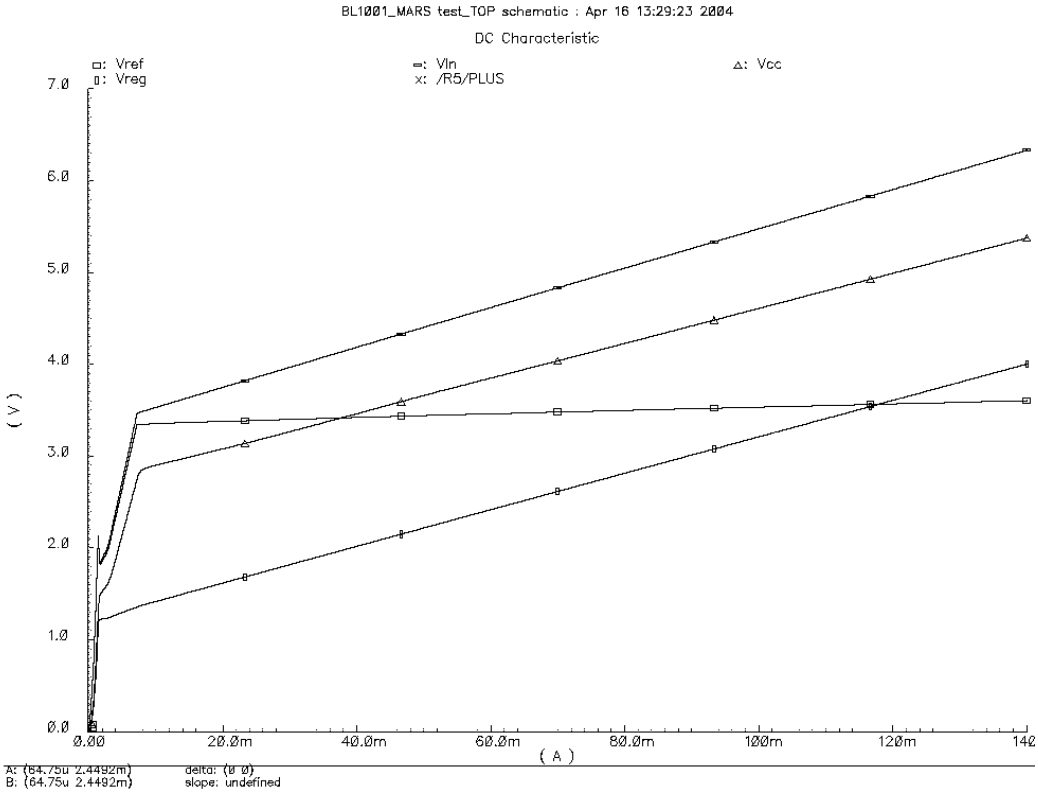


Fig.1 Main voltages versus Line current

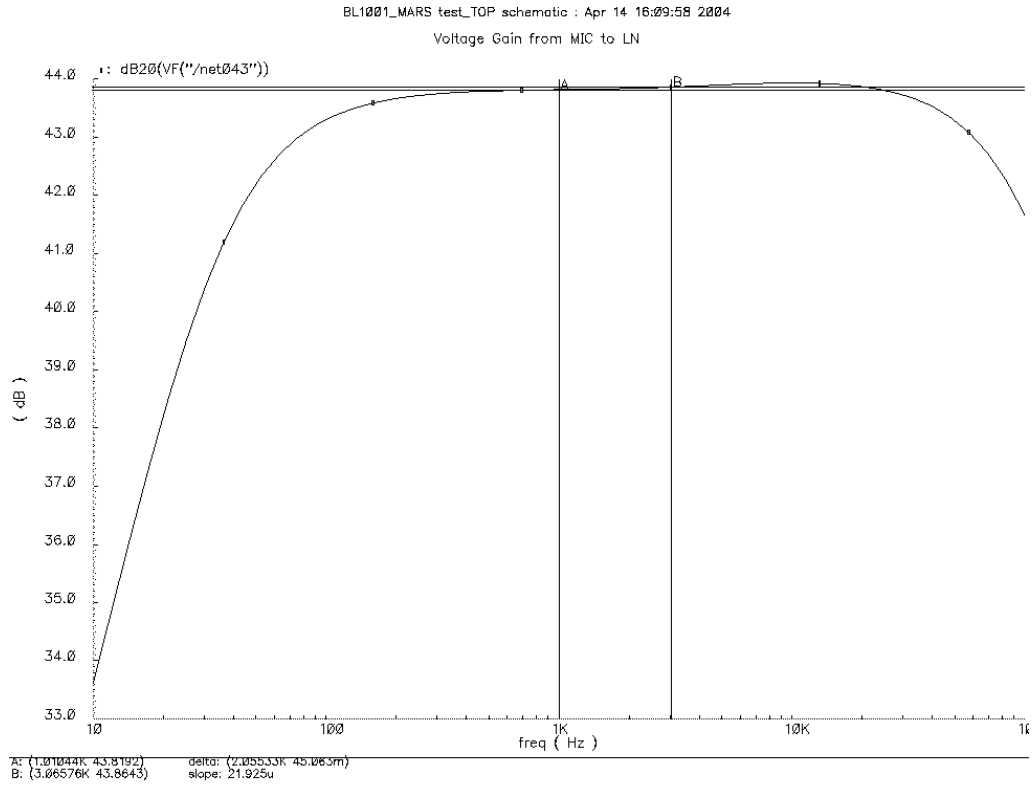


Fig.2 Voltage gain from MIC to LN

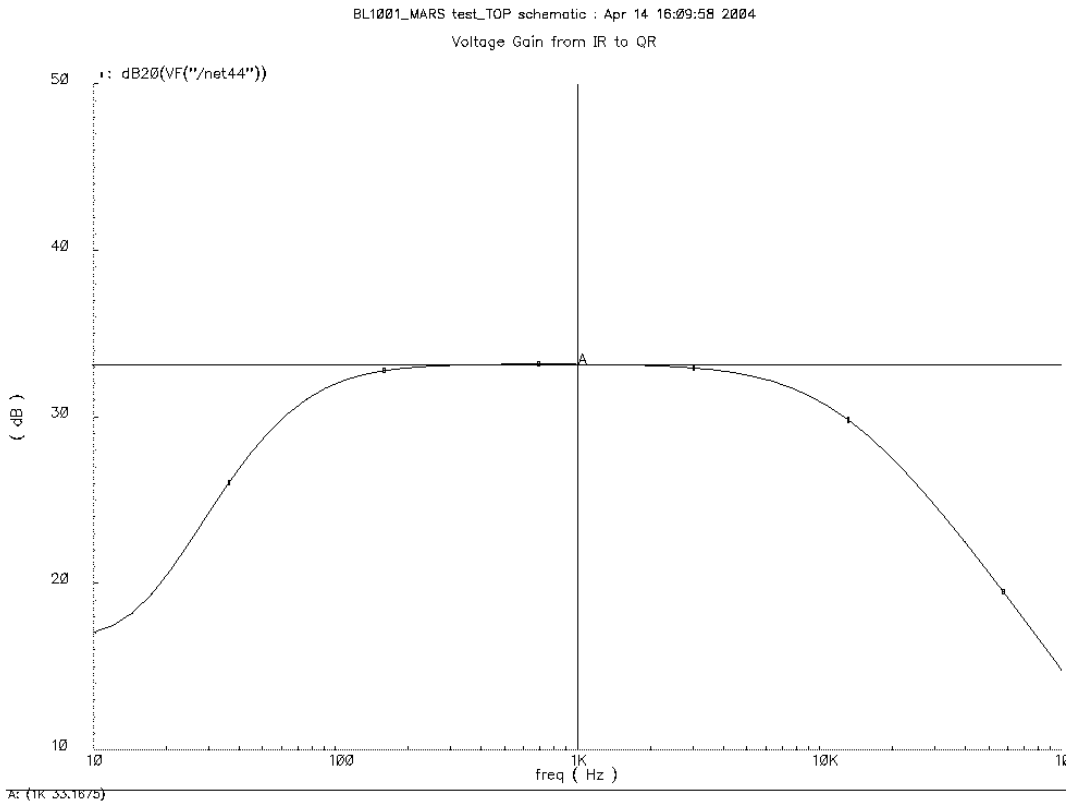


Fig.3 Voltage gain from IR to QR

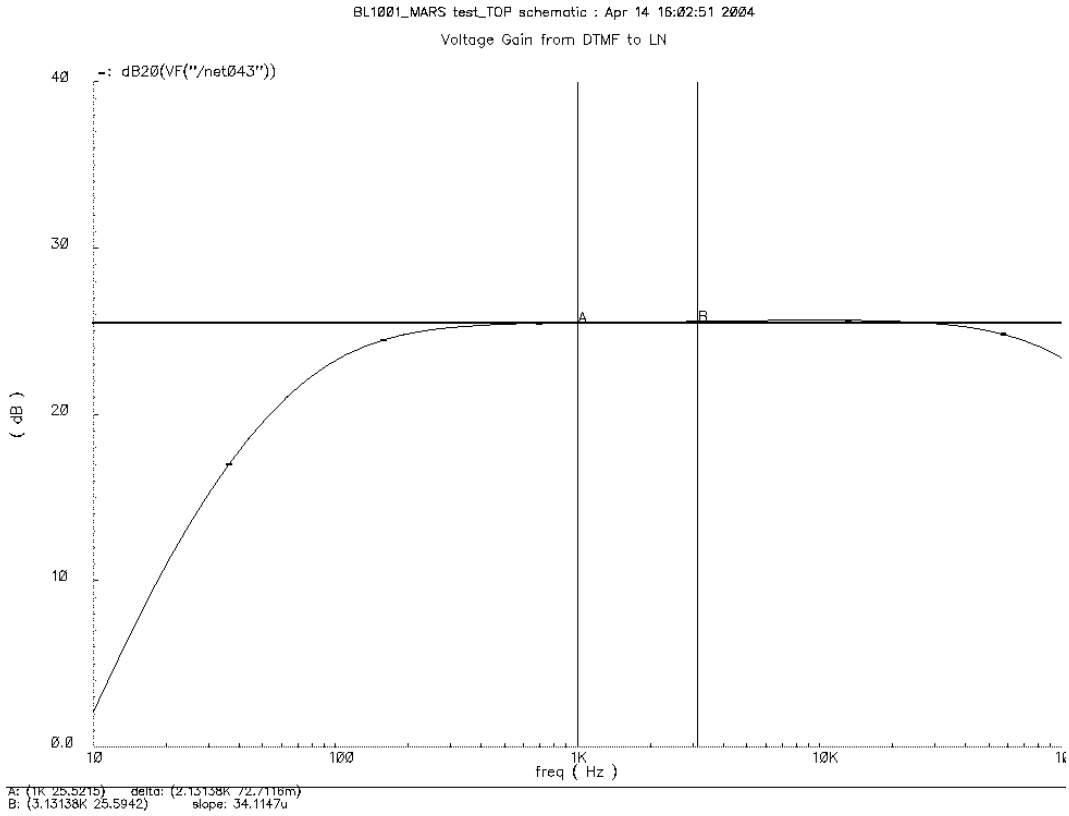


Fig.4 Voltage gain from DTMF to LN

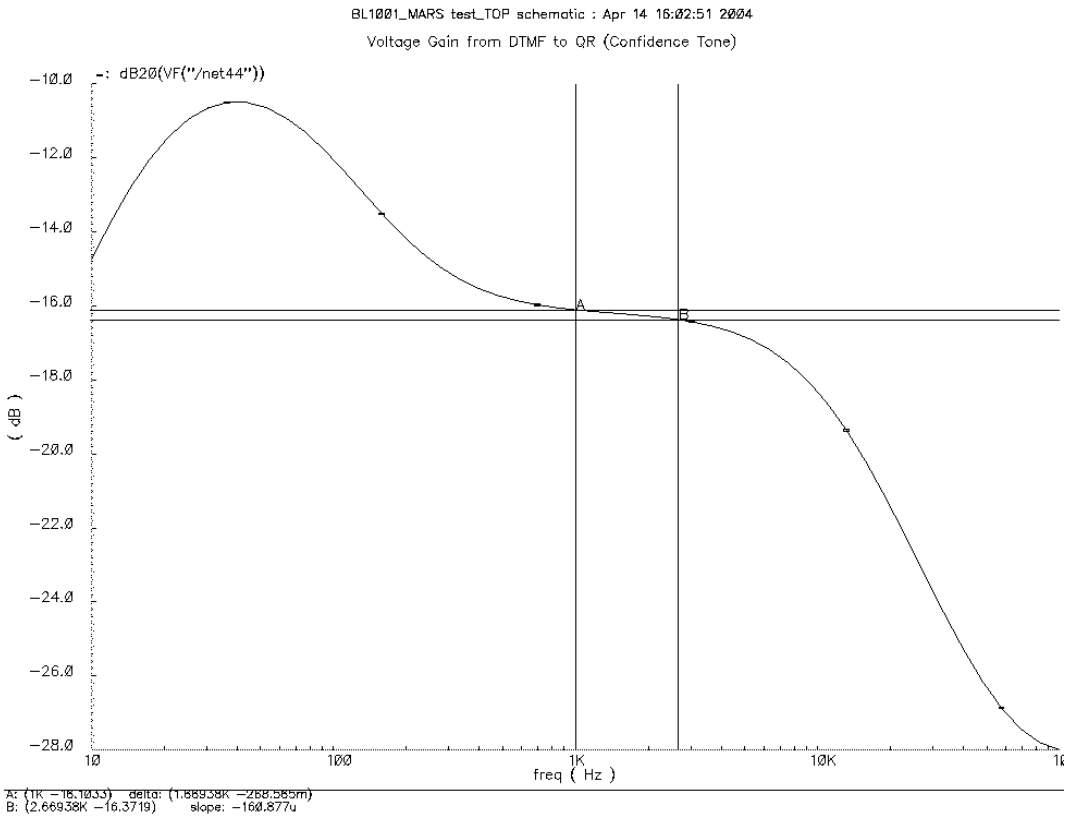


Fig.5 Confidence Tone