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NTE1860 Integrated Circuit TV Stereo Multiplexing Decoder

Description:

The NTE1860 is a bipolar IC for use in TV stereo multiplexing decoding, filters for stereo, and SAP (Separate Audio Program) demodulation applications.

Features:

- Low number of external parts
- Excellent channel separation characteristics for stereo applications. Min. 46dB at 1kHz.
- Selection of individual modes of MAIN/SAP/BOTH.
- Direct driving mode for LED display.

Absolute Maximum Ratings: ($T_A = 25^\circ\text{C}$)

Power Supply Voltage, V_{CC} 17V
 Allowed Power Dissipation, P_D 1800mW
 Individual Controlling Pins, $V_{14 \text{ to } 17}, V_{20}$ $V_{CC} + 0.3V$
 LED Driving Current, I_{LED} 25mA
 Operating Temperature, T_{opr} -10° to $+65^\circ\text{C}$
 Storage Temperature, T_{stg} -55° to $+150^\circ\text{C}$

Recommended Operating Condition:

Power Supply Voltage, V_{CC} $9.0 \pm 0.5V$

Electrical Characteristics: ($V_{CC} = 9V$, $\text{dBs} = 0.775V_{\text{rms}}$, $T_A = 25^\circ\text{C}$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
SAP Noise Level	$V_{SAP,N}$	Pin1 Input $5f_H$ (-14.4dBs) Pin25 Output 15kHz LPF is attached.	–	–40	–36	dB
SAP Carrier Leakage	CL_{SAP}	Pin1 Input $5f_H$ (-14.4dBs) Pin25 Output	–	–33	–30	dB
SAP Carrier Detecting Sensitivity	S_{CARR}	Pin1 Input $5f_H$ Input level during LED of Pin18 is lighting on	–29.0	–25.0	–21.5	dB
SAP Frequency Characteristics 10kHz	A_{SAP}	Pin1 Input SAP 10kHz 100% (-14.4dBs) Pin25 Output 15kHz IPF is attached	–4.0	–1.5	2.0	dB

Electrical Characteristics (Cont'd): ($V_{CC} = 9V$, $dBs = 0.775V_{rms}$, $T_A = 25^{\circ}C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
SAP Output Level	V_{SAP}	Pin1 Input SAP 1kHz 100% (–14.4dBs) Pin25 Output 15kHz LPF is attached	–0.8	–0.1	0.6	dB
SAP Distortion Ratio	THD_{SAP}	Pin1 Input SAP 1kHz 100% (–14.4dBs) Pin25 Output 15kHz LPF is attached	–	4.0	8.0	%
SAP BPF Frequency Characteristics $5f_H$	A BPF $5f_H$	Pin1 Input $5f_H$ (–14.4dBs) Pin6 Output	–16	–13.5	–12.5	dB
SAP BPF Frequency Characteristics $3f_H$	A BPF $3f_H$	Pin1 Input $3f_H$ (–14.4dBs) Pin6 Output	–	–32.5	–29.5	dB
SAP BPF Frequency Characteristics $6.5f_H$	A BPF $6.5f_H$	Pin1 Input $6.5f_H$ (–14.4dBs) Pin6 Output	–	–31.6	–29.5	dB
SAP Detecting Characteristics	$V_{SAP FM}$	Pin8 Input 63.37kHz (–14.4dBs) 93.67kHz (–14.4dBs) Pin25 Output	100	110	118	mV/kHz
SAP Muting Attenuation Amount	AT_{SAP}	Pin8 Input SAP 1kHz 100% (–14.4dBs) Pin25 Output	–	–68	–65	dB
MONAURAL Noise Level	$V_{ST NM}$	Non-input Pin23 Output 15kHz LPF is attached	–	–75	–70	dB
STEREO Noise Level	$V_{ST NS}$	Pin1 f_H (–24dBs) Pin40 to Pin41 –6dB ATT Pin24 Output 15kHz LPF is attached	–	–70	–66	dB
MAIN Output Level	V_{MAIN}	Pin1 Input 1kHz (–10dBs) 75 μ s de-emphasis is attached Pin23 Output 15kHz LPF is attached	–5.6	–5.0	–4.6	dB
SUB Detecting Level	V_{SUB}	Pin1 Input SUB 1kHz 100% Pin40 to Pin41 –6dB ATT Pin24 Output 15kHz LPF is attached	–12	–	–9	dB
MONAURAL Distortion Ratio	THD_{MONO}	Pin1 Input 1kHz (–10dBs) Pin23 Output 15kHz LPF is attached	–	0.25	0.50	%
STEREO Distortion	THD_{STE}	Pin1 Input SUB 1kHz 100% Pin24 Output 15kHz LPF is attached	–	0.75	1.20	%
Pilot Cancel (L + R)	PC_{L+R}	Pin1 Input f_H (–24dBs) 75 μ s de-emphasis is attached Pin23 Output f_H BPF is attached	–	–57.0	–51.5	dB
Pilot Cancel (L – R)	PC_{L-R}	Pin1 Input f_H (–24dBs) Pin40 to Pin41 –6dB ATT Pin24 Output f_H BPF is attached	–	–41	–35	dB

Electrical Characteristics (Cont'd): ($V_{CC} = 9V$, $dBs = 0.775V_{rms}$, $T_A = 25^{\circ}C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
MAIN Balance Between Channels	CB_{MAIN}	Pin34 Input f_H (–18dBs) Input 1kHz (–4dBs) to Pin28 and find the output level difference between Pin22 and Pin23 by measuring the outputs of Pin22 and Pin23 independently	–0.3	0	0.3	dB
SUB Balance Between Channels	CB_{SUB}	Input 1kHz (–4dBs) to Pin27 and find the output level difference between Pin22 and Pin23 by measuring the outputs of Pin22 and Pin23 independently. The above applicable to Pin28 ex- cept that non-input to Pin28.	–0.3	0	0.3	dB
Separation Check 1kHz	SEP_{1k}	Pin1 input L Ch 100% DSB 1kHz Measure phase difference be- tween the outputs of Pin24 and Pin23.	46	60	–	dB
Crosstalk (L – R) $\leftrightarrow$ $\overline{SAP}$	$CT_{L-R SAP}$	Pin26 and Pin41 Input 1kHz (–4dBs) Pin24 Output +1kHz BPF	–	–80	–67	dB
Crosstalk L $\leftrightarrow$ $\overline{SAP}$	CT_{LSAP}	Pin27 and Pin28 Output 1kHz (–4dBs) Pin23 Output + 1kHz BPF	–	–80	–74	dB
Crosstalk R $\leftrightarrow$ $\overline{SAP}$	CT_{RSAP}	Pin27 and Pin28 Input 1kHz (–4dBs) Pin22 Output + 1kHz BPF	–	–80	–74	dB
Stereo LPF Frequency Characteristics ($6f_H$)	$ALP1\ 6f_H$	Pin1 Input $6f_H$ (–10dBs) Pin37 Output	–	–45	–36	dB
(L + R) LPF Frequency Characteristics (12kHz)	$ALP2\ 12k$	Pin34 Input 12kHz (–4dBs) Pin29 Output	–5.2	–4.3	–2.8	dB
(L + R) LPF Frequency Characteristics ($2f_H$)	$ALP2\ 2f_H$	Pin34 Input $2f_H$ (–4dBs) Pin29 Output	–	–52	–43	dB
L – R LPF Frequency Characteristics (12kHz)	$ALP3\ 12k$	Pin26 Input 12kHz (–4dBs) Pin24 Output	–6.5	–5.3	–4.0	dB
L – R LPF Frequency Characteristics ($2f_H$)	$ALP3\ 2f_H$	Pin26 Input $2f_H$ (–4dBs) Pin24 Output	–	–52	–43	dB
Stereo Capture Range LOW	CR_{LO}	Pin34 Input f_H vicinity (–18dBs) Measure the input frequency when the LED of Pin19 goes on and off by changing the burst signal frequency	–	–	14.95	kHz
Stereo Capture Range HIGH	CR_{HI}	Pin35 and Pin36, $1\mu F$ and $4.7\mu F$ 560Ω	16.52	–	–	kHz

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
During Forced Monaural Crosstalk (L)	CT _L	Pin27 Input 1kHz (–4dBs) Pin23 Output +1kHz BPF	–	–80	–74	dB
During Forced Monaural Crosstalk (R)	CT _R	Pin27 Input 1kHz (–4dBs) Pin22 Output +1kHz BPF	–	–80	–74	dB

Electrical Characteristics (Cont'd): ($V_{CC} = 9V$, dBs = $0.775V_{rms}$, $T_A = 25^{\circ}C$)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Muting SW V15 High Muting Attenuation Amount (L) (R)	AT _{ST L}	Pin27 Input 1kHz (–4dBs) Pin22 and Pin23 Output +15kHz LPF	–	–80	–74	dB
DC Offset Voltage while Muting and Stereo are turned on	VO _{MU ST}	During no–input	–50	5	50	mV
DC Offset Voltage while Muting and SAP are turned on	VO _{MU SAP}	During no–input	–120	–20	120	mV
DC Offset Voltage while SAP and Monaural are turned on	VO _{SAP MO}	During no–input	–50	0	50	mV
DC Offset Voltage while SAP and Stereo are turned on	VO _{SAP ST}	During no–input	–120	0	120	mV
DC Offset Voltage while Stereo and Monaural are turned on	VO _{ST MO}	During no–input	–120	–20	120	mV
Circuit Current	I _{CC}	Value of inflowing current into Pin42	25	36	48	mA
V ₁₄ , V ₁₅ , V ₁₆ and V ₁₇ Controlling Voltage (L)	V _{X L}		GND	–	1.0	V
V ₁₄ , V ₁₅ , V ₁₆ , and V ₁₇ Controlling Voltage (H)	V _{X H}		2.5	–	V _{CC}	V
V ₁₃ and V ₂₀ Controlling Voltage (L)	V _{Z L}		GND	–	1.0	V
V ₁₃ and V ₂₀ Controlling Voltage (M)	V _{Z M}		2.5	–	5.5	V
V ₁₃ and V ₂₀ Controlling Voltage (H)	V _{Z H}		8.0	–	V _{CC}	V
Stereo Discriminating Level	STE V _{th}	Pin30 and Pin31 10μF f _H level is variable	12	26	39	mV _{rms}
Regulator Voltage	V _{REG}	Pin9 DC	6.7	–	–	V

Note 1. This device is for *REPLACEMENT ONLY!* No design information is available.

Pin Connection Diagram

MPX Input	1	42	V _{CC}
N.C.	2	41	(L+R) Switch Input
Stereo Filter Adjust	3	40	(L+R) Detector Output
SAP Filter Adjust	4	39	TP
Bias	5	38	N.C.
SAP BPF Output	6	37	Stereo LPF Output
N.C.	7	36	Phase Det (+)
SAP Detector Input	8	35	Phase Det (-)
Reg Out 6.7V	9	34	Stereo Input
SAP VCO Adjust	10	33	Stereo GND
Car Det	11	32	ST VCO Adjust
SAP GND	12	31	Pilot Det (+)
SAP SQU Inhibit	13	30	Pilot Det (-)
SAP Mute	14	29	L+R Output
Mute	15	28	Matrix L+R Input
MS 1	16	27	Matrix L+R/SAP Input
MS 0	17	26	SAP Switch Input
SAP Ind Drive	18	25	SAP Det Output
Stereo Ind Drive	19	24	(L+R) SAP Output
Forced Monaural	20	23	Line Output L
LED GND	21	22	Line Output R

