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## NTE7014 Integrated Circuit TV FM Multiplex Sound Decoder

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Supply Voltage, $V_{CC}$ .....	16V
Power Dissipation, $P_D$ .....	1W
Derate Above $25^\circ$ .....	10mW/ $^\circ\text{C}$
Operating Temperature Range, $T_{opr}$ .....	$-20^\circ$ to $+75^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-40^\circ$ to $+125^\circ\text{C}$

**DC Electrical Characteristics:** ( $V_{CC} = 12\text{V}$ ,  $T_A = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Circuit Current	$I_{CC}$		14	22	29	mA
Regulated Voltage, Pin12	$V_{REG}$		3.9	4.1	4.4	V
Pin2 Voltage	$V_2$		2.3	2.5	2.7	V
Pin3 Voltage	$V_3$		2.3	2.5	2.7	V
Pin4 Voltage	$V_4$		2.3	2.5	2.7	V
Pin5 Voltage	$V_5$		2.3	2.5	2.7	V
Pin6 Voltage	$V_6$		2.3	2.6	2.9	V
Pin7 Voltage	$V_7$		2.0	4.0	6.0	V
Pin9 Voltage	$V_9$		4.0	5.0	6.0	V
Pin10 Voltage	$V_{10}$		4.0	5.0	6.0	V
Pin13 Voltage	$V_{13}$		1.7	2.0	2.3	V
Pin18 Voltage	$V_{18}$		1.2	1.5	1.8	V
Pin25 Voltage	$V_{25}$		5.7	6.0	6.3	V
Pin26 Voltage	$V_{26}$		5.7	6.0	6.3	V
Pin27 Voltage	$V_{27}$		5.7	6.0	6.3	V
Pin28 Voltage	$V_{28}$		5.7	6.0	6.3	V
Pin30 Voltage	$V_{30}$		5.7	6.0	6.3	V
Pin31 Voltage	$V_{31}$		5.7	6.0	6.3	V
Pin32 Voltage	$V_{32}$		5.7	6.0	6.3	V
Pin33 Voltage	$V_{33}$		5.7	6.0	6.3	V
Pin34 Voltage	$V_{34}$		5.7	6.0	6.3	V
Pin35 Voltage	$V_{35}$		5.7	6.0	6.3	V

**AC Electrical Characteristics:** ( $V_{CC} = 12V$ ,  $T_A = +25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
L + R Amplifier Gain	$G_{AL+R}$		6.0	8.0	10.0	dB
<b>Stereo Demodulator</b>						
VCO Free-Run Frequency	$f_O$		52.9	62.9	72.9	kHz
Capture Range	$f_{CR}$		$\pm 600$	$\pm 800$	$\pm 1000$	Hz
Lock Range	$f_{LR}$		$\pm 1.6$	$\pm 2.3$	$\pm 3.0$	kHz
Pilot Signal Sensitivity	$V_{P1}$		24	35	46	mV <sub>P-P</sub>
	$V_{P2}$		18	32	-	mV <sub>P-P</sub>
L - R Output Level	$V_{OL-R}$		200	260	320	mV <sub>rms</sub>
Pilot Cancel Level	$G_{CP1}$		-	-10	-6	dB
Stereo Display Saturation Voltage	$V_{SAT11}$		-	1.3	1.6	V
<b>SAP Demodulation</b>						
Output Level	$V_{OSAP}$		40	50	60	mV <sub>rms</sub>
Carrier Level Sensitivity	$V_{CS}$		70	100	130	mV <sub>P-P</sub>
Carrier Frequency Sensitivity	$f_{CS}$		57	62	67	kHz
Carrier Frequency Detection Level	$V_{fCS}$		1.2	1.5	1.8	V
SAP Display Saturation Voltage	$V_{SAT19}$		-	1.3	1.6	V
<b>Control Circuit</b>						
Stereo → Monaural Switch Voltage	$V_{21MO}$		0.7	1.0	1.3	V
Monaural → SAP Switch Voltage	$V_{21SA}$		2.3	2.6	2.9	V
SAP → Monaural/SAP Switch Voltage	$V_{21MS}$		3.8	4.1	4.4	V
Stereo Mode Display Saturation Voltage	$V_{SAT24}$		-	1.3	1.6	V
Monaural Mode Display Saturation Voltage	$V_{SAT23}$		-	1.3	1.6	V
SAP Mode Display Saturation Voltage	$V_{SAT22}$		-	1.3	1.6	V
SAP Amplifier Gain	$G_{ASAP}$		19	21	23	dB
<b>L - R/SAP Switch</b>						
L - R Switch Gain	$G_{SL-R}$		4	6	8	dB
SAP Switch Gain	$G_{SSAP}$		4	6	8	dB
<b>L Output (Matrix, Analog Switch)</b>						
Monaural Output Level	$V_{LMO}$		500	600	700	mV <sub>rms</sub>
Stereo Output Level	$V_{LST}$		500	600	700	mV <sub>rms</sub>
SAP Output Level	$V_{LSA}$		500	600	700	mV <sub>rms</sub>
Monaural Output Distortion	$D_{LMO}$		-	0.3	1.0	%
Stereo Output Distortion	$D_{LST}$		-	0.5	1.0	%
SAP Output Distortion	$D_{LSA}$		-	0.5	1.0	%
Output Noise	$V_{LN}$		-	-70	-64	dBm
Mute Level	$M_{UL}$		-	-75	-70	dB
SAP → MAIN Crosstalk	$C_{TLa}$		-	-60	-50	dB
MAIN → SAP Crosstalk	$C_{TLb}$		-	-60	-50	dB

**AC Electrical Characteristics (Cont'd):** ( $V_{CC} = 12V$ ,  $T_A = +25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>L Output (Matrix, Analog Switch)</b>						
Monaural Output Level	$V_{RMO}$		500	600	700	$mV_{rms}$
Stereo Output Level	$V_{RST}$		500	600	700	$mV_{rms}$
SAP Output Level	$V_{RSA}$		500	600	700	$mV_{rms}$
Monaural Output Distortion	$D_{RMO}$		-	0.3	1.0	%
Stereo Output Distortion	$D_{RST}$		-	0.5	1.0	%
SAP Output Distortion	$D_{RSA}$		-	0.5	1.0	%
Output Noise	$V_{RN}$		-	-70	-64	dBm
Mute Level	$M_{UR}$		-	-75	-70	dB
SAP → MAIN Crosstalk	$C_{TRa}$		-	-60	-50	dB
MAIN → SAP Crosstalk	$C_{TRb}$		-	-60	-50	dB
L, R Output Channel Balance	$C_{BAL}$		-	0.5	1.2	dB
Stereo Separation	$S_{EP}$		35	40	-	dB
<b>Inverter Output (Analog Switch)</b>						
Monaural Output Level	$V_{INMO}$		500	600	700	$mV_{rms}$
SAP Output Level	$V_{INSA}$		500	600	700	$mV_{rms}$
Monaural Output Distortion	$D_{INMO}$		-	0.4	1.0	%
SAP Output Distortion	$D_{INSA}$		-	0.6	1.0	%
Output Noise	$V_{INN}$		-	-70	-64	dBm
Mute Level	$M_{UIN}$		-	-75	-70	dB
SAP → MAIN Crosstalk	$C_{TINa}$		-	-60	-50	db
MAIN → SAP Crosstalk	$C_{TINb}$		-	-60	-50	dB
L Output Dynamic Range	$V_{DRL}$		3.3	4.0	-	$V_{P-P}$
R Output Dynamic Range	$V_{DRR}$		3.3	4.0	-	$V_{P-P}$
Inverter Output Dynamic Range	$V_{DRIN}$		3.3	4.0	-	$V_{P-P}$
VCO Frequency Supply Voltage Characteristics	$V_{foD}$		-	40	-	Hz/V
VCO Frequency Temperature Characteristics	$V_{foD}$		-	20	-	Hz/ $^{\circ}C$

### Pin Connection Diagram

VCO Adjust	<b>1</b>	<b>36</b>	V <sub>CC</sub>
Phase Detection	<b>2</b>	<b>35</b>	Matrix L + R Input
Phase Detection	<b>3</b>	<b>34</b>	Matrix L - R Input
Stereo Signal Input	<b>4</b>	<b>33</b>	L Output
Pilot Cancel Input	<b>5</b>	<b>32</b>	R Output
L + R Det Output	<b>6</b>	<b>31</b>	Inverter Output
L - R Det Output	<b>7</b>	<b>30</b>	SAP Inverter Input
Pilot Cancel Wave Generation	<b>8</b>	<b>29</b>	Mute
Pilot Detection	<b>9</b>	<b>28</b>	SAP Amp Input
Pilot Detection	<b>10</b>	<b>27</b>	SAP Amp Output
Stereo Display	<b>11</b>	<b>26</b>	L - R/SAP Switch Output
Reference Voltage	<b>12</b>	<b>25</b>	Switch L - R Input
SAP Signal Input	<b>13</b>	<b>24</b>	Stereo Mode Display
SAP Detection Time Constant	<b>14</b>	<b>23</b>	Monaural Mode Display
SAP Detection Output	<b>15</b>	<b>22</b>	SAP Mode Display
SAP Carrier Det 1	<b>16</b>	<b>21</b>	Control Input
SAP Carrier Det 2	<b>17</b>	<b>20</b>	GND
SAP Carrier Level Detection	<b>18</b>	<b>19</b>	SAP Display

