

TC9312N

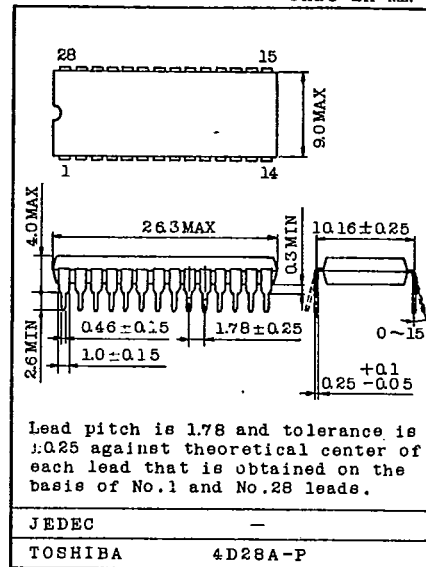
T-77-21

LOGIC CONTROLLER LSI FOR AUDIO SYSTEM.

The TC9312N is logic controller LSI for tape recorder or other audio system applications.

- Programmable ROM Array construction. (PRA)
- Having 10 input, 10 output and 4 input/output ports.
- Capable of direct driving LED displays or other external components with built-in bipolar output drivers.
- Wide voltage range and low current consumption by CMOS construction.
- Built-in low voltage detection circuit to prevent a trouble at power ON/OFF.
- As Key Matrix ROM and Output Data ROM are programmed separately, software can be developed smoothly.
- Evaluator board is prepared as a tool for development.

Unit in mm



Weight: 1.5g

MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	VDD	-0.3~7.0	V
Supply Current	I _{DD}	200	mA
Input Voltage	V _{IN}	-0.3~V _{DD} +0.3	V
Output Current	I _{OH}	30	mA
Power Dissipation	P _C	750	mW
Operating Temperature	T _{opr}	-30~75	°C
Storage Temperature	T _{stg}	-55~125	°C

Note : This IC is developed especially for audio applications. ROM data is not changeable after shipping

PIN CONNECTIONS

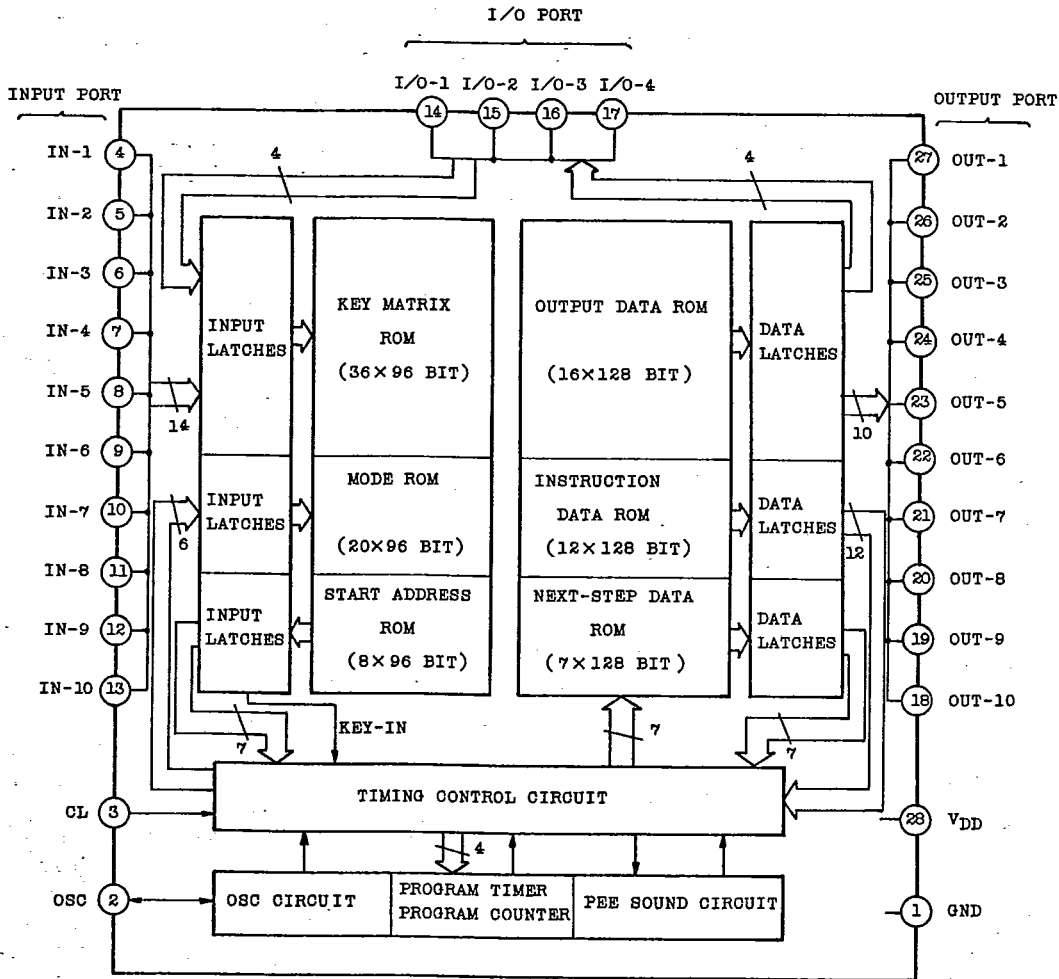
GND	1	28	VDD
OSC	2	27	OUT-1
CL	3	26	OUT-2
IN-1	4	25	OUT-3
IN-2	5	24	OUT-4
IN-3	6	23	OUT-5
IN-4	7	22	OUT-6
IN-5	8	21	OUT-7
IN-6	9	20	OUT-8
IN-7	10	19	OUT-9
IN-8	11	18	OUT-10
IN-9	12	17	I/O-4
IN-10	13	16	I/O-3
I/O-1	14	15	I/O-2

AUDIO DIGITAL IC

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BLOCK DIAGRAM



TOSHIBA

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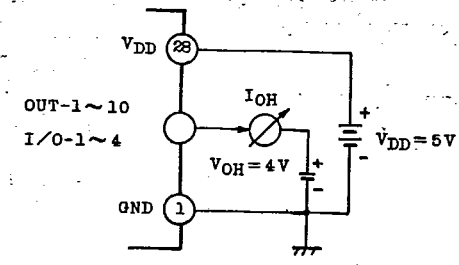
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ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $T_a=25^\circ\text{C}$, $V_{DD}=5.0\text{V}$)

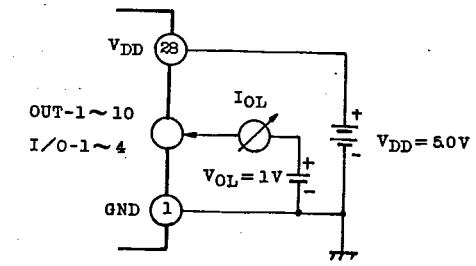
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Operating Supply Voltage	V_{DD}	-		4.0	5.0	6.0	V	
Operating Supply Current	I_{DD}	-	$f_{OSC}=6.4\text{kHz}$ No Load	-	0.2	1.0	mA	
Supply Current at Inhibit	I_{DS}	-	No Load, OSC stop (Note 1)	-	100	200	μA	
Input Voltage	"H" Level	V_{IH}	All input ports except 3 level input ports	$V_{DD} \times 0.7$	-	V_{DD}	V	
	"L" Level	V_{IL}		0	-	$V_{DD} \times 0.3$		
3 Level Input Voltage	"H" Level	V_{IH}	IN-8,9 ports with 3 level input	$V_{DD} - 0.5$	-	V_{DD}	V	
	Open	V_{IM}		-	2.5	-		
	"L" Level	V_{IL}		0	-	0.5		
Input Current	"H" Level	I_{IH}	In case of fixed C-MOS compatible input by mask option.	$V_{IH}=5\text{V}$	-	1.0	μA	
	"L" Level	I_{IL}		$V_{IL}=0\text{V}$	-	1.0		
Input Resistance	Pull-up	R_{UP}	In case of fixed pull-up or pull-down by mask option.	-	100	-	k Ω	
	Pull-Down	R_{DOWN}		-	100	-		
Output Current	"H" Level	I_{OH}	1	All output ports	$V_{OH}=4.0\text{V}$	15	20	mA
	"L" Level	I_{OL}	2	All output ports except OUT-9,10	$V_{OL}=1.0\text{V}$	-	0.2	
OUT-9,10 ports						0.5	1.0	
Operating Frequency	f_{opr}	-		0.64	6.4	64	kHz	
OSC Frequency	f_{OSC}	-	$R_x=33\text{k}\Omega$, $C_x=8200\text{pF}$	-	6.4	-	kHz	
Auto Clear Voltage	V_{CL}	-	In case of Auto-Clear function by mask option	-	3.5	3.8	V	

Note 1. The value of I_{DS} is guaranteed in case of no fixed Auto-Clear function and no fixed 3 level input by mask option.

TEST CIRCUIT 1. (I_{OH})



TEST CIRCUIT 2. (I_{OL})

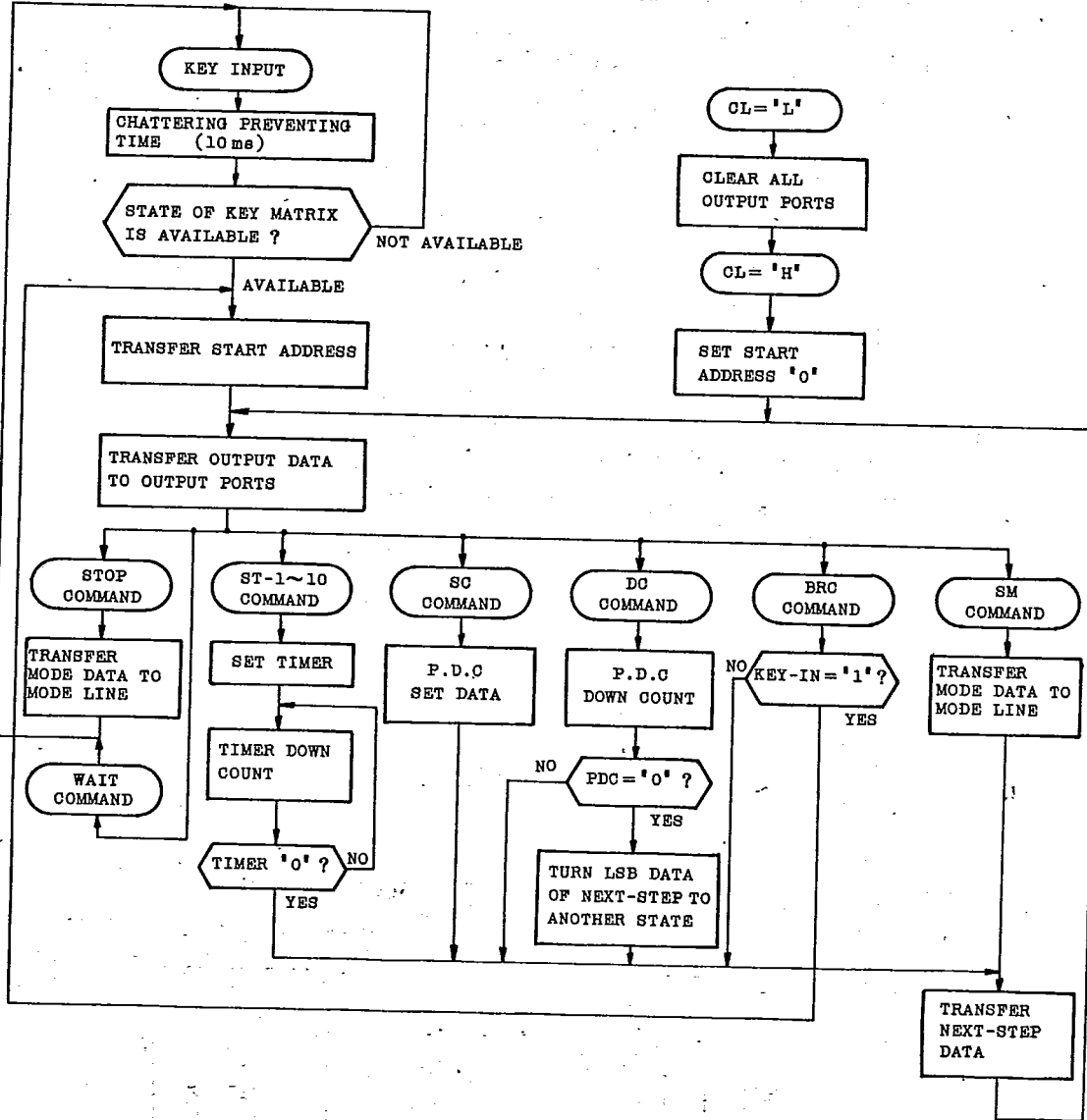


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FLOW CHART OPERATION



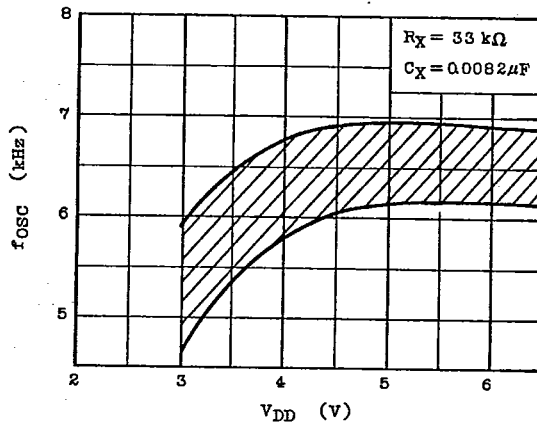
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OSCILLATION FREQUENCY (f_{OSC}) CHARACTERISTICS

(1) f_{OSC} - V_{DD} (f_{OSC} = 6.4 kHz)



(2) R_X - C_X (f_{OSC} ≈ 2.15/R_X·C_X = 6.4 kHz)

