

# TC9158P, TC9159P

9097247 TOSHIBA. ELECTRONIC

D2E 18102 D

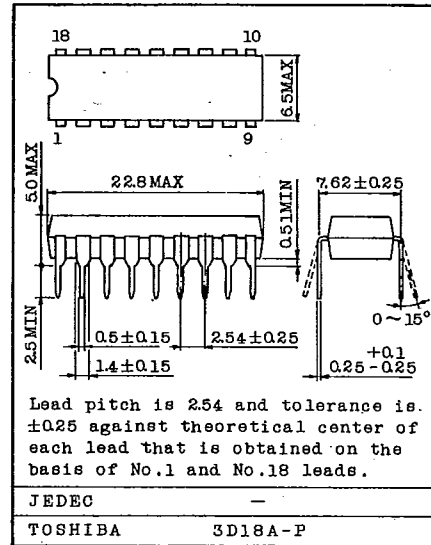
T-77-21

## TC9158P, TC9159P RECEIVING FREQUENCY DYNAMIC DRIVER.

The TC9158P/TC9159P is a receiving frequency display driver developed for the DTS-6/8. This driver latches serial data transferred from a system controller LSI, performs the correcting operation of intermediate frequency, and displays data. No external transistor is required as an output driver is built in.

- Optimum to the DTS-6/8.
- Dynamic type display simplifies wiring.
- The TC9158P has built-in high-breakdown voltage transistors and is capable of directly driving FL (Fluorescent Lamp).
- The TC9159P has built-in high current transistors and is capable of directly driving LED.
- Number of display digits is  $4\frac{1}{2}$  digit up to 19995 and mark display (FM, MW, LW) is possible.
- Serial type data transferred with a system controller LSI minimizes connection to 3 wires.
- Can be used as a display driver of microcomputers.

Unit in mm

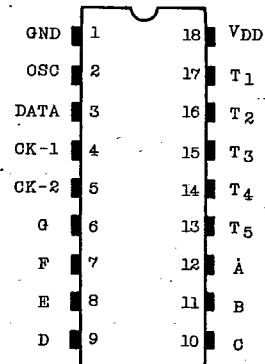


### MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	VDD	7	V
Input Voltage	VIN	-0.3 ~ VDD+0.3	V
Output Voltage (Note 1)	VOL	VDD-35	V
Output Current (Note 2)	IOH	50	mA
Power Dissipation	PD	350	mW
Operating Temperature	Topr	-30 ~ 75	°C
Storage Temperature	Tstg	-55 ~ 125	°C

- Note 1. TC9158P is only guaranteed.  
2. TC9159P is only guaranteed.

### PIN CONNECTIONS

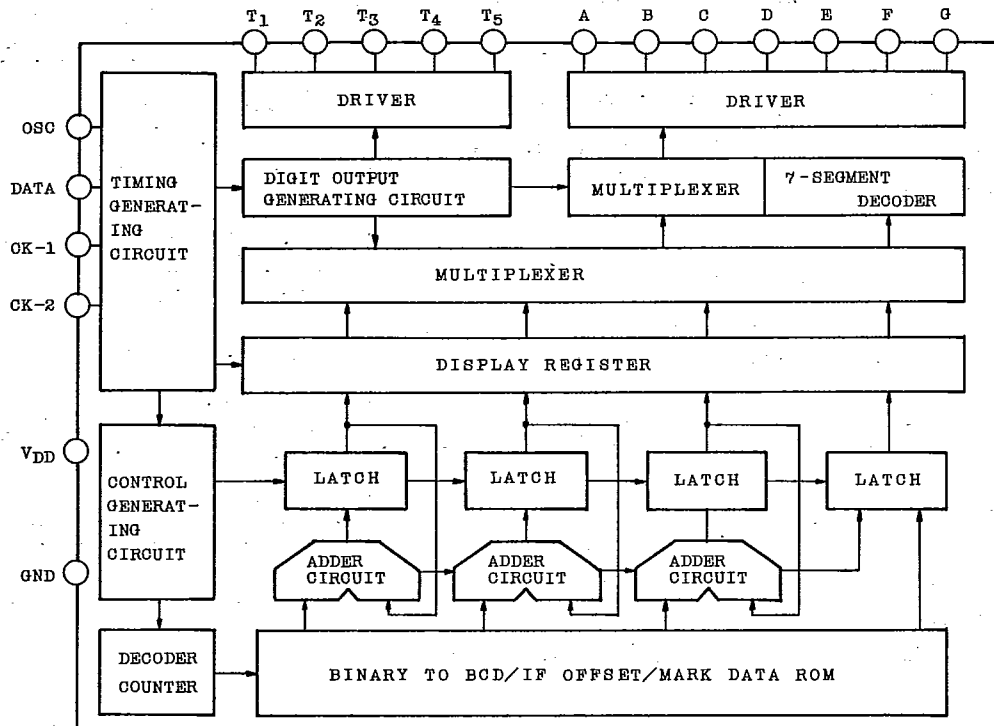


AUDIO DIGITAL IC

# TC9158P, TC9159P

T-77-21

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION OF EACH PIN

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION	REMARKS
2	OSC	For digit signal generation Pin type input pin for oscillation circuit	
3	DATA	Input pin for receiving frequency data	C-MOS Input
4, 5	CK-1 CK-2	Input pins for receiving frequency data input control timing input	
6~12	A~G	Segment drive output pin	Built in TC9158P high breakdown voltage transistor. Built in TC9159P high current transistor.
13~17	T <sub>1</sub> ~T <sub>5</sub>	Digit drive output pin	
1, 18	V <sub>DD</sub> GND	Power supply pin	

TOSHIBA

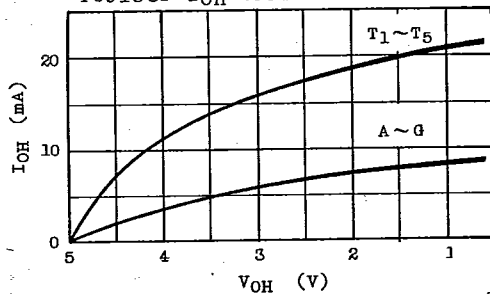
# TC9158P, TC9159P

T-77-21

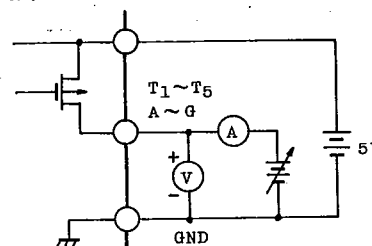
ELECTRICAL CHARACTERISTICS ( $V_{DD}=5V$ ,  $T_a=25^\circ C$ , unless otherwise noted.)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Power Supply Voltage		$V_{DD}$	-	( $T_a=-30\sim 75^\circ C$ )	4	5	6	V
Operating Power Supply Current		$I_{DD}$	-	No load $f_{OSC}=50kHz$	-	0.2	1.0	mA
Input Voltage	"H" Level	$V_{IH}$	-	DATA, CK-1, CK-2	4.0	-	5.3	V
	"L" Level	$V_{IL}$	-	"	-0.3	-	1.0	V
Input Current	"H" Level	$I_{IH}$	-	DATA, CK-1, CK-2 $V_{IH}=5V$	-	-	$\pm 1$	$\mu A$
	"L" Level	$I_{IL}$	-	" $V_{IL}=0V$	-	-	$\pm 1$	$\mu A$
Timing Input Frequency		$f_{opr}$	-	DATA, CK-1, CK-2	-	25	100	kHz
Oscillation Frequency		$f_{OSC}$	-	$R_X=24k\Omega$ , $C_X=1200pF$	-	50	-	kHz
TC9158P	Output Current	$I_{OH}$	1	$T_1\sim T_5$ , $V_{OH}=3V$	3	5	-	mA
				$A\sim G$ , $V_{OH}=3V$	10	15	-	mA
	Leak Current	$I_{OL}$	-	$T_1\sim T_5$ , $A\sim G$ , $V_{OL}=-27V$	-	-	$\pm 10$	$\mu A$
TC9159P	Output Current	$I_{OH}$	2	$T_1\sim T_5$ , $A\sim G$ , $V_{OH}=4V$	30	-	-	mA
	Output Resistance	$R_O$	-	$T_1\sim T_5$ , $A\sim G$ , $V_{OL}=1V$	-	2	-	$k\Omega$

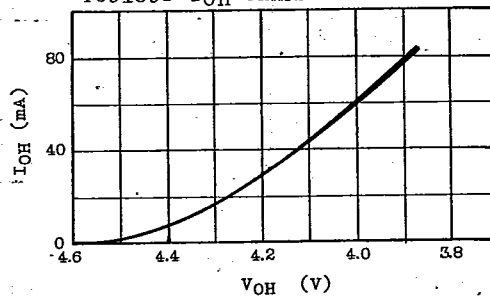
TC9158P  $I_{OH}$  CHARACTERISTIC



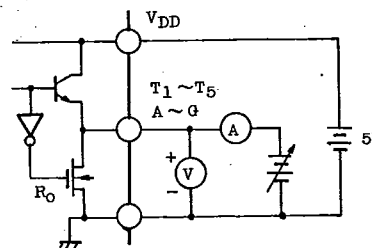
TEST CIRCUIT (1)



TC9159P  $I_{OH}$  CHARACTERISTIC



TEST CIRCUIT (2)



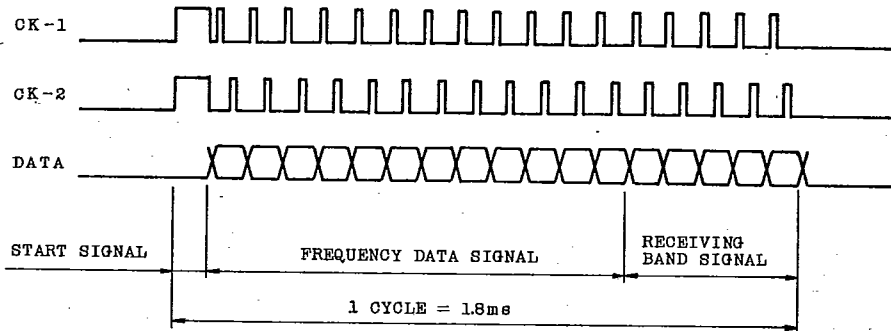
AUDIO DIGITAL IC

# TC9158P, TC9159P

T-77-21

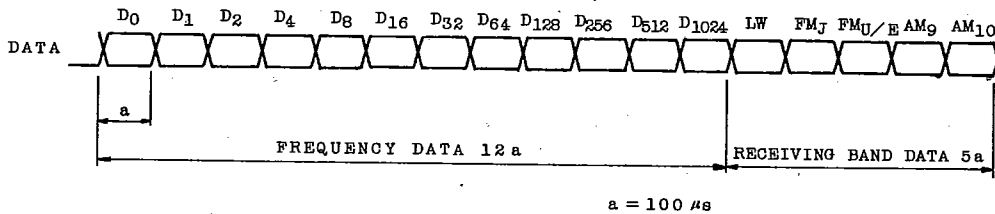
## DESCRIPTION OF OPERATION

- When receiving frequency is updated a system controller LSI, the following timing signal and serial data signal are transferred for only one cycle.



### 1.1 Data Signal (DATA)

Data signal consists of 17 bits of which 12 bits are allocated to frequency data 5 bits to receiving band (LW/FMJ/FMU/AM9/AM10) signal.



### 1.2 Timing Signals (CK-1, CK-2)

Data signal is read at the following timings:

