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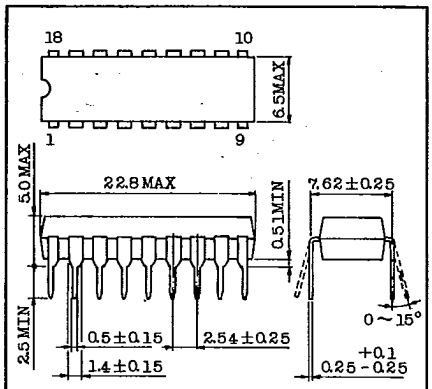
TC9158P, TC9159P RECEIVING FREQUENCY DYNAMIC DRIVER.

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



Lead pitch is 2.54 and tolerance is ±0.25 against theoretical center of each lead that is obtained on the basis of No.1 and No.18 leads.

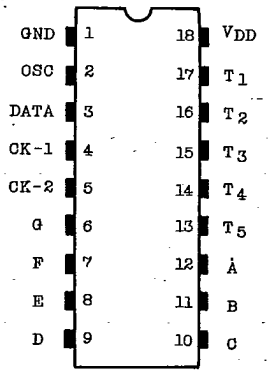
JEDEC	—
TOSHIBA	3D18A-P

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Power Supply Voltage	V_{DD}	7	V
Input Voltage	V_{IN}	-0.3~V_{DD}+0.3	V
Output Voltage (Note 1)	V_{OL}	V_{DD}-35	V
Output Current (Note 2)	I_{OH}	50	mA
Power Dissipation	P_D	350	mW
Operating Temperature	T_{opr}	-30~75	°C
Storage Temperature	T_{stg}	-55~125	°C

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

PIN CONNECTIONS



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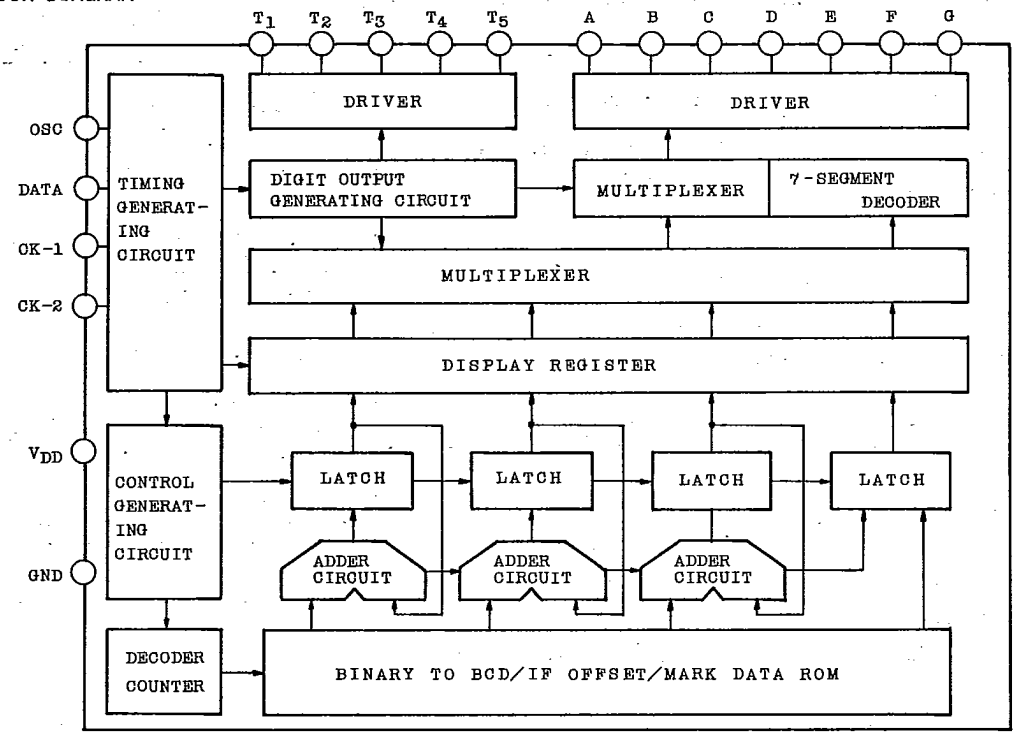
BLOCK DIAGRAM



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_1~T_5	Digit drive output pin	
1, 18	V_{DD} GND	Power supply pin	

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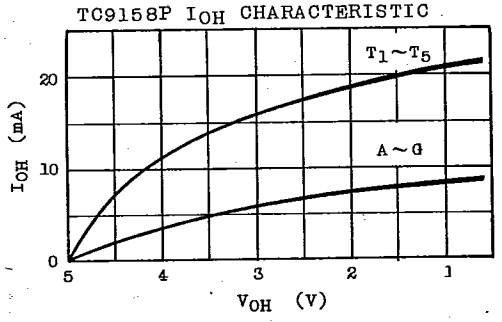
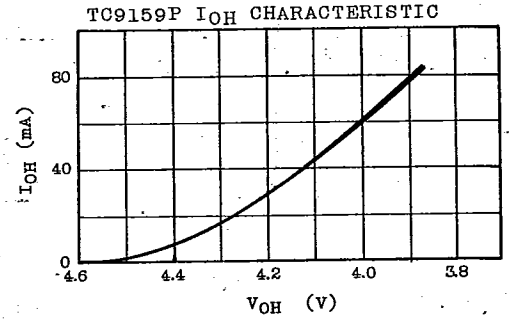
ELECTRICAL CHARACTERISTICS (V_{DD}=5V, Ta=25°C, unless otherwise noted.)

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Power Supply Voltage		V_{DD}	-	(Ta=-30~75°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	-	-	±1	μA
	"L" Level	I_{IL}	-	" V_{IL}=0V	-	-	±1	μA
Timing Input Frequency		f_{opr}	-	DATA, CK-1, CK-2	-	25	100	kHz
Oscillation Frequency		f_{OSC}	-	R_X=24kΩ, C_X=1200pF	-	50	-	kHz
TC9158P	Output Current	I_{OH}	1	T_1~T_5, V_{OH}=3V	3	5	-	mA
				A~G, V_{OH}=3V	10	15	-	mA
	Leak Current	I_{OL}	-	T_1~T_5, A~G, V_{OL}=-27V	-	-	±10	μA
TC9159P	Output Current	I_{OH}	2	T_1~T_5, A~G, V_{OH}=4V	30	-	-	mA
	Output Resistance	R_O	-	T_1~T_5, A~G, V_{OL}=1V	-	2	-	kΩ

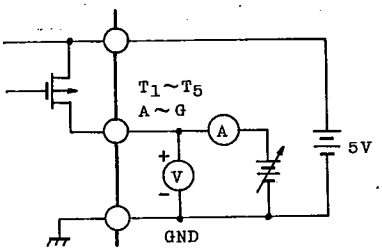
TC9158P I_{OH} CHARACTERISTIC



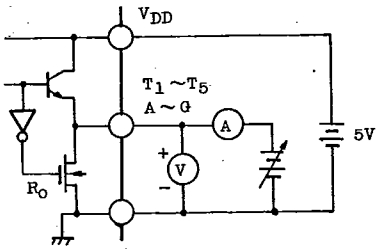
TC9159P I_{OH} CHARACTERISTIC



TEST CIRCUIT (1)



TEST CIRCUIT (2)



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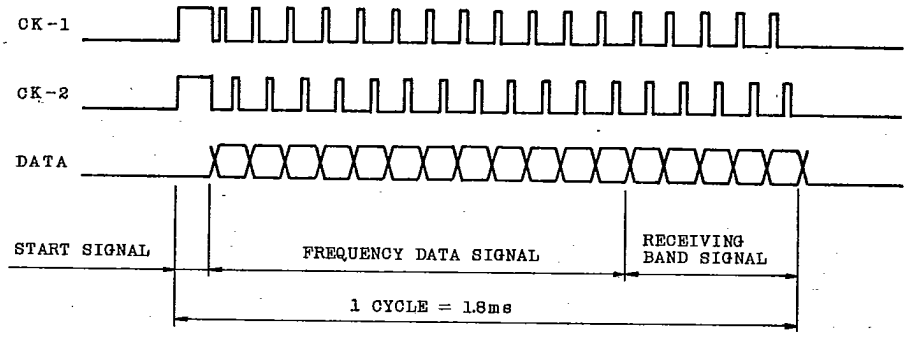
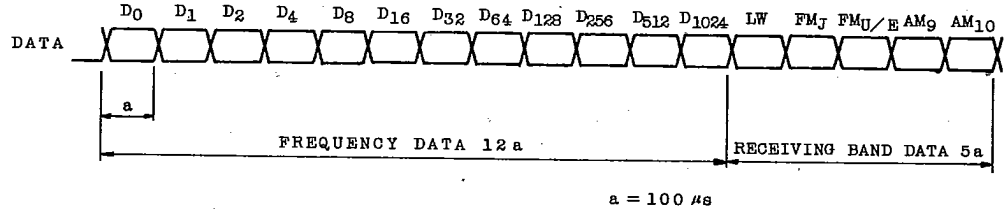
DESCRIPTION OF OPERATION

1. 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.



a = 100 μs

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

Data signal is read at the following timings: