M54503P

QUADRUPLE CURRENT DRIVER

DESCRIPTION

The M54503P is a semiconductor integrated circuit containing four TTL NAND drivers with high current, high voltage outputs.

FEATURES

- High driving current ($I_{C(max)}$=200mA)
- High breakdown voltage output ($V_{O(max)}$=30V)
- Having 4 integrated circuits, it has an excellent space factor.

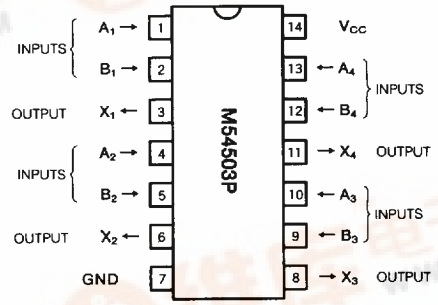
APPLICATION

General purpose, for use in industrial and consumer digital equipment. Suitable for driving magnetic relays and lamps.

FUNCTION

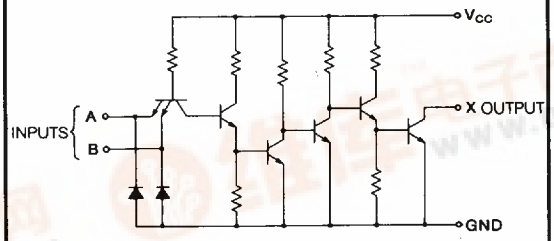
An integrated circuit consisting of 4 TTL driver NAND gate circuits. Having high current, high breakdown voltage output transistors, it can drive magnetic relays and lamps directly. Inputs can be directly connected to TTL or DTL.

PIN CONFIGURATION (TOP VIEW)



Outline 14P4

CIRCUIT SCHEMATIC (EACH DRIVER)



FUNCTION TABLE

A	B	X
H	H	L
H	L	H
L	H	H
L	L	H

ABSOLUTE MAXIMUM RATINGS (T_a = 0~75℃, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		7	V
V_I	Input voltage		5.5	V
V_O	Output voltage (output state High)		30	V
I_O	Output current (output state Low)		200	mA
P_d	Power dissipation	T_a = 25℃	1.19	W
Topr	Operating temperature		0~75	℃
Tstg	Storage temperature		−65~+150	℃

RECOMMENDED OPERATING CONDITIONS (T_a = 0~75℃, unless otherwise noted)

Symbol	Parameter	Limits			Unit
		Min	Typ	Max	
V_{CC}	Supply voltage	4.5	5	5.5	V
V_O	Output voltage (output state High)			24	V
I_O	Output current (output state Low)			100	mA

MITSUBISHI ELECTRIC

M54503P

QUADRUPLE CURRENT DRIVER

ELECTRICAL CHARACTERISTICS (T_a = 0~75℃, unless otherwise noted)

Symbol	Parameter	Test conditions		Limits			Unit
				Min	Typ	Max	
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
I_{OH}	High-level output current	V_{CC} = 4.5V, V_I = 0.8, V_O = 30V				100	μA
V_{OL}	Low-level output voltage	V_{CC} = 4.5V, V_I = 2V, I_{OL} = 100mA				0.7	V
I_{IH}	High-level input current	V_{CC} = 5.5V	V_I = 2.4V			40	μA
			V_I = 4.5V			60	
I_{IL}	Low-level input current	V_{CC} = 5.5V, V_I = 0.4V				−1.6	mA
I_{CCH}	High-level supply current	V_{CC} = 5.5V, V_I = 0V				50	mA
I_{CCL}	Low-level supply current	V_{CC} = 5.5V, V_I = 5V				120	mA

PRECAUTIONS FOR USE

The permissible amount of output current I_O (1 unit) varies according to the conditions. Calculate it as follows, using Fig. 1 "Heat Dissipation Rate Characteristics", Fig. 2 "Pulse Power Chart", and the following formula.

$$P_d = \frac{V_{CC}}{M+N}(M \cdot I_{CCL} + N \cdot I_{CCH}) + M \cdot I_O \cdot V_{OL} \cdots\cdots(1)$$

Where P_d : Power dissipation
I_{CCL} :Supply current when all outputs are "Low".
I_{CCH} :Supply current when all outputs are "High".
V_{OL} : Output voltage when the output "Low".
M : The number of gates whose outputs are "Low".
N : The number of gates whose outputs are "High".
M+N : The total number of gates included in one package.

When trying to determine permissible amount of constant current, first, read the largest permissible power consumption P_d for the given operating free-air ambient temperature range from Fig.1. Then calculate I_O by substituting into Formula (1) the maximum values of I_{CCL}, I_{CCH} and V_{CC} as well as values M and N.

Use Fig.2 to calculate pulse current I_O. First, determine maximum permissible power dissipation P_d from duty cycle and pulse width, then calculate using Formula (1). Be careful that I_O does not exceed absolute maximum rating.

TYPICAL CHARACTERISTICS

Fig.1 HEAT DISSIPATION RATE CHARACTERISTICS

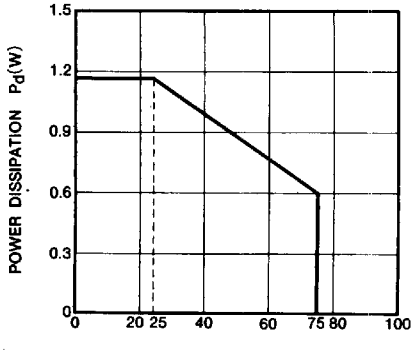


Fig.2 PULSE POWER CHART (CONTINUOUS PULSE)