MITSUBISHI BIPOLAR DIGITAL ICs

M54602P

DUAL PERIPHERAL POSITIVE NAND DRIVER

DESCRIPTION

M54602P is a semiconductor integrated circuit containing 2 circuits with TTL constructed logical NAND drivers, each having high output current and high breakdown output voltage characteristics.

FEATURES

- High output current (I_O=300mA)
- High breakdown output voltage (V_O=30V)
- High speed switching (t_{pd}=25ns)
- A small 8 pin DIL package

APPLICATION

General purpose, for use in industrial and consumer digital equipment.

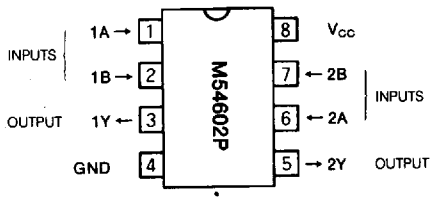
FUNCTION

The output being an open collector, each circuit is capable of handling a maximum output current of 300mA when in low-level output and, when in high-level output, a maximum voltage of 30V can be applied. As mean propagation delay time is 25ns, high speed switching is possible. Supply voltage being 5V ± 5% and input being TTL, this IC can be connected directly to TTL. This IC has a broad range of application as a relay and lamp driver as well as a MOS MEMORY driver.

FUNCTION TABLE

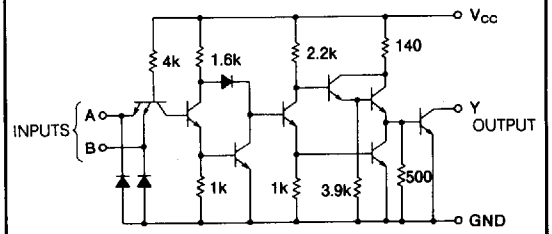
A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

PIN CONFIGURATION (TOP VIEW)



Outline 8P4

CIRCUIT SCHEMATIC (EACH DRIVER)



Unit : Ω

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_{IE}	Interemitter voltage		5.5	V
V_O	Output voltage	High-level state	30	V
I_O	Output current	Low-level state	300	mA
P_d	Power dissipation	$T_a \leq 25$℃	800	mW
T_{opr}	Operating temperature		0~75	℃
Tstg	Storage temperature		−65~+150	℃

MITSUBISHI ELECTRIC

DUAL PERIPHERAL POSITIVE NAND DRIVER

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

Symbol	Parameter		Limits			Unit
			Min	Typ	Max	
V_{CC}	Supply voltage		4.75	5	5.25	V
V_O	Output voltage	High-level state			24	V
I_{OL}	Low-level output current	V_{OL} = 0.4V			100	mA
		V_{OL} = 0.7V			300	

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
V_{IC}	Input clamp voltage	V_{CC} = 4.75V, I_{IC} = −12mA				−1.5	V
I_{OH}	High-level output current	V_{CC} = 4.75V, V_{IL} = 0.8V, V_{OH} = 30V				100	μA
V_{OL}	Low-level output voltage	V_{CC} = 4.75V, V_{IH} = 2V	I_{OL} = 100mA		0.25	0.4	V
			I_{OL} = 300mA		0.5	0.7	
I_{IH}	High-level input current	V_{CC} = 5.25V	V_I = 2.4V			40	μA
			V_I = 4.5V			60	
I_{IL}	Low-level input current	V_{CC} = 5.25V, V_I = 0.4V			−1	−1.6	mA
I_{CCH}	Supply current, all outputs high	V_{CC} = 5.25V, V_I = 0V			11	14	mA
I_{CCL}	Supply current, all outputs low	V_{CC} = 5.25V, V_I = 5V			56	71	mA

* : A typical value at T_a = 25℃.

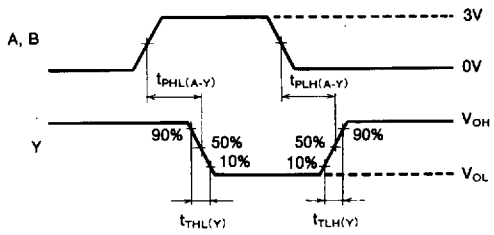
SWITCHING CHARACTERISTICS (V_{CC} = 5V, T_a = 25℃, unless otherwise noted)

Symbol (Note 1)	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
$t_{PLH(A-Y)}$	Low-to-high-level output, high-to-low-level output propagation time; from input A, B, to output Y	I_O≈200mA, C_L = 15pF, R_L = 50Ω (Notes 2, 3)		26	35	ns
$t_{PHL(A-Y)}$				24	35	ns
$t_{TLH(Y)}$	Low-to-high-level output, high-to-low-level output transition time; output Y			6	10	ns
$t_{THL(Y)}$				9	15	ns

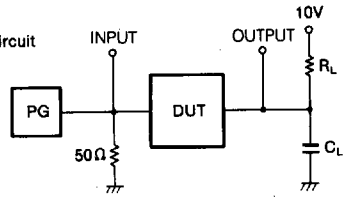
Note 1 : Symbols are representative examples.

DUAL PERIPHERAL POSITIVE NAND DRIVER

TIMING DIAGRAM (Reference level = 1.5V)



Note 2 : Test circuit

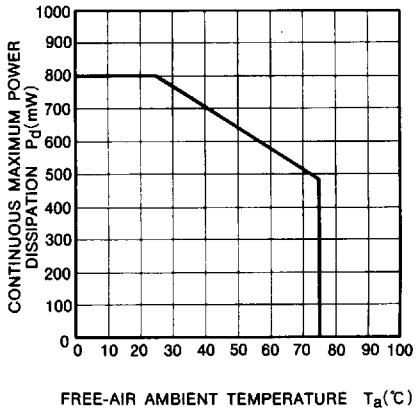


1) The pulse generator (PG) has the following characteristics: $t_r \leqq 5ns$, $t_f \leqq 10ns$, PRR = 1MHz, $t_{PW} = 500ns$, $V_P = 3V_{P-P}$, $Z_O = 50\Omega$.
2) C_L includes probe and jig capacitance.

Note 3 : Output breakdown voltage drops upon switching. Example: $I_{OL} \cong 300mA$ @ $V_O \cong 15V$ and $I_{OL} \cong 100mA$ @ $V_O \cong 20V$. In case of inductive load use, lower supply voltage. When driving a relay be sure to use a diode in the relay coil to protect against the IC being damaged by relay coil generated counter-electromotive force or when relay coil voltage drops below 12V.

TYPICAL CHARACTERISTICS

HEAT DISSIPATION CHARACTERISTICS



APPLICATION EXAMPLE

TTL or DTL POSITIVE LOGIC LEVEL DETECTOR