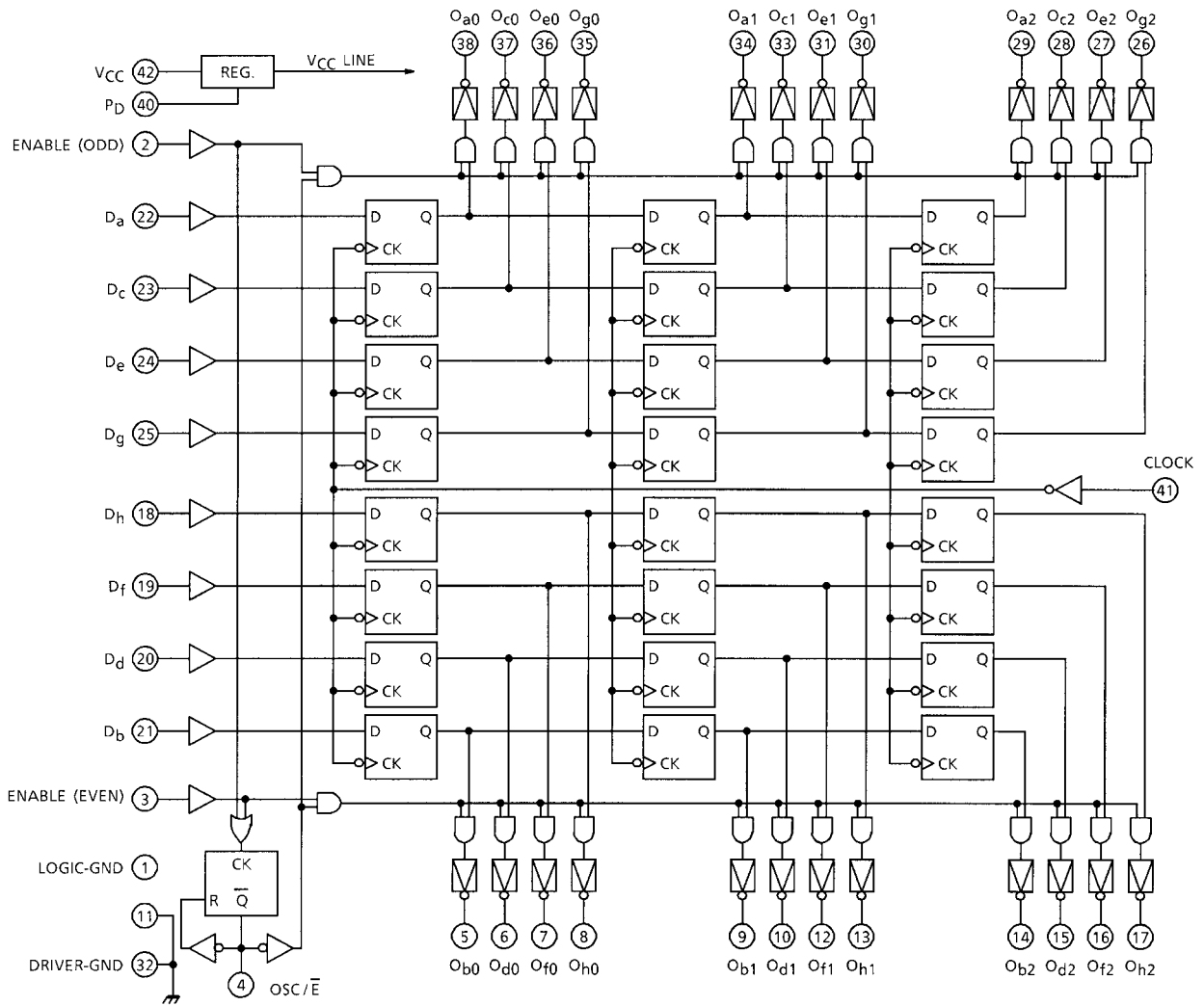
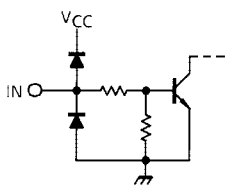


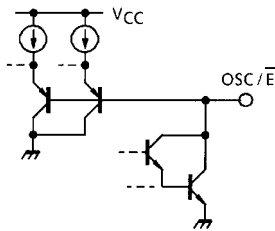
BLOCK DIAGRAM



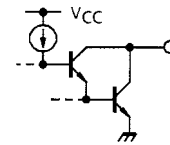
INPUT EQUIVALENT CIRCUIT



OSC / E TERMINAL EQUIVALENT CIRCUIT



OUTPUT EQUIVALENT CIRCUIT



TRUTH TABLE A

P _D	OSC / E	E (ODD)	E (EVEN)	O (ODD)	O (EVEN)	COMMENT
L	(Note 1)	(Note 1)	(Note 1)	OFF	OFF	I _{CC} < 10 μA
H	(Note 1)	L	L	OFF	OFF	—
H	L	H	L	D	OFF	—
H	L	L	H	OFF	D	—
H	L	H	H	D	D	—
H	CR	↑	L	D	OFF	OUTPUT ON time is according to CR constant.
H	CR	L	↑	OFF	D	
H	CR	↑	↑	D	D	
H	CR	H	(Note 1)	OFF	OFF	—
H	CR	(Note 1)	H	OFF	OFF	—

Note: If “H” level power is applied by force, OSC / E terminal may be destructed and therefore, it should be used with CR added or grounded.

Note 1: “H” or “L”

TRUTH TABLE B

P _D	CLOCK	D _X	Q _{X0}	Q _{X1}	Q _{X2}	COMMENT
L	(Note)	(Note)	OFF	OFF	OFF	—
H	↑	L	OFF	Q _{X0}	Q _{X1}	DATA SHIFT
H	↑	H	ON	Q _{X0}	Q _{X1}	
H	↓	(Note)	Q _{X0}	Q _{X1}	Q _{X2}	NO CHANGE
H	L	↑↓	Q _{X0}	Q _{X1}	Q _{X2}	
H	H	↑↓	Q _{X0}	Q _{X1}	Q _{X2}	

Note: “H” or “L”

MAXIMUM RATING (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	7.0	V
Output Voltage	V _{OUT}	30	V
Output Current	I _{OUT1} (Note)	80	mA / ch
	I _{OUT2} (Note)	150	
Input Voltage	V _{IN}	V _{CC}	V
External Resistor	R _{EXT}	1000	kΩ
External Capacitor	C _{EXT}	50	μF
Max. Operating Frequency	f _{MAX}	750	kHz
Power Dissipation	P _D	1.6	W
Operating Temperature	T _{opr}	0~75	°C
Storage Temperature	T _{stg}	-55~150	°C

Note: I_{OUT1} : DC, I_{OUT2} : Duty-10%

RECOMMENDED OPERATING CONDITION (Ta = 0 ~ 70°C)

CHARACTERISTIC	SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage	V _{CC}	—	4.5	5.0	5.5	V
Output Voltage	V _{OUT}	—	0	—	28	V
Output Current	I _{OUT1}	—	0	—	80	mA
	I _{OUT2}	Duty 20%	0	—	130	
Input Voltage	V _{IN}	—	0	—	V _{CC}	V
External Resistor	R _{EXT}	—	0.1	—	500	kΩ
External Capacitor	C _{EXT}	—	—	—	50	μF
Max. Operating Frequency	f _{MAX}	—	—	—	400	kHz
Clock Pulse Width	t _w (CK)	—	300	—	—	μs
	t _w (CK)	—	2.2	—	—	
Data Setup Time	t _{setup}	—	0.0	—	—	μs
Data Hold Time	t _{hold}	—	1.0	—	—	μs
Power Dissipation	P _D	T _j = 130°C, on PCB	—	—	1.5	W

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

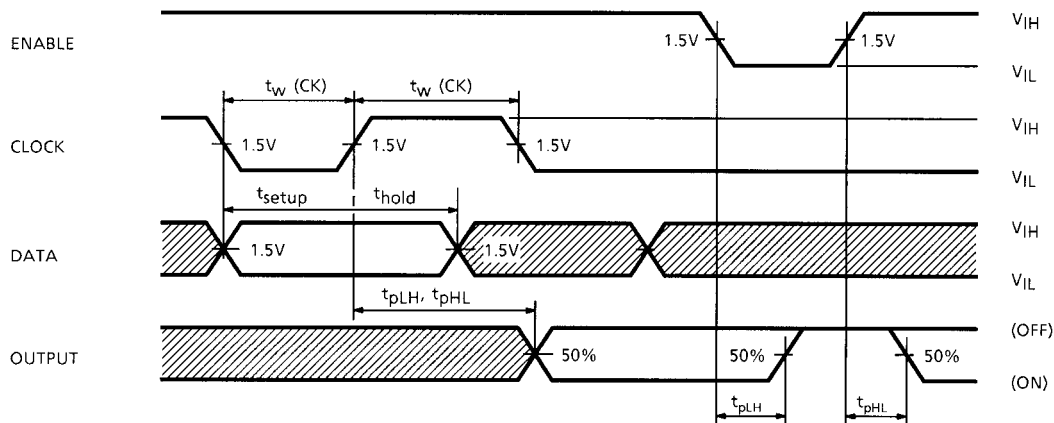
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT				
Input Voltage	"H" Level	V_{IH}	—	—	2.0	—	V_{CC}	V				
	"L" Level	V_{IL}	—	—	0	—	0.6					
Input Current	"H" Level	I_{IH}	—	$V_{CC} = 5.5 \text{ V}, V_{IN} = 2.4 \text{ V}$	—	0.12	0.2	mA				
	"L" Level	I_{IL}	—	$V_{CC} = 5.5 \text{ V}, V_{IN} = 5.5 \text{ V}$	—	0.32	0.5					
Output Leak Current		I_{OH}	—	$V_{CC} = 5.5 \text{ V}, V_{IN} = 0.3 \text{ V}$	—	—	30	μA				
Output Saturation		I_{OL}	—	$V_{CC} = 4.5 \text{ V}, V_{OUT} = 28 \text{ V}$	—	—	30	μA				
Output Saturation		V_{OL}	—	$V_{CC} = 4.5 \text{ V}, I_{OUT} = 60 \text{ mA}$	—	0.9	1.15	V				
				$V_{CC} = 4.5 \text{ V}, I_{OUT} = 120 \text{ mA}$	—	1.1	1.5					
Supply Current		I_{CC}	—	$V_{CC} = 5.5 \text{ V}$	—	—	10	mA				
		$I_{CC}(\text{ON})$							$P_D = \text{GND}$	—	12	20
		$I_{CC}(\text{OFF})$							$P_D = \text{GND}$ ALL OUTPUT "ON"	—	9.5	16
Input Voltage	"H" Level	V_{TH+}	—	—	2.5	2.8	3.1	V				
	"L" Level	V_{TH-}	—	—	1.2	1.4	1.6					
Hysteresis Voltage		V_H	—	—	—	1.4	—	V				

SWITCHING CHARACTERISTICS (Ta = 25°C, VCC = 5.0 V)

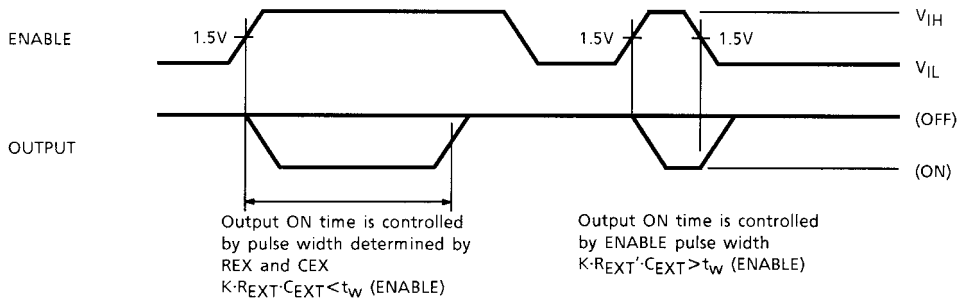
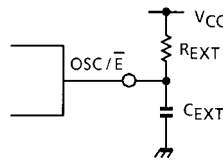
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Max. Operating Frequency		f_{MAX}	—	—	500	850	—	kHz
Propagation "H" Level	CK-OUT	t_{pLH}	—	$R_L = 68 \Omega, C_L = 15 \text{ pF}$ $V_{IH} = 3.0 \text{ V}, V_{IL} = 0 \text{ V}$	—	0.7	1.3	μs
	E-OUT				—	5.5	10	
	OSC-OUT				—	7.5	13	
	P_D -OUT				—	9	30	
Delay Time "L" Level	CK-OUT	t_{pHL}	—	$R_L = 68 \Omega, C_L = 15 \text{ pF}$ $V_{IH} = 3.0 \text{ V}, V_{IL} = 0 \text{ V}$	—	0.8	1.3	μs
	E-OUT				—	0.6	1.3	
	OSC-OUT				—	0.8	1.3	
Min. Pulse Width	CLOCK	$t_w \text{ MIN}$	—	$R_L = 68 \Omega, C_L = 15 \text{ pF}$ $V_{IH} = 3.0 \text{ V}, V_{IL} = 0 \text{ V}$	—	0.06	0.1	μs
	$\overline{\text{CLOCK}}$				—	1.1	1.85	
	ENABLE				—	0.1	0.2	
	$\overline{\text{ENABLE}}$				—	1.0	2.0	
Set Up Time	CK-DATA	t_{setup}	—	$R_L = 68 \Omega, C_L = 15 \text{ pF}$ $V_{IH} = 3.0 \text{ V}, V_{IL} = 0 \text{ V}$	—	-0.2	0	μs
	P_D				—	-0.22	0.8	
Data Hold Time		t_{hold}	—	—	—	0.15	0.5	μs
Max. Clock Rise Time		t_r	—	—	—	—	5	μs
Max. Clock Fall Time		t_f	—	—	—	—	5	ms
Enable Output Pulse Width		$t_w \text{ ON}$	—	$R_{EXT} = 10 \text{ k}\Omega, C_{EXT} = 10 \mu\text{F}$	—	3	—	ms

SWITCHING CHARACTERISTICS TEST CONDITION

A. Timing waveform (OSC / \bar{E} = GND)



B. Usage of OSC / \bar{E} terminal



PRECAUTIONS for USING

This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.

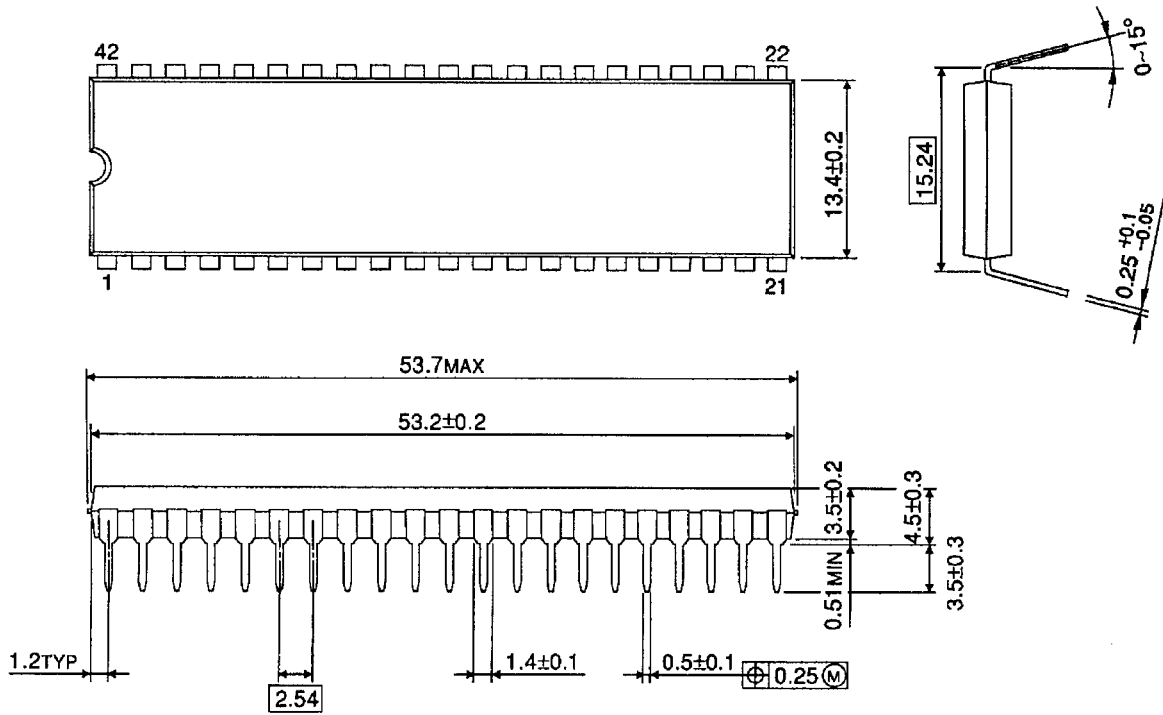
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.

Utmost care is necessary in the design of the output line, VCC and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

PACKAGE DIMENSIONS

DIP42-P-600-2.54

Unit: mm



Weight: 6.37 g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

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