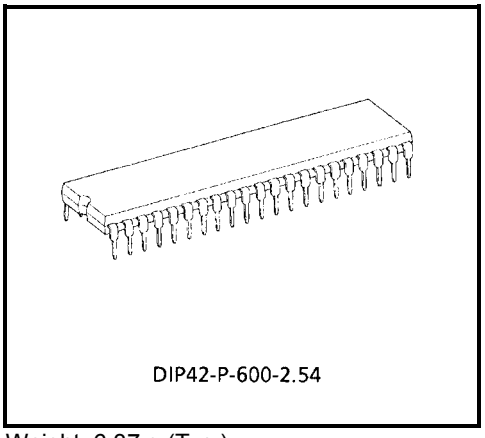
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62824P

8 × 3 PARALLEL SHIFT REGISTER / DRIVER

The TD62824P is a general purpose 24 bit driver IC consisting of 8 block 3 bit shift register and 24 bit driver (open collector).
The TD62824P is best suited as a 24 dot printer head driver.

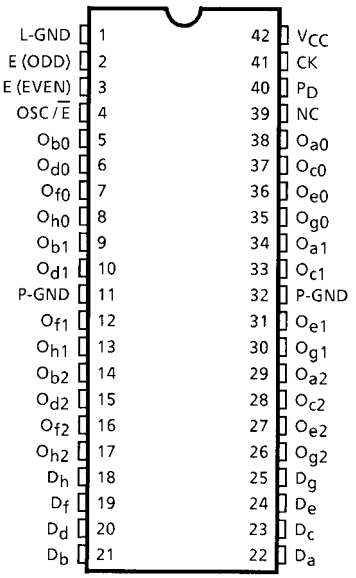


Weight: 6.37 g (Typ.)

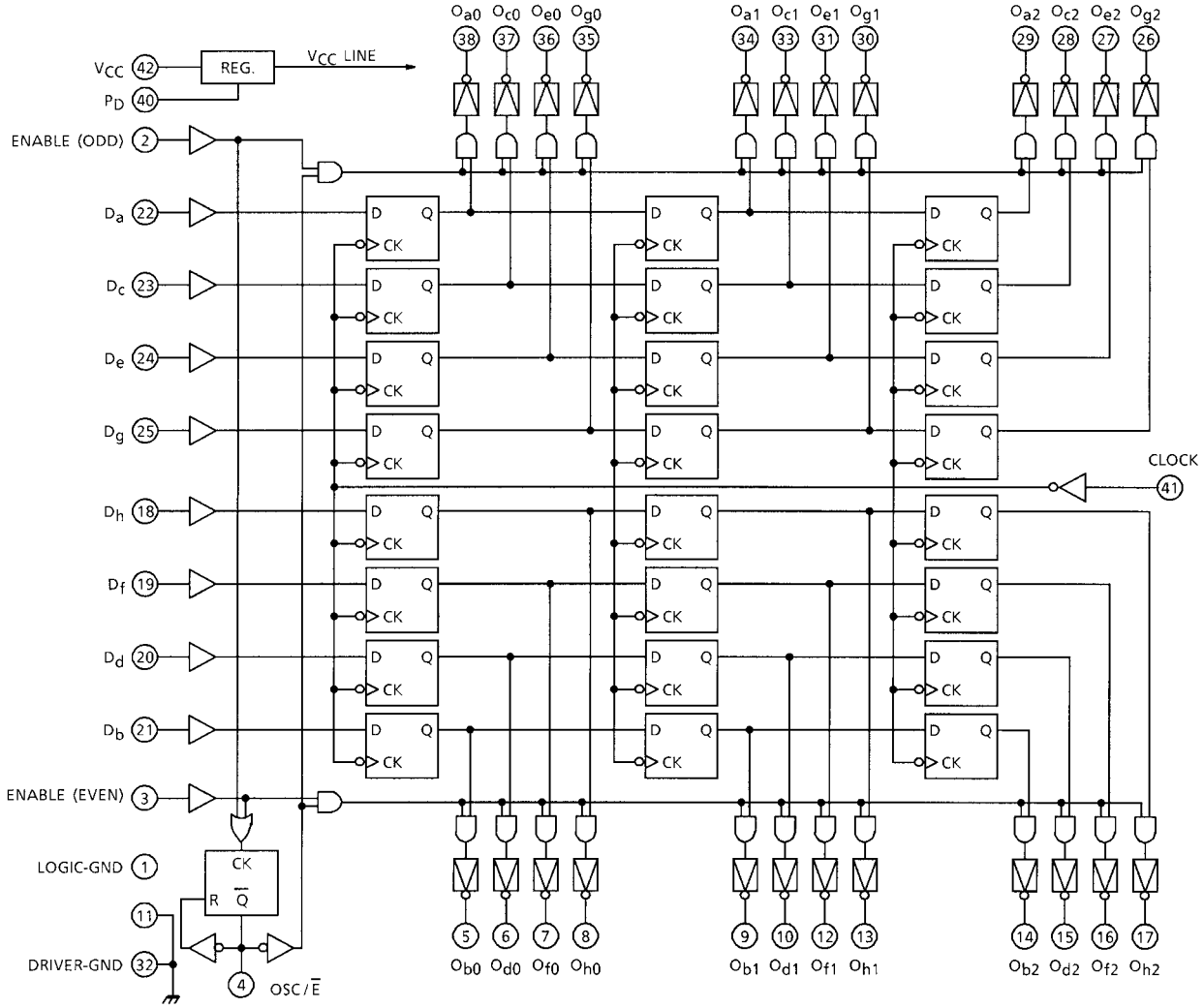
FEATURES

- Power−down function for reducing power consumption during standby or when printing is not made.
  (I_{CC} off < 10 μA)
- Independent 2 output enable terminals (even / add outputs)
- Effective as measures for regenerative effect during high−speed and high−density printing.
- 8bit parallel input and 3bit parallel shift configuration
  : High−speed operation and direct interface with CPU.
- Large output drive capacity
- Output with standing voltage ····· 30 V
  Output current ····· 80 mA DC
  150 mA 10%
- Built−in CR−Timer for load burning prevention.
- Less output saturation voltage difference in package
  : Within ±50mV (standard) at I_{OUT} = 120 mA

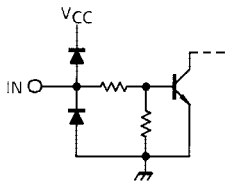
PIN CONNECTION (TOP VIEW)



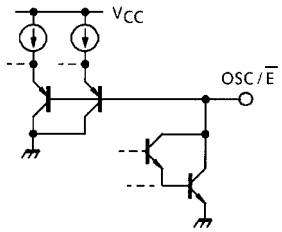
BLOCK DIAGRAM



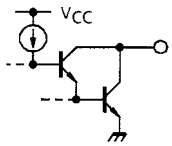
INPUT EQUIVALENT CIRCUIT



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: $I_{OUT\ 1}$: DC, $I_{OUT\ 2}$: 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 ($\overline{CK}$)	—	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)

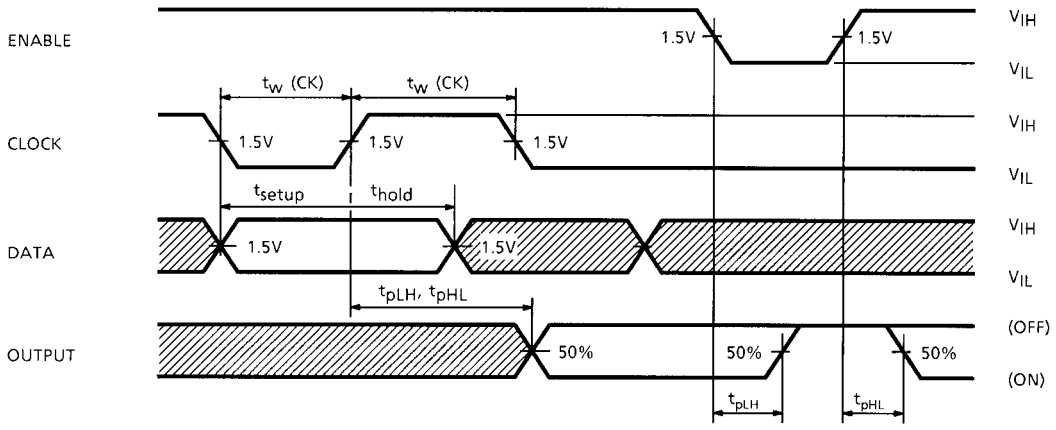
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN	TYP.	MAX	UNIT
Input Voltage	"H" Level	V_{IH}	—	—		2.0	—	V_{CC}	V
	"L" Level	V_{IL}	—	—		0	—	0.6	
Input Current	"H" Level	I_{IH}	—	V_{CC} = 5.5 V, V_{IN} = 2.4 V		—	0.12	0.2	mA
				V_{CC} = 5.5 V, V_{IN} = 5.5 V		—	0.32	0.5	
	"L" Level	I_{IL}	—	V_{CC} = 5.5 V, V_{IN} = 0.3 V		—	—	30	μA
Output Leak Current		I_{OH}	—	V_{CC} = 4.5 V, V_{OUT} = 28 V		—	—	30	μA
Output Saturation		V_{OL}	—	V_{CC} = 4.5 V, I_{OUT} = 60 mA		—	0.9	1.15	V
				V_{CC} = 4.5 V, I_{OUT} = 120 mA		—	1.1	1.5	
Supply Current		I_{CC}	—	V_{CC} = 5.5 V	P_D = GND	—	—	10	μA
		$I_{CC\ (ON)}$			P_D = GND ALL OUTPUT "ON"	—	12	20	mA
		$I_{CC\ (OFF)}$			P_D = GND ALL OUTPUT "OFF"	—	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, V_{CC} = 5.0 V)

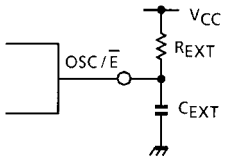
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Max. Operating Frequency		f_{MAX}	—	R_L = 68 Ω, C_L = 15 pF V_{IH} = 3.0 V, V_{IL} = 0 V	500	850	—	kHz
Propagation "H" Level	CK−OUT	t_{pLH}			—	0.7	1.3	μs
	E−OUT				—	5.5	10	
	OSC−OUT				—	7.5	13	
	P_D−OUT				—	9	30	
Delay Time "L" Level	CK−OUT	t_{pHL}			—	0.8	1.3	
	E−OUT				—	0.6	1.3	
	OSC−OU T				—	0.8	1.3	
Min. Pulse Width	CLOCK	$t_{w\ MIN}$			—	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}			—	−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 ON	—	R_{EXT} = 10 kΩ, C_{EXT} = 10 μF	—	3	—	ms

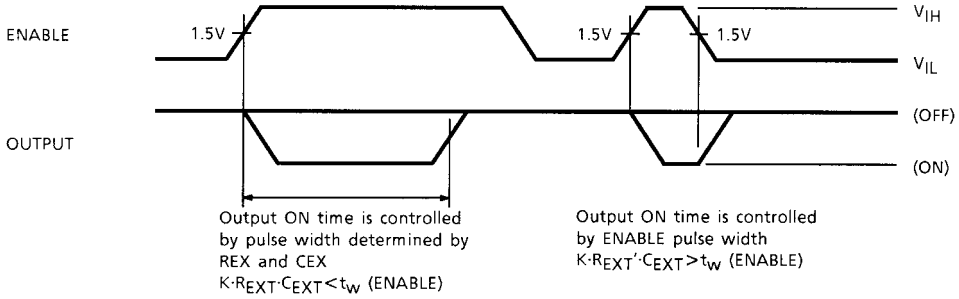
SWITCHING CHARACTERISTICS TEST CONDITION

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



B. Usage of OSC / $\overline{E}$ terminal



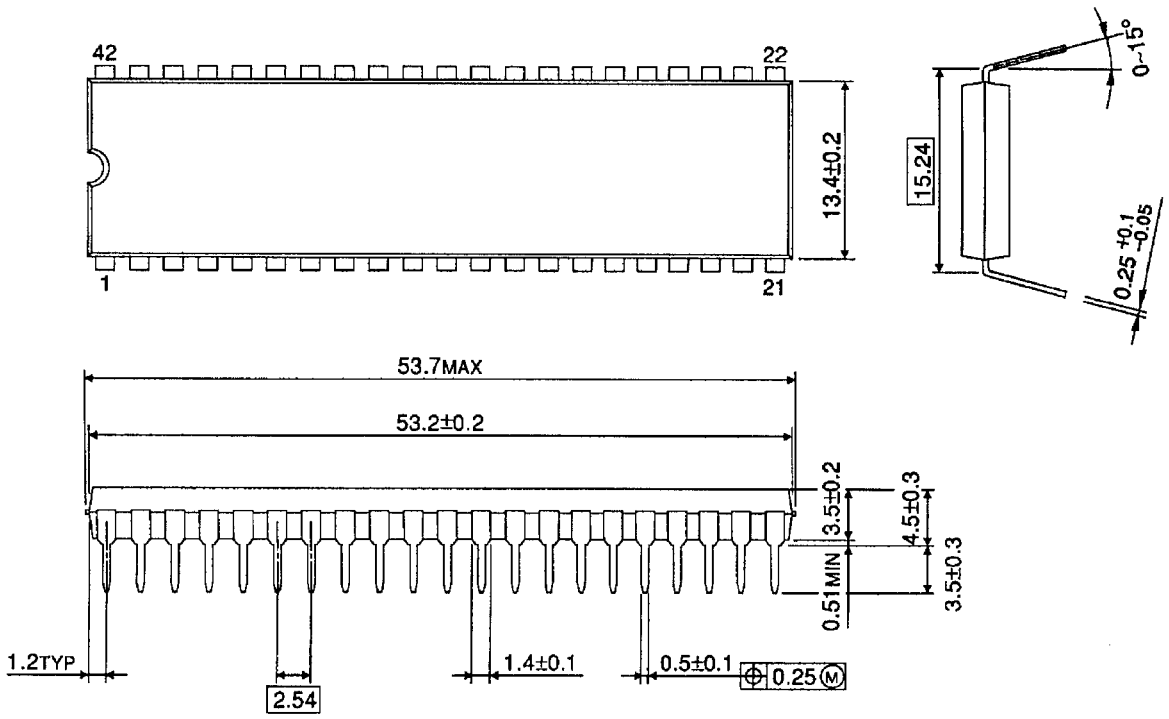


PRECAUTIONS for USING

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, V_{CC} 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

- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.