

TOSHIBA

TD62824P

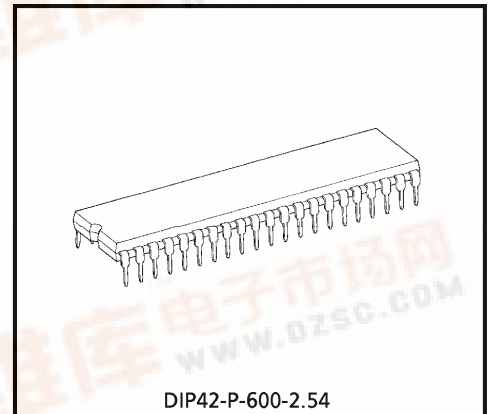
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62824P

8x3 PARALLEL SHIFT REGISTER / DRIVER

The TD62824P is a general purpose 24bit driver IC consisting of 8 block 3bit shift register and 24bit driver (open collector).

The TD62824P is best suited as a 24 dot printer head driver.



Weight : 6.37g (Typ.)

FEATURES

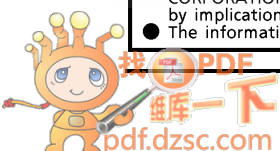
- Power-down function for reducing power consumption during standby or when printing is not made. ($I_{CC\ off} < 10\mu A$)
- Independent 2 output enable terminals (even / add outputs)
- Effective as measures for regenerative effect during high-speed and high-density printing.
- 8bit parallel input and 3bit parallel shift configuration : High-speed operation and direct interface with CPU.
- Large output drive capacity
 Output with standing voltage ... 30V
 Output current 80mA DC
 15mA 10%
- Built-in CR-Timer for load burning prevention.
- Less output saturation voltage difference in package : Within $\pm 50mV$ (standard) at $I_{OUT} = 120mA$

PIN CONNECTION (TOP VIEW)

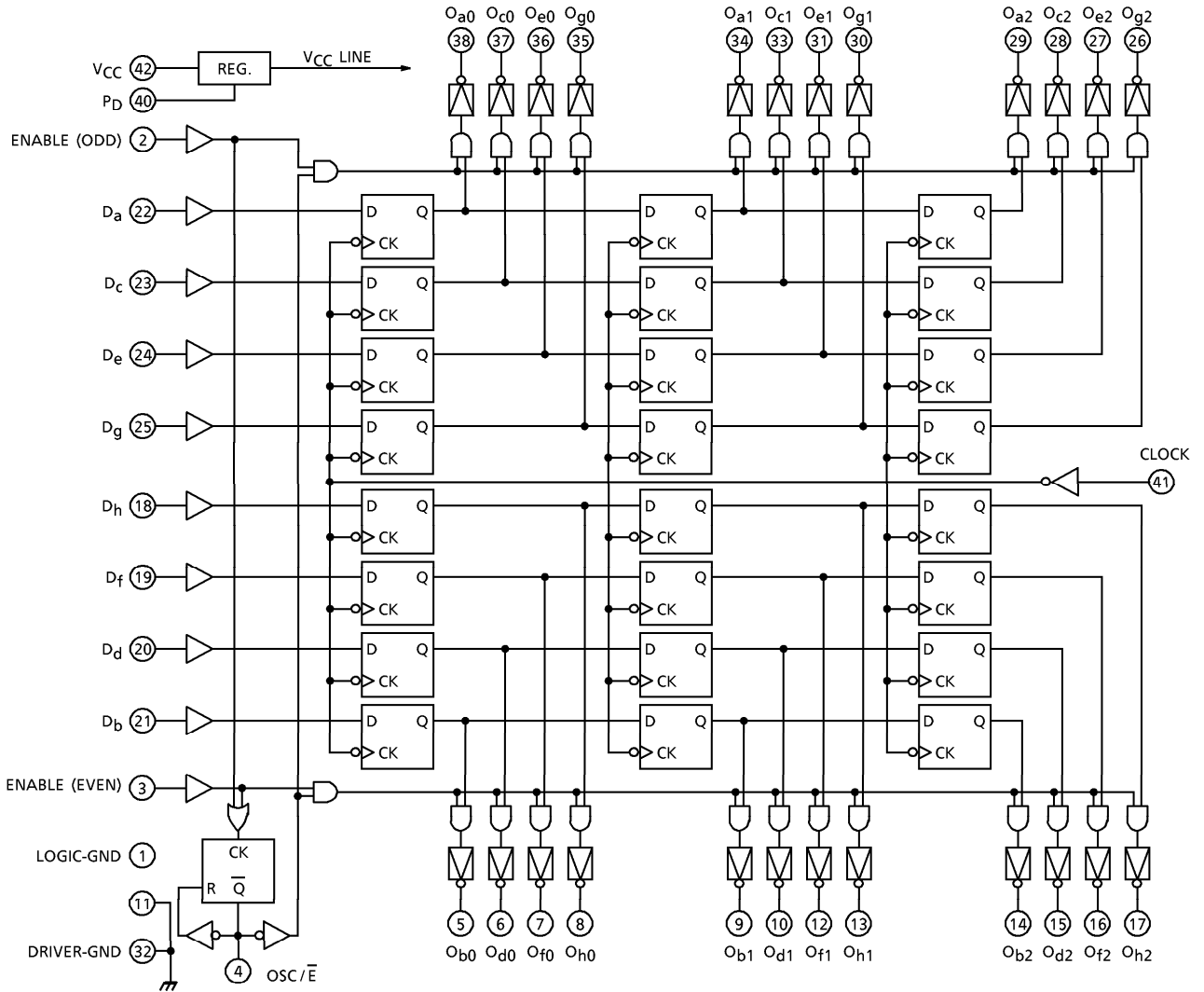
L-GND	1	42	V _{CC}
E (ODD)	2	41	CK
E (EVEN)	3	40	P _D
OSC/ \bar{E}	4	39	NC
O _{b0}	5	38	O _{a0}
O _{d0}	6	37	O _{c0}
O _{f0}	7	36	O _{e0}
O _{h0}	8	35	O _{g0}
O _{b1}	9	34	O _{a1}
O _{d1}	10	33	O _{c1}
P-GND	11	32	P-GND
O _{f1}	12	31	O _{e1}
O _{h1}	13	30	O _{g1}
O _{b2}	14	29	O _{a2}
O _{d2}	15	28	O _{c2}
O _{f2}	16	27	O _{e2}
O _{h2}	17	26	O _{g2}
D _h	18	25	D _g
D _f	19	24	D _e
D _d	20	23	D _c
D _b	21	22	D _a

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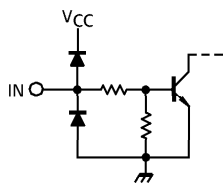
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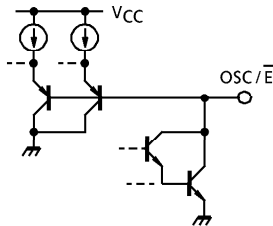
BLOCK DIAGRAM



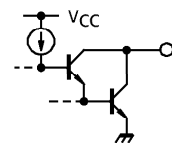
INPUT EQUIVALENT CIRCUIT



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	(*)	(*)	(*)	OFF	OFF	I _{CC} < 10μA
H	(*)	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	(*)	OFF	OFF	—
H	CR	(*)	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.

(*) "H" or "L"

TRUTH TABLE B

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

(*) "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 (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)

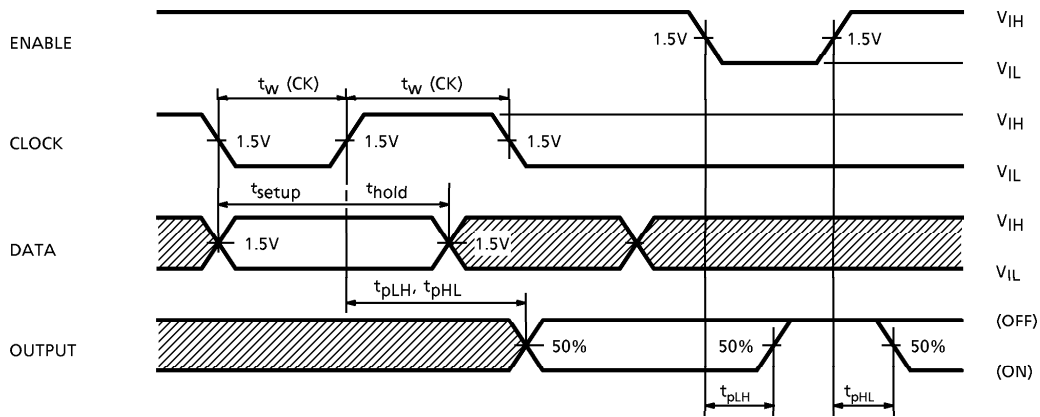
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT						
Input Voltage	"H" Level	V _{IH}	—	—	2.0	—	V _{CC}	V						
	"L" Level	V _{IL}	—	—	0	—	0.6							
Input Current	"H" Level	I _{IH}	—	V _{CC} = 5.5V, V _{IN} = 2.4V	—	0.12	0.2	mA						
	"L" Level	I _{IL}	—	V _{CC} = 5.5V, V _{IN} = 5.5V	—	0.32	0.5							
Output Leak Current		I _{OH}	—	V _{CC} = 5.5V, V _{IN} = 0.3V	—	—	30	μA						
Output Saturation		I _{OL}	—	V _{CC} = 4.5V, V _{OUT} = 28V	—	—	30	μA						
Output Saturation		V _{OL}	—	V _{CC} = 4.5V, I _{OUT} = 60mA	—	0.9	1.15	V						
				V _{CC} = 4.5V, I _{OUT} = 120mA	—	1.1	1.5							
Supply Current		I _{CC}	—	V _{CC} = 5.5V	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	
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} = 5.0V)

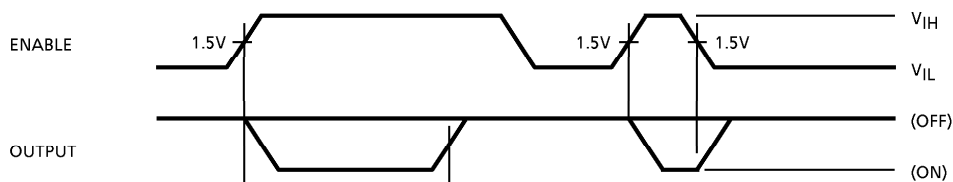
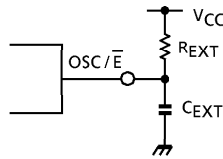
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Max. Operating Frequency		f _{MAX}	—	—	500	850	—	kHz
Propagation "H" Level	CK-OUT	t _{pLH}	—	R _L = 68Ω, C _L = 15pF V _{IH} = 3.0V, V _{IL} = 0V	—	0.7	1.3	μs
	E-OUT				—	5.5	10	
	OSC-OUT				—	7.5	13	
	P _D -OUT				—	9	30	
Delay Time "L" Level	CK-OUT	t _{pHL}	—	R _L = 68Ω, C _L = 15pF V _{IH} = 3.0V, V _{IL} = 0V	—	0.8	1.3	μs
	E-OUT				—	0.6	1.3	
	OSC-OUT				—	0.8	1.3	
Min. Pulse Width	CLOCK	t _w MIN	—	R _L = 68Ω, C _L = 15pF V _{IH} = 3.0V, V _{IL} = 0V	—	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 = 68Ω, C _L = 15pF V _{IH} = 3.0V, V _{IL} = 0V	—	-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} = 10kΩ, C _{EXT} = 10μF	—	3	—	ms

SWITCHING CHARACTERISTICS TEST CONDITION

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



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



Output ON time is controlled by pulse width determined by REX and CEX
 $K \cdot R_{EXT} \cdot C_{EXT} < t_w (\text{ENABLE})$

Output ON time is controlled by ENABLE pulse width
 $K \cdot R_{EXT} \cdot C_{EXT} > t_w (\text{ENABLE})$

PRECAUTIONS for USING

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.

