

TOSHIBA Silicon Monolithic Bi-Polar Digital Integrated Circuit

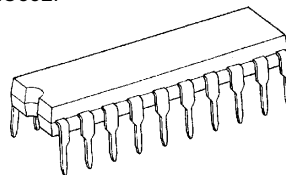
TD62C851P TD62C852P

8 Bit Serial-In Parallel-Out Shift Register/Latch Drivers

Product Description:

These products are monolithic circuits designed to be used together with Bi-CMOS integrated circuits. The devices consist of an 8 bit shift register, 8 bit latches, and 8 output circuits (integral clamp diodes for switching inductive loads).

TD62C851P
TD62C852P



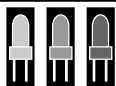
Weight DIP20-P-300A: 2.25g (Typ.)

Features:

- 8 bit serial-in parallel-out shift register / latch driver (Bi-CMOS process)
- Output current:
 TD62C851P - 200mA / ch (Low saturation type)
 TD62C852P - 500mA / ch (Darlington type)
- Sustaining voltage output: 50V
- Built in output clamp diodes
- CMOS compatible inputs
- Package: DIP20-P-300A

MAXIMUM RATINGS (Ta=25°C unless otherwise noted.)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V _{DD}	7	V
Output Sustaining Voltage		V _{CE(SUS)}	-0.5~50	V
Output Current	TD62C851P	I _{OUT}	200	mA / ch
	TD62C852P		500	
Input Voltage		V _{IN}	0.4~V _{DD} +0.3	V
Power Dissipation		P _D	1.47	W
Operating Temperature		T _{opr}	-40~85	°C
Storage Temperature		T _{stg}	-55~150	°C



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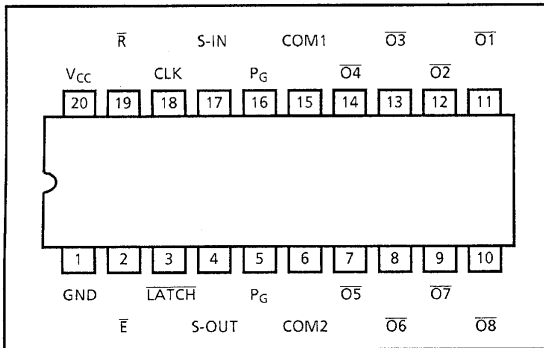
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All specifications subject to change.

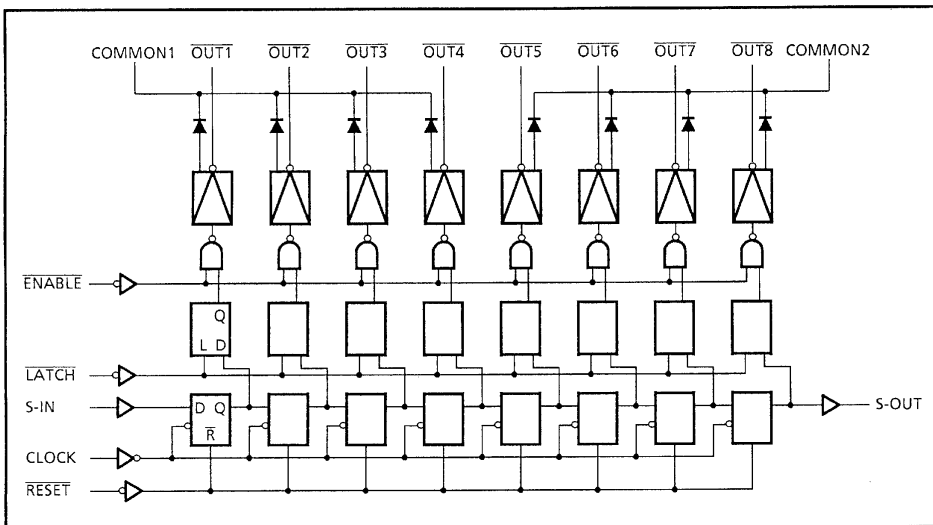
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PIN CONNECTION (TOP VIEW)



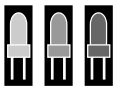
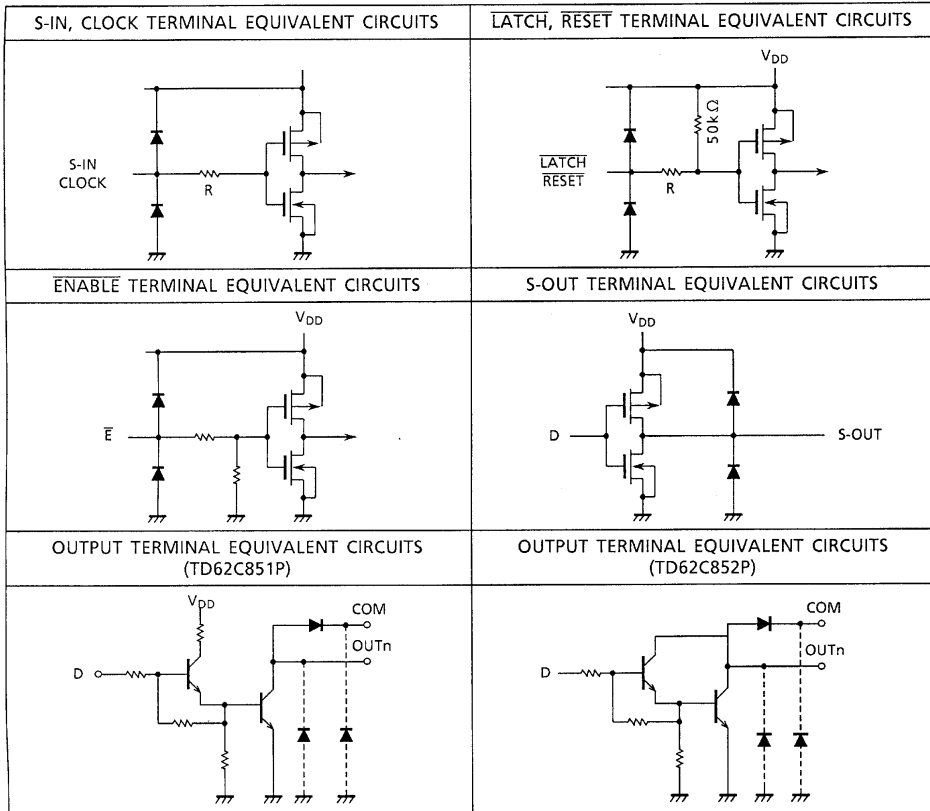
BLOCK DIAGRAM



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EQUIVALENT OF INPUTS AND OUTPUTS



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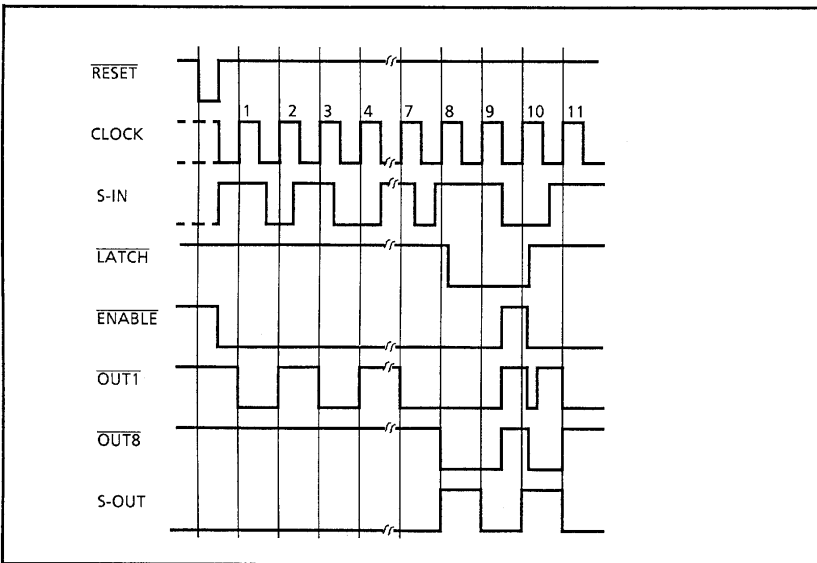
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TRUTH TABLE

CK	\bar{E}	\bar{R}	$\overline{\text{LATCH}}$	S-IN	OUT		S-OUT
					$\overline{O1}$	$\overline{O_{n-1}}$	
$\bar{1}$	L	H	H	L	OFF	$\overline{O_{n-1}}$	Q7
$\bar{1}$	L	H	H	H	ON	$\overline{O_{n-1}}$	Q7
$\bar{1}$	L	H	L	*	NC	NC	Q7
$\bar{1}$	H	H	*	*	OFF	OFF	Q7
$\bar{1}$	*	*	*	*	NC	NC	Q7
*	*	L	H	*	OFF	OFF	L
*	L	$\bar{1}$	L	*	NC	NC	L

CK = CLOCK \bar{E} = ENABLE \bar{R} = RESET $\overline{\text{LATCH}}$ = LATCH S-IN = SERIAL IN OUT = PARALLEL OUT S-OUT = SERIAL OUT	* = DON'T CARE NC = NO CHANGE L = LOW LEVEL HIGH = LEVEL
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TIMING DIAGRAM



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RECOMMENDED OPERATING CONDITIONS (Ta = -40~85°C)

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT		
Supply Voltage		V _{DD}		4.5	5.0	5.5	V		
Input Voltage		V _{IN}		0	—	V _{DD}	V		
Output Current ("H" LEVEL)		S-OUT I _{OH}	Ta = 25°C	—	—	-0.4	mA		
Output Voltage ("L" LEVEL)		On V _{OH}		0	—	5.0	V		
		S-OUT		—	—	0.4			
Output Current ("L" LEVEL)		TD62C851P On TD62C852P	I _{OL}	DC 1 CIRCUIT, Ta = 25°C		0	160	mA/ch	
				8 CIRCUIT ON, T _{pw} = 25ms		Duty = 10%	0		160
				Ta = 85°C, V _{CC} = 5.5V		Duty = 40%	0		95
				DC 1 CIRCUIT, Ta = 25°C			0		400
				8 CIRCUIT ON, T _{pw} = 25ms		Duty = 50%	0		400
				Ta = 85°C, V _{DD} = 5.5V		Duty = 50%	0		170
Clock Frequency		f _{CLOCK}		1.5	—	—	MHz		
Clock Plus Width		f _w CLOCK		0.33	—	—	μs		
Data Set up Time		t _{set up}		100	—	—	ns		
Data Hold Time		t _{hold}		100	—	—	ms		
Clamp Diode Reverse Voltage		V _R		0	—	50	V		
Clamp Diode		TD62C851P		0	—	160	mA		
Forward Current		TD62C852P I _F		0	—	400			

ELECTRICAL CHARACTERISTICS (Ta = -40~85°C)

CHARACTERISTIC		SYM-BOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Input Voltage		"H" LEVEL V _{IH}	—		0.7 V _{DD}	—	—	V	
		"L" LEVEL V _{IL}	—		—	—	0.3 V _{DD}		
Input Current		"H" LEVEL I _{IH}	—	ENABLE, V _{DD} = 5.5V, V _{IH} = V _{DD}	28	55	110	μA	
		"L" LEVEL I _{IL}	—	LATCH, RESET, V _{DD} = 5.5V, V _{IL} = GND	-55	-110	-275		
		I _{IN}	—	CLOCK, S-IN, V _{CC} or GND	—	—	±1.0		
Output Voltage ("H" LEVEL)		S-OUT V _{OH}	—	V _{DD} = 4.5V	I _{OH} = -10μA 4.0	—	—	V	
					I _{OH} = -400μA 3.9	4.1	—		
Output Current ("H" LEVEL)		On I _{OH}	—	V _{DD} = 4.5V, V _{OH} = 2.4V	—	—	100		
		S-OUT			I _{OL} = 8.0mA —	0.2	0.4	V	
Output Voltage ("L" LEVEL)		TD62C851P On TD62C852P	V _{OL}	V _{DD} = 4.5V	I _{OL} = 100mA	—	0.29		0.50
					I _{OL} = 160mA	—	0.39		0.65
					I _{OL} = 250mA	—	1.24		1.90
					I _{OL} = 400mA	—	1.54		2.30
					ENABLE = "H"	—	130	200	
Supply Current		I _{DD1}	—	V _{DD} = 5.5V	—	—	—	mA	
Operating Supply Current		I _{DD2}	—	Ta = 25°C	f _{CLK} = 1MHz DATA = 1/2f _{CLK}	2.0	5.0		
		TD62C851P I _{DD3}	—		—	35	40		
		TD62C852P	—	1 CIRCUIT ON	—	1.0	1.5		
Clamp Diode Reverse Current		I _R	—	V _R = 50V	—	—	50	μA	
Clamp Diode		TD62C851P	—	I _F = 160mA	—	1.00	1.30	V	
Forward Voltage		TD62C852P V _F	—	I _F = 400mA	—	1.50	2.00		

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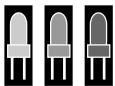
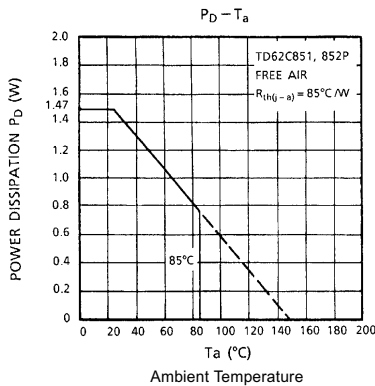
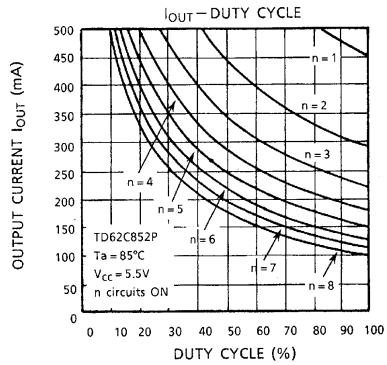
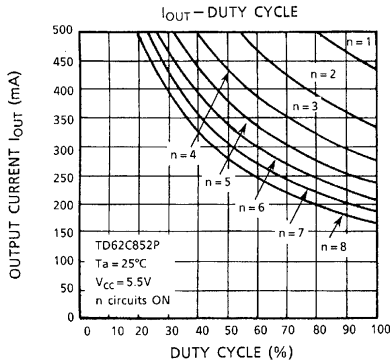
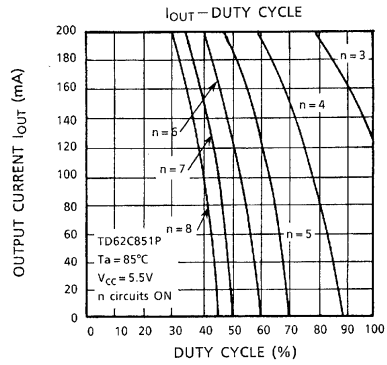
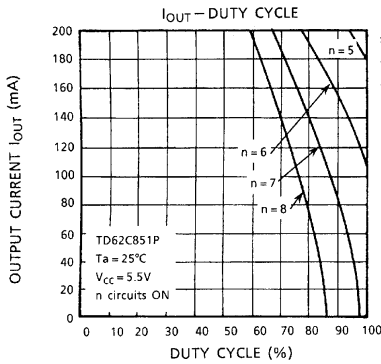
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SWITTING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYM-BOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Propa- gation Delay Time	Low-to- High	CK-S · OUT	t _{pLH}	V _{DD} = 5.5V, V _{IH} = 5.0V V _{IL} = 0V, Duty = 50% RL = 300Ω (TD62C851P) 120Ω (TD62C852P)	—	0.40	0.65	μs
		CK-On			—	1.80	3.00	
		L-On			—	2.10	3.50	
		R-On			—	1.50	2.50	
	High-to- Low	E-On	t _{pHL}		—	1.50	2.50	μs
		CK-S · OUT			—	0.33	0.55	
		CK-On			—	0.41	0.70	
		L-On			—	0.30	0.50	
R-S · OUT	E-On	—	0.25	0.42	μs			
		—	0.21	0.35				
Maximam Clock Frequency	f _{max}	—	—	1.5	2.0	—	MHz	
Mimimun Pulse Width	CLOCK	twCK	—	—	250	330	ns	
	LATCH	twL	—	—	116	160		
	RESET	twR	—	—	107	140		
Data Set up Time	t _{set up}	—	—	—	30	60	ns	
Data Hold Time	t _{hold}	—	—	—	14	40	ns	
Maximum Clock Rise Time	t _r	—	—	—	70	—	ns	
Maximum Clock Fall Time	t _f	—	—	—	70	—	ns	

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