

TOSHIBA Bi-CMOS INTEGRATED CIRCUIT SILICON MONOLITHIC

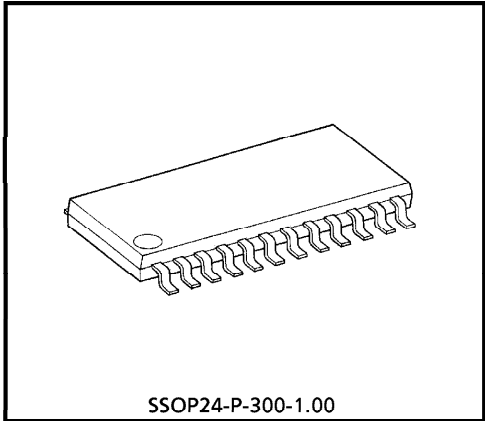
TD62C853F, TD62C854F

8BIT SERIAL-IN PARALLEL-OUT SHIFT REGISTER / LATCH DRIVERS

The TD62C853F and TD62C854F are monolithic circuits designed to be used together with Bi-CMOS integrated circuits. The devices consist of a 8 bit shift register, 8 bit latches, and 8 output circuits.

FEATURES

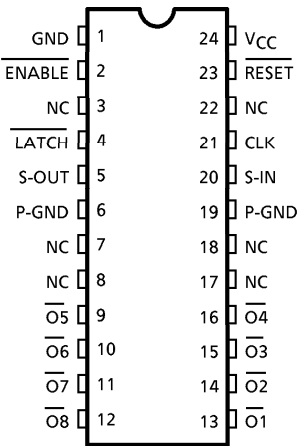
- 8 bit serial-in parallel-out shift register / latch driver (Bi-CMOS process)
- Maximum output sustaining voltage ; 50 V
- Maximum output current ;
TD62C853F 200 mA / ch (Low saturation type)
TD62C854F 500 mA / ch (darlington type)
- CMOS compatible inputs
- Package ; SSOP24-P-300-1.00



Weight : 0.32 g (Typ.)

Note: S-OUT pin is sensitive against Latch-up. (Latch-up performance is under 30mA)
Please connect an external resistor to S-OUT pin in series due to protect this device from Latch-up. (Recommended resistance: R = 100 [Ω])

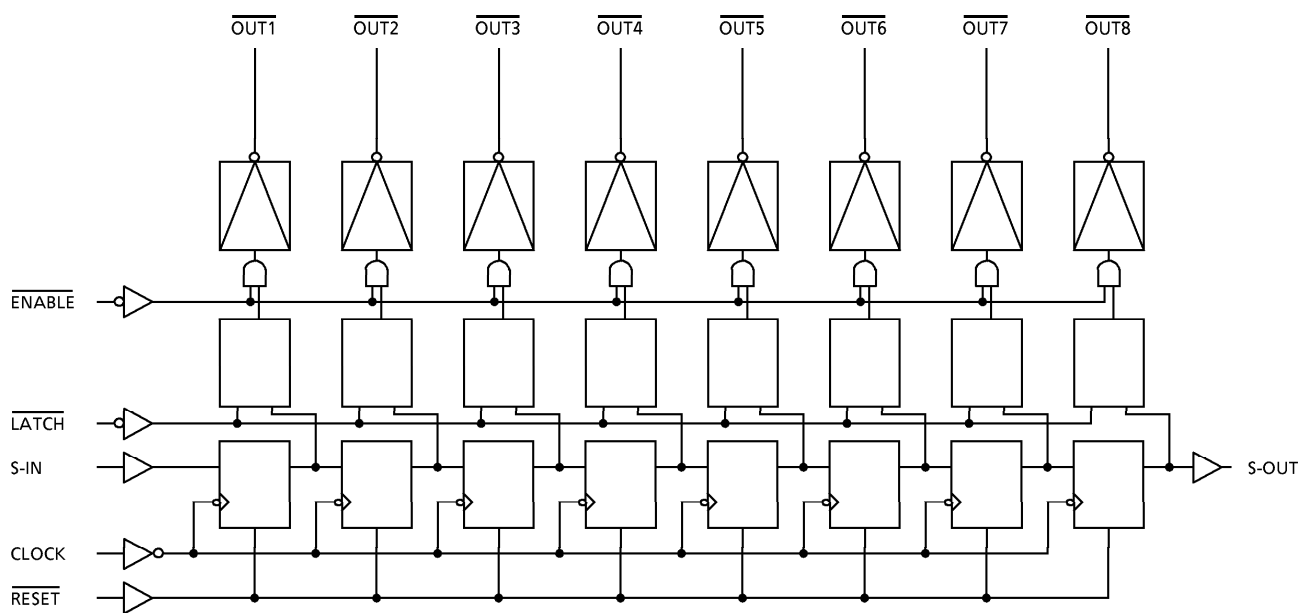
PIN CONNECTION (TOP VIEW)



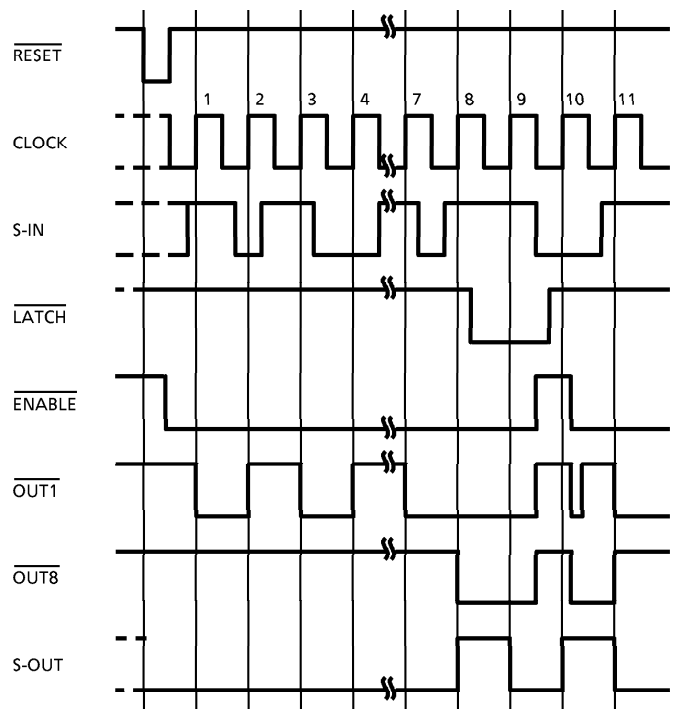
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BLOCK DIAGRAM

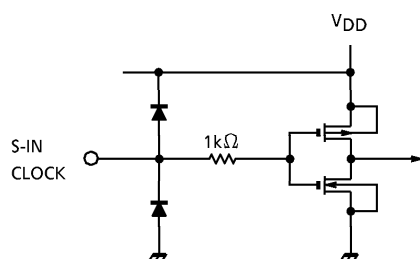


TIMING DIAGRAM

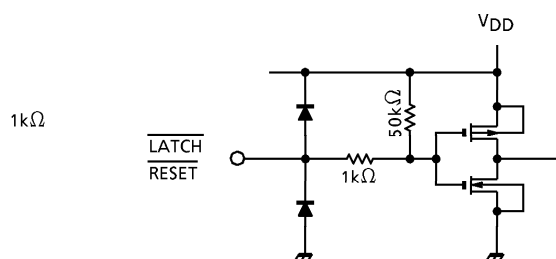


EQUIVALENT CIRCUITS OF INPUTS AND OUTPUTS

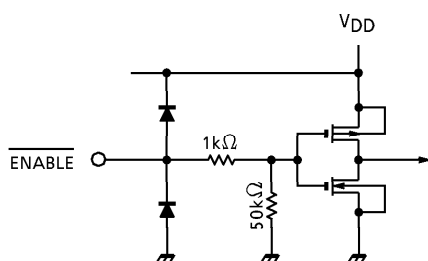
S-IN, CLOCK terminal equivalent circuit



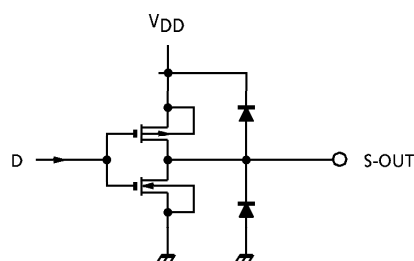
$\overline{\text{LATCH}}$, $\overline{\text{RESET}}$ terminal equivalent circuit



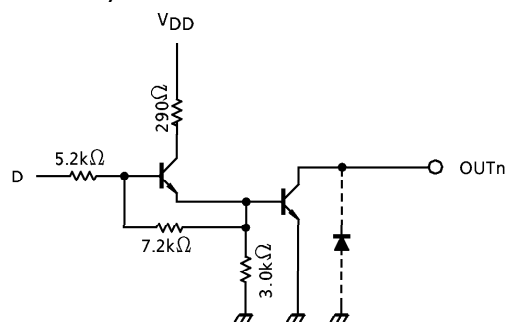
$\overline{\text{ENABLE}}$ terminal equivalent circuit



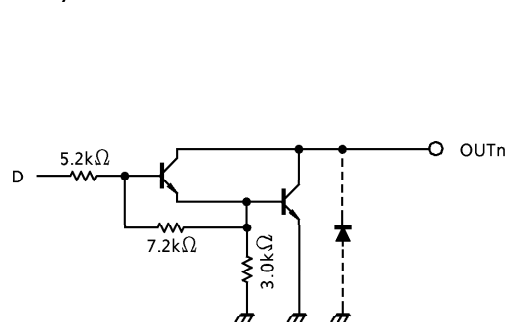
S-OUT terminal equivalent circuit



Output terminal equivalent circuit
(TD62C853F)



Output terminal equivalent circuit
(TD62C854F)



(Note) The output parasitic diode cannot be used as clamp diode.

TRUTH TABLE

CK	$\bar{E}$	$\bar{R}$	$\overline{LATCH}$	S-IN	OUT		S-OUT
					$\overline{O1}$	$\overline{On-1}$	
	L	H	H	L	OFF	$\overline{On-1}$	Q ₇
	L	H	H	H	ON	$\overline{On-1}$	Q ₇
	L	H	L	(*)	NC	NC	Q ₇
	H	H	(*)	(*)	OFF	NC	Q ₇
	(*)	(*)	(*)	(*)	NC	NC	Q ₇
(*)	(*)	L	H	(*)	OFF	OFF	L
(*)	H		L	(*)	NC	NC	L

CK = CLOCK
 $\bar{E}$ = ENABLE
 $\bar{R}$ = RESET
 $\overline{LATCH}$ = LATCH
S-IN = SERIAL IN
OUT = PARALLEL OUT
S-OUT = SERIAL OUT

(*) = DON'T CARE
NC = NO CHANGE
L = LOW LEVEL
H = HIGH LEVEL

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{DD}	- 0.3~7.0	V
Output Sustaining Voltage	V _{CE (SUS)}	- 0.5~50	V
Output Current	TD62C853F	200	mA / ch
	TD62C854F	500	
Input Voltage	V _{IN}	~0.4~V _{DD} + 0.3	V
Power Dissipation	P _D	830 (*)	mW
Operating Temperature	T _{opr}	- 40~85	°C
Storage Temperature	T _{stg}	- 55~150	°C

(*) On PCB (50 × 50 × 1.6 mm Cu 30% Glass Epoxy PCB)
The derating factor above Ta = 25°C: 6.6 mW / °C

PRECAUTIONS for USING

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

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

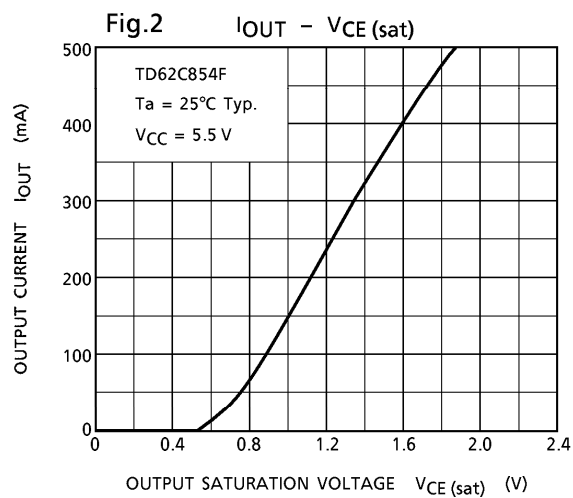
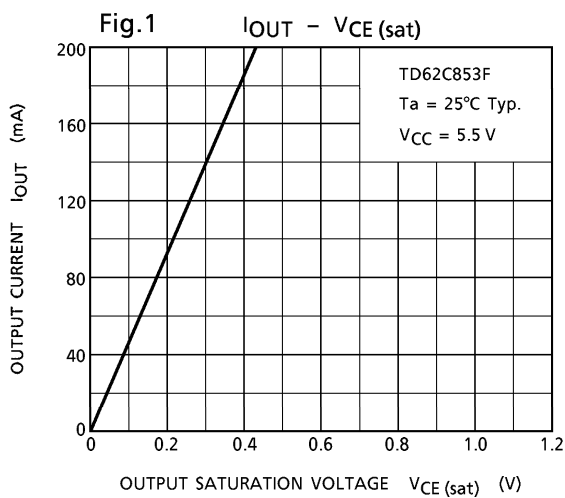
CHARACTERISTIC		SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT	
Supply Voltage		V _{DD}	—		4.5	5.0	5.5	V	
Input Voltage		V _{IN}	—		0	—	V _{DD}	V	
Output Current ("H" Level)	S-OUT	I _{OH}	Ta = 25°C		—	—	− 0.4	mA	
Output Voltage ("H" Level)		$\overline{\text{On}}$	V _{OH}	—	0	—	50	V	
Output Current ("L" Level)		S-OUT	I _{OL}	—	—	—	0.4	mA / ch	
		TD62C853F		DC 1 circuit, Ta = 25°C		0	—		160
				8 circuits on T _{pw} = 25 ms Ta = 85°C V _{DD} = 5.5 V	Duty = 10%	0	—		160
		Duty = 40%			0	—	55		
		TD62C854F		DC 1 circuit, Ta = 25°C		0	—		360
				8 circuits on T _{pw} = 25 ms Ta = 85°C V _{DD} = 5.5 V	Duty = 10%	0	—		400
		Duty = 50%			0	—	170		
		Clock Frequency		f _{CLOCK}	—		1.5		—
Clock Pulse Width		f _w CLOCK	—		0.33	—	—	μs	
Data Set Up Time		t _{setup}	—		100	—	—	ns	
Data Hold Time		t _{hold}	—		100	—	—	ns	

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} = 5.5 V V _{IH} = V _{DD}		28	55	110	μA	
		"L" Level	I _{IL}	—	LATCH, RESET V _{DD} = 5.5 V, V _{IL} = GND		− 55	− 110	− 275		
			I _{IN}	—	CLOCK, S-IN V _{IN} = V _{CC} or GND		—	—	± 1.0		
Output Voltage	"H" Level	S-OUT		V _{OH}	—	V _{DD} = 4.5 V I _{OH} = − 10 μA		3.9	4.1	—	V
	"L" Level	S-OUT		V _{OL}	—	V _{DD} = 4.5 V	I _{OL} = 0.8 mA	—	0.2	0.4	V
		$\overline{\text{On}}$	TD62C 853F				I _{OL} = 100 mA	—	0.29	0.50	
			TD62C 854F				I _{OL} = 160 mA	—	0.39	0.65	
							I _{OL} = 250 mA	—	1.24	1.90	
							I _{OL} = 400 mA	—	1.54	2.30	
Output Current	"H" Level	$\overline{\text{On}}$		I _{OH}	—	V _{DD} = 5.5 V, V _{OH} = 50.0 V		—	—	100	μA
Operating Supply Current			I _{DD1}	—	V _{DD} = 5.5 V Ta = 25°C	ENABLE = "H"	—	130	200	mA	
			I _{DD2}			f _{CLK} = 1 MHz Output open DATA = 1 / 2 f _{CLK}	—	2.0	5.0		
			TD62C853F			I _{DD3}	1 circuit on f _{CLK} = 1 MHz	—	35		40
							ENABLE = "L"	—	1.0		1.4
			TD62C854F								

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC			SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Propagation Delay Time	Low-to-High	CK-S-OUT	t_{pLH}	—	$V_{DD} = 5.0\text{ V}$, $V_{IH} = 5.0\text{ V}$ $V_{IL} = 0\text{ V}$, Duty = 50% $R_L = \left[\begin{array}{l} 300\ \Omega\ (\text{TD62C853F}) \\ 120\ \Omega\ (\text{TD62C854F}) \end{array} \right]$	—	0.40	0.65	μs
		$\overline{\text{CK}}\text{-}\overline{\text{On}}$				—	1.80	3.00	
		$\overline{\text{L}}\text{-}\overline{\text{On}}$				—	2.10	3.50	
		$\overline{\text{R}}\text{-}\overline{\text{On}}$				—	1.50	2.50	
		$\overline{\text{E}}\text{-}\overline{\text{On}}$				—	1.50	2.50	
	High-to-Low	CK-S-OUT	t_{pHL}	—		—	0.33	0.55	
		$\overline{\text{CK}}\text{-}\overline{\text{On}}$				—	0.41	0.70	
		$\overline{\text{L}}\text{-}\overline{\text{On}}$				—	0.30	0.50	
		R-S-OUT				—	0.25	0.42	
		$\overline{\text{E}}\text{-}\overline{\text{On}}$				—	0.21	0.35	
Maximum Clock Frequency			f_{MAX}	—	1.5	2.0	—	MHz	
Minimum Pulse Width		CLOCK	$t_{w\text{CK}}$	—	—	250	330	ns	
		$\overline{\text{LATCH}}$	$t_{w\text{L}}$		—	116	160		
		$\overline{\text{RESET}}$	$t_{w\text{R}}$		—	107	140		
Data Set Up Time			t_{setup}	—	—	30	60	ns	
Data Hold Time			t_{hold}		—	14	40		
Maximum Clock Rise Time			t_r	—	—	70	—	ns	
Maximum Clock Fall Time			t_f		—	70	—		



TD62C853F each characteristic data and reference graph

Output current I_{OUT} vs lighting rate DUTY,
Condition: 1~8 circuit operation, $V_{DD} = 5.5\text{ V}$

Fig.3 DUTY - I_{OUT} ($T_{opr} = 85^\circ\text{C}$)

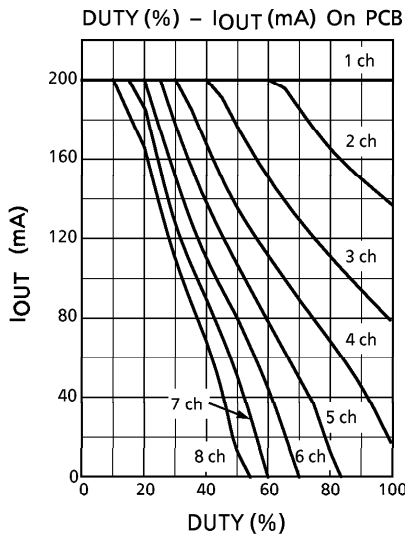


Fig.4 DUTY - I_{OUT} ($T_{opr} = 55^\circ\text{C}$)

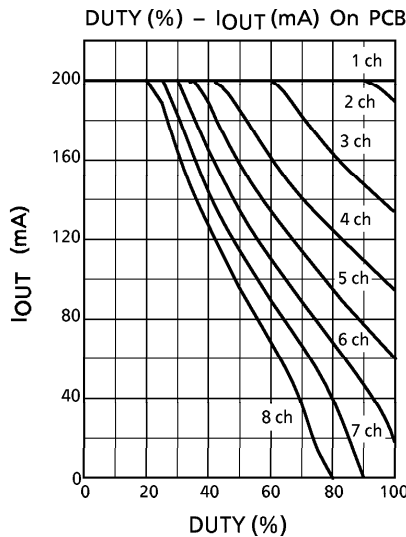
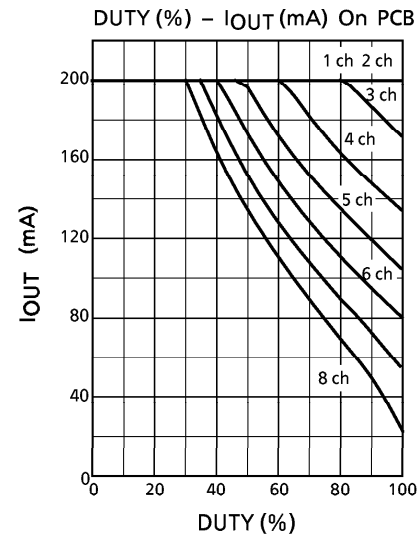


Fig.5 DUTY - I_{OUT} ($T_{opr} = 25^\circ\text{C}$)



TD62C854F each characteristic data and reference graph

Output current I_{OUT} vs lighting rate DUTY,
Condition: 1~8 circuit operation, $V_{DD} = 5.5\text{ V}$

Fig.6 DUTY – I_{OUT} (Topr = 85°C)

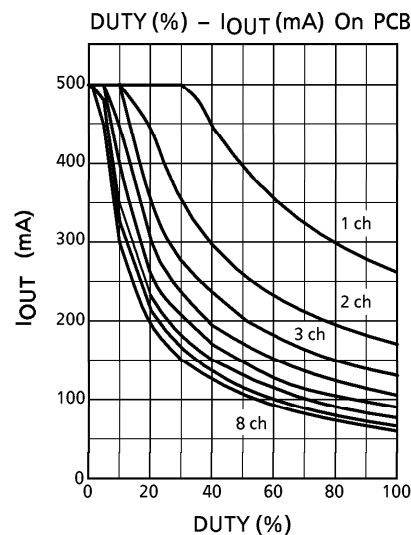


Fig.7 DUTY – I_{OUT} (Topr = 55°C)

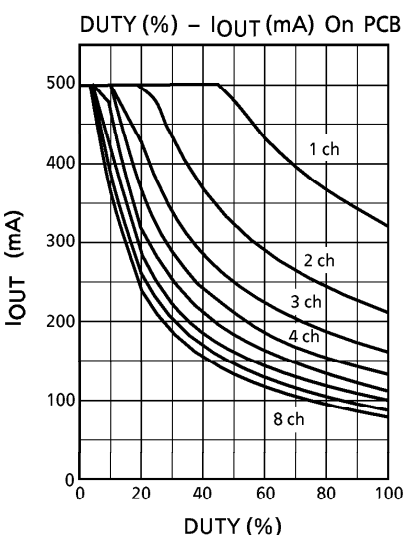
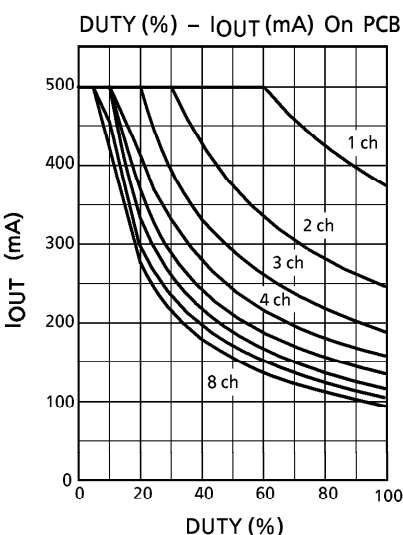
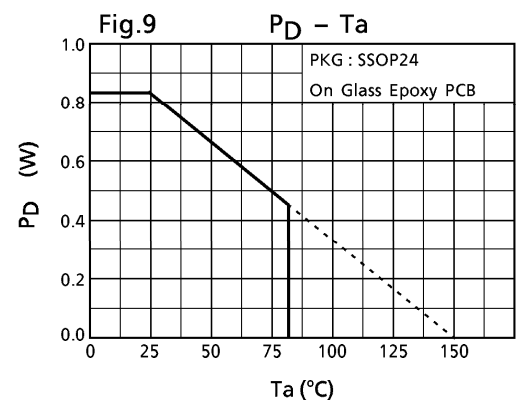


Fig.8 DUTY – I_{OUT} (Topr = 25°C)

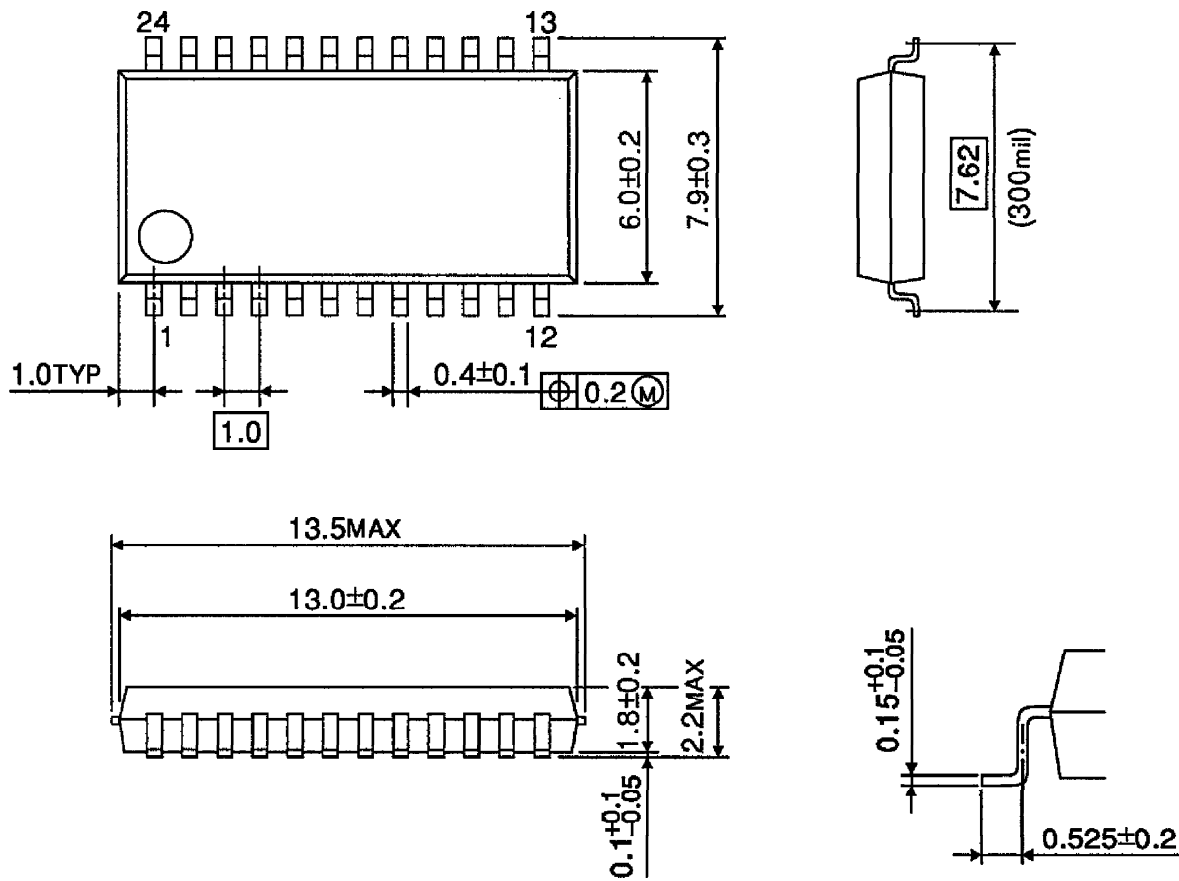


SSOP24 Power dissipation



PACKAGE DIMENSIONS
SSOP24-P-300-1.00

Unit: mm



Weight: 0.32 g (Typ.)