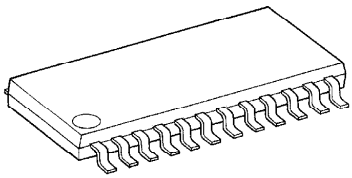
TOSHIBA Bi-CMOS INTEGRATED CIRCUIT SILICON MONOLITHIC

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.



SSOP24-P-300-1.00

Weight : 0.32 g (Typ.)

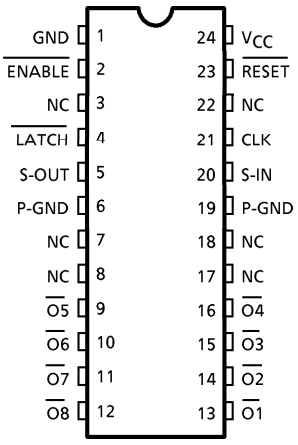
FEATURES

- 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

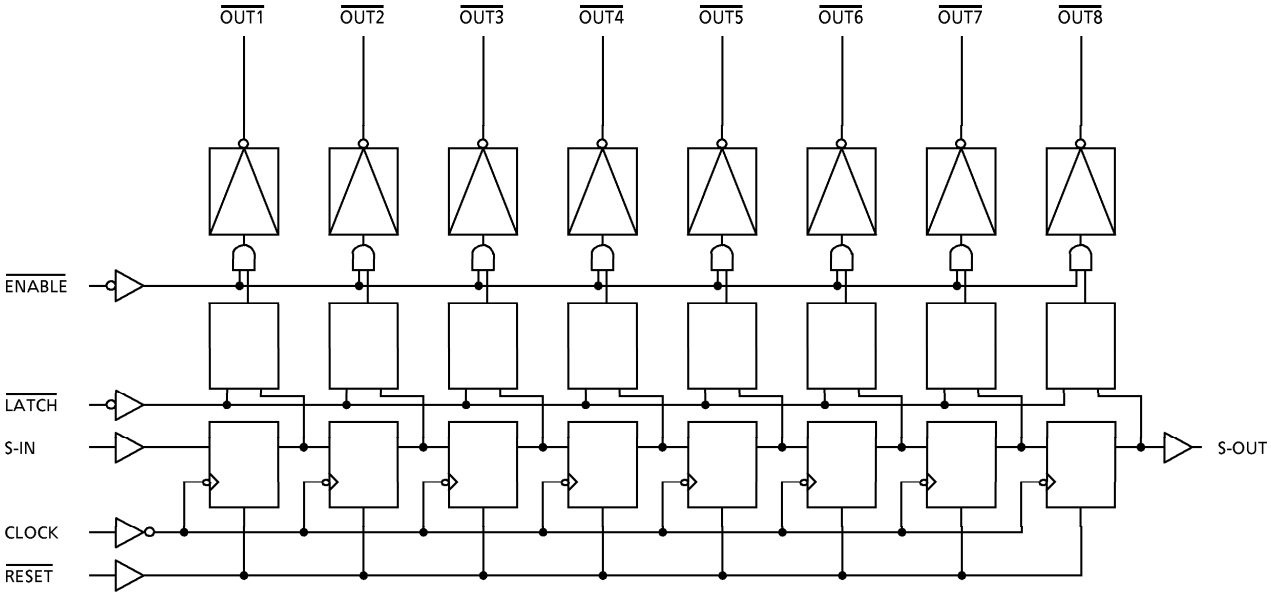
(Note) S-OUT pin is sensitive against Latch-up. (Latch-up performance is under 30mA)

PIN CONNECTION (TOP VIEW)

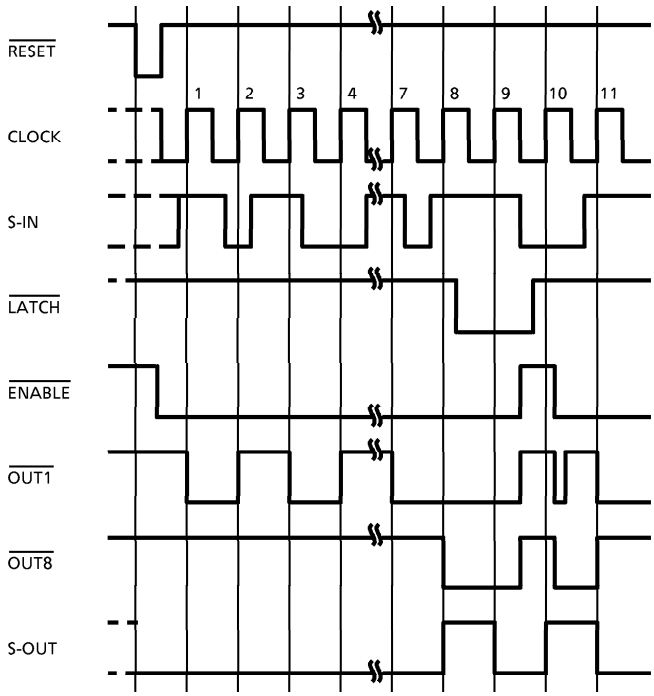


980910EBA1

BLOCK DIAGRAM

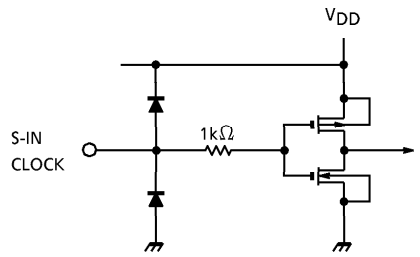


TIMING DIAGRAM

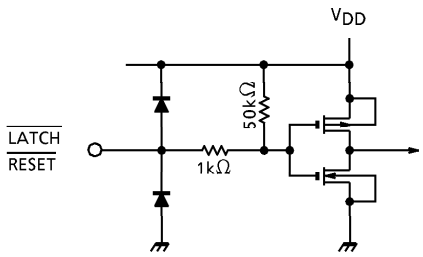


EQUIVALENT CIRCUITS OF INPUTS AND OUTPUTS

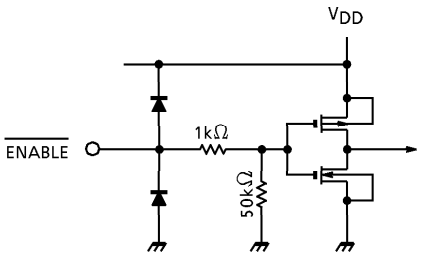
S-IN, CLOCK terminal equivalent circuit



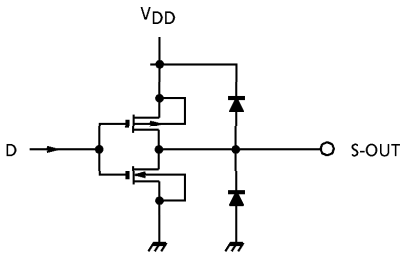
$\overline{LATCH}$, $\overline{RESET}$ terminal equivalent circuit



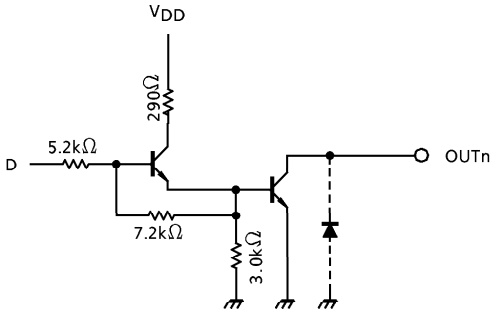
$\overline{ENABLE}$ terminal equivalent circuit



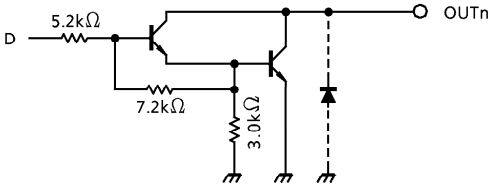
S-OUT terminal equivalent circuit



Output terminal equivalent circuit
(TD62C853F)



Output terminal equivalent circuit
(TD62C854F)



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

TRUTH TABLE

CK	$\overline{E}$	$\overline{R}$	$\overline{LATCH}$	S-IN	OUT		S-OUT
					$\overline{O1}$	$\overline{On}$	
↑	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
$\overline{E}$ = $\overline{ENABLE}$
$\overline{R}$ = $\overline{RESET}$
$\overline{LATCH}$ = $\overline{LATCH}$
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	I_{OUT}	200	mA / ch
	TD62C854F		500	
Input Voltage		V_{IN}	~0.4~V_{DD} + 0.3	V
Power Dissipation		P_D	780 (*)	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)
Ambient temperature delated above 25°C in the proportion of 6.6 mW / °C

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)		$\overline{On}$	V_{OH}	—		0	—	50	V
Output Current ("L" Level)		S-OUT	I_{OL}	—		—	—	0.4	mA / ch
	TD62C853F	$\overline{On}$		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	—	—	MHz
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
		$\overline{On}$	TD62C853F				I_{OL} = 100 mA	—	0.29	0.50	
							I_{OL} = 160 mA	—	0.39	0.65	
			TD62C854F				I_{OL} = 250 mA	—	1.24	1.90	
							I_{OL} = 400 mA	—	1.54	2.30	
Output Current	"H" Level	$\overline{On}$		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 ENABLE = "L"	—	35	40	
		TD62C854F						—	1.0	1.4	

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC			SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Propagation Delay Time	Low-to-High	CK-S-OUT	t_{pLH}	—	V_{DD} = 5.0 V, V_{IH} = 5.0 V V_{IL} = 0 V, Duty = 50% R_L = 300 Ω (TD62C853F) / 120 Ω (TD62C854F)	—	0.40	0.65	μs
		CK-$\overline{On}$				—	1.80	3.00	
		L-$\overline{On}$				—	2.10	3.50	
		R-$\overline{On}$				—	1.50	2.50	
		E-$\overline{On}$				—	1.50	2.50	
	High-to-Low	CK-S-OUT	t_{pHL}	—		—	0.33	0.55	
		CK-$\overline{On}$				—	0.41	0.70	
		L-$\overline{On}$				—	0.30	0.50	
		R-S-OUT				—	0.25	0.42	
		E-$\overline{On}$				—	0.21	0.35	
Maximum Clock Frequency			f_{MAX}	—		1.5	2.0	—	MHz
Minimum Pulse Width		CLOCK	t_{wCK}	—		—	250	330	ns
		$\overline{LATCH}$	t_{wL}			—	116	160	
		$\overline{RESET}$	t_{wR}			—	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	—	

Fig.1 I_{OUT} – $V_{CE\,(sat)}$

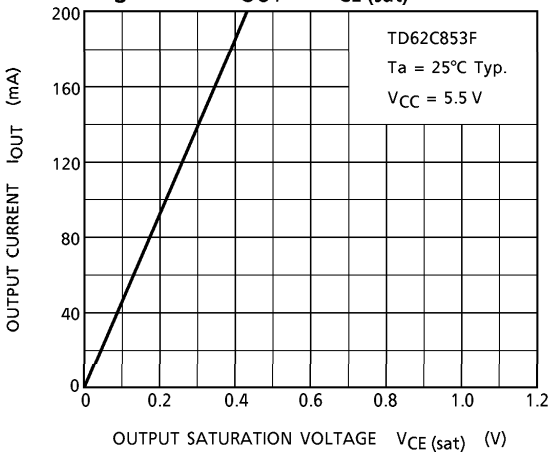
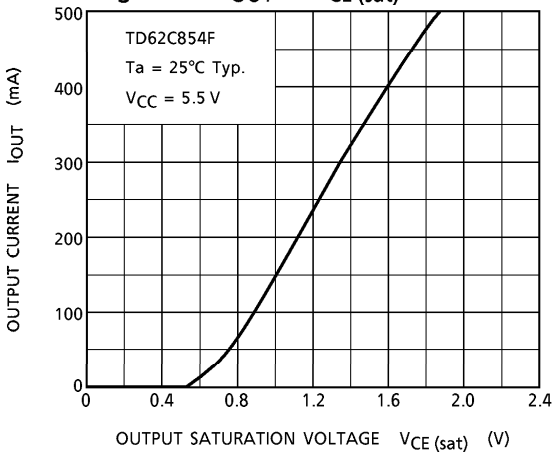


Fig.2 I_{OUT} – $V_{CE\,(sat)}$



TD62C853F each characteristic data and reference graph

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

Fig.3 DUTY – I_{OUT} (Topr = 85°C)

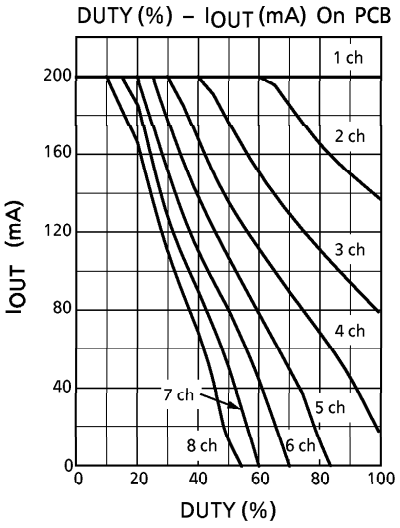


Fig.4 DUTY – I_{OUT} (Topr = 55°C)

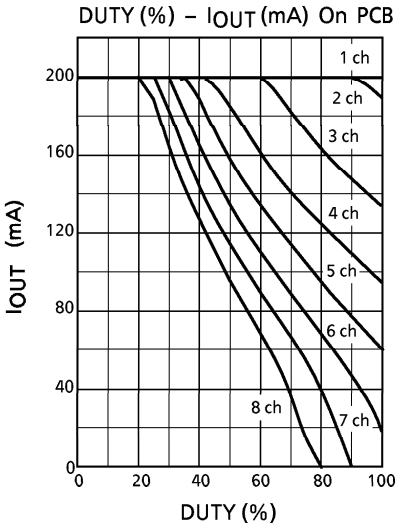
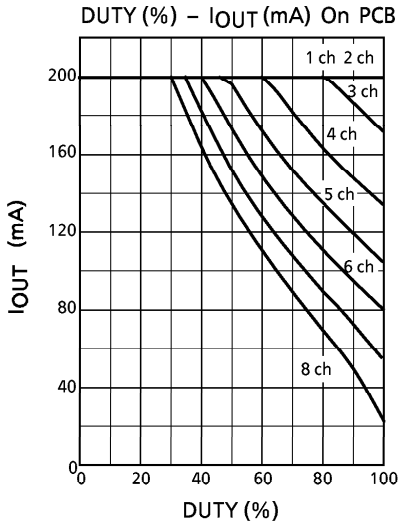


Fig.5 DUTY – I_{OUT} (Topr = 25°C)



TD62C854F each characteristic data and reference graph

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

Fig.6 DUTY – I_{OUT} (Topr = 85°C)

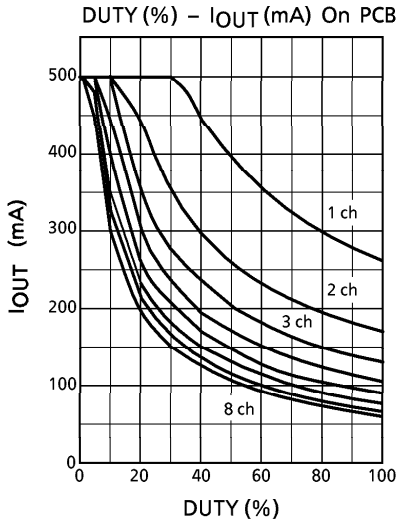


Fig.7 DUTY – I_{OUT} (Topr = 55°C)

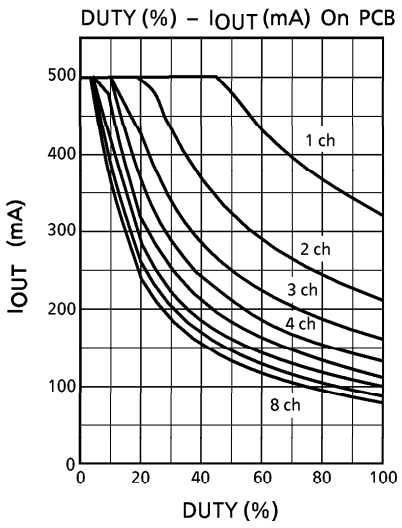
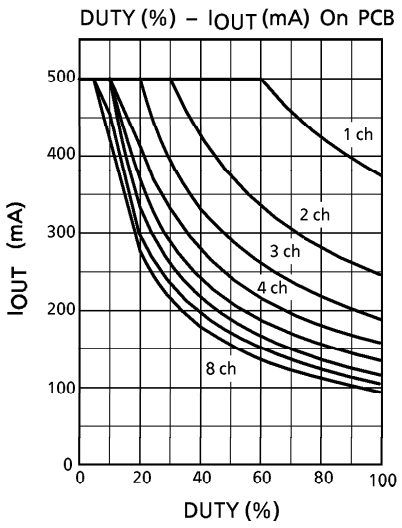
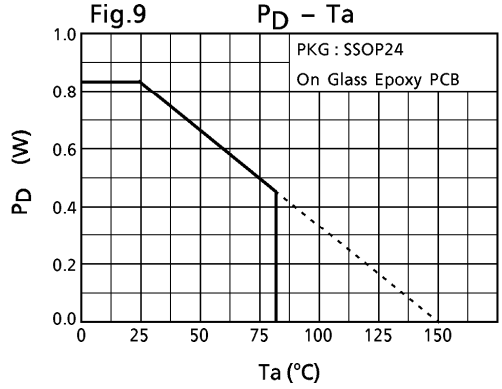


Fig.8 DUTY – I_{OUT} (Topr = 25°C)



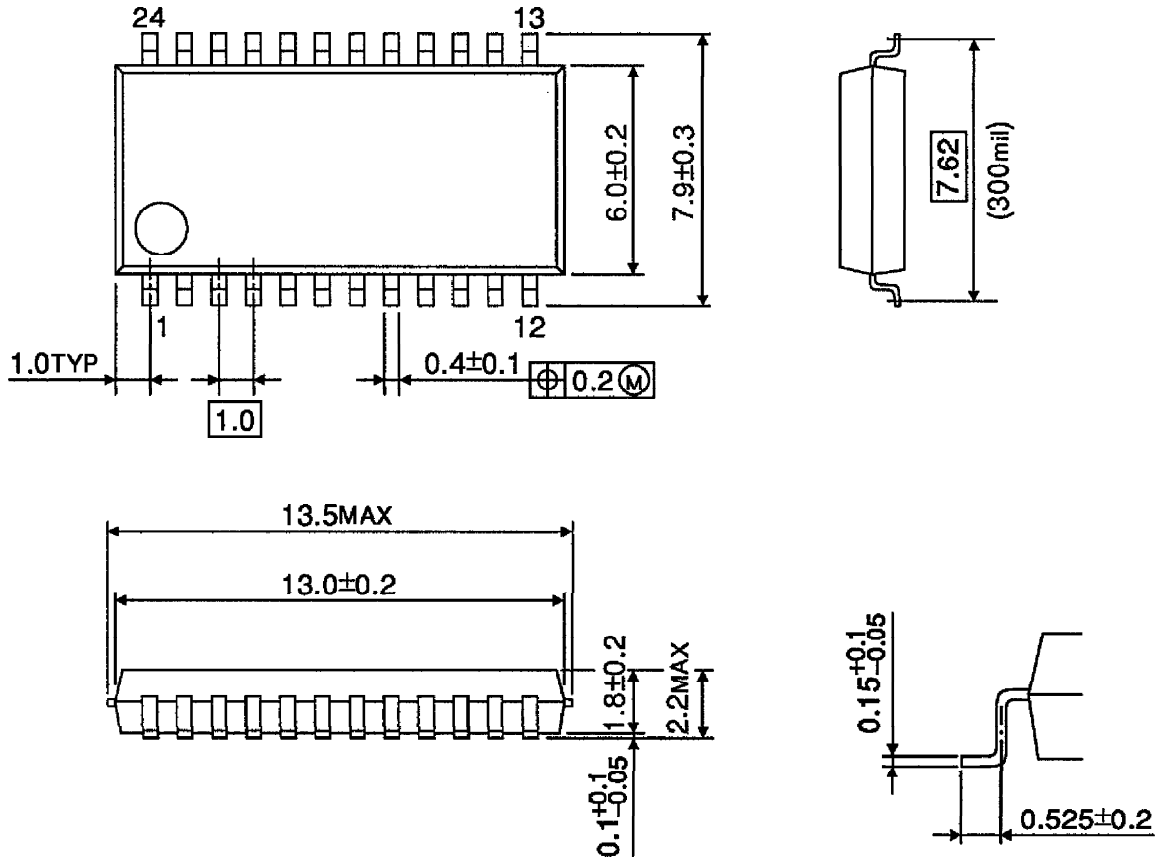
SSOP24 Power dissipation

Fig.9 P_D – Ta



PACKAGE DIMENSIONS

SSOP24-P-300-1.00 Unit: mm



Weight: 0.32 g (Typ.)