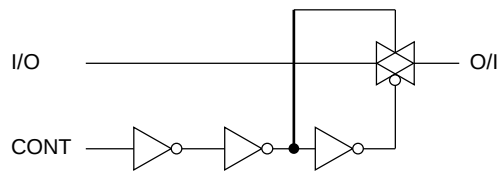


Logic Diagram

1/4 TC4066B



Absolute Maximum Ratings

Characteristics	Symbol	Rating	Unit
DC supply voltage	V_{DD}	$V_{SS} - 0.5$ to $V_{SS} + 20$	V
Control input voltage	V_{CIN}	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
Switch I/O voltage	V_I/V_O	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
Power dissipation	P_D	300 (DIP)/180 (SOP/TSSOP)	mW
Potential difference across I/O during ON	$V_I - V_O$	± 0.5	V
Control input current	I_{CIN}	± 10	mA
Operating temperature range	T_{opr}	-40 to 85	°C
Storage temperature range	T_{stg}	-65 to 150	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Operating Ranges ($V_{SS} = 0$ V)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
DC supply voltage	V_{DD}	—	3	—	18	V
Input/Output voltage	V_{IN}/V_{OUT}	—	0	—	V_{DD}	V

Note: The operating ranges must be maintained to ensure the normal operation of the device.

Unused control inputs must be tied to either V_{DD} or V_{SS} .

Electrical Characteristics ($V_{SS} = 0\text{ V}$, unless specified otherwise)

Characteristics	Symbol	Test Condition	V_{DD} (V)	-40°C		25°C			85°C		Unit
				Min	Max	Min	Typ.	Max	Min	Max	
Control input high voltage	V_{IH}	$ I_{IS} = 10\text{ }\mu\text{A}$	5	3.5	—	3.5	2.75	—	3.5	—	V
			10	7.0	—	7.0	5.50	—	7.0	—	
			15	11.0	—	11.0	8.25	—	11.0	—	
Control input low voltage	V_{IL}	$ I_{IS} = 10\text{ }\mu\text{A}$	5	—	1.5	—	2.25	1.5	—	1.5	V
			10	—	3.0	—	4.50	3.0	—	3.0	
			15	—	4.0	—	6.75	4.0	—	4.0	
On-state resistance	R_{ON}	$0 \leq V_{IS} \leq V_{DD}$ $R_L = 10\text{ k}\Omega$	5	—	800	—	290	950	—	1200	Ω
			10	—	210	—	120	250	—	300	
			15	—	140	—	85	160	—	200	
Δ On-state resistance (between any 2 switches)	$R_{ON\Delta}$	—	5	—	—	—	10	—	—	—	Ω
			10	—	—	—	6	—	—	—	
			15	—	—	—	4	—	—	—	
Input/output leakage current	I_{OFF}	$V_{IN} = 18\text{ V}, V_{OUT} = 0\text{ V}$	18	—	± 100	—	± 0.1	± 100	—	± 1000	nA
		$V_{IN} = 0\text{ V}, V_{OUT} = 18\text{ V}$	18	—	± 100	—	± 0.1	± 100	—	± 1000	
Quiescent supply current	I_{DD}	$V_{IN} = V_{SS}, V_{DD}$ (Note 1)	5	—	0.25	—	0.001	0.25	—	7.5	μA
			10	—	0.50	—	0.001	0.50	—	15.0	
			15	—	1.00	—	0.002	1.00	—	30.0	
Control Input current	"H" level	I_{IH}	$V_{IH} = 18\text{ V}$	18	—	0.1	—	10^{-5}	0.1	—	μA
	"L" level	I_{IL}	$V_{IL} = 0\text{ V}$	18	—	-0.1	—	-10^{-5}	-0.1	—	

Note 1: All valid input combinations.

Switching Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	V _{SS} (V)	V _{DD} (V)	Min	Typ.	Max	Unit
Phase difference between input to output	ϕ_{I-O}	$C_L = 50 \text{ pF}$	0	5	—	15	40	ns
			0	10	—	8	20	
			0	15	—	5	15	
Propagation delay time (control-OUT)	t_{pZL} t_{pZH}	$R_L = 1 \text{ k}\Omega$ $C_L = 50 \text{ pF}$	0	5	—	55	120	ns
			0	10	—	25	40	
			0	15	—	20	30	
Propagation delay time (control -OUT)	t_{pLZ} t_{pHZ}	$R_L = 1 \text{ k}\Omega$ $C_L = 50 \text{ pF}$	0	5	—	45	80	ns
			0	10	—	30	70	
			0	15	—	25	60	
Max control input repetition rate	$f_{\text{max}} \text{ (C)}$	$R_L = 1 \text{ k}\Omega$ $C_L = 50 \text{ pF}$	0	5	—	10	—	MHz
			0	10	—	12	—	
			0	15	—	12	—	
-3dB cutoff frequency	$f_{\text{max}} \text{ (I-O)}$	$R_L = 1 \text{ k}\Omega$ $C_L = 15 \text{ pF}$ (Note 1)	-5	5	—	30	—	MHz
Total harmonic distortion	—	$R_L = 10 \text{ k}\Omega$ $f = 1 \text{ kHz}$ (Note 2)	-5	5	—	0.03	—	%
-50dB feed through frequency	—	$R_L = 1 \text{ k}\Omega$ (Note 3)	-5	5	—	600	—	kHz
-50dB crosstalk frequency	—	$R_L = 1 \text{ k}\Omega$ (Note 4)	-5	5	—	1	—	MHz
Crosstalk (control-OUT)	—	$R_{IN} = 1 \text{ k}\Omega$ $R_{OUT} = 10 \text{ k}\Omega$ $C_L = 15 \text{ pF}$	0	5	—	200	—	mV
			0	10	—	400	—	
			0	15	—	600	—	
Input capacitance	C_{IN}	Control input	—	—	—	5	7.5	pF
		Switch I/O	—	—	—	10	—	
Feed through capacitance	C_{IN-OUT}	—	—	—	—	0.5	—	pF

Note 1: Sine wave of $\pm 2.5 V_{p-p}$ shall be used for V_{IS} and the frequency of $20 \log 10 \frac{V_{OS}}{V_{IS}} = -3 \text{ dB}$ shall be f_{max} .

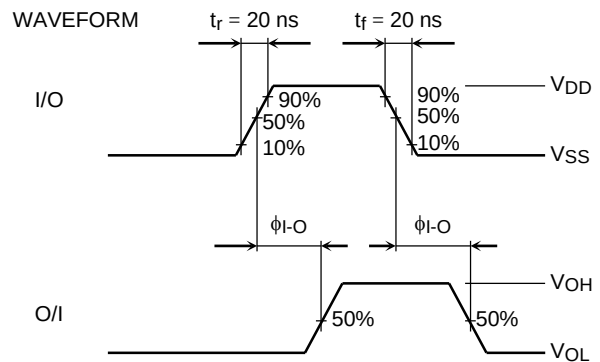
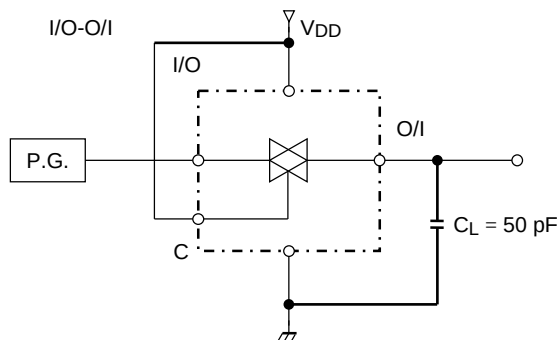
Note 2: V_{IS} shall be sine wave of $\pm 2.5 V_{p-p}$

Note 3: Sine wave of $\pm 2.5 V_{p-p}$ shall be used for V_{IS} and the frequency of $20 \log 10 \frac{V_{OS}}{V_{IS}} = -50 \text{ dB}$ shall be feed-through.

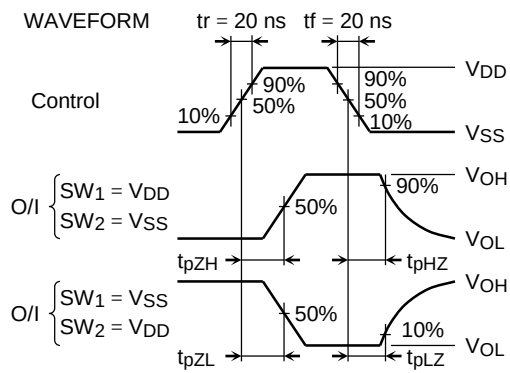
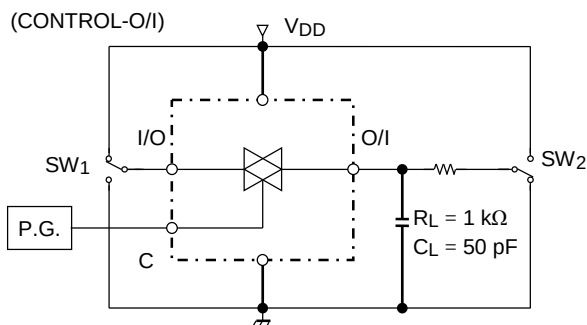
Note 4: Sine wave of $\pm 2.5 V_{p-p}$ shall be used for V_{IS} and the frequency of $20 \log 10 \frac{V_{OS}}{V_{IS}} = -50 \text{ dB}$ shall be crosstalk.

Circuit for Measurement of Electrical Characteristics

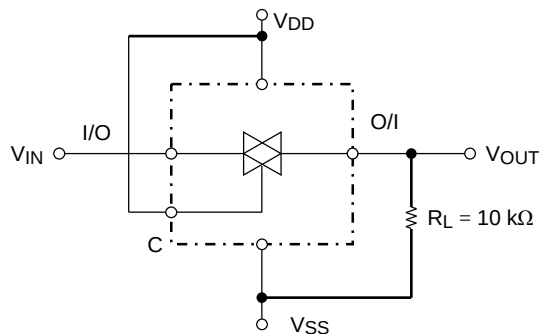
1. $\phi I-O$



2. t_{pZL} , t_{pZH} , t_{pLZ} , t_{pHZ}



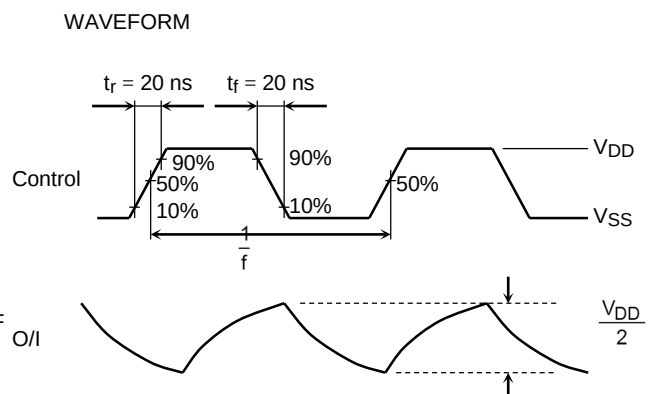
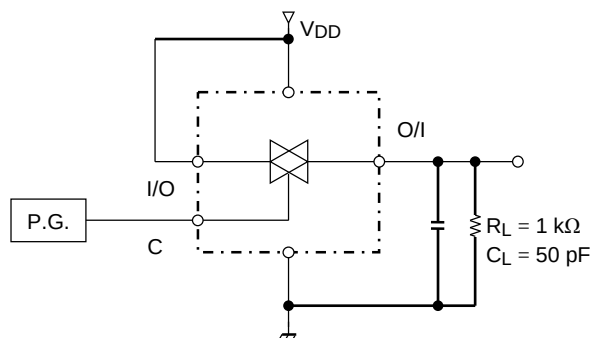
3. R_{ON}



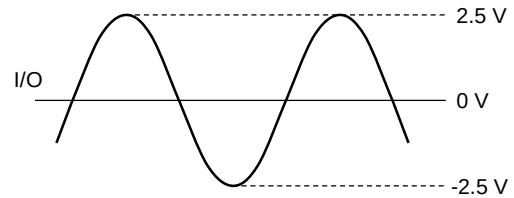
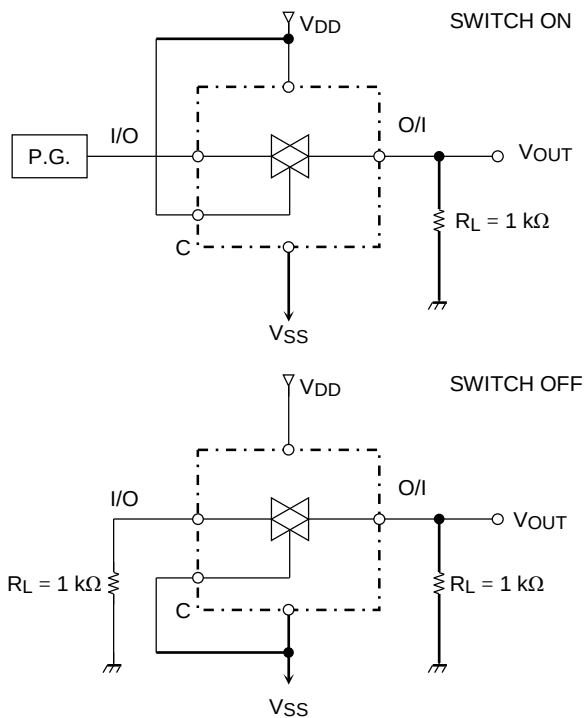
RON Calculation Method

$$R_{ON} = 10 \times \frac{(V_{IN} - V_{OUT})}{V_{OUT}} [k\Omega]$$

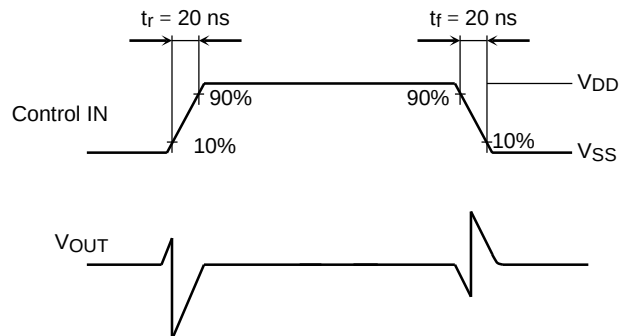
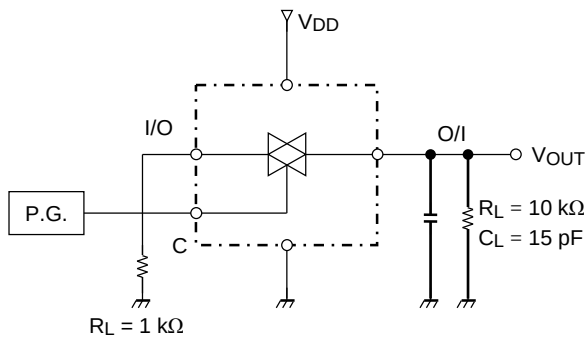
4. $f_{max}(C)$



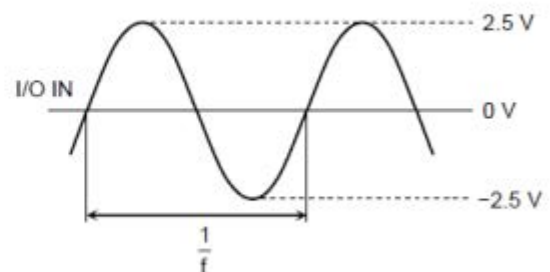
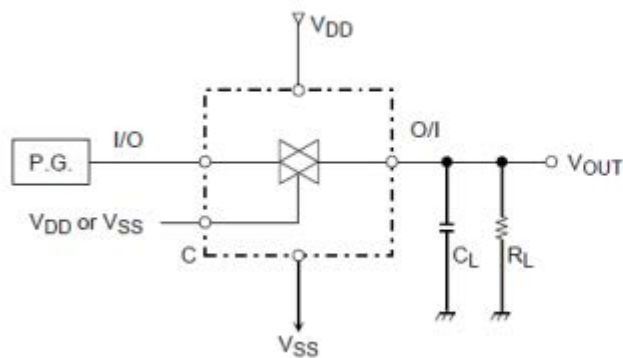
5. Crosstalk between Any Two Switches



6. Crosstalk, Control to Input



7. Total Harmonic Distortion, fmax (I-O), Feedthrough (Switch OFF)

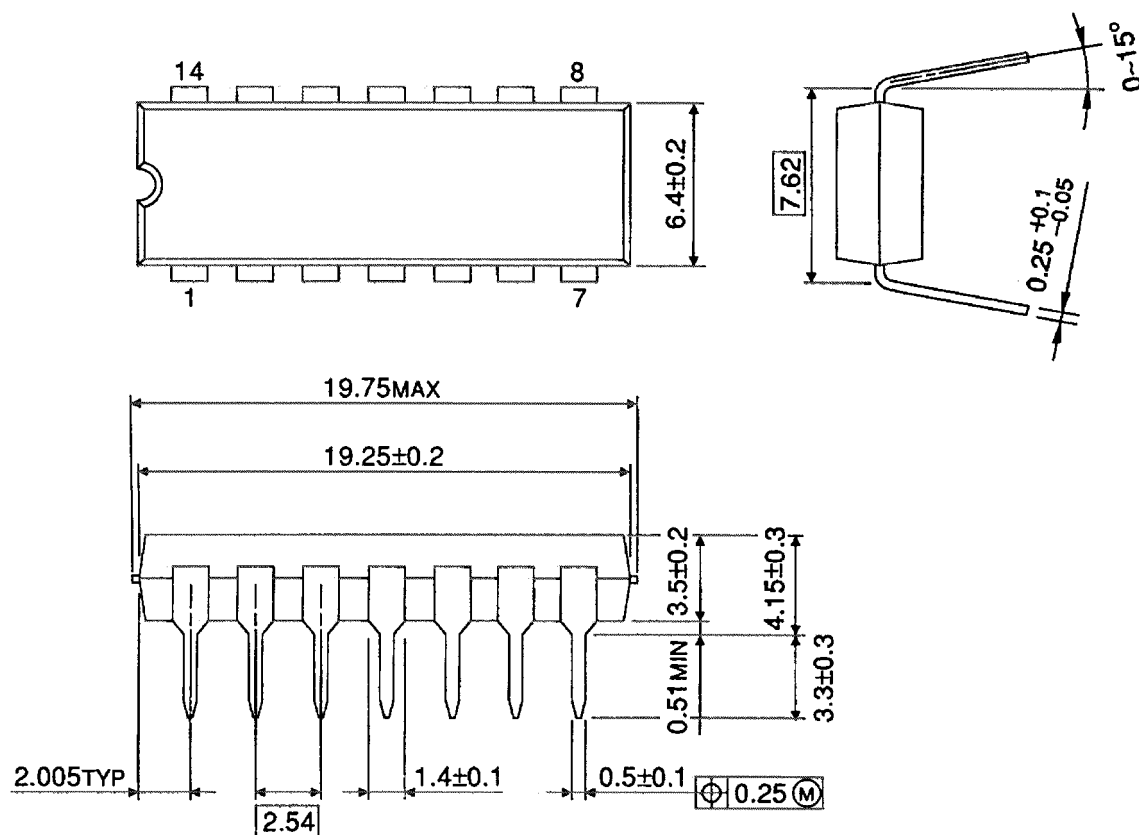


CL, RL: Reference to Test Condition

Package Dimensions

DIP14-P-300-2.54

Unit : mm

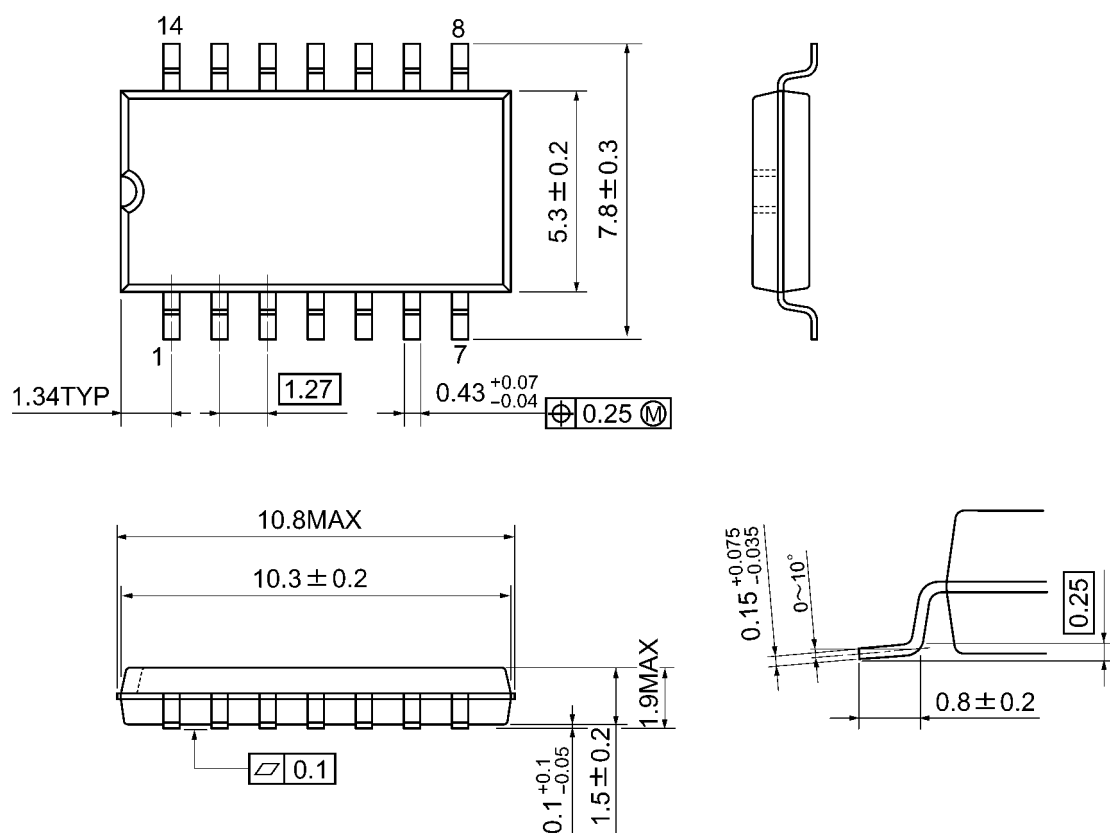


Weight: 0.96 g (typ.)

Package Dimensions

SOP14-P-300-1.27A

Unit: mm

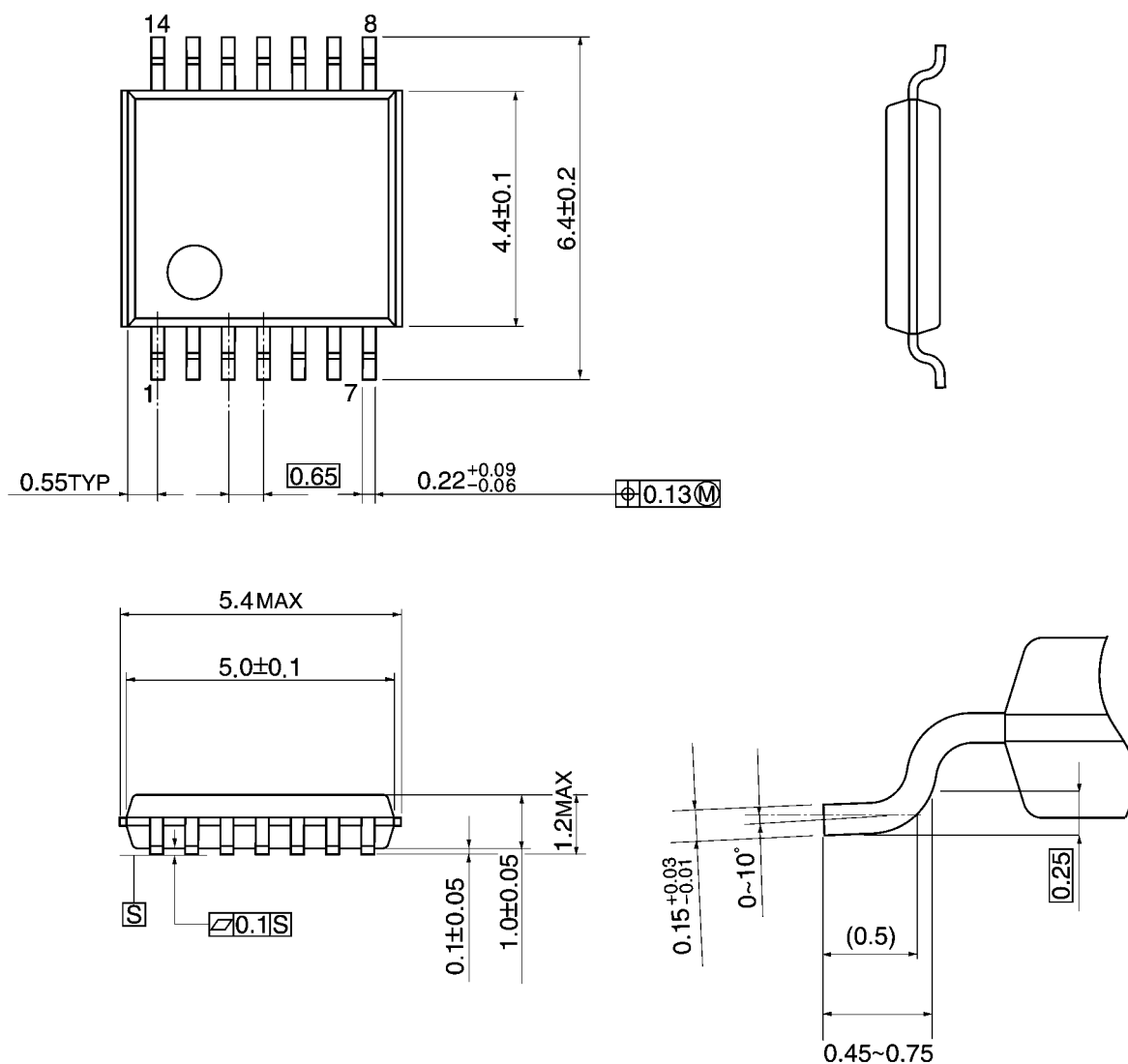


Weight: 0.18 g (typ.)

Package Dimensions

TSSOP14-P-0044-0.65A

Unit: mm



Weight: 0.06 g (typ.)

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