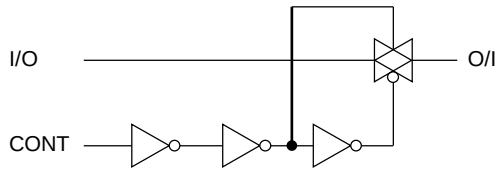
Logic Diagram

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 V, unless specified otherwise)

Characteristics		Symbol	Test Condition	V_{DD} (V)	-40°C Min	-40°C Max	25°C Min	25°C Typ.	25°C Max	85°C Min	85°C Max	Unit
Control input high voltage		V_{IH}	$\|I_{IS}\|$ = 10 μA	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 μA	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 ≤ V_{IS} ≤ VDD R_L = 10 kΩ	5	—	800	—	290	950	—	1200	Ω
				10	—	210	—	120	250	—	300	
				15	—	140	—	85	160	—	200	
ΔOn-state resistance (between any 2 switches)		$R_{ON}Δ$	—	5	—	—	—	10	—	—	—	Ω
				10	—	—	—	6	—	—	—	
				15	—	—	—	4	—	—	—	
Input/output leakage current		I_{OFF}	V_{IN} = 18 V, V_{OUT} = 0 V	18	—	±100	—	±0.1	±100	—	±1000	nA
			V_{IN} = 0 V, V_{OUT} = 18 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 V	18	—	0.1	—	10^{-5}	0.1	—	1.0	μA
	"L" level	I_{IL}	V_{IL} = 0 V	18	—	-0.1	—	-10^{-5}	-0.1	—	-1.0	

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 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 kΩ C_L = 50 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 kΩ C_L = 50 pF	0	5	—	45	80	ns
			0	10	—	30	70	
			0	15	—	25	60	
Max control input repetition rate	f_{max} (C)	R_L = 1 kΩ C_L = 50 pF	0	5	—	10	—	MHz
			0	10	—	12	—	
			0	15	—	12	—	
-3dB cutoff frequency	f_{max} (I-O)	R_L = 1 kΩ C_L = 15 pF (Note 1)	-5	5	—	30	—	MHz
Total harmonic distortion	—	R_L = 10 kΩ f = 1 kHz (Note 2)	-5	5	—	0.03	—	%
-50dB feed through frequency	—	R_L = 1 kΩ (Note 3)	-5	5	—	600	—	kHz
-50dB crosstalk frequency	—	R_L = 1 kΩ (Note 4)	-5	5	—	1	—	MHz
Crosstalk (control-OUT)	—	R_{IN} = 1 kΩ R_{OUT} = 10 kΩ C_L = 15 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 ±2.5 V_{p-p} shall be used for V_{IS} and the frequency of 20 log 10 $\frac{V_{OS}}{V_{IS}}$ = -3 dB shall be f_{max}.

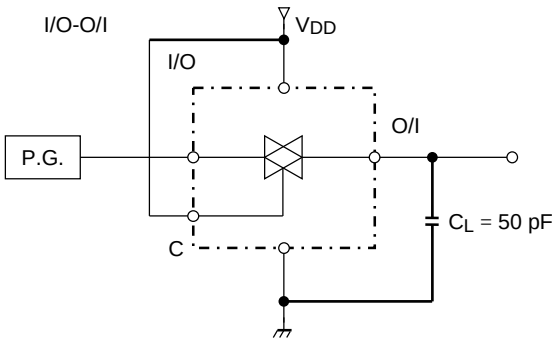
Note 2: V_{IS} shall be sine wave of ±2.5 V_{p-p}

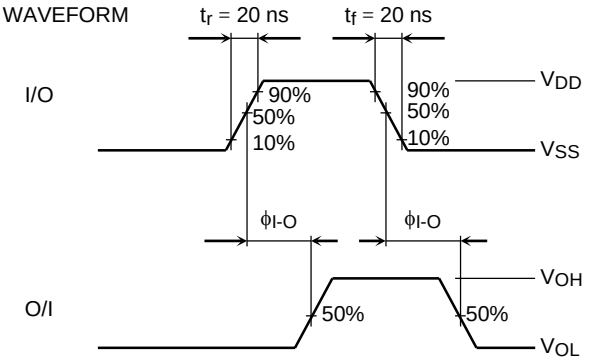
Note 3: Sine wave of ±2.5 V_{p-p} shall be used for V_{IS} and the frequency of 20 log 10 $\frac{V_{OS}}{V_{IS}}$ = -50 dB shall be feed-through.

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

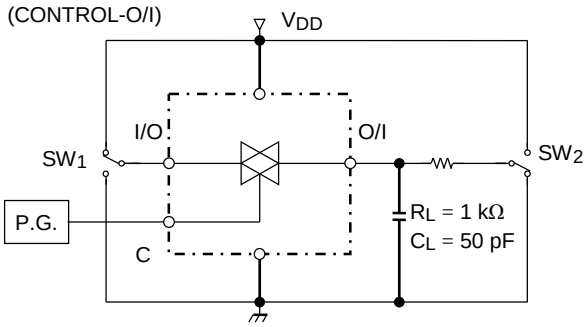
Circuit for Measurement of Electrical Characteristics

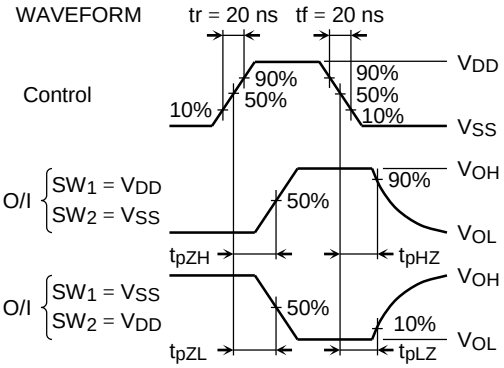
1. ϕ_{I-O}



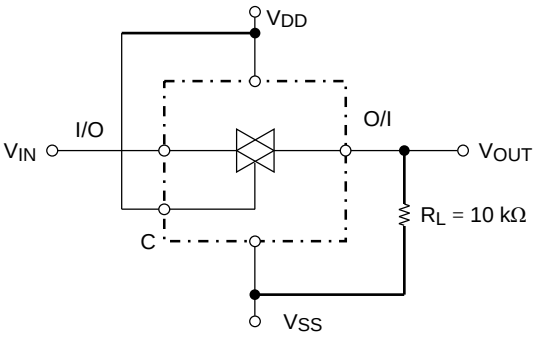


2. t_{pZL}, t_{pZH}, t_{pLZ}, t_{pHZ}





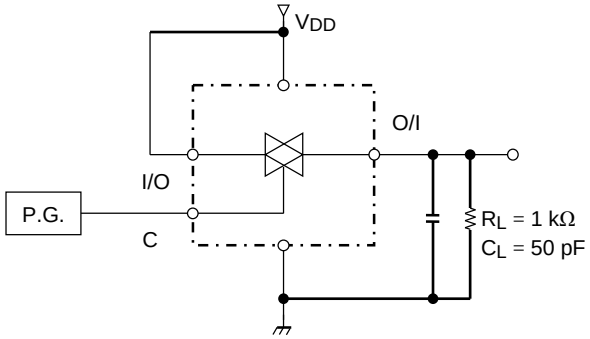
3. RON

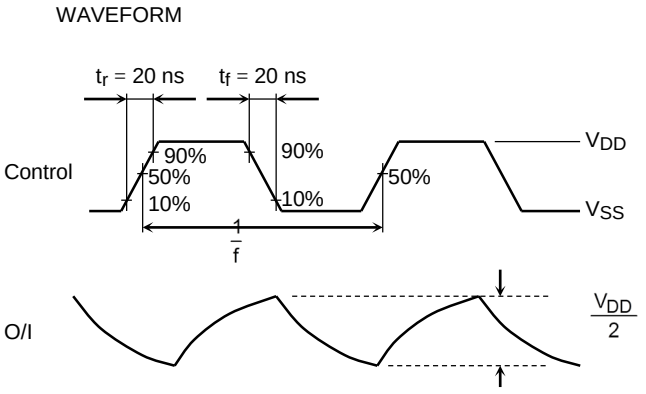


RON Calculation Method

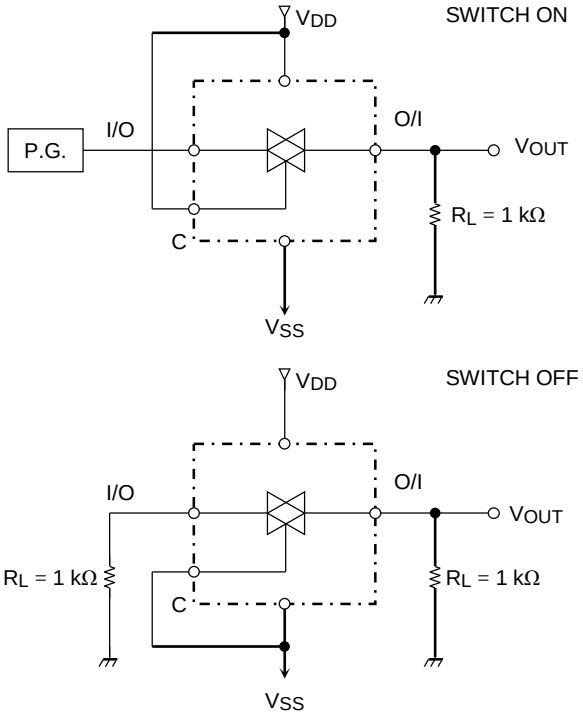
$$R_{ON} = 10 \times \frac{(V_{IN} - V_{OUT})}{V_{OUT}} [k\Omega]$$

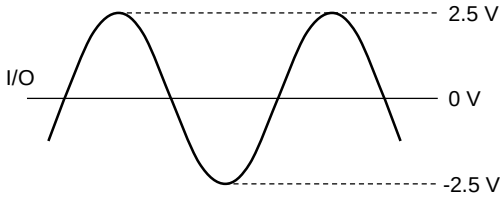
4. fmax (C)



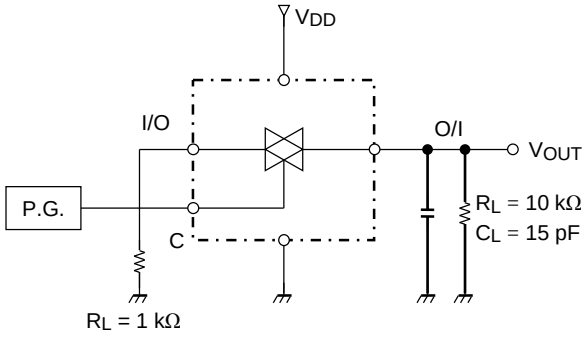


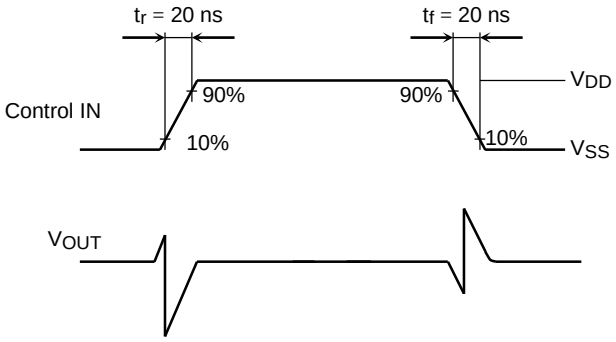
5. Crosstalk between Any Two Switches



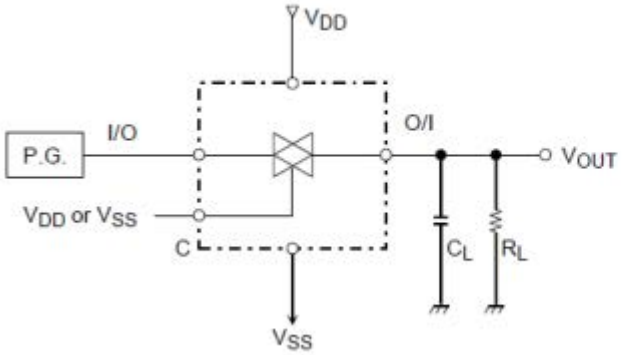


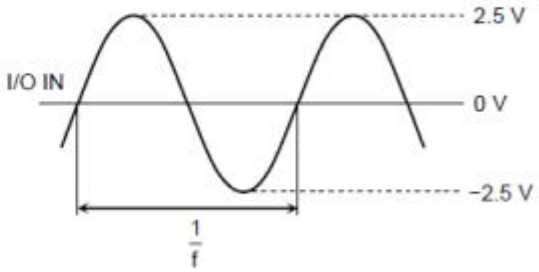
6. Crosstalk, Control to Input





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

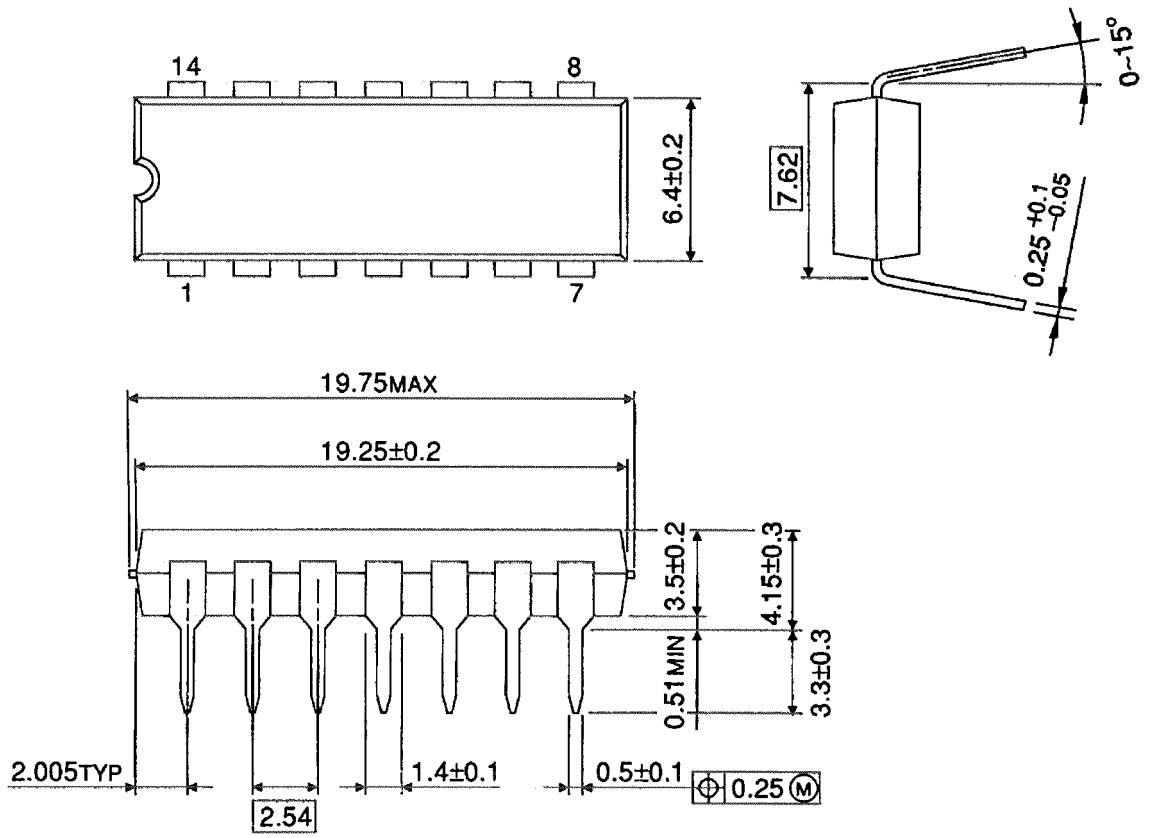




CL, RL: Reference to Test Condition

Package Dimensions

DIP14-P-300-2.54 Unit : mm

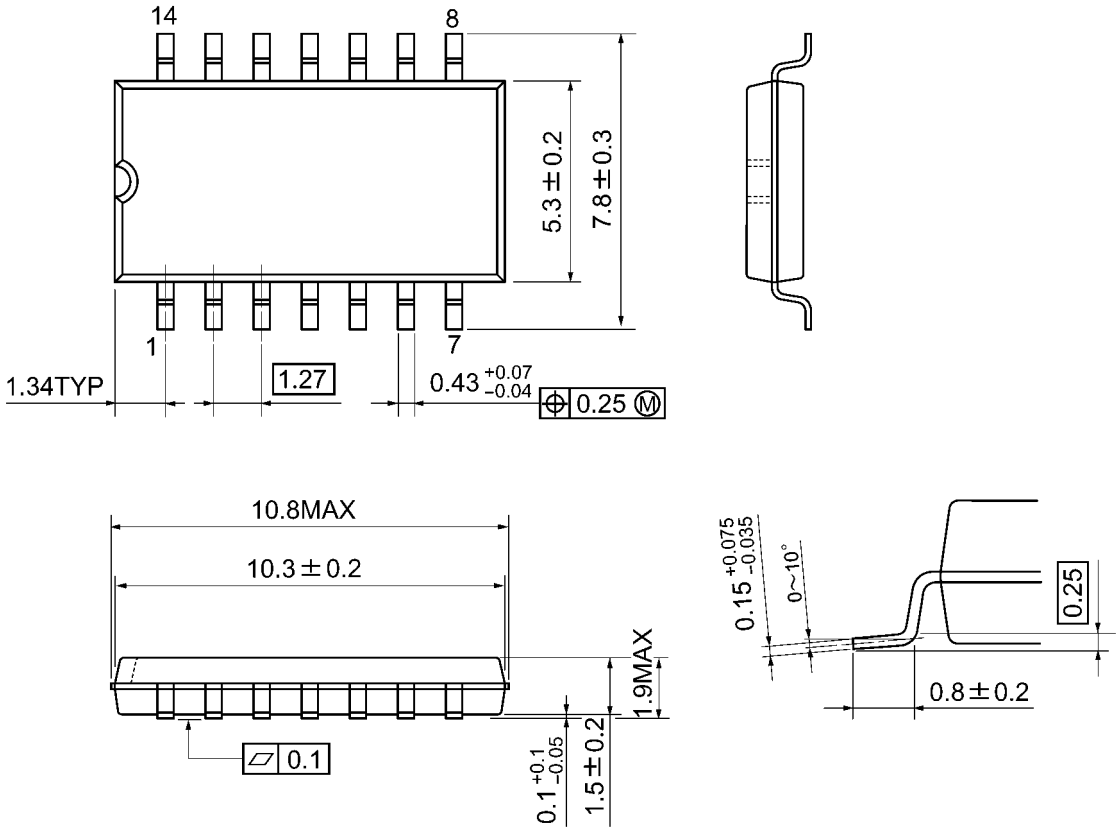


Weight: 0.96 g (typ.)

Package Dimensions

SOP14-P-300-1.27A

Unit: mm

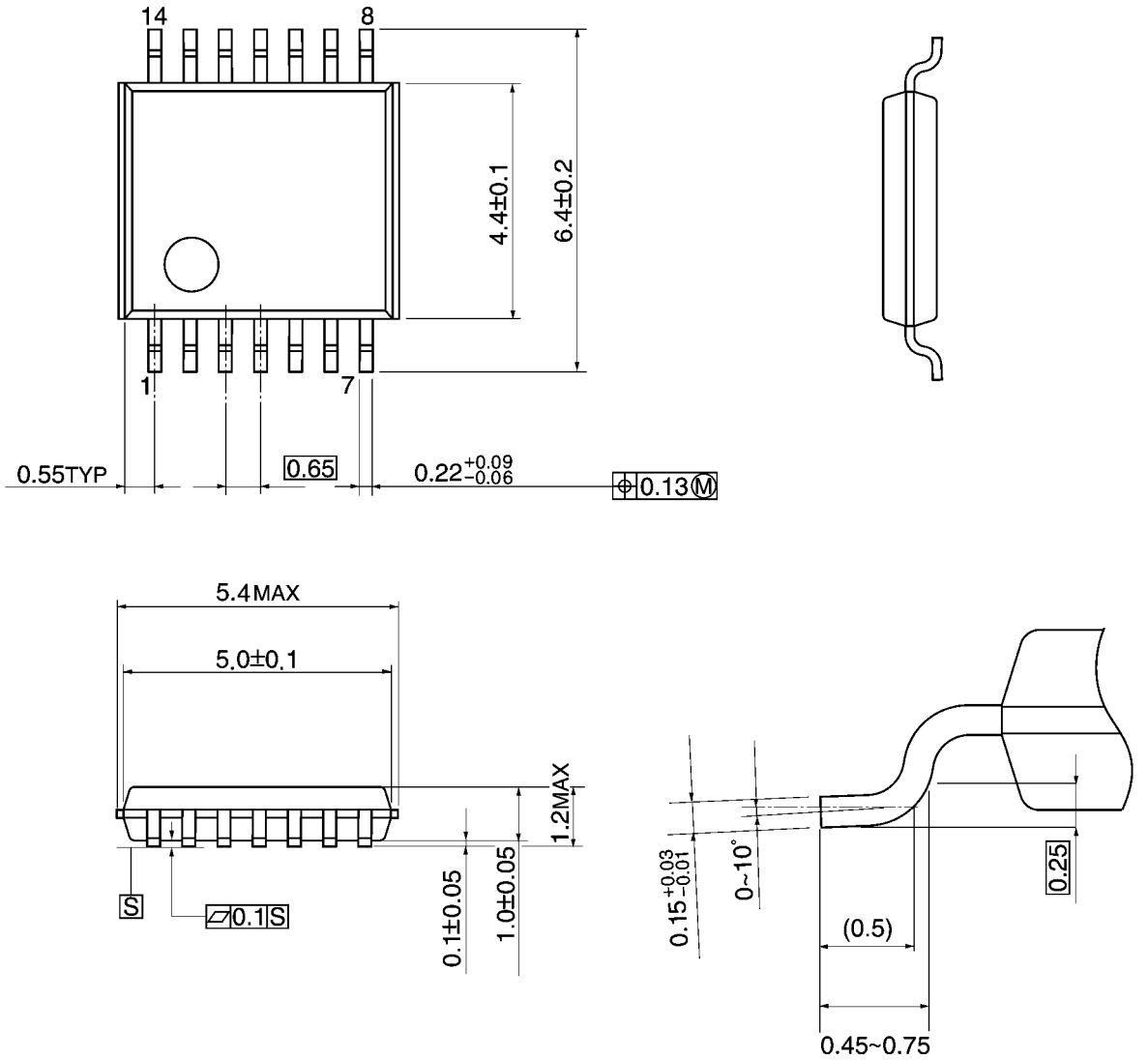


Weight: 0.18 g (typ.)

Package Dimensions

TSSOP14-P-0044-0.65A

Unit: mm



Weight: 0.06 g (typ.)

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