

設計驗證
工程課
2025 -10- 14
發行

PROSCORE
華鑫勝科技有限公司

APPROVAL SHEET

客戶名稱	鈺緯科技開發股份有限公司
產牌	TOSHIBA
品名	TC4S66F,LF　3ATC4S66F1Y(A0569)
供應商	華鑫勝科技有限公司 新北市新店區寶中路94號7樓之1 TEL:02-8913-5008
業務工程師	莊清華　Ext:68
日期	2025-09-22

承認日期	廠商簽章	客戶承認章
	華鑫勝科技有限公司 統一發票專用章 新北市 統一編號 24257830 新店區 負責人:莊仙化 TEL:89135008 寶中路94號7樓之1	設計驗證 工程課 2025 -10- 14 發行 鈺緯科技開發股份有限公司

TOSHIBA

Date: 08, Aug 2025

Certificate Regarding EU RoHS Controlled Substances

We hereby certify that the product as listed below under section 1 that we supply to you does/ do not contain the controlled 10 substances(Cd, Pb, Hg, Cr6+, PBBs, PBDEs, DEHP, DBP, BBP and DIBP) of EU RoHS Directive 2011/65/EU (as of the date hereof) listed below under Section 2 exceeding their maximum concentration values listed below by weight in homogenous materials (#1). However, the exemptions under EU RoHS Directive 2011/65/EU (as of the date hereof) are excluded.

(#1)Homogenous material means a material that can not be mechanically disjoined into different materials.
The term 'homogeneous' means "of uniform composition throughout". Examples of "homogeneous materials" are individual types of:plastics, ceramics, glass, metals, alloys, paper, board, resins and coatings.
The term "mechanically disjointed" means that the materials can, in principle, be separated by mechanical actions such as: unscrewing, cutting, crushing, grinding and abrasive processes.

1. Applicable product

TC4S66F

Please contact your TOSHIBA sales representative for details of applicable Product.

2. The controlled 10 substances and their maximum concentration values under EU RoHS Directive 2011/65/EU (as of the date hereof)

Cadmium and its compounds	100ppm or less
Lead and its compounds	1000ppm or less
Mercury and its compounds	1000ppm or less
Hexavalent Chromium compounds	1000ppm or less
PBBs	1000ppm or less
PBDEs	1000ppm or less
DEHP (Bis(2-ethylhexyl) phthalate)	1000ppm or less
BBP (Butyl benzyl phthalate)	1000ppm or less
DBP (Dibutyl phthalate)	1000ppm or less
DIBP (Diisobutyl phthalate)	1000ppm or less

Remarks;

*EU RoHS Directive means EU RoHS Directive 2011/65/EU (as of the date hereof; Controlled 10 substances: Cd, Pb, Hg, Cr6+, PBB, PBDE, DEHP, DBP, BBP and DIBP).
*This certificate covers only product, and the packing materials and the substances used in manufacturing process are excluded from this certificate.
*The information provided herein is accurate as of the date that it was provided, to the best of the knowledge and belief of the undersigning company.
This certificate is intended only for the use of the company to which it is addressed and no other person or entity is entitled to rely on it.

Toshiba Electronic Devices & Storage Corporation
Headquarter Quality Assurance Div.
General Manager

TOSHIBA

Date: 08, Aug 2025

Certificate on Content of SVHC of EU REACH

I. Content of SVHC.

The undersigning company ("Toshiba") hereby certifies that the substances, which dates are specified ON or BEFORE 25/06/2025 under the column "date of inclusion", in SVHC (Substances of Very High Concern) Candidate List announced by ECHA (European Chemicals Agency) are not content as known ingredients over 1000ppm per product weight in the below product.
Lead oxide and Diboron Trioxide in the glass or ceramic materials are not regarded as SVHC based on the industry's position issued by JEITA (Japan Electronics and Information Technology Industries Association).

II. Applicable Product. (Part Number)

TC4S66F

Please contact your TOSHIBA sales representative for details of applicable Product.

III. Certification.

Toshiba hereby certifies that all of the information provided in this Certificate is true and correct as of the date hereof.

Toshiba Electronic Devices & Storage Corporation
Headquarter Quality Assurance Div.
General Manager

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Certain of the information contained herein is simplified guidance based on complex and changing legislation, and does not constitute legal advice.
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CMOS Digital Integrated Circuits Silicon Monolithic

TC4S66F,TC4S66FU

1. Functional Description

- Bilateral Switch

2. General

TC4S66F, TC4S66FU contains one circuit of bidirectional switches.

When control input, CONT is set to "H" level, the impedance between input and output of the switch becomes low and when it is set to "L" level, the switch becomes high.

This can be applied for switching of analog signals and digital signals.

3. Features

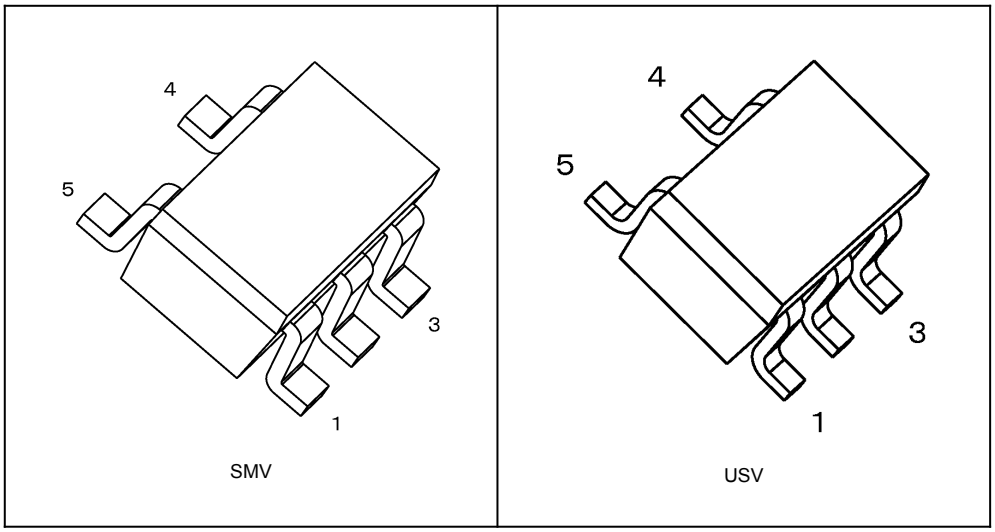
(1) ON resistance: R_{ON} = 250 Ω (Typ.) at V_{DD} - V_{SS} = 5 V

R_{ON} = 110 Ω (Typ.) at V_{DD} - V_{SS} = 10 V

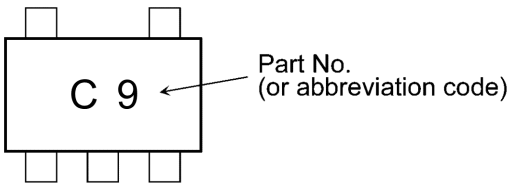
R_{ON} = 70 Ω (Typ.) at V_{DD} - V_{SS} = 15 V

(2) OFF resistance: R_{OFF} (Typ.) > 10^9 Ω

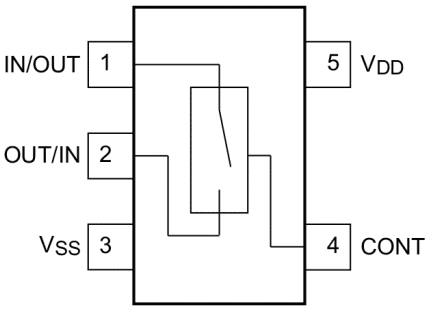
4. Packaging



5. Marking and Pin Assignment



Marking

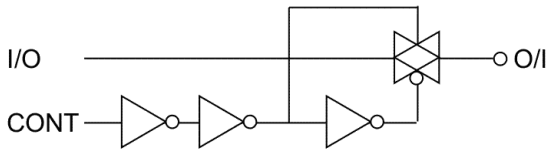


Pin Assignment (Top view)

Start of commercial production
1988-01

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6. Logic Diagram



7. Truth Table

Control	Impedance between IN/OUT-OUT/IN (Note 1)
H	0.5 to 5.0 × 10^2 Ω
L	> 10^9 Ω

Note 1: See electrical characteristics

8. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Rating	Unit
DC Supply voltage	V_{DD}	V_{SS} - 0.5 to V_{SS} + 20	V
Input voltage	V_{IN}	V_{SS} - 0.5 to V_{DD} + 0.5	
Switch I/O voltage.	$V_{I/O}$	V_{SS} - 0.5 to V_{DD} + 0.5	
Power dissipation	P_D	200	mW
Potential difference across I/O during ON	V_I-V_O	±0.5	V
Input current	I_{IN}	±10	mA
Operation temperature range	T_{opr}	-40 to 85	°C
Storage temperature	T_{stg}	-65 to 150	°C
Lead temperature (10 s)	T_L	260	°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).

9. Operating Ranges (V_{SS} = 0 V)

Characteristics	Symbol	Min	Typ.	Max	Unit
DC Supply voltage	V_{DD}	3	—	18	V
Switch I/O voltage.	$V_{I/O}$	0	—	V_{DD}	V

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10. Electrical Characteristics

10.1. Electrical Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Test Condition	V_{DD} (V)	Min	Typ.	Max	Unit
High-level input voltage	V_{IH}	$\|I_{IS}\|$ = 10 μA	5	3.5	2.75	—	V
			10	7.0	5.50	—	
			15	11.0	8.25	—	
Low-level input voltage	V_{IL}	$\|I_{IS}\|$ = 10 μA	5	—	2.25	1.5	
			10	—	4.5	3.0	
			15	—	6.75	4.0	
ON-resistance	R_{ON}	$0 \le V_{IS} \le V_{DD}$ R_L = 10 kΩ	5	—	290	950	Ω
			10	—	120	250	
			15	—	85	160	
Power-OFF leakage current	I_{OFF}	V_{IN} = 18 V, V_{OUT} = 0 V V_{IN} = 0 V, V_{OUT} = 18 V	18	—	±0.1	±100	nA
			18	—	±0.1	±100	
Quiescent device current	I_{DD}	V_{IN} = V_{DD}, V_{SS}	5	—	0.001	0.25	μA
			10	—	0.001	0.5	
			15	—	0.002	1.0	
High level input current	I_{IH}	V_{IH} = 18 V	18	—	10^{-5}	0.1	μA
Low level input current	I_{IL}	V_{IL} = 0 V	18	—	-10^{-5}	-0.1	

10.2. Electrical Characteristics (Unless otherwise specified, T_a = -40 °C)

Characteristics	Symbol	Test Condition	V_{DD} (V)	Min	Max	Unit
High-level input voltage	V_{IH}	$\|I_{IS}\|$ = 10 μA	5	3.5	—	V
			10	7.0	—	
			15	11.0	—	
Low-level input voltage	V_{IL}	$\|I_{IS}\|$ = 10 μA	5	—	1.5	
			10	—	3.0	
			15	—	4.0	
ON-resistance	R_{ON}	$0 \le V_{IS} \le V_{DD}$ R_L = 10 kΩ	5	—	800	Ω
			10	—	210	
			15	—	140	
Power-OFF leakage current	I_{OFF}	V_{IN} = 18 V, V_{OUT} = 0 V V_{IN} = 0 V, V_{OUT} = 18 V	18	—	±100	nA
			18	—	±100	
Quiescent device current	I_{DD}	V_{IN} = V_{DD}, V_{SS}	5	—	0.25	μA
			10	—	0.5	
			15	—	1.0	
High level input current	I_{IH}	V_{IH} = 18 V	18	—	0.1	μA
Low level input current	I_{IL}	V_{IL} = 0 V	18	—	-0.1	

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10.3. Electrical Characteristics (Unless otherwise specified, T_a = 85 °C)

Characteristics	Symbol	Test Condition	V_{DD} (V)	Min	Max	Unit
High-level input voltage	V_{IH}	$\|I_{IS}\|$ = 10 μA	5	3.5	—	V
			10	7.0	—	
			15	11.0	—	
Low-level input voltage	V_{IL}	$\|I_{IS}\|$ = 10 μA	5	—	1.5	
			10	—	3.0	
			15	—	4.0	
ON-resistance	R_{ON}	$0 \le V_{IS} \le V_{DD}$ R_L = 10 kΩ	5	—	1200	Ω
			10	—	300	
			15	—	200	
Power-OFF leakage current	I_{OFF}	V_{IN} = 18 V, V_{OUT} = 0 V V_{IN} = 0 V, V_{OUT} = 18 V	18	—	±1000	nA
			18	—	±1000	
Quiescent device current	I_{DD}	V_{IN} = V_{DD}, V_{SS}	5	—	7.5	μA
			10	—	15	
			15	—	30	
High level input current	I_{IH}	V_{IH} = 18 V	18	—	1.0	μA
Low level input current	I_{IL}	V_{IL} = 0 V	18	—	-1.0	

11. Switching Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Note	Test Condition	V_{SS} (V)	V_{DD} (V)	Min	Typ.	Max	Unit
Propagation delay time(IN-OUT)	t_{PLH},t_{PHL}		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	—	
Maximum frequency response	$f_{MAX(I-O)}$	(Note 1)	R_L = 1 kΩ C_L = 50 pF	-5	5	—	30	—	
Total Harmonic Distortion	THD	(Note 2)	R_L = 10 kΩ f = 1 kHz	-5	5	—	0.03	—	%
Feed through attenuation (SWITCH OFF)	FTH	(Note 3)	R_L = 1 kΩ	-5	5	—	600	—	kHz
Crosstalk(CONTROL-OUT)	Xtalk		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	—	
Feedthrough capacitance	C_{IOS}		—			—	0.5	—	pF

Note 1: The frequency at 20 log10 V_{OS}/V_{IS} = -3 dB shall be $f_{MAX(I-O)}$ using sine wave of ±2.5 Vp-p for V_{IS}.
Note 2: V_{IS} shall be sine wave of ±2.5 V.
Note 3: The frequency at 20 log10 V_{OS}/V_{IS} = -50 dB shall be the feed through using of ±2.5 Vp-p.

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11.1. Switching Test Circuit

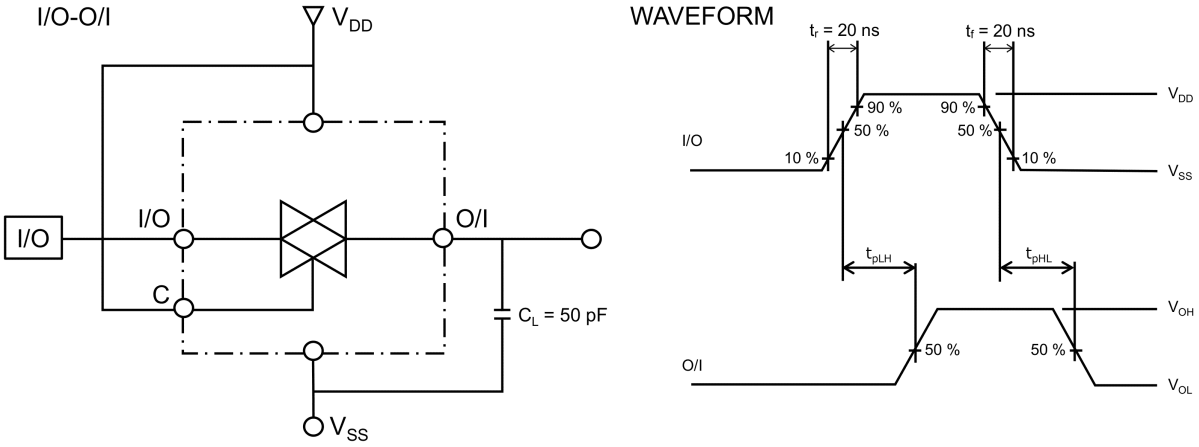


Fig. 11.1.1 t_{pLH}, t_{pHL}

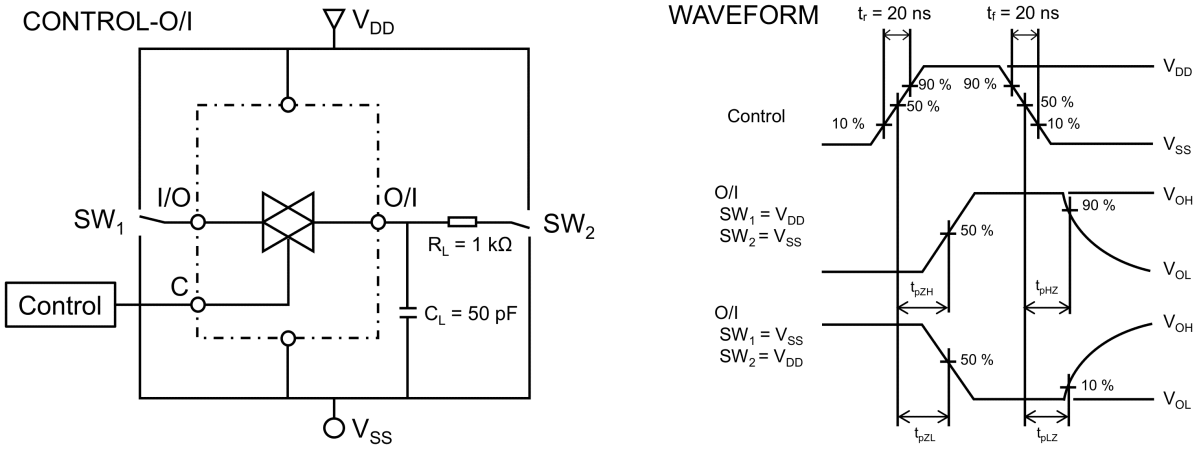


Fig. 11.1.2 t_{pZL}.t_{pZH}, t_{pLZ}, t_{pHZ}

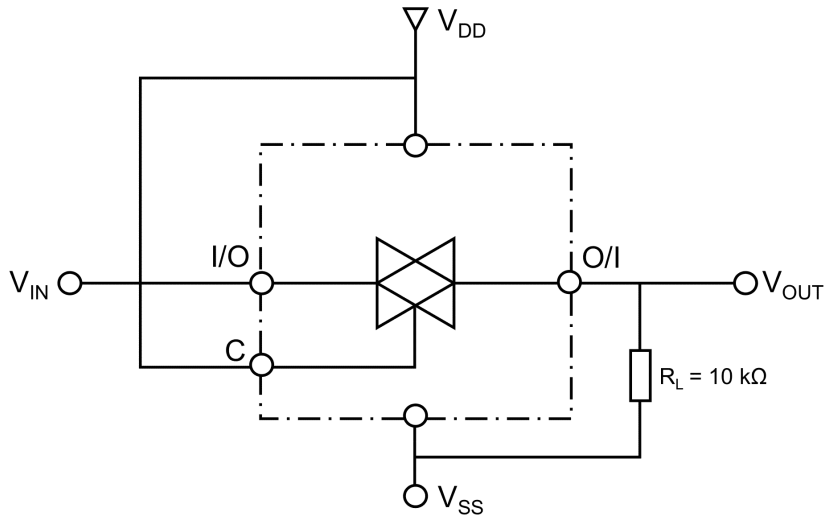


Fig. 11.1.3 R_{ON}

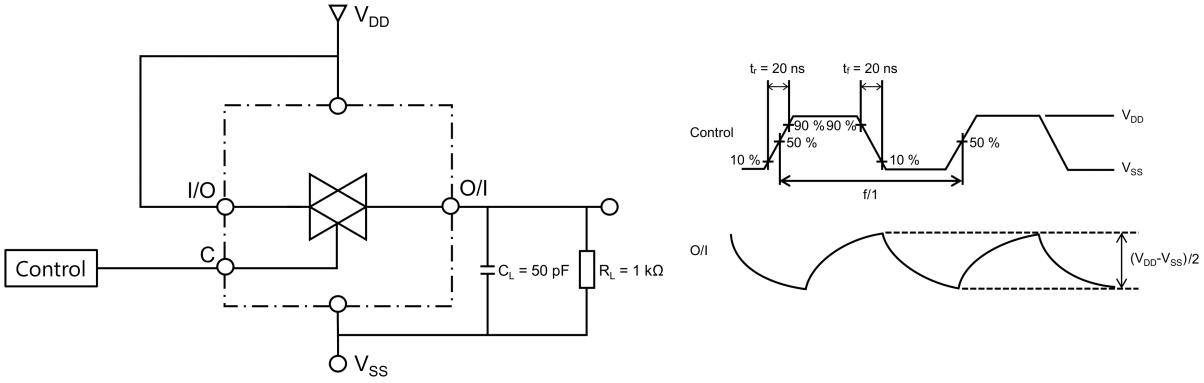


Fig. 11.1.4 f_{MAX} (C)

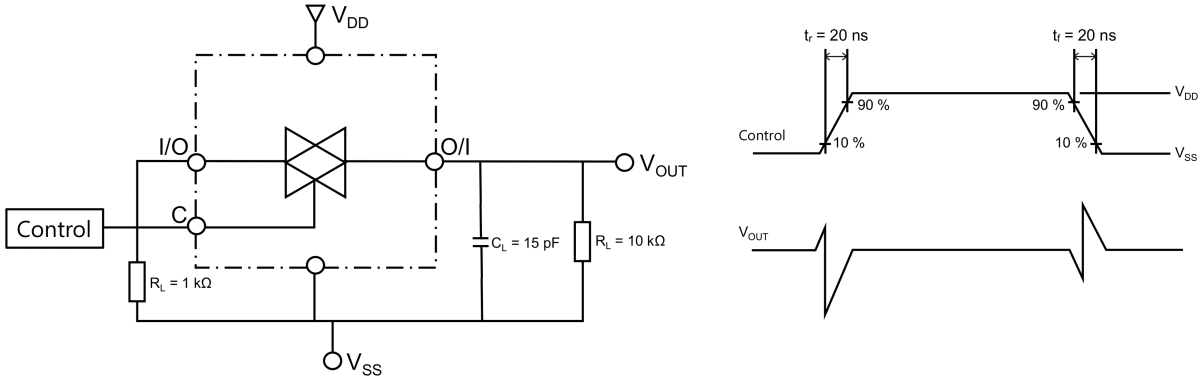
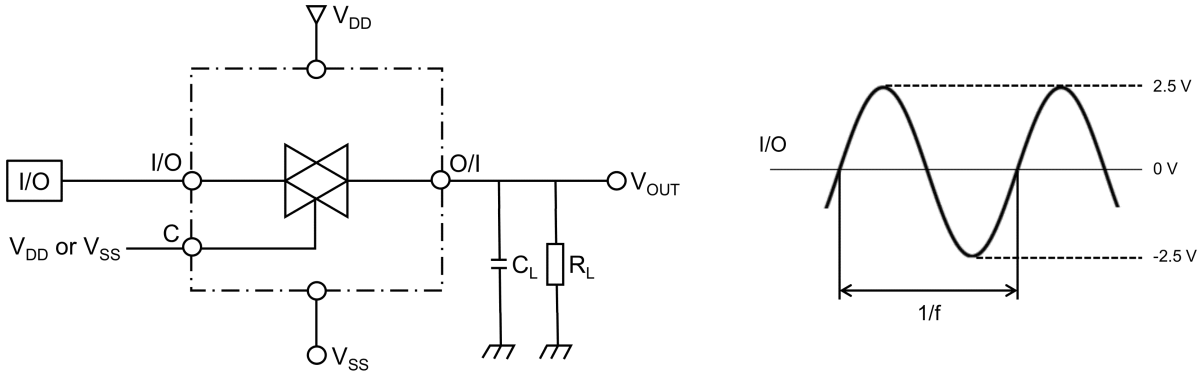


Fig. 11.1.5 CROSSTALK(CONTROL INPUT)



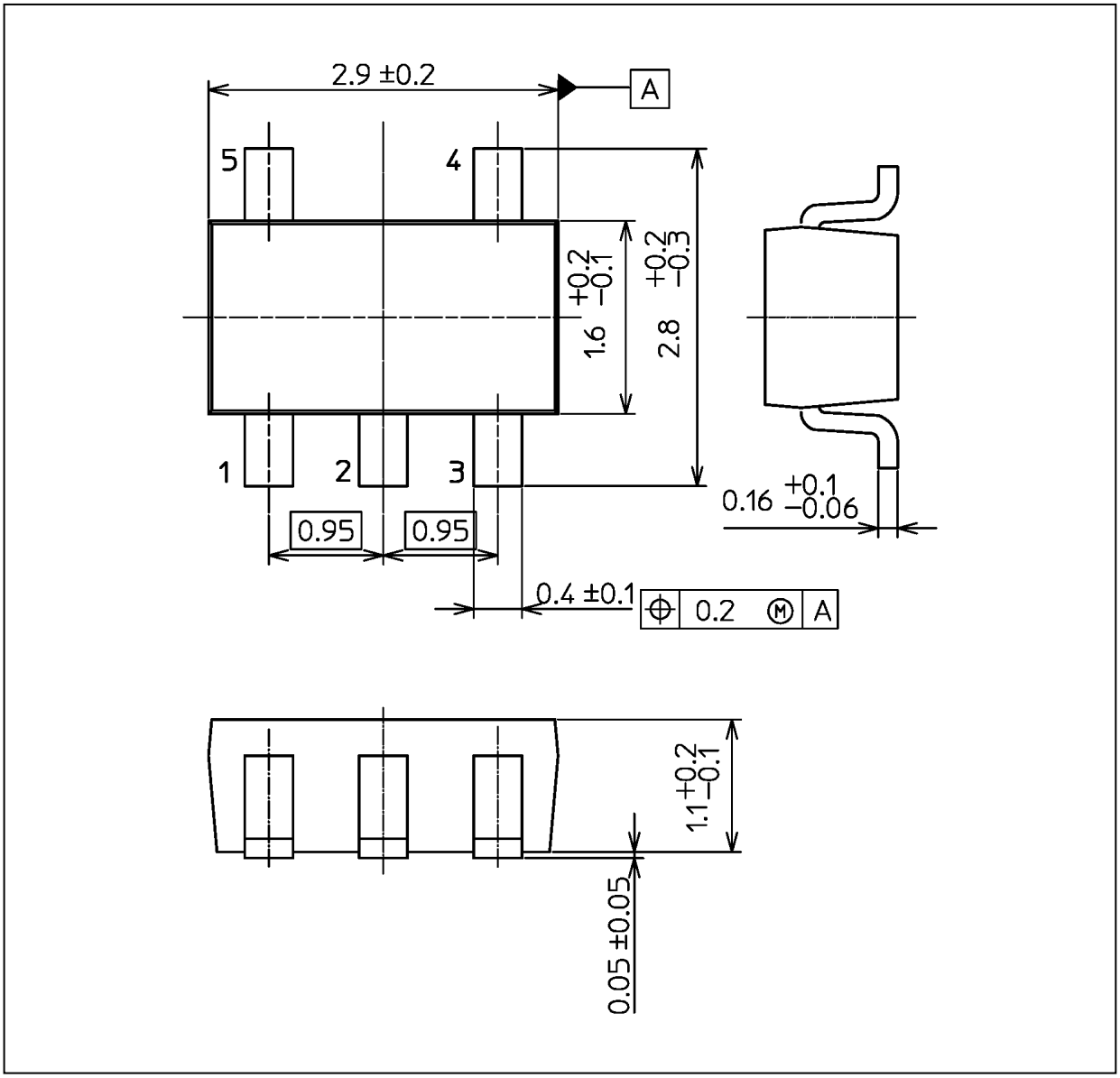
C_L, R_L: Reference to Test Condition

Fig. 11.1.6 TOTAL HARMONIC DISTORTION, f_{MAX}(I/O-O/I), FEEDTHRU(SWITCH OFF)

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Package Dimensions

Unit: mm

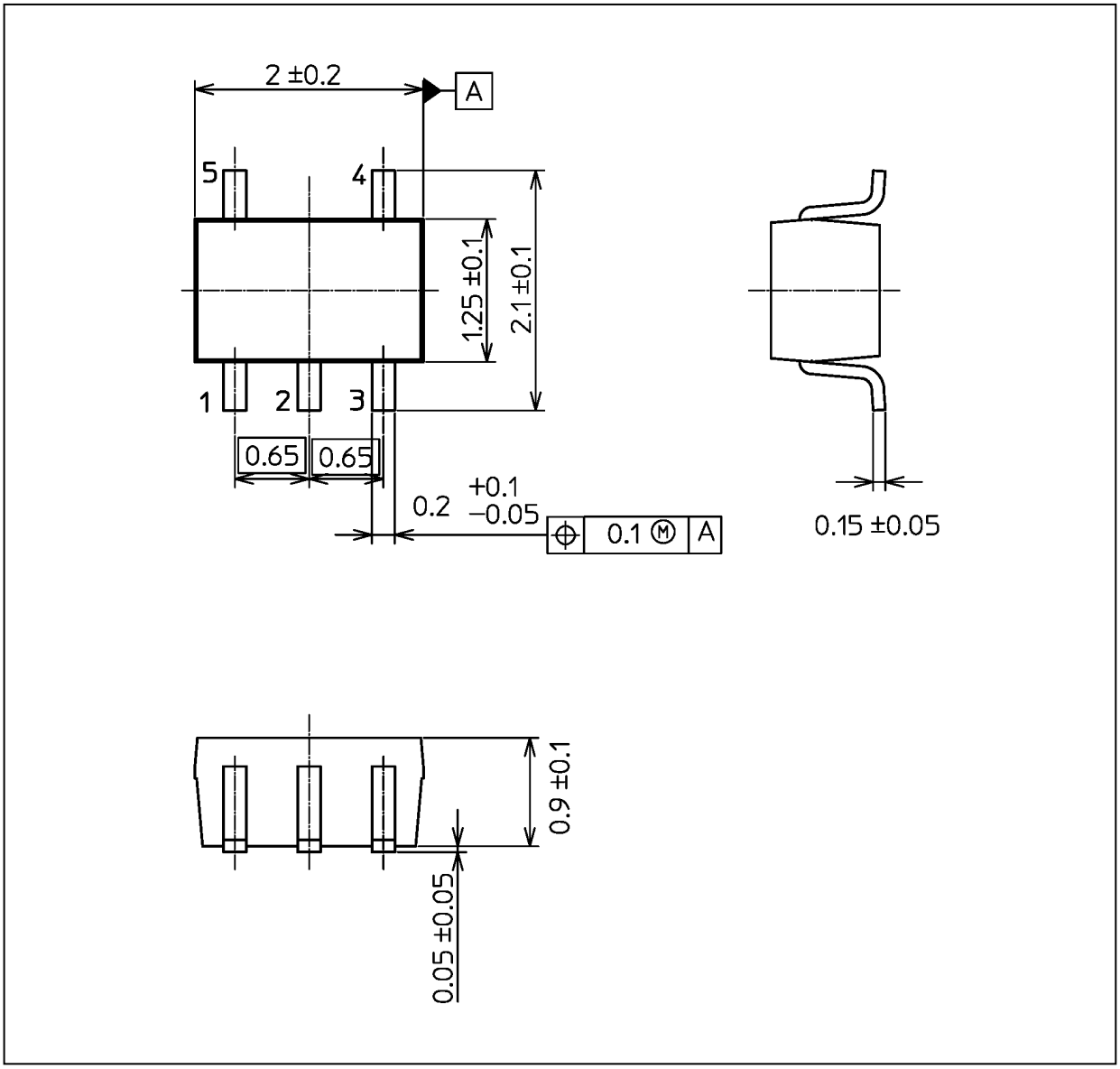


Weight: 14 mg (typ.)

Package Name(s)
JEDEC: SOT-25
Nickname: SMV

Package Dimensions

Unit: mm



Weight: 0.006 g (typ.)

Package Name(s)
JEDEC: SOT-353
Nickname: USV

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