Low Power Single Buffer (Open-drain)

CJ74AUP1G07 Logic

1 Introduction

The CJ74AUP1G07 provides the single non-inverting buffer with open-drain output. The output of the device is an open drain and can be connected to other open-drain outputs to implement active-LOW wired-OR or active-HIGH wired-AND functions.

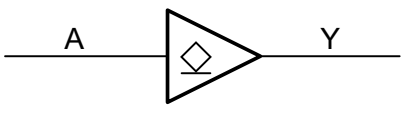
This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8V to 3.6V.

This device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

2 Available Packages

PART NUMBER	PACKAGE
CJ74AUP1G07	SOT-23-5L
	SOT-353

Note: For all available packages, please refer to the part Orderable Information.



Simplified schematic

3 Features

- Wide supply voltage range from 0.8V to 3.6V
- Low static power consumption; I_{CC}=1uA (maximum)
- Inputs accept voltages up to 3.6V
- I_{OFF} circuitry provides partial Power-down mode operation
- Specified from: -40°C to +125°C

4 Applications

- ATCA Solutions
- Active Noise Cancellation (ANC)
- Barcode Scanner
- Blood Pressure Monitor
- CPAP Machine
- Cable Solutions
- DLP 3D Machine Vision, Hyperspectral Imaging, Optical Networking, and Spectroscopy
- E-Book
- Embedded PC
- Field Transmitter: Temperature or Pressure Sensor
- Fingerprint Biometrics
- HVAC: Heating, Ventilating, and Air Conditioning
- Network-Attached Storage (NAS)
- Server Motherboard and PSU
- Software Defined Radio (SDR)
- TV: High-Definition (HDTV), LCD, and Digital
- Video Communications System
- Wireless Data Access Card, Headset, Keyboard, Mouse, and LAN Card
- X-ray: Baggage Scanner, Medical, and Dental

5 Orderable Information

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74AUP1G07M5N	SOT-23-5L	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units / Reel	Active
CJ74AUP1G07R5N	SOT-353	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units / Reel	Active

Note:

ECO PLAN: For the RoHS and Green certification standards of this product, please refer to the official report provided by JSCJ.

MSL: Moisture Sensitivity Level. Determined according to JEDEC industry standard classification.

SORT: Specifically defined as follows:
Active: Recommended for new products;
Customized: Products manufactured to meet the specific needs of customers;
Preview: The device has been released and has not been fully mass produced. The sample may or may not be available;
NoRD: It is not recommended to use the device for new design. The device is only produced for the needs of existing customers;
Obsolete: The device has been discontinued.

6 Pin Configuration and Marking Information

6.1 Pin Configuration

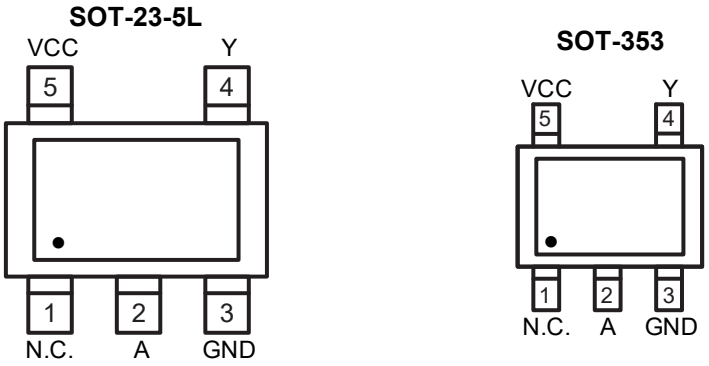


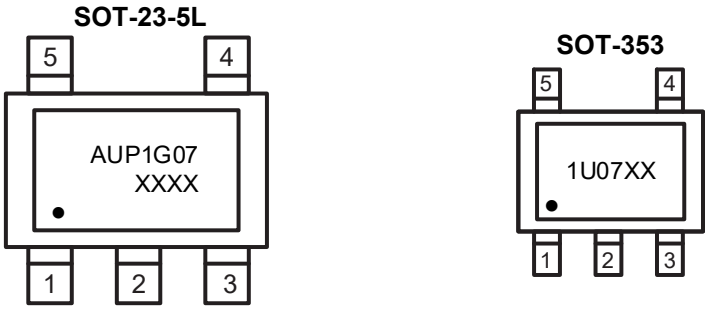
Figure 6-1 Pin configuration

6.2 Pin Function

PIN		I/O(1)	DESCRIPTION
No.	NAME		
1	N.C.	-	Not connected
2	A	I	Data input
3	GND	G	Ground (0V)
4	Y	O	Data output
5	VCC	P	Supply voltage

(1) I-Input, O-Output, P-Power, G-Ground

6.3 Marking Information



XXXX or XX: Code, indicates weekly record information.

7 Specifications

7.1 Absolute Maximum Ratings

T_{amb}=25°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CC}	Supply voltage	-	-0.5	+4.6	V
I_{IK}	Input clamping current	V_I < 0V	-50	-	mA
V_I	Input voltage	-	-0.5	+4.6	V
I_{OK}	Output clamping current	V_O < 0V	-50	-	mA
V_O	Output voltage	Active mode and power-down mode	-0.5	+4.6	V
I_O	Output current	V_O=0V to V_{CC}	-	20	mA
I_{CC}	Supply current	-	-	50	mA
I_{GND}	Ground current	-	-50	-	mA
T_{stg}	Storage temperature	-	-65	+150	°C
P_{tot}	Total power dissipation	-	-	250	mW
T_L	Soldering temperature	10s	-	260	°C

Note: Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to GND. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

7.2 Recommended Operating Conditions

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CC}	Supply voltage	-	0.8	-	3.6	V
V_I	Input voltage	-	0	-	3.6	V
V_O	Output voltage	Active mode and power-down mode	0	-	3.6	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C
Δt/ΔV	Input transition rise and fall rate	V_{CC}=0.8V to 3.6V	0	-	200	ns/V

7.3 ESD Ratings

SYMBOL	ESD RATINGS		VALUE	UNIT
$V_{ESD-HBM}$	Electrostatic discharge	Human body model (HBM)(1)	±2000	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

7.4 Electrical Characteristics

7.4.1 DC Characteristics 1

T_{amb}=25°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	V_{CC}=0.8V		0.70xV_{CC}	-	-	V
		V_{CC}=0.9V to 1.95V		0.65xV_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.6	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
V_{IL}	LOW-level input voltage	V_{CC}=0.8V		-	-	0.30xV_{CC}	V
		V_{CC}=0.9V to 1.95V		-	-	0.35xV_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}	I_O=20uA; V_{CC}=0.8V to 3.6V	-	-	0.1	V
			I_O=1.1mA; V_{CC}=1.1V	-	-	0.3xVCC	V
			I_O=1.7mA; V_{CC}=1.4V	-	-	0.31	V
			I_O=1.9mA; V_{CC}=1.65V	-	-	0.31	V
			I_O=2.3mA; V_{CC}=2.3V	-	-	0.31	V
			I_O=3.1mA; V_{CC}=2.3V	-	-	0.44	V
			I_O=2.7mA; V_{CC}=3.0V	-	-	0.31	V
			I_O=4.0mA; V_{CC}=3.0V	-	-	0.44	V
I_I	Input leakage current	V_I=GND to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
I_{OZ}	OFF-state output current	V_I=V_{IH}; V_O=0V to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
I_{OFF}	Power-off leakage current	V_I or V_O=0V to 3.6V; V_{CC}=0V		-	-	±1.0	uA
ΔI_{OFF}	Additional power-off leakage current	V_I or V_O=0V to 3.6V; V_{CC}=0V to 0.2V		-	-	±1.0	uA
I_{CC}	Supply current	V_I=GND or V_{CC}; I_O=0A; V_{CC}=0.8V to 3.6V		-	-	1.0	uA
ΔI_{CC}	Additional supply current	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=3.3V		-	-	40	uA
C_I	Input capacitance	V_{CC}=0V to 3.6V; V_I=GND or V_{CC}		-	0.8	-	pF
C_O	Output capacitance	Output enabled; V_O=GND; V_{CC}=0V		-	1.7	-	pF
		Output disabled; V_O=GND; V_{CC}=0V		-	1.1	-	pF

7.4.2 DC Characteristics 2

T_{amb}=-40°C to +85°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	V_{CC}=0.8V	0.70xV_{CC}	-	-	V
		V_{CC}=0.9V to 1.95V	0.65xV_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V	1.6	-	-	V
		V_{CC}=3.0V to 3.6V	2.0	-	-	V

V_{IL}	LOW-level input voltage	V_{CC}=0.8V		-	-	0.30xV_{CC}	V
		V_{CC}=0.9V to 1.95V		-	-	0.35xV_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}	I_O=20uA; V_{CC}=0.8V to 3.6V	-	-	0.1	V
			I_O=1.1mA; V_{CC}=1.1V	-	-	0.3xV_{CC}	V
			I_O=1.7mA; V_{CC}=1.4V	-	-	0.37	V
			I_O=1.9mA; V_{CC}=1.65V	-	-	0.35	V
			I_O=2.3mA; V_{CC}=2.3V	-	-	0.33	V
			I_O=3.1mA; V_{CC}=2.3V	-	-	0.45	V
			I_O=2.7mA; V_{CC}=3.0V	-	-	0.33	V
			I_O=4.0mA; V_{CC}=3.0V	-	-	0.45	V
I_I	Input leakage current	V_I=GND to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
I_{OZ}	OFF-state output current	V_I=V_{IH}; V_O=0V to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
I_{OFF}	Power-off leakage current	V_I or V_O=0V to 3.6V; V_{CC}=0V		-	-	±1.0	uA
ΔI_{OFF}	Additional power-off leakage current	V_I or V_O=0V to 3.6V; V_{CC}=0V to 0.2V		-	-	±1.0	uA
I_{CC}	Supply current	V_I=GND or V_{CC}; I_O=0A; V_{CC}=0.8V to 3.6V		-	-	1.0	uA
ΔI_{CC}	Additional supply current	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=3.3V		-	-	50	uA

7.4.3 DC Characteristics 3

T_{amb}=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
V_{IH}	HIGH-level input voltage	V_{CC}=0.8V		0.75xV_{CC}	-	-	V
		V_{CC}=0.9V to 1.95V		0.70xV_{CC}	-	-	V
		V_{CC}=2.3V to 2.7V		1.6	-	-	V
		V_{CC}=3.0V to 3.6V		2.0	-	-	V
V_{IL}	LOW-level input voltage	V_{CC}=0.8V		-	-	0.25xV_{CC}	V
		V_{CC}=0.9V to 1.95V		-	-	0.30xV_{CC}	V
		V_{CC}=2.3V to 2.7V		-	-	0.7	V
		V_{CC}=3.0V to 3.6V		-	-	0.9	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}	I_O=20uA; V_{CC}=0.8V to 3.6V	-	-	0.11	V
			I_O=1.1mA; V_{CC}=1.1V	-	-	0.33xV_{CC}	V
			I_O=1.7mA; V_{CC}=1.4V	-	-	0.41	V
			I_O=1.9mA; V_{CC}=1.65V	-	-	0.39	V
			I_O=2.3mA; V_{CC}=2.3V	-	-	0.36	V
			I_O=3.1mA; V_{CC}=2.3V	-	-	0.50	V
			I_O=2.7mA; V_{CC}=3.0V	-	-	0.36	V
			I_O=4.0mA; V_{CC}=3.0V	-	-	0.50	V
I_I	Input leakage current	V_I=GND to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
I_{OZ}	OFF-state output current	V_I=V_{IH}; V_O=0V to 3.6V; V_{CC}=0V to 3.6V		-	-	±1.0	uA
I_{OFF}	Power-off leakage current	V_I or V_O=0V to 3.6V; V_{CC}=0V		-	-	±1.0	uA
ΔI_{OFF}	Power-off leakage current	V_I or V_O=0V to 3.6V; V_{CC}=0V to 0.2V		-	-	±1.0	uA
I_{CC}	Supply current	V_I=GND or V_{CC}; I_O=0A; V_{CC}=0.8V to 3.6V		-	-	1.4	uA
ΔI_{CC}	Additional supply current	V_I=V_{CC}-0.6V; I_O=0A; V_{CC}=3.3V		-	-	75	uA

7.4.4 AC Characteristics 1

T_{amb}=25°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP. (1)	MAX.	UNIT
t_{pd}	Propagation delay	A to Y; C_L=5pF See Figure 8-5(2)	V_{CC}=0.8V	-	11.6	-	ns
			V_{CC}=1.1V to 1.3V	2.1	4.1	7.5	ns
			V_{CC}=1.4V to 1.6V	1.6	3.0	5.1	ns
			V_{CC}=1.65V to 1.95V	1.6	2.7	4.0	ns
			V_{CC}=2.3V to 2.7V	1.1	2.1	3.2	ns
			V_{CC}=3.0V to 3.6V	1.4	2.2	2.8	ns
		A to Y; C_L=10pF See Figure 8-5(2)	V_{CC}=0.8V	-	14.7	-	ns
			V_{CC}=1.1V to 1.3V	3.0	5.1	9.0	ns
			V_{CC}=1.4V to 1.6V	2.3	3.8	6.1	ns
			V_{CC}=1.65V to 1.95V	2.4	3.6	4.8	ns
			V_{CC}=2.3V to 2.7V	1.7	2.8	3.8	ns
			V_{CC}=3.0V to 3.6V	2.2	3.1	4.2	ns
		A to Y; C_L=15pF See Figure 8-5(2)	V_{CC}=0.8V	-	17.7	-	ns
			V_{CC}=1.1V to 1.3V	3.5	6.1	10.4	ns
			V_{CC}=1.4V to 1.6V	3.0	4.5	6.8	ns
			V_{CC}=1.65V to 1.95V	2.8	4.4	6.7	ns
			V_{CC}=2.3V to 2.7V	2.4	3.4	4.5	ns
			V_{CC}=3.0V to 3.6V	2.2	4.0	5.7	ns
		A to Y; C_L=30pF See Figure 8-5(2)	V_{CC}=0.8V	-	24.6	-	ns
			V_{CC}=1.1V to 1.3V	4.8	9.0	15.6	ns
			V_{CC}=1.4V to 1.6V	4.1	6.7	9.4	ns
			V_{CC}=1.65V to 1.95V	3.8	6.8	9.7	ns
			V_{CC}=2.3V to 2.7V	3.7	5.2	6.7	ns
			V_{CC}=3.0V to 3.6V	3.6	6.4	9.7	ns
C_{PD}	Power dissipation capacitance	f=1MHz; V_I=GND to V_{CC}(3)	V_{CC}=0.8V	-	0.5	-	pF
			V_{CC}=1.1V to 1.3V	-	0.6	-	pF
			V_{CC}=1.4V to 1.6V	-	0.6	-	pF
			V_{CC}=1.65V to 1.95V	-	0.7	-	pF
			V_{CC}=2.3V to 2.7V	-	0.9	-	pF
			V_{CC}=3.0V to 3.6V	-	1.2	-	pF

(1) All typical values are measured at nominal V_{CC}.

(2) t_{pd} is the same as t_{PLZ} and t_{PZL}.

(3) C_{PD} is used to determine the dynamic power dissipation (P_D in uW).
$P_D=C_{PD}xV_{CC}^2xf_ixN$ where:
f_i=input frequency in MHz;
V_{CC}=supply voltage in V;
N=number of inputs switching.

7.4.5 AC Characteristics 2

T_{amb}=-40°C to +125°C, voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	MAX. (85°C)	MAX. (125°C)	UNIT
t_{pd}	Propagation delay	A to Y; C_L=5pF See Figure 8-5(2)	V_{CC}=1.1V to 1.3V	1.7	9.1	10.0	ns
			V_{CC}=1.4V to 1.6V	1.3	6.1	6.7	ns
			V_{CC}=1.65V to 1.95V	1.2	5.0	5.5	ns
			V_{CC}=2.3V to 2.7V	0.9	4.0	4.4	ns
			V_{CC}=3.0V to 3.6V	1.1	3.3	3.6	ns
		A to Y; C_L=10pF See Figure 8-5(2)	V_{CC}=1.1V to 1.3V	2.4	11.2	12.3	ns
			V_{CC}=1.4V to 1.6V	2.0	7.4	8.1	ns
			V_{CC}=1.65V to 1.95V	1.8	6.1	6.7	ns
			V_{CC}=2.3V to 2.7V	1.3	4.8	5.3	ns
			V_{CC}=3.0V to 3.6V	1.6	4.5	5.0	ns
		A to Y; C_L=15pF See Figure 8-5(2)	V_{CC}=1.1V to 1.3V	3.2	13.1	14.5	ns
			V_{CC}=1.4V to 1.6V	2.6	8.6	9.4	ns
			V_{CC}=1.65V to 1.95V	2.2	7.8	8.6	ns
			V_{CC}=2.3V to 2.7V	1.9	5.3	5.8	ns
			V_{CC}=3.0V to 3.6V	1.9	6.1	6.7	ns
		A to Y; C_L=30pF See Figure 8-5(2)	V_{CC}=1.1V to 1.3V	4.3	18.8	20.7	ns
			V_{CC}=1.4V to 1.6V	3.7	11.8	13.0	ns
			V_{CC}=1.65V to 1.95V	3.2	11.0	12.1	ns
			V_{CC}=2.3V to 2.7V	3.0	7.1	7.8	ns
			V_{CC}=3.0V to 3.6V	2.8	10.4	11.4	ns

(1) All typical values are measured at nominal V_{CC}.

(2) t_{pd} is the same as t_{PLZ} and t_{PZL}.

8 Detailed Description

8.1 Overview

The CJ74AUP1G07 provides the single non-inverting buffer with open-drain output. The output of the device is an open drain and can be connected to other open-drain outputs to implement active-LOW wired-OR or active-HIGH wired-AND functions.

This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8V to 3.6V.

This device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing the damaging backflow current through the device when it is powered down.

8.2 Functional Block Diagram

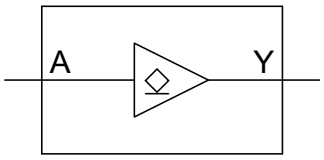


Figure 8-1 Logic symbol

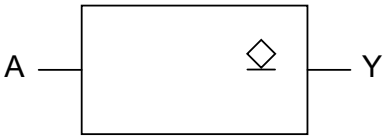


Figure 8-2 IEC logic symbol

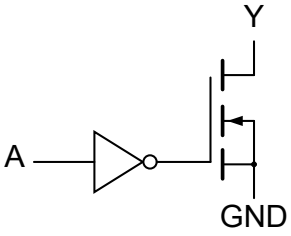


Figure 8-3 Logic diagram

8.3 Function Table(1)

INPUT	OUTPUT
A	**Y**
L	L
H	Z

(1) H=HIGH voltage level; L=LOW voltage level; Z=high-impedance OFF-state.

8.4 Testing Circuit

8.4.1 AC Testing Circuit

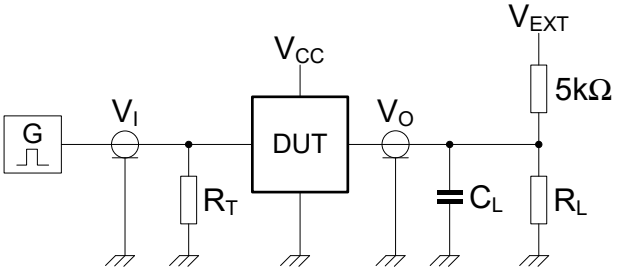


Figure 8-4 Test circuit for measuring switching times

Definitions for test circuit:

R_L=Load resistance.

C_L=Load capacitance including jig and probe capacitance.

R_T=Termination resistance should be equal to the output impedance Z_o of the pulse generator.

V_{EXT}=External voltage for measuring switching times.

8.4.2 AC Testing Waveforms

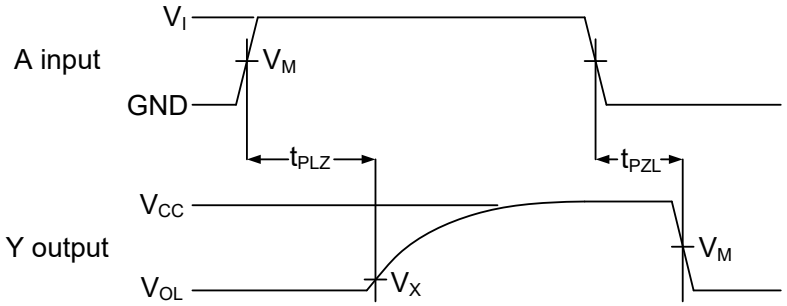


Figure 8-5 The data input (A) to output (Y) propagation delays

8.4.3 Measurement Points

SUPPLY VOLTAGE	INPUT	OUTPUT	
V_{CC}	V_M	V_M	V_X
0.8V to 1.6V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.1V
1.65V to 2.7V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.15V
3.0V to 3.6V	0.5×V_{CC}	0.5×V_{CC}	V_{OL}+0.3V

8.4.4 Test Data

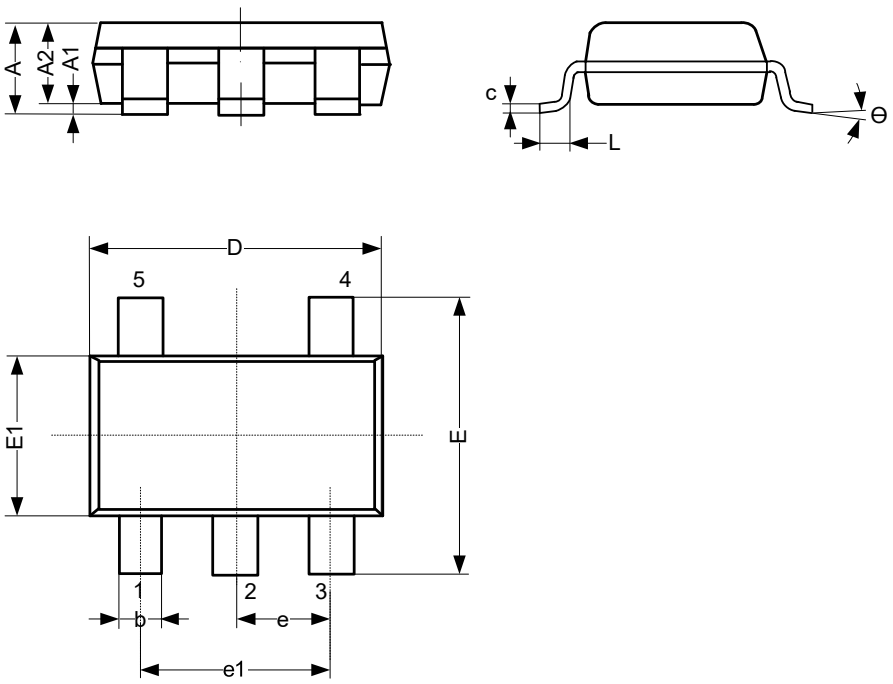
SUPPLY VOLTAGE	LOAD		V_{EXT}		
V_{CC}	C_L	R_L(1)	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
0.8V to 3.6V	5pF, 10pF, 15pF and 30pF	5kΩ or 1MΩ	Open	GND	2xV_{CC}

(1) For measuring enable and disable times R_L=5kΩ, for measuring propagation delays, setup and hold times and pulse width R_L=1MΩ.

9 Mechanical Information

9.1 SOT-23-5L Mechanical Information

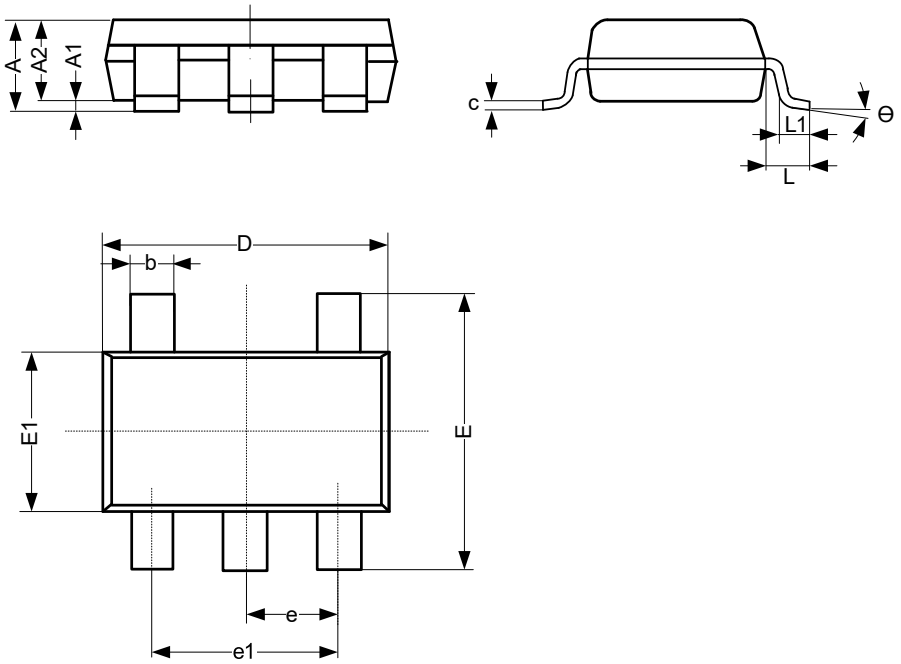
9.1.1 SOT-23-5L Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	-	-	1.26
A1	0.00	-	0.12
A2	1.00	-	1.20
b	0.30	-	0.50
c	0.10	-	0.20
D	2.82	-	3.02
E	2.60	-	3.00
E1	1.50	-	1.70
e	0.95 BSC		
e1	1.80	-	2.00
L	0.30	-	0.60
Θ	0°	-	8°
Unit: mm			

9.2 SOT-353 Mechanical Information

9.2.1 SOT-353 Outline Dimensions



SYMBOL	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.90	-	1.10
A1	0.00	-	0.10
A2	0.90	-	1.00
b	0.15	-	0.35
c	0.11	-	0.175
D	2.00	-	2.20
E	2.15	-	2.45
E1	1.15	-	1.35
e	0.65 BSC		
e1	1.20	-	1.40
L	-	0.525	-
L1	0.26	-	0.46
Θ	0°	-	8°
Unit: mm			

10 Notes and Revision History

10.1 Associated Product Family and Others

To view other products of the same type or IC products of other types, click the official website of JSCJ -- ***https:www.jscj-elec.com*** for more details.

10.2 Notes

Electrostatic Discharge Caution

This IC may be damaged by ESD. Relevant personnel shall comply with correct installation and use specifications to avoid ESD damage to the IC. If appropriate measures are not taken to prevent ESD damage, the hazards caused by ESD include but are not limited to degradation of integrated circuit performance or complete damage of integrated circuit. For some precision integrated circuits, a very small parameter change may cause the whole device to be inconsistent with its published specifications.

10.3 Revision History

July, 2025: rev - 1.1, Change marking information.

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

The information in this data sheet is intended to describe the operation and characteristics of our products. JSCJ has the right to make any modification, enhancement, improvement, correction or other changes to any content in this data sheet, including but not limited to specification parameters, circuit design and application information, without prior notice.

Any person who purchases or uses JSCJ products for design shall: 1. Select products suitable for circuit application and design; 2. Design, verify and test the rationality of circuit design; 3. Procedures to ensure that the design complies with relevant laws and regulations and the requirements of such laws and regulations. JSCJ makes no warranty or representation as to the accuracy or completeness of the information contained in this data sheet and assumes no responsibility for the application or use of any of the products described in this data sheet.

Without the written consent of JSCJ, this product shall not be used in occasions requiring high quality or high reliability, including but not limited to the following occasions: medical equipment, military facilities and aerospace. JSCJ shall not be responsible for casualties or property losses caused by abnormal use or application of this product.

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