



Single 2-input NOR Gate

CJ74AHC/AHCT1G02 Logic

1 Introduction

The CJ74AHC1G02 and CJ74AHCT1G02 are single 2-input NOR gates.

2 Available Packages

PART NUMBER	PACKAGE
CJ74AHC1G02	SOT-23-5L
	SOT-353
CJ74AHCT1G02	SOT-23-5L
	SOT-353

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

3 Features

- Power supply voltage range:
 - CJ74AHC1G02: 2V to 5.5V
 - CJ74AHCT1G02: 4.5V to 5.5V
- Low power dissipation
- Specified from -40°C to +125°C

4 Applications

- Infotainment
- Printers
- Cameras
- PCs, Notebooks
- E-Meters
- Body Control Modules



Simplified schematic

5 Orderable Information

DEVICE	PACKAGE	OP TEMP	ECO PLAN	MSL	PACKING OPTION	SORT
CJ74AHC1G02M5N	SOT-23-5L	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units / Reel	Active
CJ74AHCT1G02M5N	SOT-23-5L	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units / Reel	Active
CJ74AHC1G02R5N	SOT-353	-40~125°C	RoHS & Green	Level 3 168HR	Tape and Reel 3000 Units / Reel	Active
CJ74AHCT1G02R5N	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

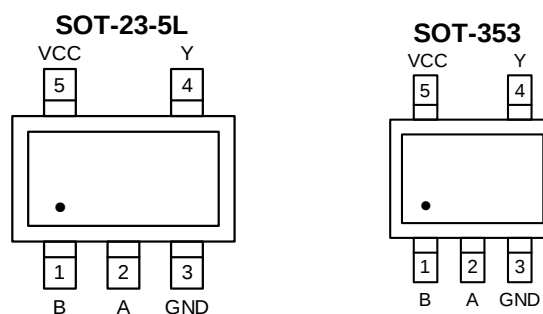


Figure 6-1 Pin configuration

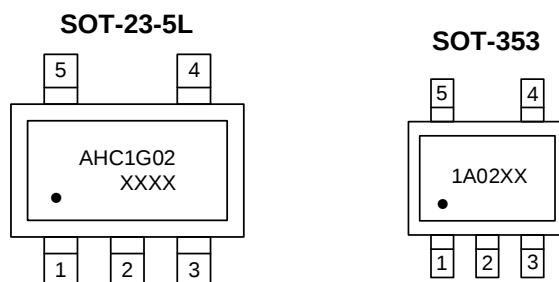
6.2 Pin Function

PIN		I/O ⁽¹⁾	DESCRIPTION
No.	NAME		
1	B	I	Data input
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

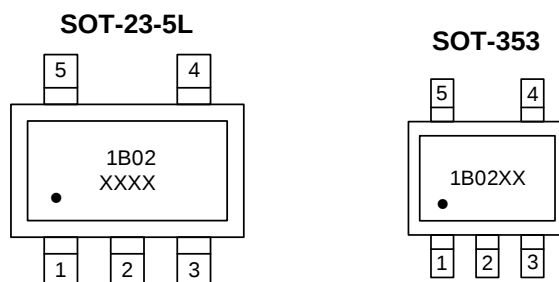
6.3 Marking Information

6.3.1 CJ74AHC1G02



XXXX or XX: Code, indicates weekly record information.

6.3.2 CJ74AHCT1G02



XXXX or XX: Code, indicates weekly record information.

7 Specifications

7.1 Absolute Maximum Ratings

Voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CC}	Supply voltage	-	-0.5	+7.0	V
V_I	Input voltage	-	-0.5	+7.0	V
I_{IK}	Input clamping current	$V_I < -0.5V$	-20	-	mA
I_{OK}	Output clamping current	$V_O < -0.5V$ or $V_O > V_{CC} + 0.5V$	-	± 20	mA
I_O	Output current	$-0.5V < V_O < V_{CC} + 0.5V$	-	± 25	mA
I_{CC}	Supply current	-	-	75	mA
I_{GND}	Ground current	-	-75	-	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

Voltages are referenced to GND (ground=0V), unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CJ74AHC1G02						
V_{CC}	Supply voltage	-	2.0	5.0	5.5	V
V_I	Input voltage	-	0	-	5.5	V
V_O	Output voltage	-	0	-	V_{CC}	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C
CJ74AHCT1G02						
V_{CC}	Supply voltage	-	4.5	5.0	5.5	V
V_I	Input voltage	-	0	-	5.5	V
V_O	Output voltage	-	0	-	V_{CC}	V
T_{amb}	Ambient temperature	-	-40	-	+125	°C

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

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CJ74AHC1G02						
V_{IH}	HIGH-level input voltage	$V_{CC}=2.0\text{V}$	1.5	-	-	V
		$V_{CC}=3.0\text{V}$	2.1	-	-	V
		$V_{CC}=5.5\text{V}$	3.85	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC}=2.0\text{V}$	-	-	0.5	V
		$V_{CC}=3.0\text{V}$	-	-	0.9	V
		$V_{CC}=5.5\text{V}$	-	-	1.65	V
V_{OH}	HIGH-level output voltage	$I_o=-50\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	2.0	-	V
		$I_o=-50\mu\text{A}; V_{CC}=3.0\text{V}$	2.9	3.0	-	V
		$I_o=-50\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	4.5	-	V
		$I_o=-4\text{mA}; V_{CC}=3.0\text{V}$	2.48	-	-	V
		$I_o=-8\text{mA}; V_{CC}=4.5\text{V}$	3.8	-	-	V
V_{OL}	LOW-level output voltage	$I_o=50\mu\text{A}; V_{CC}=2.0\text{V}$	-	0	0.1	V
		$I_o=50\mu\text{A}; V_{CC}=3.0\text{V}$	-	0	0.1	V
		$I_o=50\mu\text{A}; V_{CC}=4.5\text{V}$	-	0	0.1	V
		$I_o=4\text{mA}; V_{CC}=3.0\text{V}$	-	-	0.44	V
		$I_o=8\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.44	V
I_I	Input leakage current	$V_I=5.5\text{V}$ or GND; $V_{CC}=0\text{V}$ to 5.5V	-	-	1.0	μA
I_{CC}	Supply current	$V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$	-	-	10	μA
CJ74AHCT1G02						
V_{IH}	HIGH-level input voltage	$V_{CC}=4.5\text{V}$ to 5.5V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC}=4.5\text{V}$ to 5.5V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	$I_o=-50\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	4.5	-	V
		$I_o=-8\text{mA}; V_{CC}=4.5\text{V}$	3.8	-	-	V
V_{OL}	LOW-level output voltage	$I_o=50\mu\text{A}; V_{CC}=4.5\text{V}$	-	0	0.1	V
		$I_o=8\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.44	V
I_I	Input leakage current	$V_I=5.5\text{V}$ or GND; $V_{CC}=0\text{V}$ to 5.5V	-	-	1.0	μA
I_{CC}	Supply current	$V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}; I_o=0\text{A}$	-	-	10	μA
ΔI_{CC}	Additional supply current	$V_{CC}=\text{per input pin}; V_I=3.4\text{V}; \text{Other inputs at } V_{CC} \text{ or GND}; V_{CC}=5.5\text{V}$	-	-	1.5	mA

7.4.2 DC Characteristics 2

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CJ74AHC1G02						
V_{IH}	HIGH-level input voltage	$V_{CC}=2.0\text{V}$	1.5	-	-	V
		$V_{CC}=3.0\text{V}$	2.1	-	-	V
		$V_{CC}=5.5\text{V}$	3.85	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC}=2.0\text{V}$	-	-	0.5	V
		$V_{CC}=3.0\text{V}$	-	-	0.9	V
		$V_{CC}=5.5\text{V}$	-	-	1.65	V
V_{OH}	HIGH-level output voltage	$I_o=-50\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	-	-	V
		$I_o=-50\mu\text{A}; V_{CC}=3.0\text{V}$	2.9	-	-	V
		$I_o=-50\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	-	-	V
		$I_o=-4\text{mA}; V_{CC}=3.0\text{V}$	2.4	-	-	V
		$I_o=-8\text{mA}; V_{CC}=4.5\text{V}$	3.7	-	-	V
V_{OL}	LOW-level output voltage	$I_o=50\mu\text{A}; V_{CC}=2.0\text{V}$	-	-	0.1	V
		$I_o=50\mu\text{A}; V_{CC}=3.0\text{V}$	-	-	0.1	V
		$I_o=50\mu\text{A}; V_{CC}=4.5\text{V}$	-	-	0.1	V
		$I_o=4\text{mA}; V_{CC}=3.0\text{V}$	-	-	0.55	V
		$I_o=8\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.55	V
I_I	Input leakage current	$V_I=5.5\text{V}$ or GND; $V_{CC}=0\text{V}$ to 5.5V	-	-	2.0	μA
I_{CC}	Supply current	$V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$	-	-	40	μA
CJ74AHCT1G02						
V_{IH}	HIGH-level input voltage	$V_{CC}=4.5\text{V}$ to 5.5V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC}=4.5\text{V}$ to 5.5V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	$I_o=-50\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	4.5	-	V
		$I_o=-8\text{mA}; V_{CC}=4.5\text{V}$	3.8	-	-	V
V_{OL}	LOW-level output voltage	$I_o=50\mu\text{A}; V_{CC}=4.5\text{V}$	-	0	0.1	V
		$I_o=8\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.55	V
I_I	Input leakage current	$V_I=5.5\text{V}$ or GND; $V_{CC}=0\text{V}$ to 5.5V	-	-	2.0	μA
I_{CC}	Supply current	$V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}; I_o=0\text{A}$	-	-	40	μA
ΔI_{CC}	Additional supply current	$V_{CC}=\text{per input pin}; V_I=3.4\text{V}; \text{Other inputs at } V_{CC} \text{ or GND}; V_{CC}=5.5\text{V}$	-	-	1.5	mA

7.4.3 AC Characteristics 1

$T_{amb} = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $GND = 0V$, $t_r = t_f \leq 3.0\text{ns}$, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
CJ74AHC1G02							
t _{pd}	Propagation delay	A and B to Y See Figure 8-5 ⁽¹⁾	C _L =15pF; V _{CC} =3.0V to 3.6V ⁽²⁾	-	4.4	9.5	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =50pF; V _{CC} =3.0V to 3.6V ⁽²⁾	-	6.3	13	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =15pF; V _{CC} =4.5V to 5.5V ⁽³⁾	-	3.2	6.5	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =50pF; V _{CC} =4.5V to 5.5V ⁽³⁾	-	4.6	8.5	ns
CJ74AHCT1G02							
t _{pd}	Propagation delay	A and B to Y See Figure 8-5 ⁽¹⁾	C _L =15pF; V _{CC} =4.5V to 5.5V ⁽³⁾	-	3.5	6.5	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =50pF; V _{CC} =4.5V to 5.5V ⁽³⁾	-	4.9	8.5	ns

(1) t_{pd} is the same as t_{PLH} and t_{PHL} .

(2) Typical values are measured at $V_{CC} = 3.3V$.

(3) Typical values are measured at $V_{CC} = 5V$.

7.4.4 AC Characteristics 2

$T_{amb} = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, $GND = 0V$, $t_r = t_f \leq 3.0\text{ns}$, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS		MIN.	TYP.	MAX.	UNIT
CJ74AHC1G02							
t _{pd}	Propagation delay	A and B to Y See Figure 8-5 ⁽¹⁾	C _L =15pF; V _{CC} =3.0V to 3.6V ⁽²⁾	1.0	-	10.5	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =50pF; V _{CC} =3.0V to 3.6V ⁽²⁾	1.0	-	14.5	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =15pF; V _{CC} =4.5V to 5.5V ⁽³⁾	1.0	-	7.0	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =50pF; V _{CC} =4.5V to 5.5V ⁽³⁾	1.0	-	9.5	ns
CJ74AHCT1G02							
t _{pd}	Propagation delay	A and B to Y See Figure 8-5 ⁽¹⁾	C _L =15pF; V _{CC} =4.5V to 5.5V ⁽³⁾	1.0	-	7.0	ns
		A and B to Y See Figure 8-5 ⁽¹⁾	C _L =50pF; V _{CC} =4.5V to 5.5V ⁽³⁾	1.0	-	9.5	ns

(1) t_{pd} is the same as t_{PLH} and t_{PHL} .

(2) Typical values are measured at $V_{CC} = 3.3V$.

(3) Typical values are measured at $V_{CC} = 5V$.

8 Detailed Description

8.1 Overview

The CJ74AHC1G02 and CJ74AHCT1G02 are single 2-input NOR gates.

8.2 Functional Block Diagram

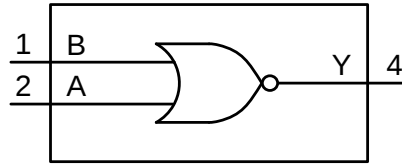


Figure 8-1 Logic symbol

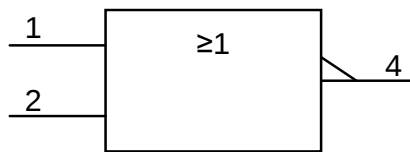


Figure 8-2 IEC logic symbol

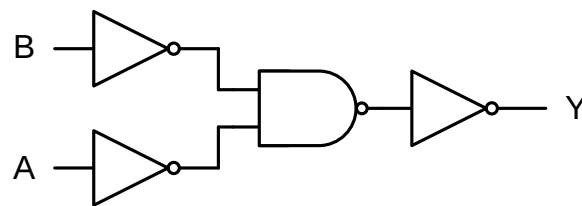


Figure 8-3 Logic diagram

8.3 Function Table

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

Note: H=HIGH voltage level; L=LOW voltage level.

8.4 Testing Circuit

8.4.1 AC Testing Circuit

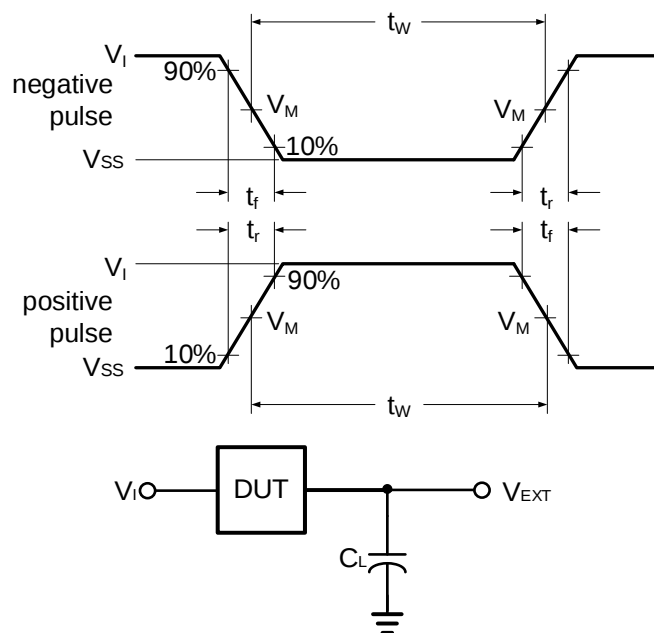


Figure 8-4 Test circuit for measuring switching times

Definitions for test circuit:

C_L =Load capacitance including jig and probe capacitance.

8.4.2 AC Testing Waveforms

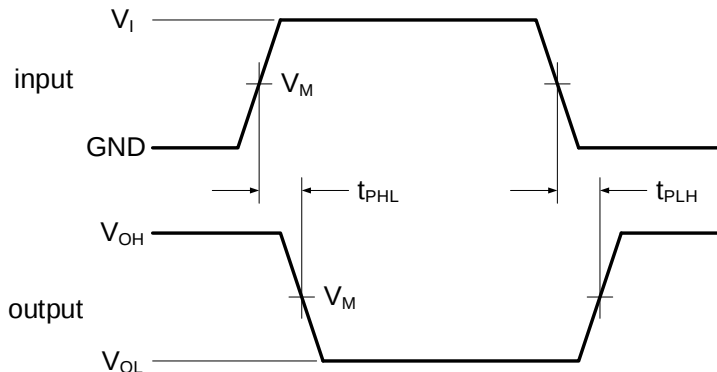


Figure 8-5 The inputs (A and B) to output (Y) propagation delays

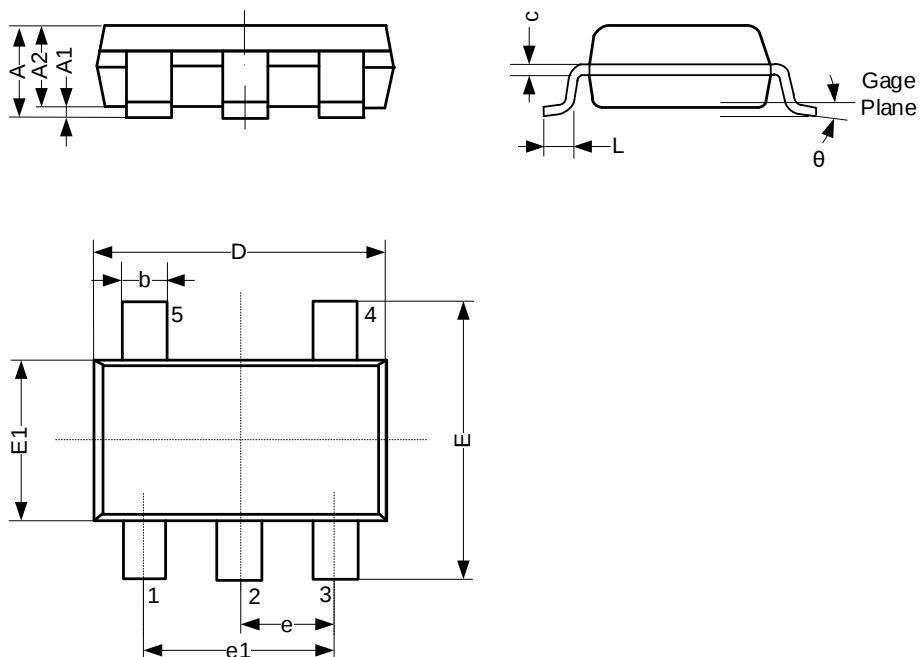
8.4.3 Measurement Points

TYPE	INPUT		OUTPUT
	V_I	V_M	V_M
CJ74AHC1G02	GND to V_{CC}	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
CJ74AHCT1G02	GND to 3.0V	1.5V	$0.5 \times V_{CC}$

9 Mechanical Information

9.1 SOT-23-5L Mechanical Information

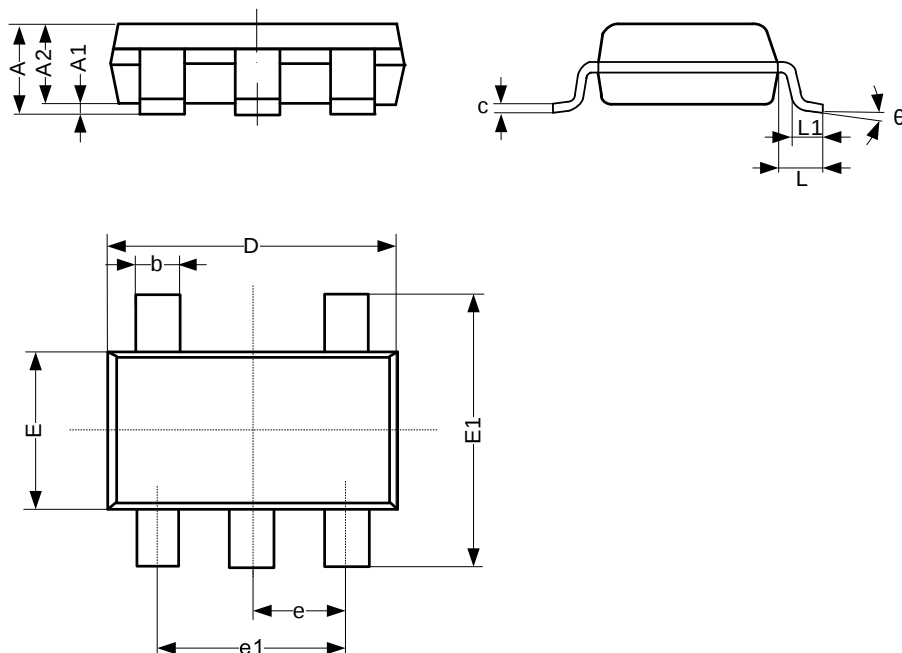
9.1.1 SOT-23-5L Outline Dimensions



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	1.15	-	1.35
E1	2.15	-	2.45
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.

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

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