



# SGM4564

## 4-Bit Bidirectional Voltage-Level Translator with Auto Direction Sensing

### GENERAL DESCRIPTION

The SGM4564 is a 4-bit, non-inverting, bidirectional voltage-level translator which features two independent configurable power-supply lines. The A and B ports track the  $V_{CCA}$  supply and  $V_{CCB}$  supply respectively. The supply voltage range is 1.2V to 5.5V for A ports and 1.65V to 5.5V for B ports. The device provides a bidirectional translation function between the different voltage nodes (including 1.2V, 1.5V, 1.8V, 2.5V, 3.3V and 5V).

The SGM4564 has an output enable (OE) function, which controls the outputs states. When OE goes low, all outputs enter into the high-impedance state. The OE should be connected to GND via a pull-down resistor, and the minimum resistor value is depended on the current source capability of the driver.

The SGM4564 features the OE input circuit which is referenced to  $V_{CCA}$ .

The SGM4564 is available in Green SOIC-14, UTQFN-1.8×1.8-12L and TQFN-2×2-12L packages. It operates over an ambient temperature range of -40°C to +85°C.

### FEATURES

- **Power Supply Voltage Range ( $V_{CCA} \leq V_{CCB}$ )**
  - ♦ **A Ports: 1.2V to 5.5V**
  - ♦ **B Ports: 1.65V to 5.5V**
- **Support  $V_{CCA}$  or  $V_{CCB}$  Isolation**
  - ♦ **When  $V_{CCA}$  or  $V_{CCB}$  is Low, Device Enters Power-Down Mode**
- **OE Input Circuit Referenced to  $V_{CCA}$**
- **Support Partial-Power-Down Function**
- **Support Push-Pull Output**
- **Low Power Consumption**
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green SOIC-14, UTQFN-1.8×1.8-12L and TQFN-2×2-12L Packages**

### APPLICATIONS

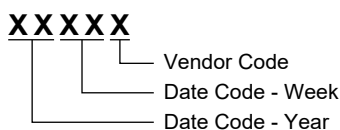
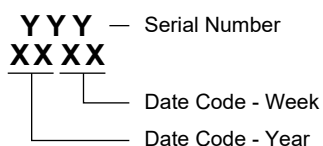
Universal Asynchronous Receiver/Transmitter  
General Purpose I/O (GPIO)  
Smart Phones  
Portable Equipment

**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4564	UTQFN-1.8x1.8-12L	-40°C to +85°C	SGM4564YUQN12G/TR	4564 XXXX	Tape and Reel, 3000
	SOIC-14	-40°C to +85°C	SGM4564YS14G/TR	SGM4564YS14 XXXXXX	Tape and Reel, 2500
	TQFN-2x2-12L	-40°C to +85°C	SGM4564YTQM12G/TR	4564 XXXX	Tape and Reel, 3000

**MARKING INFORMATION**

NOTE: XXXX = Date Code. XXXXX = Date Code and Vendor Code.



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

**OVERSTRESS CAUTION**

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

**DISCLAIMER**

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

**ABSOLUTE MAXIMUM RATINGS**

Supply Voltage Range	
$V_{CCA}$ .....	-0.3V to 6V
$V_{CCB}$ .....	-0.3V to 6V
Input Voltage Range, $V_I$	
A Ports .....	-0.3V to 6V
B Ports .....	-0.3V to 6V
Output Voltage Range for the High-Impedance or Power-Off State, $V_O$	
A Ports .....	-0.3V to 6V
B Ports .....	-0.3V to 6V
Output Voltage Range for the High or Low State, $V_O$ <sup>(1)</sup>	
A Ports .....	-0.3V to $V_{CCA} + 0.3V$
B Ports .....	-0.3V to $V_{CCB} + 0.3V$
Input Clamp Current, $I_{IK}$ ( $V_I < 0$ ) .....	-50mA
Output Clamp Current, $I_{OK}$ ( $V_O < 0$ ) .....	-25mA
Continuous Current through $V_{CCA}$ , $V_{CCB}$ , or GND	
.....	$\pm 100mA$
Junction Temperature .....	+150°C
Storage Temperature Range .....	-65°C to +150°C
Lead Temperature (Soldering, 10s) .....	+260°C
ESD Susceptibility	
HBM .....	4000V
MM .....	300V

**NOTE:**

1.  $V_{CCA}$  and  $V_{CCB}$  values are shown in the recommended operating conditions table.

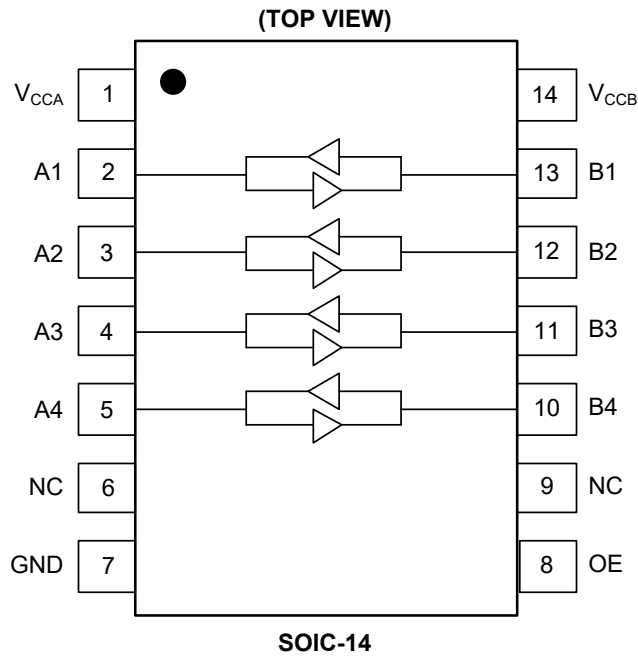
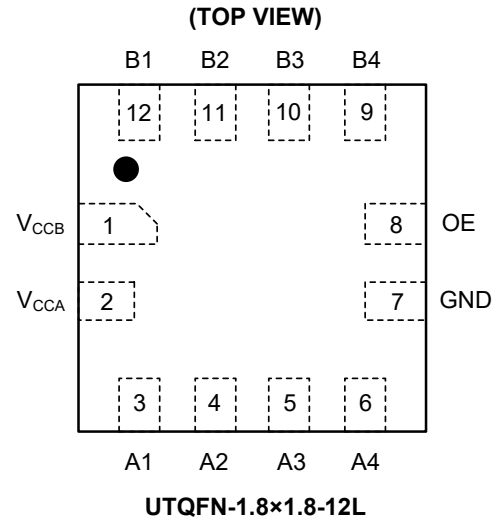
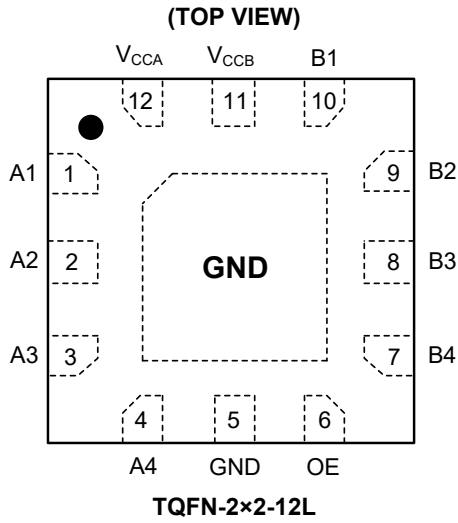
**RECOMMENDED OPERATING CONDITIONS**  
(2) (3)

Supply Voltage Range	
$V_{CCA}$ .....	1.2V to 5.5V
$V_{CCB}$ .....	1.65V to 5.5V
High-Level Input Voltage, $V_{IH}$	
Data Inputs .....	$V_{CCI} \times 0.85$ <sup>(4)</sup> to $V_{CCI}$
OE Input .....	$V_{CCA} \times 0.85$ to 5.5V
Low-Level Input Voltage, $V_{IL}$	
Data Inputs .....	0V to $V_{CCI} \times 0.2$ <sup>(4)</sup>
OE Input .....	0V to $V_{CCA} \times 0.2$
Output Voltage Range for the High-Impedance or Power-Off State, $V_O$	
.....	0V to 5.5V
B Ports .....	0V to 5.5V
Input Transition Rise or Fall Rate, $\Delta t/\Delta V$	
A Port Inputs .....	40ns/V (MAX)
B Port Inputs .....	40ns/V (MAX)
Operating Temperature Range .....	-40°C to +85°C

**NOTES:**

2. Ensure that the A side and B side of the unused data I/O pairs remain the same state, that is., both at  $V_{CCI}$  or both at GND.
3. Ensure that  $V_{CCA} \leq V_{CCB}$  and  $V_{CCA}$  must not exceed 5.5V.
4.  $V_{CCI}$  is the supply voltage associated with the input ports.

PIN CONFIGURATIONS



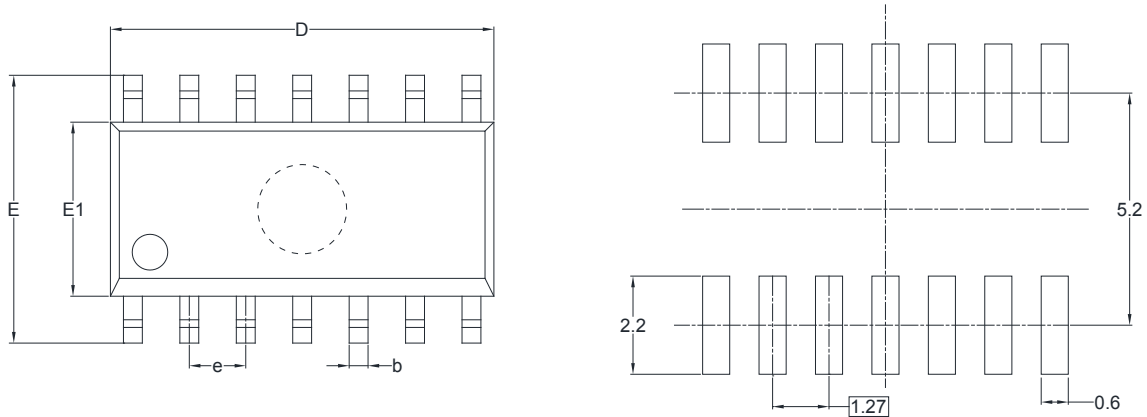
## PIN DESCRIPTION

PIN			NAME	FUNCTION
SOIC-14	UTQFN- 1.8×1.8-12L	TQFN- 2×2-12L		
1	2	12	V <sub>CCA</sub>	Supply Voltage on A Ports. It can be operated from 1.2V to 5.5V, and V <sub>CCA</sub> is always ≤ V <sub>CCB</sub> .
2	3	1	A1	Input/Output 1. It tracks the V <sub>CCA</sub> supply.
3	4	2	A2	Input/Output 2. It tracks the V <sub>CCA</sub> supply.
4	5	3	A3	Input/Output 3. It tracks the V <sub>CCA</sub> supply.
5	6	4	A4	Input/Output 4. It tracks the V <sub>CCA</sub> supply.
6, 9	—	—	NC	No Connection. Not internally connected.
7	7	5	GND	Ground.
8	8	6	OE	Output Enable Control Pin. Active high. When OE goes low, all outputs enter into the high-impedance state. It tracks the V <sub>CCA</sub> supply.
10	9	7	B4	Input/Output 4. It tracks the V <sub>CCB</sub> supply.
11	10	8	B3	Input/Output 3. It tracks the V <sub>CCB</sub> supply.
12	11	9	B2	Input/Output 2. It tracks the V <sub>CCB</sub> supply.
13	12	10	B1	Input/Output 1. It tracks the V <sub>CCB</sub> supply.
14	1	11	V <sub>CCB</sub>	Supply Voltage on B Ports. It can be operated from 1.65V to 5.5V.
—	—	Exposed Pad	GND	Exposed pad should be soldered to PCB board and connected to GND or left floating.

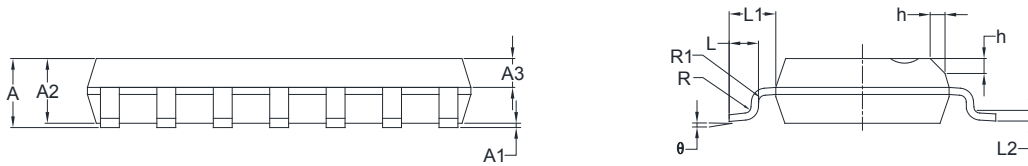
# PACKAGE INFORMATION

## PACKAGE OUTLINE DIMENSIONS

### SOIC-14



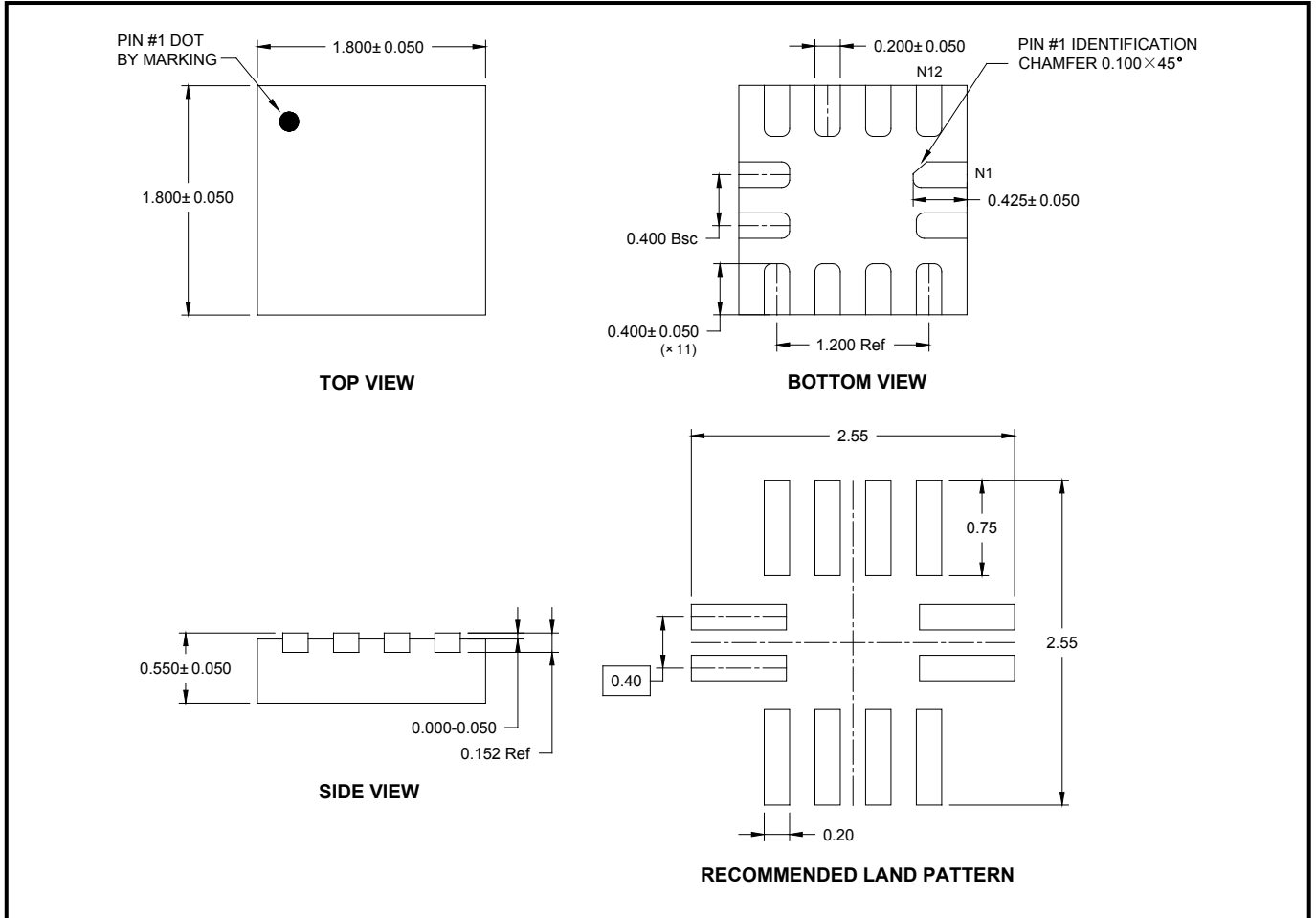
RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
A3	0.55	0.75	0.022	0.030
b	0.36	0.49	0.014	0.019
D	8.53	8.73	0.336	0.344
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.45	0.80	0.018	0.032
L1	1.04 REF		0.040 REF	
L2	0.25 BSC		0.01 BSC	
R	0.07		0.003	
R1	0.07		0.003	
h	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

UTQFN-1.8×1.8-12L

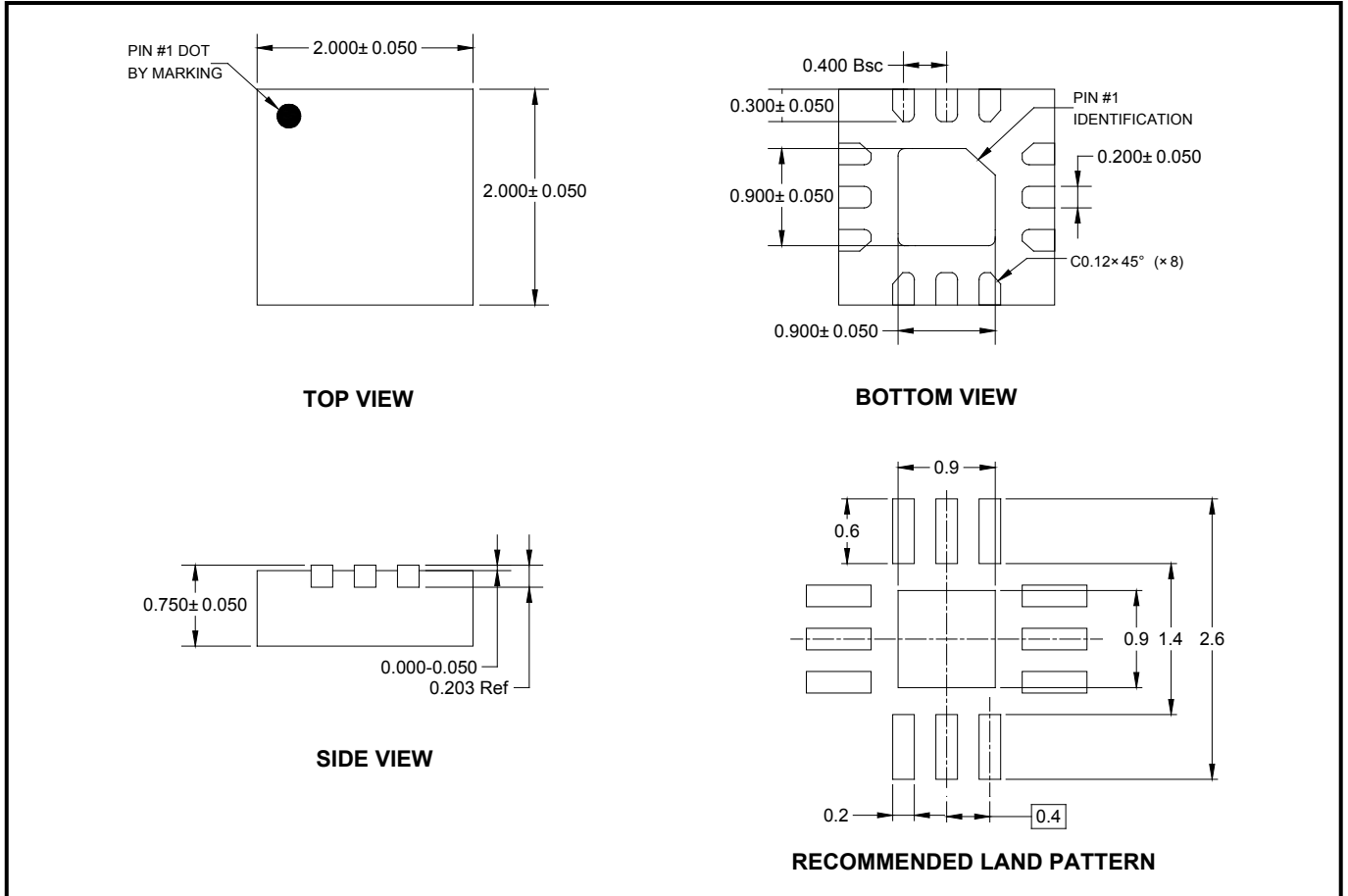


NOTE: All linear dimensions are in millimeters.

# PACKAGE INFORMATION

## PACKAGE OUTLINE DIMENSIONS

### TQFN-2×2-12L



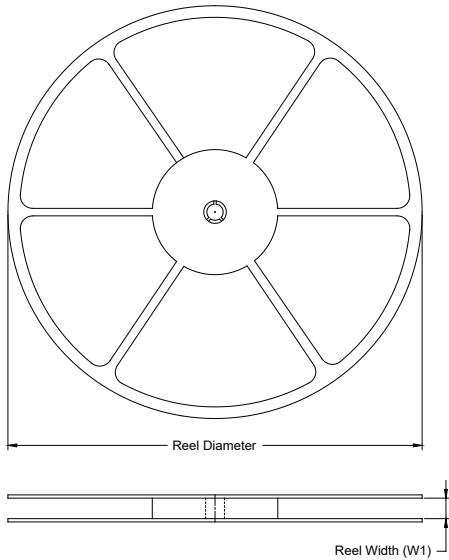
NOTE: All linear dimensions are in millimeters.



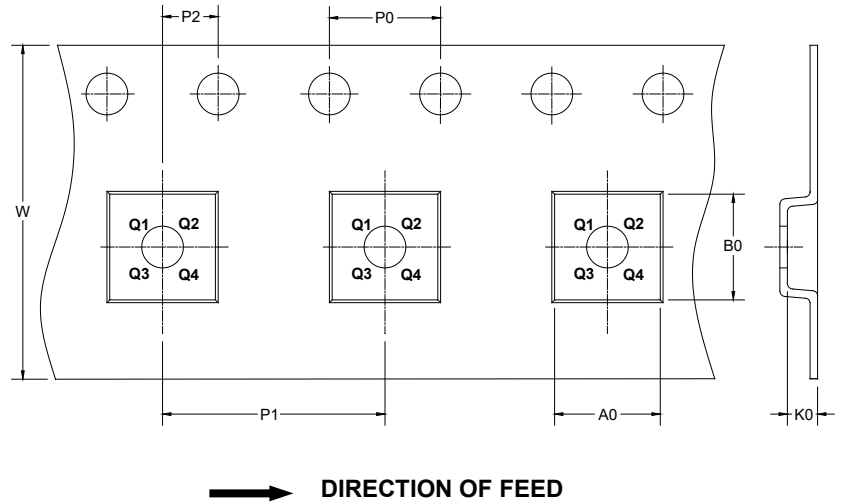
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
UTQFN-1.8×1.8-12L	7"	9.0	2.10	2.10	0.80	4.0	4.0	2.0	8.0	Q1
TQFN-2×2-12L	7"	9.5	2.30	2.30	0.90	4.0	4.0	2.0	8.0	Q1

DD0001

# PACKAGE INFORMATION

## CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18
13"	386	280	370	5

DD0002

单击下面可查看定价，库存，交付和生命周期等信息

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