

### GENERAL DESCRIPTION

The SGM4574 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 1.65V to 5.5V for A ports and 2.3V to 5.5V for B ports. The device provides a bidirectional translation function between the different voltage nodes (including 1.8V, 2.5V, 3.3V and 5V).

The SGM4574 has an output enable (OE) function, which controls the inputs and outputs states. When OE goes low, all I/Os 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 SGM4574 features the OE input circuit which is referenced to  $V_{CCA}$ .

The SGM4574 is available in Green UTQFN-1.8×1.8-12L, TQFN-2×2-12L, SOIC-14 and TQFN-3.5×3.5-14AL packages. It operates over an ambient temperature range of -40°C to +85°C.

### FEATURES

- **Power Supply Voltage Ranges ( $V_{CCA} \leq V_{CCB}$ )**
  - ◆ **A Ports: 1.65V to 5.5V**
  - ◆ **B Ports: 2.3V to 5.5V**
- **Direction-Control Signal is Not Required**
- **Data Rates**
  - ◆ **Push-Pull: 24Mbps**
  - ◆ **Open-Drain: 2Mbps**
- **No Specific Power Sequences Required for  $V_{CCA}$  and  $V_{CCB}$**
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green UTQFN-1.8×1.8-12L, TQFN-2×2-12L, SOIC-14 and TQFN-3.5×3.5-14AL Packages**

### APPLICATIONS

Smart Phones  
 Portable Devices  
 Handheld Devices  
 PC/Tablet

### TYPICAL APPLICATION

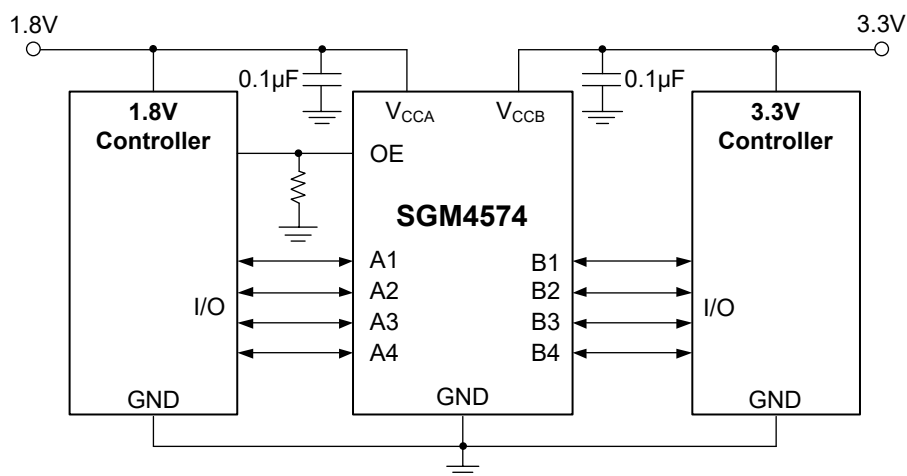


Figure 1. Typical Application Circuit

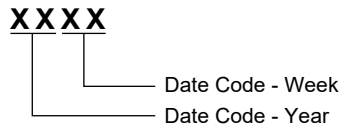
**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4574	UTQFN-1.8×1.8-12L	-40°C to +85°C	SGM4574YUQN12G/TR	4574 XXXX	Tape and Reel, 3000
	TQFN-2×2-12L	-40°C to +85°C	SGM4574YTQM12G/TR	4574 XXXX	Tape and Reel, 3000
	SOIC-14	-40°C to +85°C	SGM4574YS14G/TR	SGM4574YS14 XXXXX	Tape and Reel, 2500
	TQFN-3.5×3.5-14AL	-40°C to +85°C	SGM4574YTSZ14G/TR	SGM4574 YTSZ14 XXXXX	Tape and Reel, 4000

**MARKING INFORMATION**

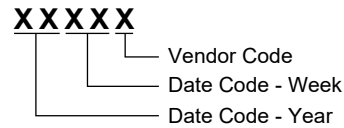
**UTQFN-1.8×1.8-12L/TQFN-2×2-12L**

(1) XXXX = Date Code.



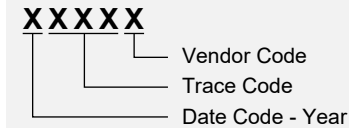
**SOIC-14**

(2) XXXXX = Date Code and Vendor Code.



**TQFN-3.5×3.5-14AL**

(3) XXXXX = Date Code, Trace 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
A Ports, B Ports, OE Input Voltage Range, $V_I$ <sup>(1)</sup>	
.....	-0.3V to 6V
Output Voltage Range for the High-Impedance or Power-Off State, $V_O$ <sup>(1)</sup>	
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)(2)</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 Output Current, $I_O$ .....	$\pm 50mA$
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
CDM .....	1000V

**NOTES:**

1. When the input and output current ratings are observed, the input and I/O negative voltage ratings may be exceeded.
2.  $V_{CCA}$  and  $V_{CCB}$  values are shown in the recommended operating conditions table.

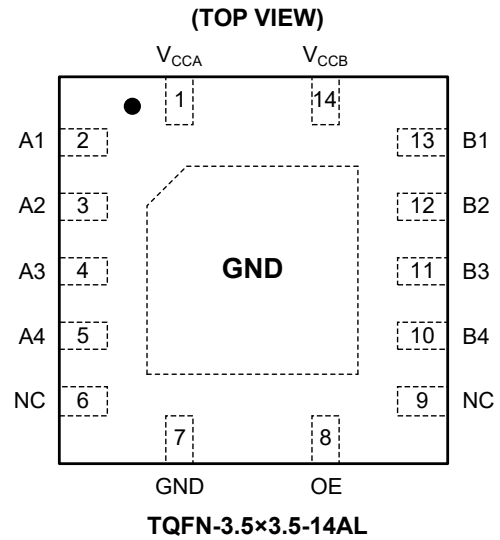
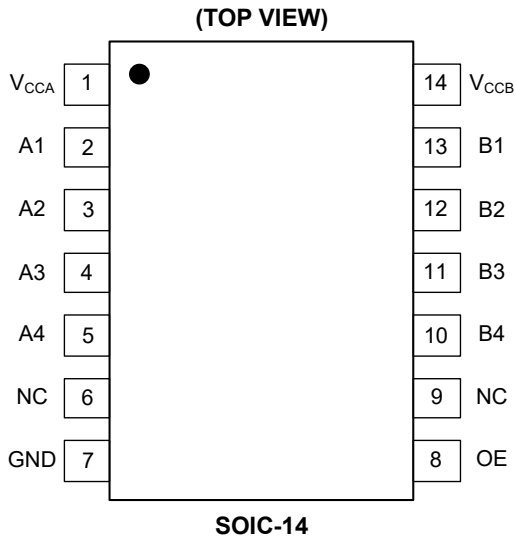
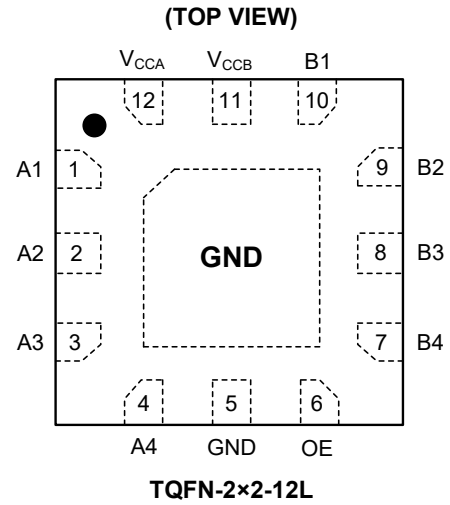
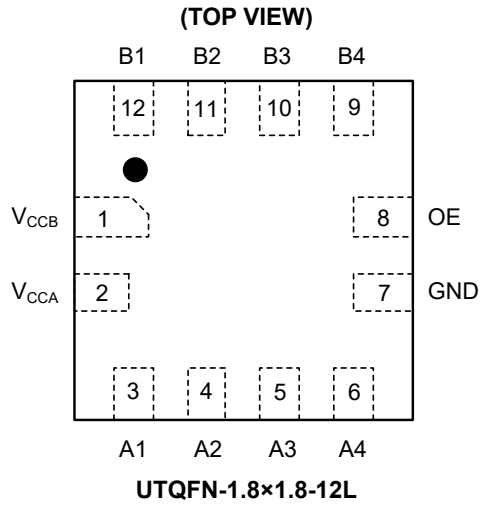
**RECOMMENDED OPERATING CONDITIONS**  
**(3) (4)**

Supply Voltage Range <sup>(5)</sup>	
$V_{CCA}$ .....	1.65V to 5.5V
$V_{CCB}$ .....	2.3V to 5.5V
High-Level Input Voltage, $V_{IH}$	
A Port I/Os ( $V_{CCA} = 1.65V$ , $V_{CCB} = 2.3V$ to 5.5V)	
.....	$V_{CCI} - 0.1V$ to $V_{CCI}$
A Port I/Os ( $V_{CCA} = 1.95V$ to 5.5V, $V_{CCB} = 2.3V$ to 5.5V)	
.....	$V_{CCI} - 0.4V$ to $V_{CCI}$
B Port I/Os .....	$V_{CCI} - 0.4V$ to $V_{CCI}$
OE Input .....	$0.8V \times V_{CCA}$ to 5.5V
Low-Level Input Voltage, $V_{IL}$	
A Port I/Os .....	0V to 0.15V
B Port I/Os .....	0V to 0.15V
OE Input .....	0V to $0.25V \times V_{CCA}$
Operating Temperature Range .....	-40°C to +85°C

**NOTES:**

3.  $V_{CCI}$  is the supply voltage associated with the input ports.
4.  $V_{CCO}$  is the supply voltage associated with the output ports.
5. Ensure that  $V_{CCA} \leq V_{CCB}$  and  $V_{CCA}$  must not exceed 5.5V.

PIN CONFIGURATIONS



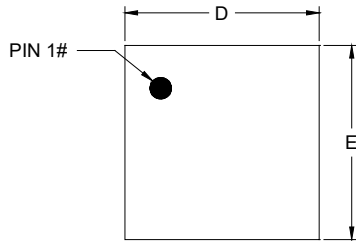
## PIN DESCRIPTION

PIN				NAME	TYPE	FUNCTION
TQFN- 2×2-12L	UTQFN- 1.8×1.8-12L	SOIC-14	TQFN- 3.5×3.5-14AL			
1	3	2	2	A1	I/O	Input/Output 1. It tracks the $V_{CCA}$ supply.
2	4	3	3	A2	I/O	Input/Output 2. It tracks the $V_{CCA}$ supply.
3	5	4	4	A3	I/O	Input/Output 3. It tracks the $V_{CCA}$ supply.
4	6	5	5	A4	I/O	Input/Output 4. It tracks the $V_{CCA}$ supply.
–	–	6, 9	6, 9	NC	–	No Connection. Not internally connected.
5	7	7	7	GND	S	Ground.
6	8	8	8	OE	I	Output Enable Control Pin. Active high. When OE goes low, all outputs enter into the high-impedance state. It tracks the $V_{CCA}$ supply.
7	9	10	10	B4	I/O	Input/Output 4. It tracks the $V_{CCB}$ supply.
8	10	11	11	B3	I/O	Input/Output 3. It tracks the $V_{CCB}$ supply.
9	11	12	12	B2	I/O	Input/Output 2. It tracks the $V_{CCB}$ supply.
10	12	13	13	B1	I/O	Input/Output 1. It tracks the $V_{CCB}$ supply.
11	1	14	14	$V_{CCB}$	S	Supply Voltage on B Ports. It can be operated from 2.3V to 5.5V.
12	2	1	1	$V_{CCA}$	S	Supply Voltage on A Ports. It can be operated from 1.65V to 5.5V, and $V_{CCA}$ is always $\leq V_{CCB}$ .
Exposed Pad	–	–	Exposed Pad	GND	–	Exposed pad should be soldered to PCB board and connected to GND or left floating.

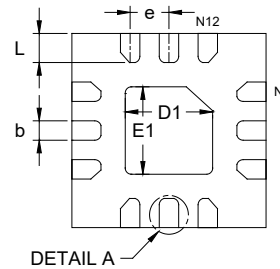
# PACKAGE INFORMATION

## PACKAGE OUTLINE DIMENSIONS

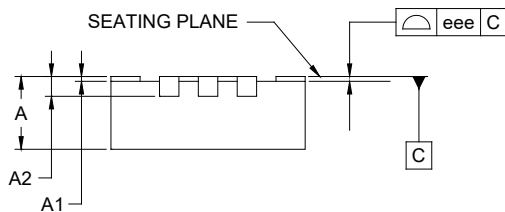
### TQFN-2x2-12L



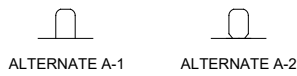
TOP VIEW



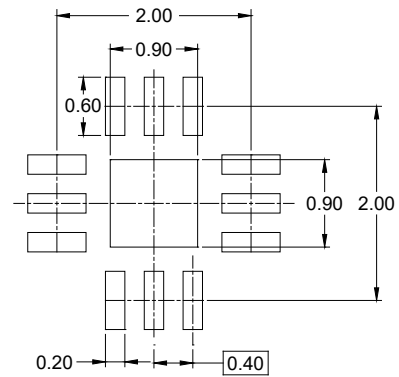
BOTTOM VIEW



SIDE VIEW



DETAIL A  
ALTERNATE TERMINAL  
CONSTRUCTION



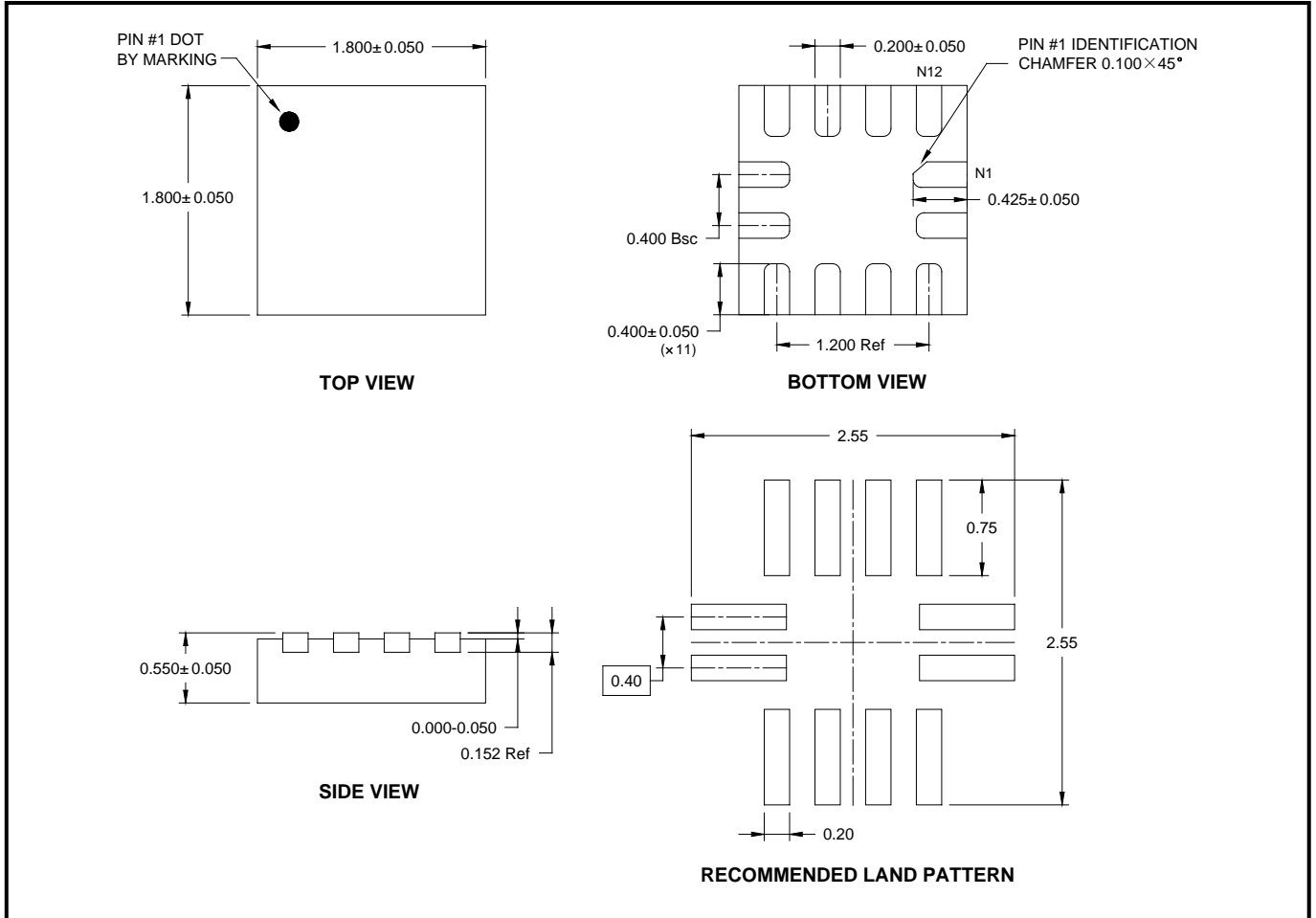
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.150	-	0.250
D	1.950	-	2.050
D1	0.850	-	0.950
E	1.950	-	2.050
E1	0.850	-	0.950
e	0.400 BSC		
L	0.250	-	0.350
eee	0.080		

NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

UTQFN-1.8x1.8-12L

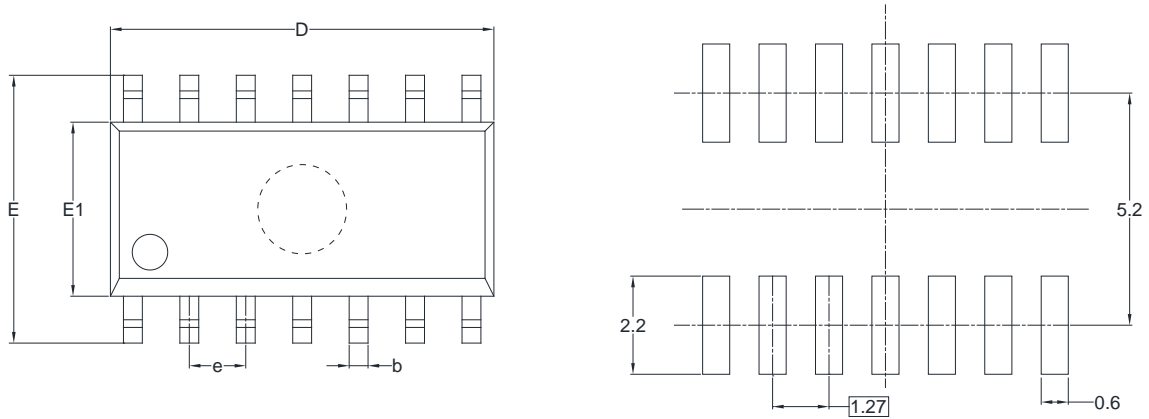


NOTES:

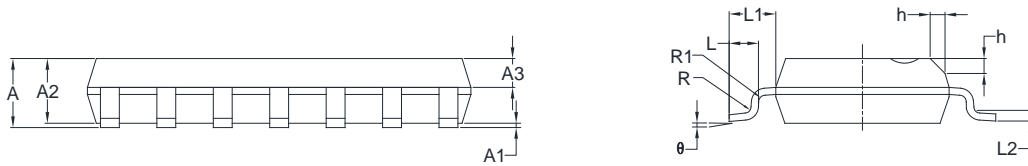
1. All linear dimensions are in millimeters.
2. This drawing is subject to change without notice.

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°

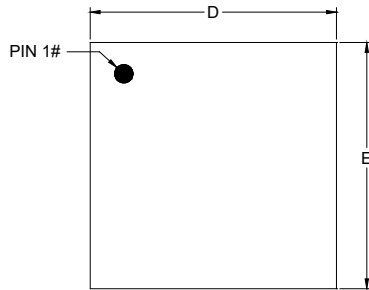
NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

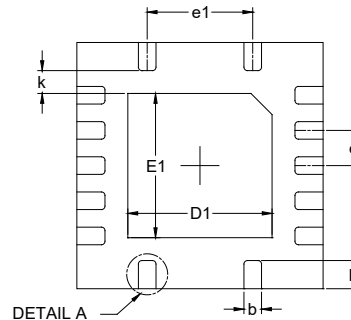


PACKAGE OUTLINE DIMENSIONS

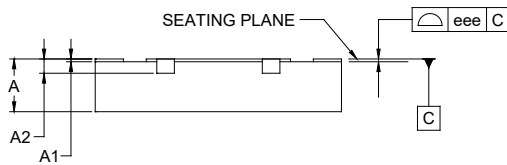
TQFN-3.5×3.5-14AL



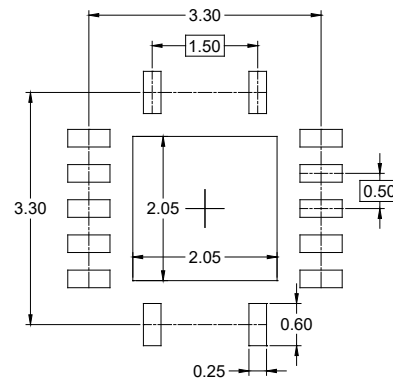
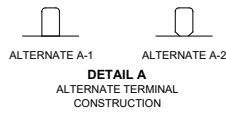
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions in Millimeters		
	MIN	MOD	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.200	-	0.300
D	3.400	-	3.600
E	3.400	-	3.600
D1	1.950	-	2.150
E1	1.950	-	2.150
e	0.500 BSC		
e1	1.500 BSC		
k	0.200 MIN		
L	0.300	-	0.500
eee	0.080		

NOTE: This drawing is subject to change without notice.

# 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
TQFN-2×2-12L	7"	9.5	2.30	2.30	0.90	4.0	4.0	2.0	8.0	Q2
UTQFN-1.8×1.8-12L	7"	9.0	2.10	2.10	0.80	4.0	4.0	2.0	8.0	Q2
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TQFN-3.5×3.5-14AL	13"	12.4	3.80	3.80	1.10	4.0	8.0	2.0	12.0	Q1

D00001

# 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