

GENERAL DESCRIPTION

The SGM4563 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 SGM4563 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 SGM4563 features the OE input circuit which is referenced to V_{CCA} .

The direction of three channels is from A to B, and the other channel is from B to A, so SGM4563 is the ideal device to finish the level translation of SPI bus or UART interface.

The SGM4563 is available in Green SOIC-14 and UTQFN-1.8×1.8-12L 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**
- **The Direction of Channel 1, 2 and 3 is from A to B, The Direction of Channel 4 is from B to A**
- **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 and UTQFN-1.8×1.8-12L Packages**

APPLICATIONS

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

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4563	SOIC-14	-40°C to +85°C	SGM4563YS14G/TR	SGM4563YS14 XXXXX	Tape and Reel, 2500
	UTQFN-1.8×1.8-12L	-40°C to +85°C	SGM4563YUQN12G/TR	4563 XXXX	Tape and Reel, 3000

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.

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 Port -0.3V to 6V

Output Voltage Range for the High-Impedance or Power-Off State, V_O

A Port -0.3V to 6V

B Ports -0.3V to 6V

Output Voltage Range for the High or Low State, V_O ⁽¹⁾

A Port -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 $\pm 25mA$

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, 10sec) 260°C

ESD Susceptibility

HBM 4000V

MM 400V

NOTE:

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

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.

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 $V_{CCI} \times 0.85$ ⁽⁴⁾ to V_{CCI}

OE Input $V_{CCA} \times 0.85$ to 5.5V

Low-Level Input Voltage, V_{IL}

Data Inputs 0V to $V_{CCI} \times 0.2$ ⁽⁴⁾

OE Input 0V to $V_{CCA} \times 0.2$

Output Voltage Range for the High-Impedance or Power-Off State, V_O

A Port 0V to 5.5V

B Ports 0V to 5.5V

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.

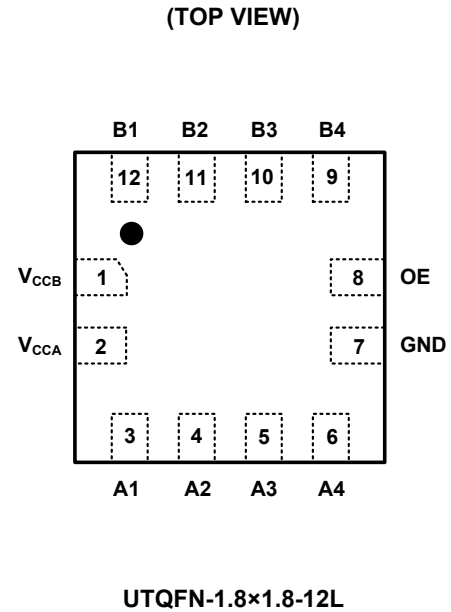
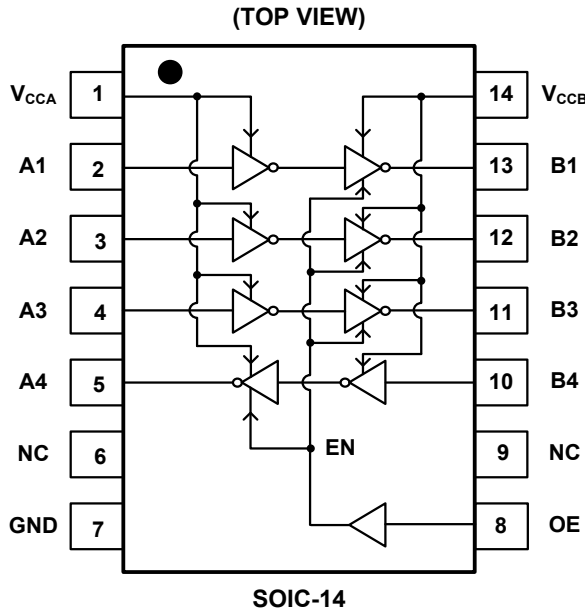
ESD SENSITIVITY CAUTION

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.

DISCLAIMER

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

PIN CONFIGURATIONS

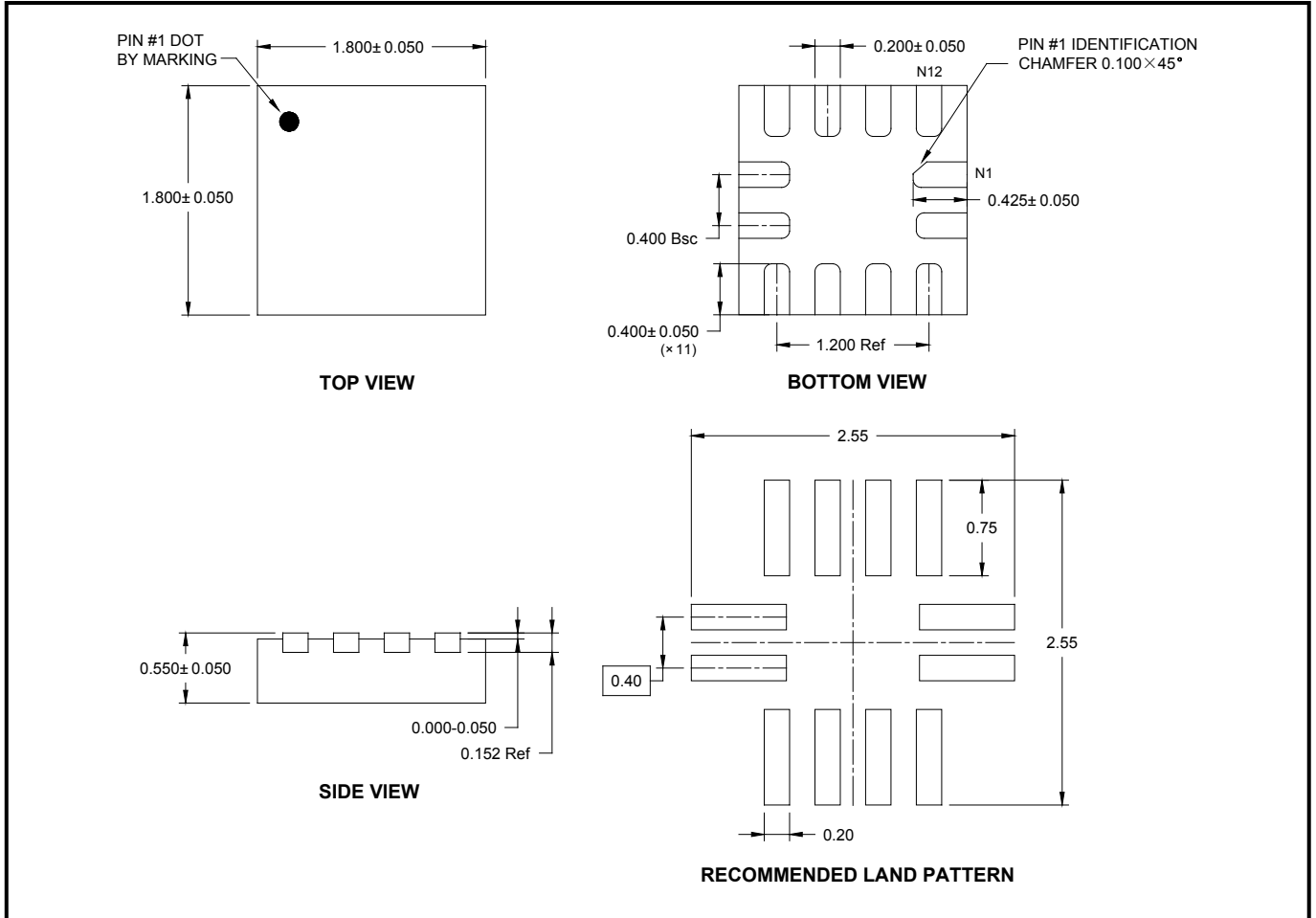


PIN DESCRIPTION

PIN		NAME	FUNCTION
SOIC-14	UTQFN-1.8x1.8-12L		
1	2	V _{CCA}	Supply Voltage on A Ports. It can be operated from 1.2V to 5.5V, and V _{CCA} is always ≤ V _{CCB} .
2	3	A1	Input 1. It tracks the V _{CCA} supply.
3	4	A2	Input 2. It tracks the V _{CCA} supply.
4	5	A3	Input 3. It tracks the V _{CCA} supply.
5	6	A4	Output of B4. It tracks the V _{CCA} supply.
6, 9	—	NC	No Connection. Not internally connected.
7	7	GND	Ground.
8	8	OE	Output Enable Control Pin. Active high. When OE goes low, all outputs enter into the high-impedance state. It tracks the V _{CCA} supply. OE is powered by V _{CCA} .
10	9	B4	Input. It tracks the V _{CCB} supply.
11	10	B3	Output of A3. It tracks the V _{CCB} supply.
12	11	B2	Output of A2. It tracks the V _{CCB} supply.
13	12	B1	Output of A1. It tracks the V _{CCB} supply.
14	1	V _{CCB}	Supply Voltage on B Ports. It can be operated from 1.65V to 5.5V.

PACKAGE OUTLINE DIMENSIONS

UTQFN-1.8×1.8-12L

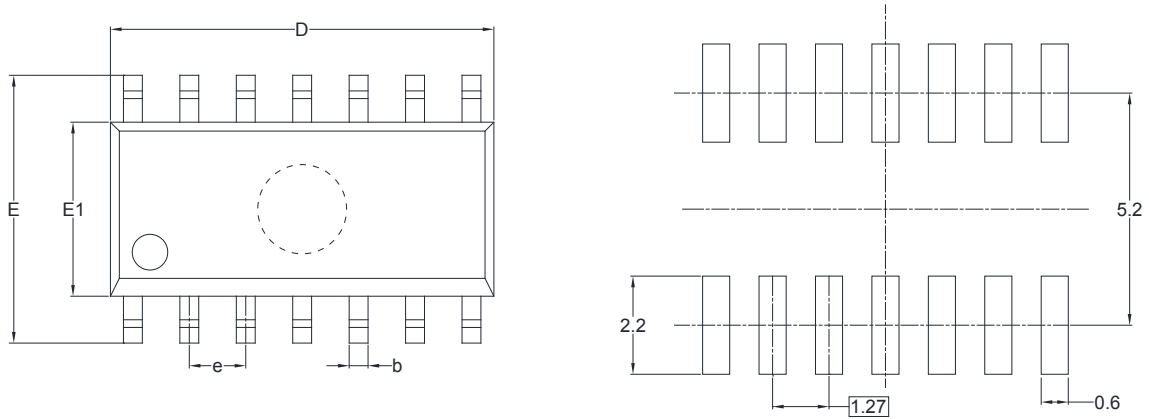


NOTE: All linear dimensions are in millimeters.

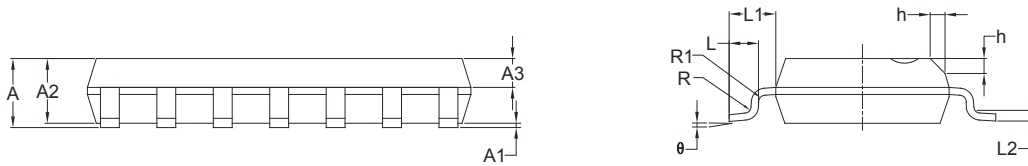
PACKAGE INFORMATION

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°

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
UTQFN-1.8×1.8-12L	7"	9.0	2.10	2.10	0.80	4.0	4.0	2.0	8.0	Q1
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	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