SGM4570Q

Automotive, Open-Drain, Dual-Supply Translating Transceiver with Auto Direction Sensing

GENERAL DESCRIPTION

The SGM4570Q is a 4-bit, dual-supply translating transceiver. The auto direction sensing function allows a bidirectional voltage level translation for the device. The nA and nB are 4-bit data input-output ports and OE is an output enable input. V_{CCA} and V_{CCB} are two supply pins that accept the voltage from 1.65V to 3.6V and 2.3V to 5.5V respectively. This makes the translation among voltage nodes of 1.8V, 2.5V, 3.3V and 5V. OE and nA pins track the V_{CCA} supply, and nB pins track the V_{CCB} supply. When OE pin is held low, the outputs enter a high-impedance state.

The device is AEC-Q100 qualified (Automotive Electronics Council (AEC) standard Q100 Grade 1) and it is suitable for automotive applications.

FEATURES

- **AEC-Q100 Qualified for Automotive Applications**
  Device Temperature Grade 1
  T_A = -40℃ to +125℃
- **V_{CCA} Supply Voltage Range: 1.65V to 3.6V**
- **V_{CCB} Supply Voltage Range: 2.3V to 5.5V (V_{CCA} ≤ V_{CCB})**
- **Inputs Accept Voltages up to 5.5V**
- **Maximum Data Rates:**
  - **Push-Pull: 24Mbps**
  - **Open-Drain: 2Mbps**
- **Support Partial Power-Down Mode**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in a Green TSSOP-14 Package**

APPLICATIONS

Automotive Applications
Computers
Mobile Phones

FUNCTION TABLE

SUPPLY VOLTAGE		CONTROL INPUT	INPUT/OUTPUT	
V_{CCA} (1)	V_{CCB}	OE	nA	nB
1.65V to 3.6V	2.3V to 5.5V	L	Z	Z
1.65V to 3.6V	2.3V to 5.5V	H	Input or Output	Output or Input
GND (2)	GND (2)	*X*	Z	Z

H = High Voltage Level

L = Low Voltage Level

Z = High-Impedance State

X = Don't Care

NOTES:

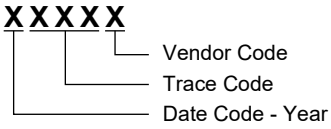
1. V_{CCA} ≤ V_{CCB} and V_{CCA} ≤ 3.6V.
2. The device enters power-down mode when either V_{CCA} or V_{CCB} is at GND.

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE TOP MARKING	PACKING OPTION
SGM4570Q	TSSOP-14	-40℃ to +125℃	SGM4570QTS14G/TR	MEG TS14 XXXXX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: 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.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage Range, V_{CCA} ..... -0.5V to 6.5V
Supply Voltage Range, V_{CCB} ..... -0.5V to 6.5V
Input Voltage Range, V_I (1) ..... -0.5V to 6.5V
Output Voltage Range, V_O (1)
Active Mode, A or B Ports ..... -0.5V to V_{CCO} + 0.5V
Power-Down Mode or 3-State Mode
A Ports ..... -0.5V to 4.6V
B Ports ..... -0.5V to 6.5V
Input Clamp Current, I_{IK} (V_I < 0V) ..... -50mA
Output Clamp Current, I_{OK} (V_O < 0V) ..... -50mA
Output Current, I_O (V_O = 0V to V_{CC})
High-State ..... -50mA
Low-State 50mA
Supply Current, I_{CCA} or I_{CCB} 100mA
Ground Current, I_{GND} ..... -100mA
Junction Temperature (2) ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility (3) (4)
HBM ..... ±4000V
CDM ..... ±1000V

NOTES:

1. The minimum input and output voltage ratings may be exceeded if the input and output clamp current ratings are observed.

2. The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability.

3. For human body model (HBM), all pins comply with AEC-Q100-002 specification.

4. For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, V_{CCA} ..... 1.65V to 3.6V
Supply Voltage Range, V_{CCB} ..... 2.3V to 5.5V
Input Transition Rise or Fall Rate, Δt/ΔV
A or B Ports, Push-Pull Driving
V_{CCA} = 1.65V to 3.6V, V_{CCB} = 2.3V to 5.5V .... 10ns/V (MAX)
OE Input
V_{CCA} = 1.65V to 3.6V, V_{CCB} = 2.3V to 5.5V .... 10ns/V (MAX)
Operating Temperature Range ..... -40℃ to +125℃

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.

ESD SENSITIVITY CAUTION

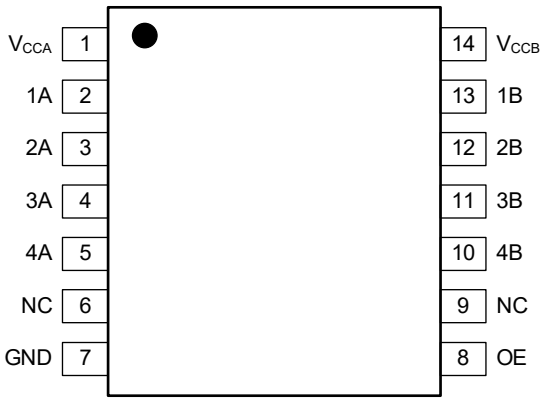
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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 CONFIGURATION

(TOP VIEW)



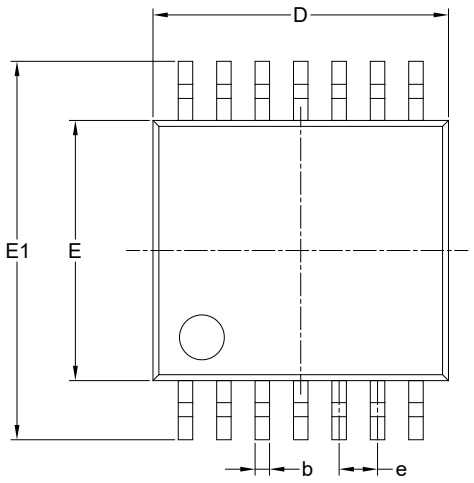
TSSOP-14

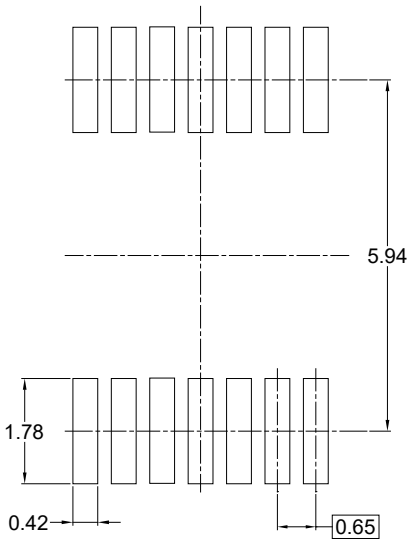
PIN DESCRIPTION

PIN	NAME	FUNCTION
1	V_{CCA}	Supply Voltage on A Ports.
2, 3, 4, 5	1A, 2A, 3A, 4A	Data Inputs/Outputs. They track the V_{CCA} supply.
6, 9	NC	No Connection.
7	GND	Ground.
8	OE	Output Enable Input (Active-High). It tracks the V_{CCA} supply.
10, 11, 12, 13	4B, 3B, 2B, 1B	Data Inputs/Outputs. They track the V_{CCB} supply.
14	V_{CCB}	Supply Voltage on B Ports.

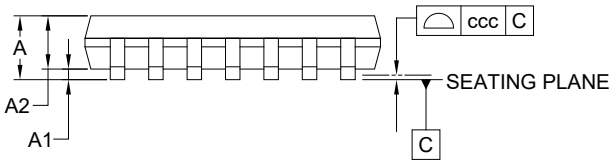
PACKAGE OUTLINE DIMENSIONS

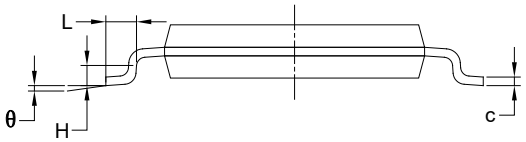
TSSOP-14





RECOMMENDED LAND PATTERN (Unit: mm)



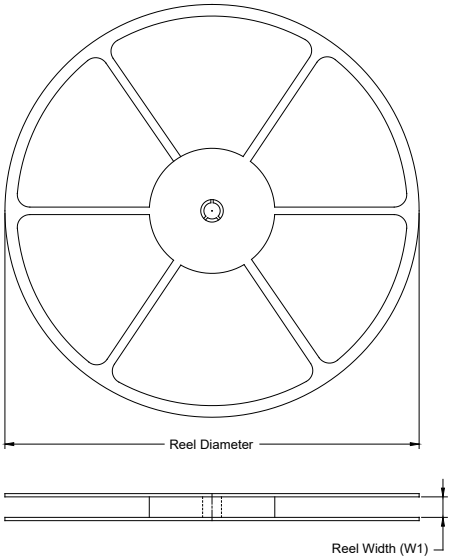


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.200
A1	0.050	-	0.150
A2	0.800	-	1.050
b	0.190	-	0.300
c	0.090	-	0.200
D	4.860	-	5.100
E	4.300	-	4.500
E1	6.200	-	6.600
e	0.650 BSC		
L	0.450	-	0.750
H	0.250 TYP		
θ	0°	-	8°
ccc	0.100		

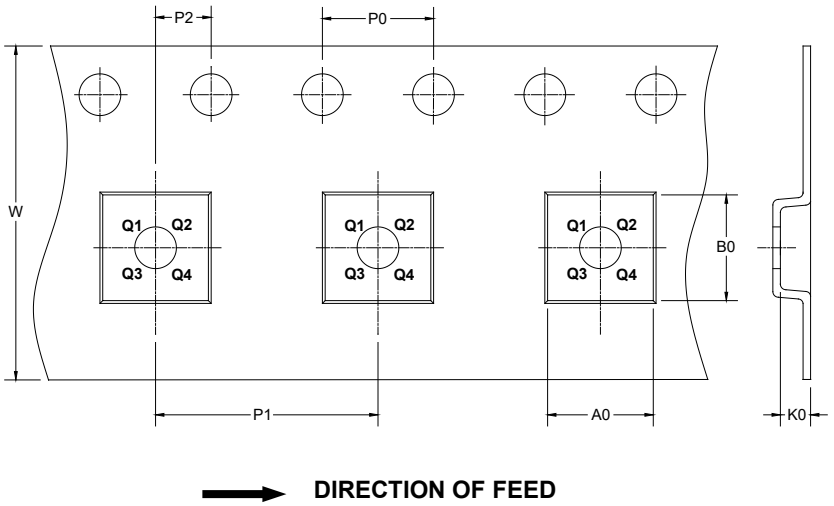
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-153.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



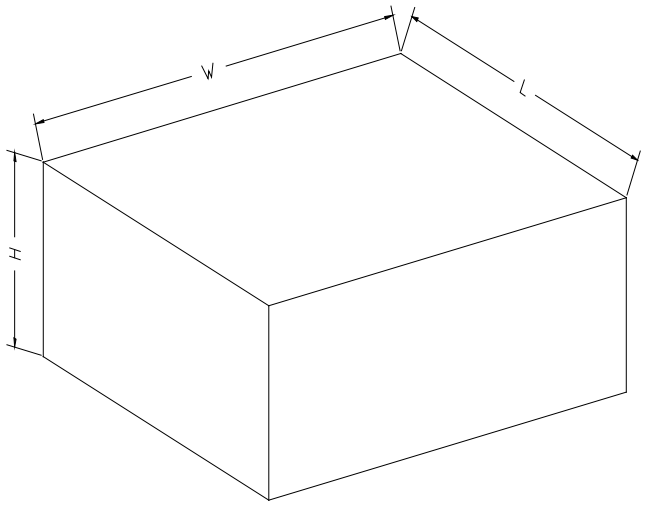
NOTE: The picture is only for reference. Please make the object as the standard.

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
TSSOP-14	13″	12.4	6.80	5.40	1.50	4.0	8.0	2.0	12.0	Q1

DD0001

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
13″	386	280	370	5

DD0002