

### GENERAL DESCRIPTION

The SGM4568 is an 8-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 SGM4568 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 SGM4568 features the OE input circuit which is referenced to  $V_{CCA}$ .

The SGM4568 is available in Green TSSOP-20 and TQFN-3x3-20L 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 TSSOP-20 and TQFN-3x3-20L Packages**

### APPLICATIONS

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

### TYPICAL APPLICATION

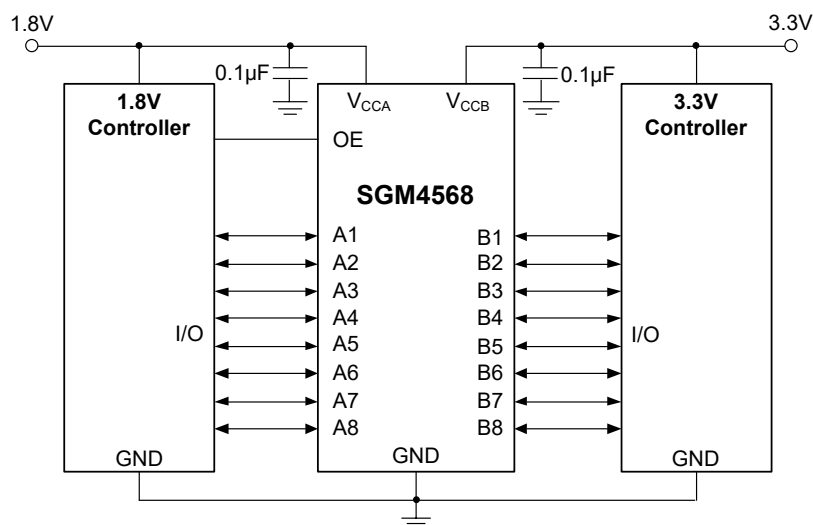


Figure 1. Typical Application Circuit

**PACKAGE/ORDERING INFORMATION**

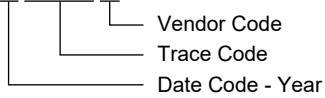
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM4568	TSSOP-20	-40°C to +85°C	SGM4568YTS20G/TR	SGM4568YTS20 XXXXX	Tape and Reel, 4000
	TQFN-3x3-20L	-40°C to +85°C	SGM4568YTQG20G/TR	SGM 4568QG XXXXX	Tape and Reel, 4000

**MARKING INFORMATION**

**TSSOP-20**

XXXXX = Date Code, Trace Code and Vendor Code.

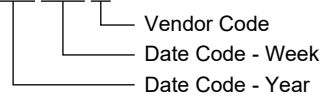
**XXXXX**



**TQFN-3x3-20L**

XXXXX = Date Code and Vendor Code.

**XXXXX**



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 by ESD if you don't pay attention to ESD protection. 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 very small parametric changes could cause the device not to meet its 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.

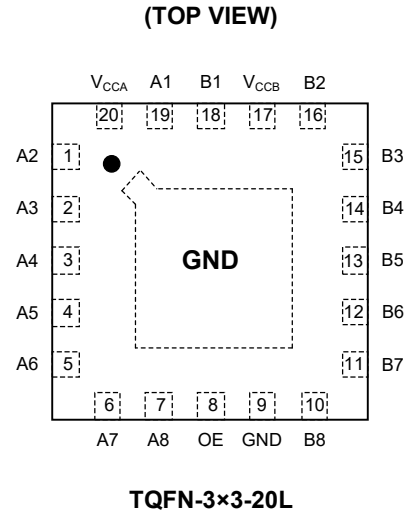
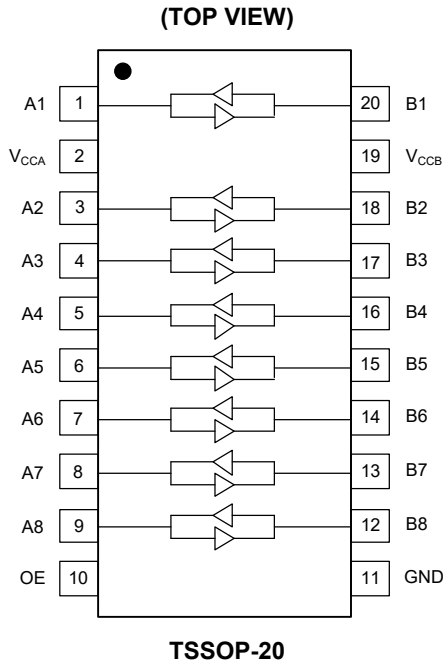
**RECOMMENDED OPERATING CONDITIONS**  
(2, 3)

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, $V_O$	
A Ports.....	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

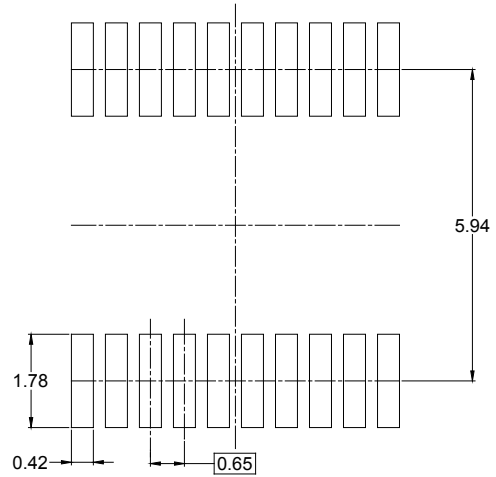
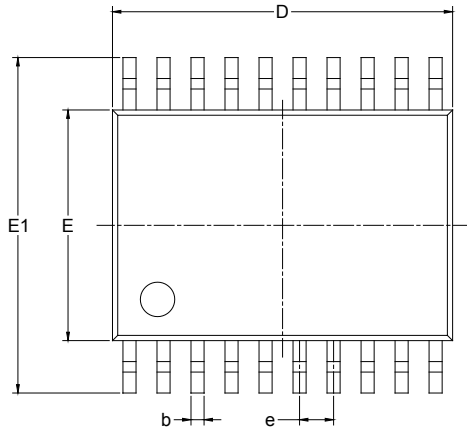


PIN DESCRIPTION

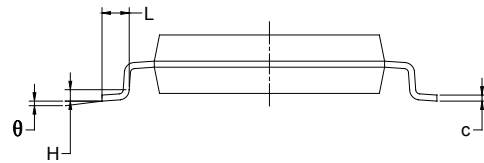
PIN		NAME	FUNCTION
TSSOP-20	TQFN-3x3-20L		
1	19	A1	Input/Output 1. It tracks the V <sub>CCA</sub> supply.
2	20	V <sub>CCA</sub>	Supply Voltage on A Ports. It can be operated from 1.2V to 5.5V, and V <sub>CCA</sub> is always ≤ V <sub>CCB</sub> .
3	1	A2	Input/Output 2. It tracks the V <sub>CCA</sub> supply.
4	2	A3	Input/Output 3. It tracks the V <sub>CCA</sub> supply.
5	3	A4	Input/Output 4. It tracks the V <sub>CCA</sub> supply.
6	4	A5	Input/Output 5. It tracks the V <sub>CCA</sub> supply.
7	5	A6	Input/Output 6. It tracks the V <sub>CCA</sub> supply.
8	6	A7	Input/Output 7. It tracks the V <sub>CCA</sub> supply.
9	7	A8	Input/Output 8. It tracks the V <sub>CCA</sub> supply.
10	8	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.
11	9	GND	Ground.
12	10	B8	Input/Output 8. It tracks the V <sub>CCB</sub> supply.
13	11	B7	Input/Output 7. It tracks the V <sub>CCB</sub> supply.
14	12	B6	Input/Output 6. It tracks the V <sub>CCB</sub> supply.
15	13	B5	Input/Output 5. It tracks the V <sub>CCB</sub> supply.
16	14	B4	Input/Output 4. It tracks the V <sub>CCB</sub> supply.
17	15	B3	Input/Output 3. It tracks the V <sub>CCB</sub> supply.
18	16	B2	Input/Output 2. It tracks the V <sub>CCB</sub> supply.
19	17	V <sub>CCB</sub>	Supply Voltage on B Ports. It can be operated from 1.65V to 5.5V.
20	18	B1	Input/Output 1. It tracks the V <sub>CCB</sub> supply.
—	Exposed Pad	GND	Exposed pad should be soldered to PCB board and connected to GND or left floating.

PACKAGE OUTLINE DIMENSIONS

TSSOP-20



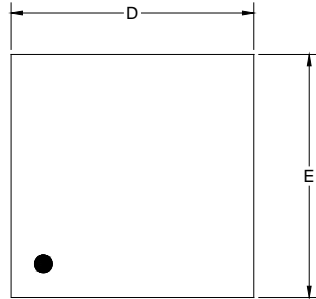
RECOMMENDED LAND PATTERN (Unit: mm)



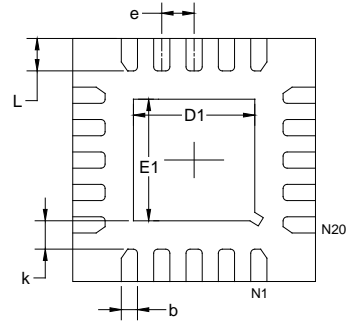
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.100		0.043
A1	0.050	0.150	0.002	0.006
A2	0.800	1.000	0.031	0.039
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	6.400	6.600	0.252	0.259
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500	0.700	0.02	0.028
H	0.25 TYP		0.01 TYP	
θ	1°	7°	1°	7°

PACKAGE OUTLINE DIMENSIONS

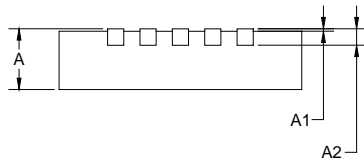
TQFN-3x3-20L



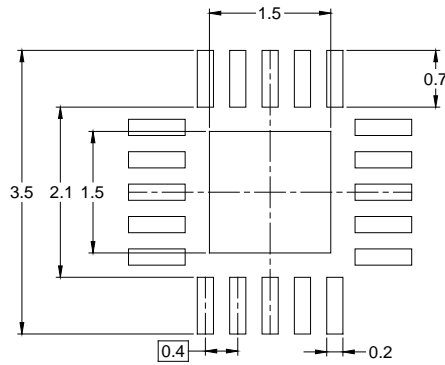
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	2.924	3.076	0.115	0.121
D1	1.400	1.600	0.055	0.063
E	2.924	3.076	0.115	0.121
E1	1.400	1.600	0.055	0.063
k	0.200 MIN		0.008 MIN	
b	0.150	0.250	0.006	0.010
e	0.400 TYP		0.016 TYP	
L	0.324	0.476	0.013	0.019

NOTE: This drawing is subject to change without notice.

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	Assembly House
TSSOP-20	13"	12.4	6.80	6.85	1.70	4.0	8.0	2.0	12.0	Q1	JCET-D8
TSSOP-20	13"	16.4	6.80	6.90	1.50	4.0	8.0	2.0	16.0	Q1	HTTS
TQFN-3×3-20L	13"	12.4	3.30	3.30	1.10	4.0	8.0	2.0	12.0	Q1	JCET-D8

00001

# 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
13"	386	280	370	5

DD0002