SGM65232
High Speed, 2:1 32-Bit Bus Multiplexer

GENERAL DESCRIPTION

The SGM65232 is a 32-bit high speed, 1.8V CMOS logic compatible 2:1 multiplexer/demultiplexer bus switch. The low on-resistance of the switch allows inputs to be connected to outputs without adding propagation delay or generating additional ground bounce noise.

The device can be used in applications where two buses need to be switched. The SGM65232 can be used as a 32-bit multiplexer or demultiplexer.

Two I/O (EN, S) inputs provide chip enable and multiplexer select control.

The SGM65232 is designed to prevent through-current between bus B and bus C when switching buses.

The SGM65232 is available in Green LQFP-14×14-100L package. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **11Ω Switch Connection between Two Ports**
- **Minimal Propagation Delay through the Switch**
- **"T" Type Switch Structure to Reduce Crosstalk and Enhance Isolation between A and Unselected B or C Bus**
- **Low Quiescent Supply Current**
- **Control Inputs Compatible with 1.8V Logic**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in Green LQFP-14×14-100L Package**

TYPICAL APPLICATION

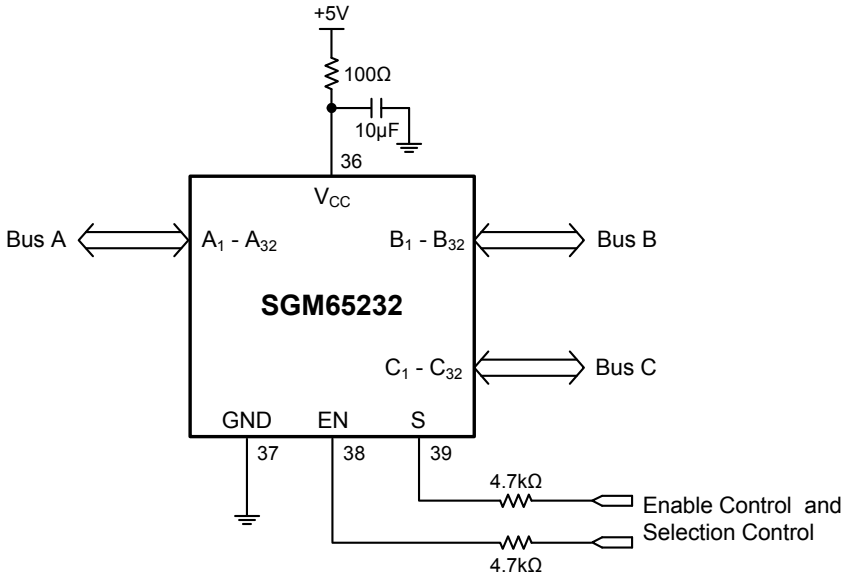


Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM65232	LQFP-14×14-100L	-40℃ to +85℃	SGM65232YLFD100G/TY	SGM65232 YLFD100 XXXXX	Tray, 90

NOTE: 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_{CC} ..... -0.3V to 6V
Enable Control Voltage Range, V_{EN} ..... -0.3V to 6V
Selection Control Voltage Range, V_S ..... -0.3V to 6V
DC Input Diode Current, I_{IK}
V_{IN} < 0V .....-50mA
DC Output Sink Current, I_{OUT} 64mA
DC V_{CC}/GND Current, I_{CC}/I_{GND} .....±100mA
Junction Temperature .....150℃
Storage Temperature Range .....-65℃ to +150℃
Lead Temperature (Soldering, 10s) .....260℃
ESD Susceptibility
HBM.....2000V
MM.....200V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range .....3.3V to 5V
Enable Control Voltage Range ..... 0V to V_{CC}
Selection Control Voltage Range..... 0V to V_{CC}
Signal Voltage Range .....0V to V_{CC} - 1.5V
Control Input Rise and Fall Time, t_r, t_f
Switch Control Input..... 3ns/V
Switch I/O 3ns/V
Operating Temperature Range .....-40℃ to +85℃

OVERSTRESS CAUTION

Stresses beyond those listed may cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational section of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

ESD SENSITIVITY CAUTION

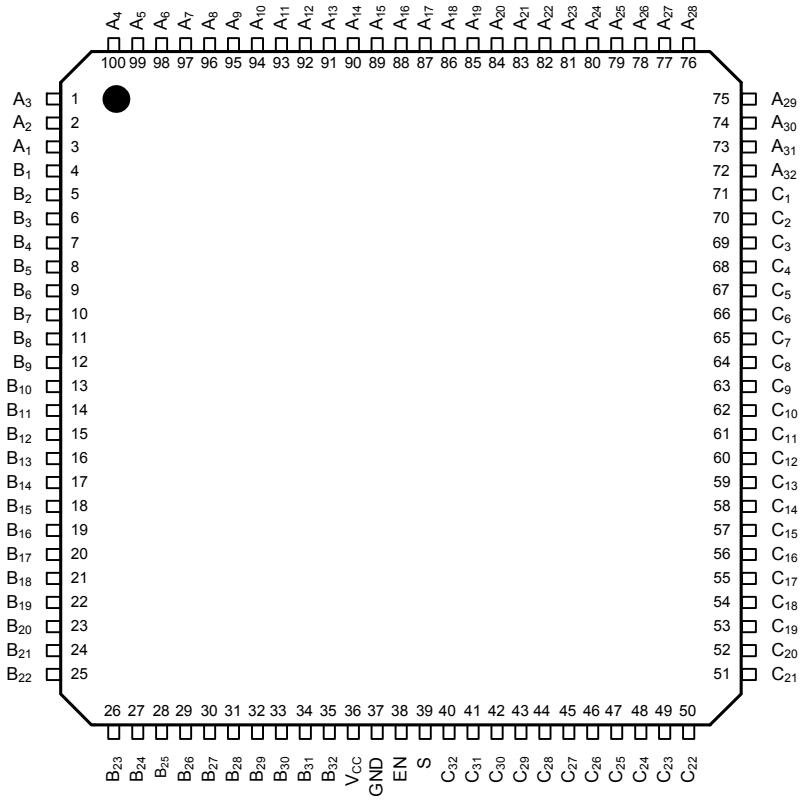
This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time.

PIN CONFIGURATION

(TOP VIEW)



LQFP-14×14-100L

PIN DESCRIPTION

PIN	NAME	FUNCTION
1-3, 72-100	A_n	Bus A.
4-35	B_n	Bus B.
36	V_{CC}	Power Supply.
37	GND	Ground.
38	EN	Enable Control. When EN = “High”, chip is enabled; When EN = “Low”, chip enters into shutdown status, bus B and bus C are all disconnected with bus A. There is a 500kΩ pull-low resistor at EN Pin.
39	S	Select Input. When S = “Low”, $A_n = B_n$; When S = “High”, $A_n = C_n$; There is a 500kΩ pull-low resistor at S Pin.
40-71	C_n	Bus C.

FUNCTION TABLE

INPUTS		FUNCTION
S	EN	
L	H	$A_n = B_n$
H	H	$A_n = C_n$
X	L	Shutdown status, A_n is disconnected with B_n and C_n.

ELECTRICAL CHARACTERISTICS

(Full = -40℃ to +85℃, typical values are at V_{CC} = 5.0V, T_A = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		TEMP	MIN	TYP	MAX	UNITS
DC CHARACTERISTICS								
Clamp Diode Voltage	V_{IK}	V_{CC} = 5.0V, I_{IN} = -18mA		Full			-2	V
High-Level Input Voltage	V_{IH}	V_{CC} = 3.3V to 5.0V		Full	1.5			V
Low-Level Input Voltage	V_{IL}	V_{CC} = 3.3V to 5.0V		Full			0.5	V
Input Leakage Current	I_{IN}	V_{CC} = 5.0V, 0 ≤ V_{IN} ≤ 5.0V		+25℃		15	18	μA
				Full			20	
		V_{CC} = 0V, V_{IN} = 5.0V		+25℃		15	18	
				Full			20	
Off-State Leakage Current	I_{OFF}	V_{CC} = 5.0V, 0 ≤ A, B ≤ V_{CC}		+25℃		0.1	7	μA
				Full			8	
On-Resistance (1)	R_{ON}	V_{CC} = 5.0V, V_{IN} = 0V, I_{IN} = 64mA		+25℃		11	16	Ω
				Full			19	
		V_{CC} = 5.0V, V_{IN} = 0V, I_{IN} = 30mA		+25℃		11	16	
				Full			19	
		V_{CC} = 5.0V, V_{IN} = 2.4V, I_{IN} = 15mA		+25℃		15	20	
				Full			24	
Quiescent Supply Current	I_{CC}	V_{CC} = 5.0V, V_{IN} = V_{CC} or GND, I_{OUT} = 0		+25℃		0.1	40	μA
				Full			45	
Increase in I_{CC} per Input	ΔI_{CC}	V_{CC} = 5.0V, one input at 3.4V, other inputs at V_{CC} or GND		+25℃		3	44	μA
				Full			48	
AC CHARACTERISTICS (C_L = 50pF, R_U = R_D = 500Ω)								
Bus B to Bus A or Bus C to Bus A (2)	t_{PHL}, t_{PLH}	V_I = OPEN, Figure 2, Figure 3	V_{CC} = 5.0V			2		ns
			V_{CC} = 3.3V			3		
S to A	t_{PHL}, t_{PLH}	V_I = OPEN, Figure 2, Figure 3	V_{CC} = 5.0V			15		ns
			V_{CC} = 3.3V			20		
Output Enable Time, EN to A	t_{PZH}, t_{PZL}	V_I = 7V for t_{PZL}, V_I = OPEN for t_{PZH}, Figure 2, Figure 3	V_{CC} =5.0V			12		ns
			V_{CC} = 3.3V			15		
Output Disable Time, EN to A	t_{PHZ}, t_{PLZ}	V_I = 7V for t_{PLZ}, V_I = OPEN for t_{PHZ}, Figure 2, Figure 3	V_{CC} = 5.0V			14		ns
			V_{CC} = 3.3V			17		
-3dB Bandwidth	BW	Signal = 0dBm, R_L = 50Ω	V_{CC} = 5.0V			100		MHz
			V_{CC} = 3.3V			100		
Off Isolation	O_{ISO}	Signal = 0dBm, R_L = 50Ω, f = 1MHz	V_{CC} = 5.0V			-80		dB
			V_{CC} = 3.3V			-80		
		Signal = 0dBm, R_L = 50Ω, f = 10MHz	V_{CC} = 5.0V			-60		
			V_{CC} = 3.3V			-60		
Channel-to-Channel Crosstalk	X_{TALK}	Signal = 0dBm, R_L = 50Ω, f = 1MHz	V_{CC} = 5.0V			-70		dB
			V_{CC} = 3.3V			-70		
		Signal = 0dBm, R_L = 50Ω, f = 10MHz	V_{CC} = 5.0V			-50		
			V_{CC} = 3.3V			-50		

ELECTRICAL CHARACTERISTICS

(Full = -40℃ to +85℃, typical values are at V_{CC} = 5.0V, T_A = +25℃, unless otherwise noted.)

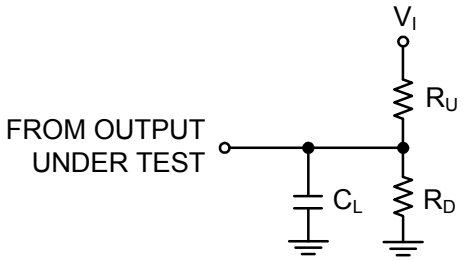
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
CAPACITANCE							
Control Pin Input Capacitance	C_{IN}	V_{CC} = 5.0V, f = 1MHz			13		pF
Input/Output Capacitance	$C_{I/O}$	V_{CC} = 5.0V, Switch OFF, f = 1MHz			13		pF
		V_{CC} = 5.0V, Switch ON, f = 1MHz			26		

NOTES:

1. Measured by the voltage drop between A and B pins at the indicated current through the switch. On-resistance is determined by the lower of the voltages on the two (B or C) pins.

2. The bus switch contributes no propagation delay other than the RC delay of the typical on-resistance of the switch and the 50pF load capacitance, when driven by an ideal voltage source (zero output impedance).

AC LOADING AND WAVEFORMS



NOTES:
1. Input driven by 50Ω source terminated in 50Ω.
2. C_L includes load and stray capacitance.
3. Input PRR = 1.0MHz, t_W = 500ns.

Figure 2. AC Test Circuit

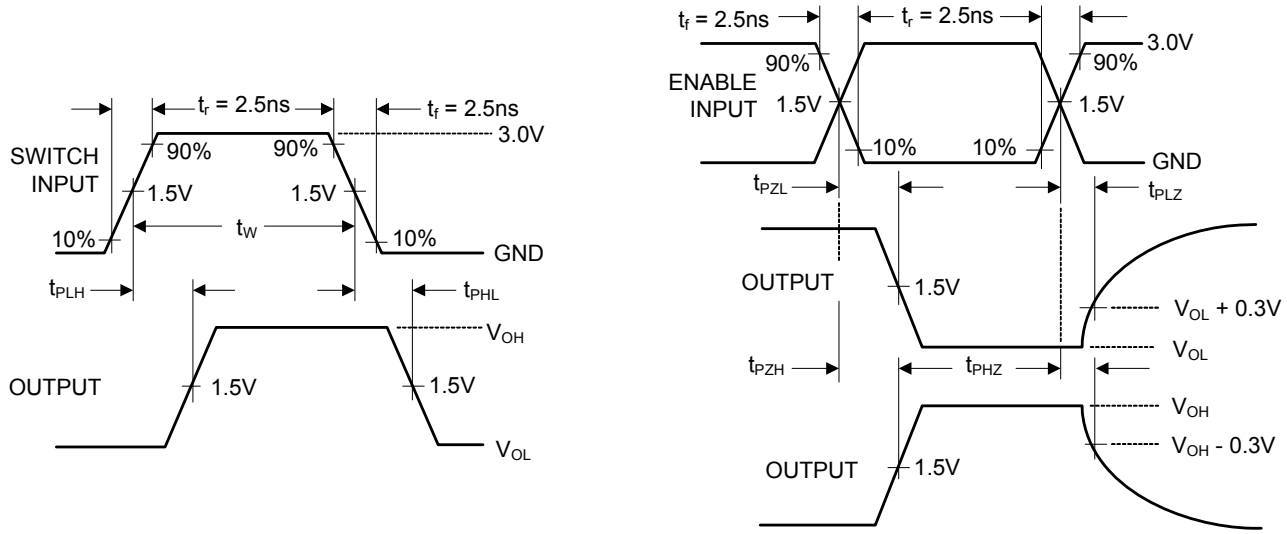
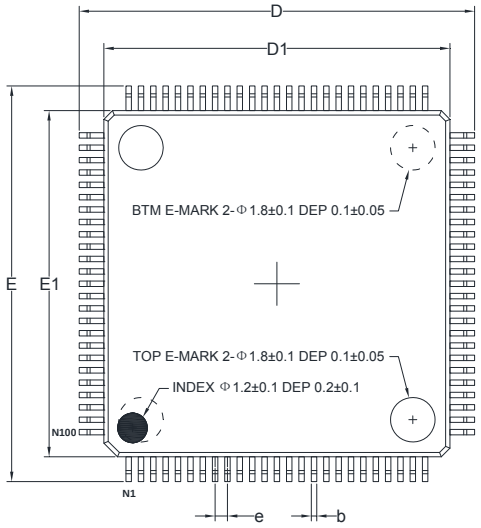


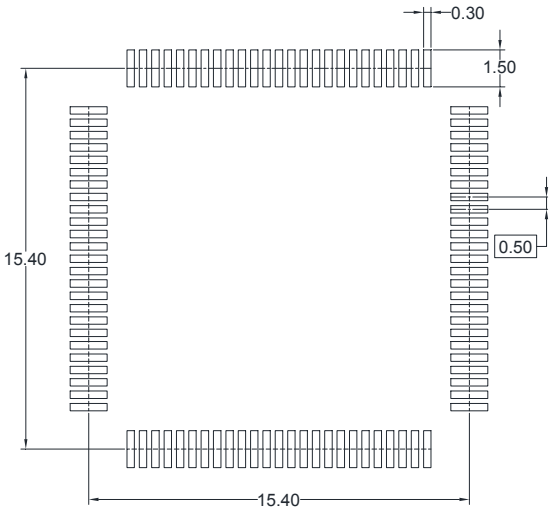
Figure 3. AC Waveforms

PACKAGE OUTLINE DIMENSIONS

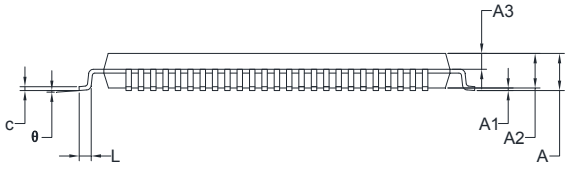
LQFP-14×14-100L



TOP VIEW



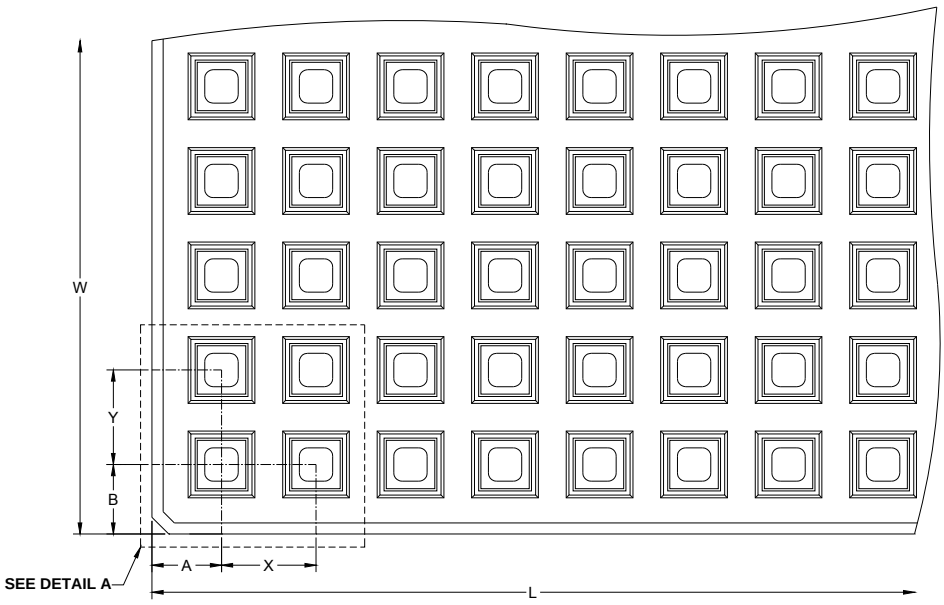
RECOMMENDED LAND PATTERN (Unit: mm)



SIDE VIEW

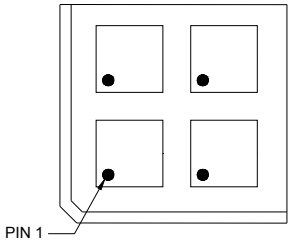
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.60
A1	0.05	-	0.15
A2	1.35	1.40	1.45
A3	0.59	0.64	0.69
b	0.17	-	0.27
c	0.13	-	0.18
D	15.80	16.00	16.20
D1	13.90	14.00	14.10
E	15.80	16.00	16.20
E1	13.90	14.00	14.10
e	0.50 BSC		
L	0.45	0.60	0.75
θ	0°	3.5°	7°

TRAY INFORMATION



TOP VIEW

SIDE VIEW



DETAIL A

Pin 1 is closest to the chamfered corner of the tray.

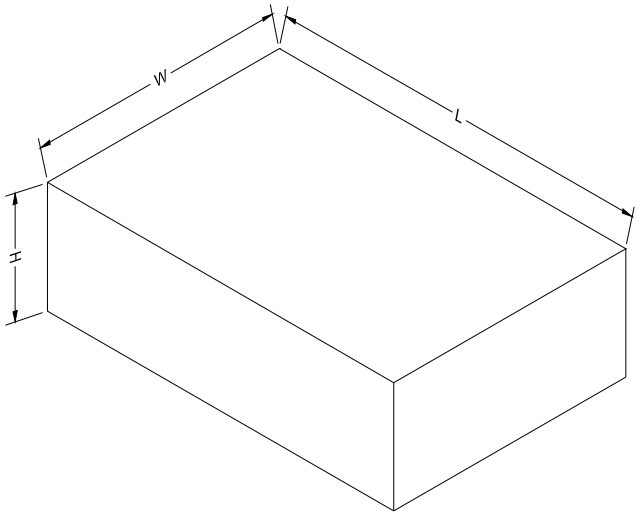
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TRAY

Package Type	A (mm)	B (mm)	X (mm)	Y (mm)	L (mm)	W (mm)	H (mm)	Devices/Tray
LQFP-14×14-100L	15.40	15.45	20.30	21.00	322.6	135.9	7.6	90

DD0003

CARTON BOX DIMENSIONS



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

KEY PARAMETER LIST OF CARTON BOX

Packing Type	Length (mm)	Width (mm)	Height (mm)	Inner Box/Carton	Tray/Inner Box
Tray	560	375	180	6	2

DD0004