



SGM4520Q

Automotive, 36V High Voltage, CMOS Analog Switch

GENERAL DESCRIPTION

The SGM4520Q is configured as three single-pole/double-throw (SPDT) switches. It operates from +3.2V to +36V single power supply or $\pm 3.2V$ to $\pm 18V$ dual power supplies.

The SGM4520Q features high voltage, low on-resistance and low distortion. The high performances make it very suitable for multiple applications, such as battery-operated equipment, audio and video signal routing, etc.

TTL/CMOS logic compatibility can be guaranteed when using a single +5V or dual $\pm 5V$ power supplies.

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

The SGM4520Q is available in Green TSSOP-16 and TQFN-3 \times 3-16GL packages. It operates over an operating temperature range of $-40^{\circ}C$ to $+125^{\circ}C$.

FEATURES

- **AEC-Q100 Qualified for Automotive Applications Device Temperature Grade 1**
 $T_A = -40^{\circ}C$ to $+125^{\circ}C$
- **Single Supply Voltage Range: +3.2V to +36V**
- **Dual-Supply Voltage Range: $\pm 3.2V$ to $\pm 18V$**
- **High Off-Isolation: $-75dB$ ($R_L = 50\Omega$, $f = 1MHz$)**
- **On-Resistance:**
23 Ω (TYP) with 36V Single Supply
- **Low On-Resistance Flatness**
- **Low Off-Leakage Current: $\pm 0.01\mu A$ (TYP) at $+25^{\circ}C$**
- **Low On-Leakage Current: $\pm 0.01\mu A$ (TYP) at $+25^{\circ}C$**
- **Low Crosstalk: $-75dB$ (TYP) ($R_L = 50\Omega$, $f = 1MHz$)**
- **Low Distortion: 0.001% ($R_L = 600\Omega$, $f = 1kHz$)**
- **Rail-to-Rail Input and Output Operation**
- **TTL/CMOS-Logic Compatible**
- **$-40^{\circ}C$ to $+125^{\circ}C$ Operating Temperature Range**
- **Available in Green TSSOP-16 and TQFN-3 \times 3-16GL Packages**

APPLICATIONS

Automotive System
Portable Equipment
Sample-and-Hold Circuits
Battery-Powered Systems
Audio and Video Signal Routing

PACKAGE/ORDERING INFORMATION

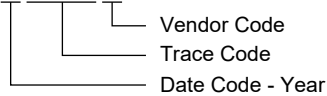
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE TOP MARKING	PACKING OPTION
SGM4520Q	TSSOP-16	-40°C to +125°C	SGM4520QTS16G/TR	0TITS16 XXXXX	Tape and Reel, 4000
	TQFN-3×3-16GL	-40°C to +125°C	SGM4520QTVH16G/TR	0RPVH XXXXX XX#XX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.

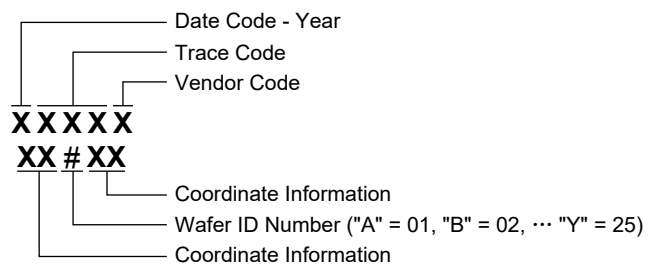
TSSOP-16

XXXXX



TQFN-3×3-16GL

XXXXX
XX # XX



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.

SGM4520Q

ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to V_{EE}

V_{CC}	-0.3V to 40V
GND	-0.3V to 40V
Analog Switch I/O Voltage, V_{IS}	$(V_{EE} - 0.3V)$ to $(V_{CC} + 0.3V)$
Digital Control Voltage	$(GND - 0.3V)$ to $(V_{CC} + 0.3V)$
Continuous Current into Analog Switch I/O, X_{-} , Y_{-} , Z_{-} ⁽¹⁾ or X , Y , Z	$\pm 40mA$
Package Thermal Resistance	
TSSOP-16, θ_{JA}	102.8°C/W
TSSOP-16, θ_{JB}	67.8°C/W
TSSOP-16, θ_{JC}	39.4°C/W
TQFN-3x3-16GL, θ_{JA}	40.2°C/W
TQFN-3x3-16GL, θ_{JB}	15.2°C/W
TQFN-3x3-16GL, $\theta_{JC(TOP)}$	43.4°C/W
TQFN-3x3-16GL, $\theta_{JC(BOT)}$	4.4°C/W
Junction Temperature.....	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s).....	+260°C
ESD Susceptibility ^{(2) (3)}	
HBM.....	$\pm 3000V$
CDM	$\pm 1000V$

NOTES:

1. X_{-} : Analog Switch Inputs X0, X1. Y_{-} : Analog Switch Inputs Y0, Y1. Z_{-} : Analog Switch Inputs Z0, Z1.
2. For human body model (HBM), all pins comply with AEC-Q100-002 specification.
3. For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range.....-40°C to +125°C

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.

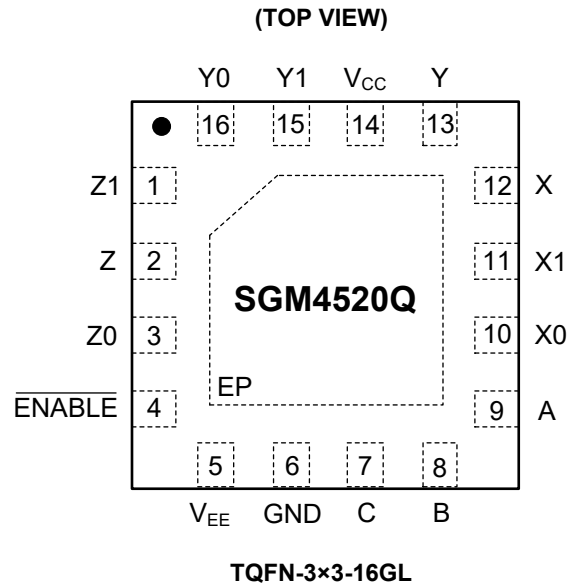
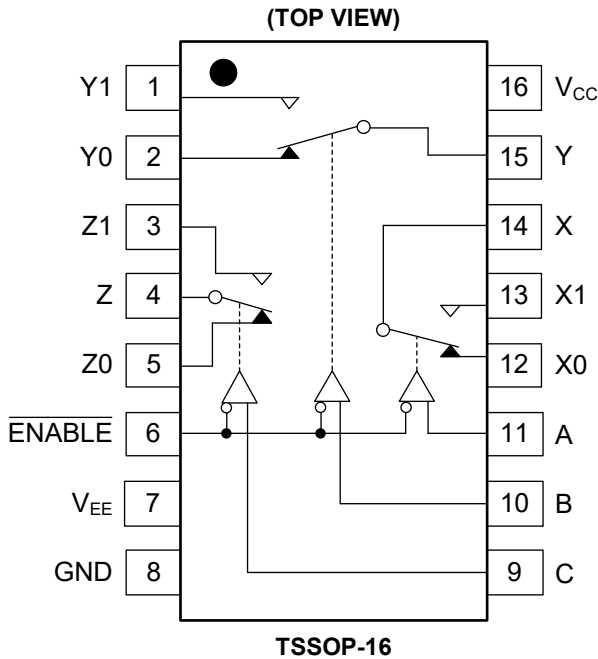
ESD SENSITIVITY CAUTION

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 CONFIGURATIONS



PIN DESCRIPTION

PIN		NAME	FUNCTION
TSSOP-16	TQFN-3x3-16GL		
14	12	X	Analog Switch "X" Output Pin.
15	13	Y	Analog Switch "Y" Output Pin.
4	2	Z	Analog Switch "Z" Output Pin.
13	11	X1	Analog Switch "X" Normally Open Input Pin.
12	10	X0	Analog Switch "X" Normally Closed Input Pin.
1	15	Y1	Analog Switch "Y" Normally Open Input Pin.
2	16	Y0	Analog Switch "Y" Normally Closed Input Pin.
3	1	Z1	Analog Switch "Z" Normally Open Input Pin.
5	3	Z0	Analog Switch "Z" Normally Closed Input Pin.
16	14	V _{CC}	Positive Analog and Digital Supply Voltage Input Pin.
11	9	A	Digital Address "A" Input Pin.
10	8	B	Digital Address "B" Input Pin.
9	7	C	Digital Address "C" Input Pin.
8	6	GND	Ground.
7	5	V _{EE}	Negative Analog Supply Voltage Input Pin. Connect to GND for single-supply operation.
6	4	ENABLE	Digital Enable Control Input Pin (Active Low). Normally connected to GND.
—	Exposed Pad	EP	Exposed Pad. It can be connected to V _{EE} or be left floating.

NOTE:

Any input terminal can be used as an output terminal, and any output terminal can also be used as an input terminal. Signal transmission in both directions is equally well.

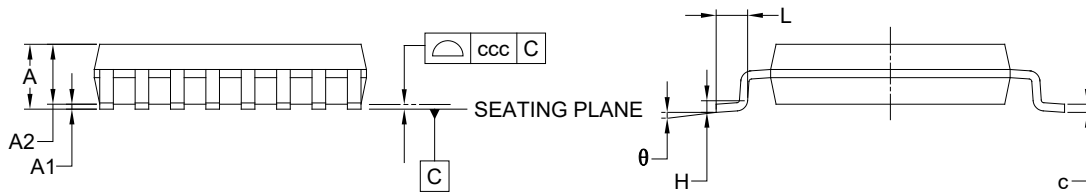
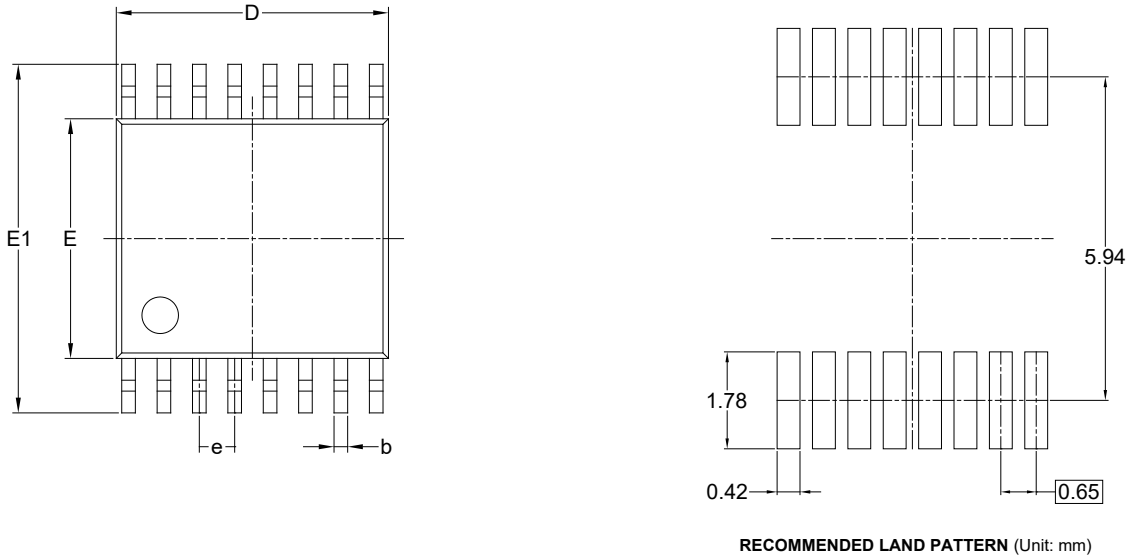
FUNCTION TABLE

ENABLE Input	Select Inputs			On Switches
	C	B	A	
H	X	X	X	All Switches Open
L	L	L	L	X-X0, Y-Y0, Z-Z0
L	L	L	H	X-X1, Y-Y0, Z-Z0
L	L	H	L	X-X0, Y-Y1, Z-Z0
L	L	H	H	X-X1, Y-Y1, Z-Z0
L	H	L	L	X-X0, Y-Y0, Z-Z1
L	H	L	H	X-X1, Y-Y0, Z-Z1
L	H	H	L	X-X0, Y-Y1, Z-Z1
L	H	H	H	X-X1, Y-Y1, Z-Z1

X = Don't care.

PACKAGE OUTLINE DIMENSIONS

TSSOP-16



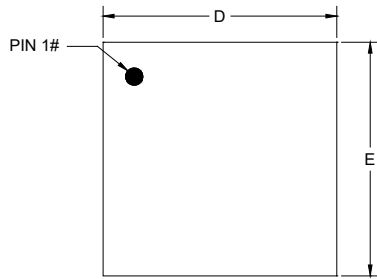
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.200
A1	0.050	-	0.150
A2	0.800	-	1.050
b	0.190	-	0.300
c	0.090	-	0.200
D	4.860	-	5.100
E	4.300	-	4.500
E1	6.200	-	6.600
e	0.650 BSC		
L	0.450	-	0.750
H	0.250 TYP		
θ	0°	-	8°
ccc	0.100		

- 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.

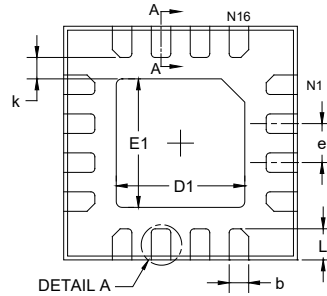
PACKAGE INFORMATION

PACKAGE OUTLINE DIMENSIONS

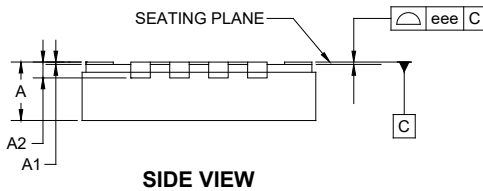
TQFN-3×3-16GL



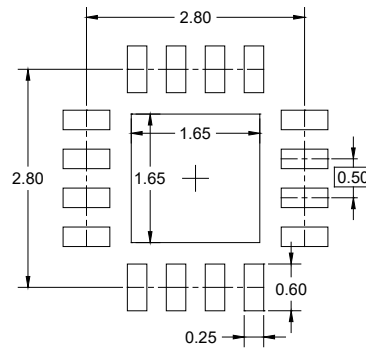
TOP VIEW



BOTTOM VIEW



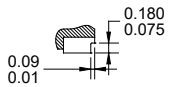
SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTION



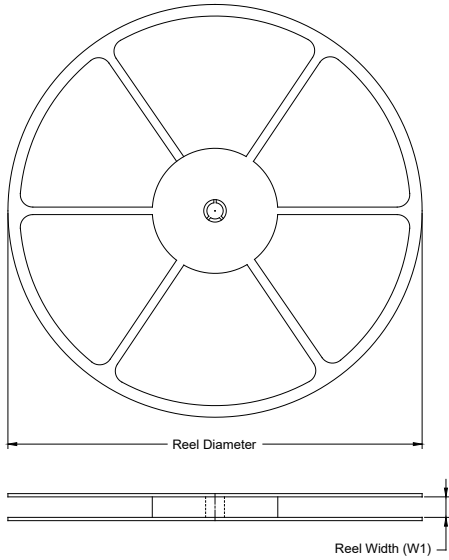
SECTION A-A
TERMINAL CROSS SECTION

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	-	0.800
A1	0.000	-	0.050
A2	0.203 REF		
b	0.200	-	0.300
D	2.900	-	3.100
D1	1.600	-	1.800
E	2.900	-	3.100
E1	1.600	-	1.800
e	0.500 BSC		
L	0.300	-	0.500
k	0.275 REF		
eee	0.080		

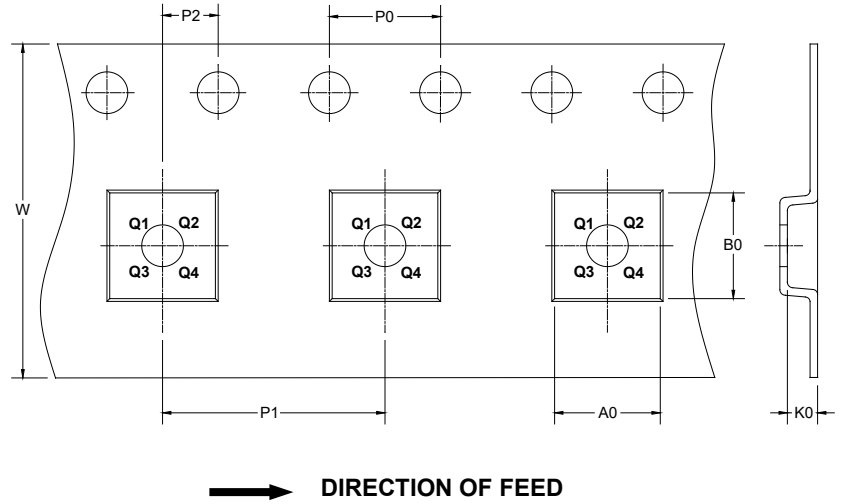
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

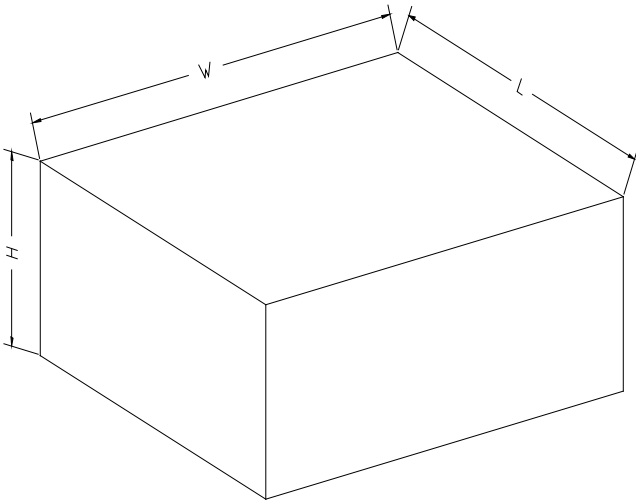
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TSSOP-16	13"	12.4	6.80	5.40	1.50	4.0	8.0	2.0	12.0	Q1
TQFN-3×3-16GL	13"	12.4	3.30	3.30	1.05	4.0	8.0	2.0	12.0	Q2

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
13"	386	280	370	5

DD0002