

GENERAL DESCRIPTION

The SGM84782 is high-speed, low-voltage, low on-resistance, CMOS analog multiplexer/switch that configured as two 4-channel multiplexers. It operates from a single +1.8V to +4.2V power supply. Targeted applications include battery powered equipment that benefit from low R_{ON} (4Ω) and fast switching speeds ($t_{ON} = 17ns$, $t_{OFF} = 9ns$).

The SGM84782 can handle rail-to-rail analog signals and is available in Green TQFN-3×3-16L and TSSOP-16 packages.

APPLICATIONS

- Communication Systems
- Cell Phones
- Portable Instrumentation
- Audio Signal Routing
- Audio and Video Switching
- Computer Peripherals
- Low-Voltage Data-Acquisition Systems

FUNCTION TABLE

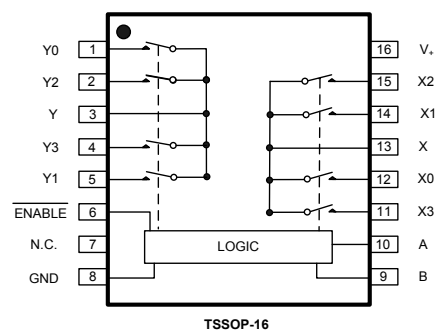
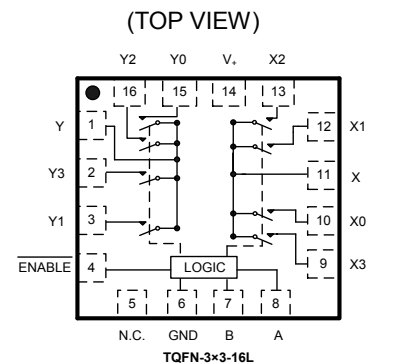
| CONTROL INPUTS | | | ON SWITCHES |
|----------------|--------|---|-------------------|
| ENABLE | Select | | |
| | B | A | |
| L | L | L | X-X0 Y-Y0 |
| L | L | H | X-X1 Y-Y1 |
| L | H | L | X-X2 Y-Y2 |
| L | H | H | X-X3 Y-Y3 |
| H | √ | √ | All Switches Open |

√ = Don't Care.

FEATURES

- Voltage Operation: 1.8V to 4.2V
- Low On-Resistance: 4Ω (TYP) at 4.2V
- Low On-Resistance Flatness
- -3dB Bandwidth: 150MHz
- Fast Switching Times (+4.2V)
 - t_{ON} 17ns
 - t_{OFF} 9ns
- Low Crosstalk: -92dB at 10MHz
- Rail-to-Rail Input and Output Operation
- Typical Power Consumption (< 0.01μW)
- TTL/CMOS Compatible
- Break-Before-Make Switching
- -40°C to +85°C Operating Temperature Range
- Available in Green TQFN-3×3-16L and TSSOP-16 Packages

PIN CONFIGURATIONS



PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|----------|---------------------|-----------------------------|------------------|--------------------------|---------------------|
| SGM84782 | TQFN-3×3-16L | -40°C to +85°C | SGM84782YTQ16/TR | 84782 XXXXX | Tape and Reel, 3000 |
| | TSSOP-16 | -40°C to +85°C | SGM84782YTS/TR | SGM84782 YTS XXXXX | Tape and Reel, 3000 |

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

V₊ to GND0V to 4.6V
 Analog, Digital Voltage Range -0.3V to (V₊) + 0.3V
 Continuous Current NO, NC, or COM..... ±100mA
 Junction Temperature+150°C
 Storage Temperature Range-65°C to +150°C
 Lead Temperature (Soldering, 10s)+260°C
 ESD Susceptibility
 HBM.....4000V
 MM.....400V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range1.8V to 4.2V
 Operating Temperature Range-40°C to +85°C

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 DESCRIPTION

| PIN | | NAME | FUNCTION |
|----------------|---------------|----------------------------|---|
| TSSOP-16 | TQFN-3×3-16L | | |
| 1, 5, 2, 4 | 15, 3, 16, 2 | Y0-Y3 | Analog Switch Y Inputs Y0-Y3. |
| 3 | 1 | Y | Analog Switch Y Output. |
| 6 | 4 | $\overline{\text{ENABLE}}$ | Digital Enable Input. Normally connect to GND. Drive to logic high to set all switches off. |
| 7 | 5 | N.C. | Not Internally Connected. |
| 8 | 6 | GND | Ground. |
| 9 | 7 | B | Digital Address B Input. |
| 10 | 8 | A | Digital Address A Input. |
| 12, 14, 15, 11 | 10, 12, 13, 9 | X0-X3 | Analog Switch X Inputs X0-X3. |
| 13 | 11 | X | Analog Switch X Output. |
| 16 | 14 | V ₊ | Power Supply. |
| - | Exposed Pad | GND | Exposed pad should be soldered to PCB board and connected to GND. |

ELECTRICAL CHARACTERISTICS

($V_+ = +4.2V$, $GND = 0V$, $V_{IH} = +1.6V$, $V_{IL} = +0.6V$, $T_A = -40^\circ C$ to $+85^\circ C$. Typical values are at $V_+ = +4.2V$, $T_A = +25^\circ C$, unless otherwise noted.)

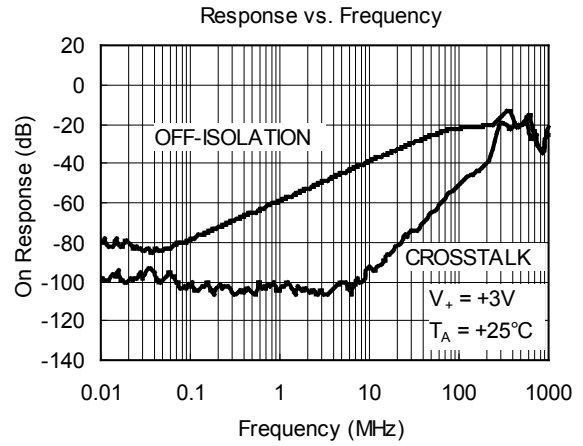
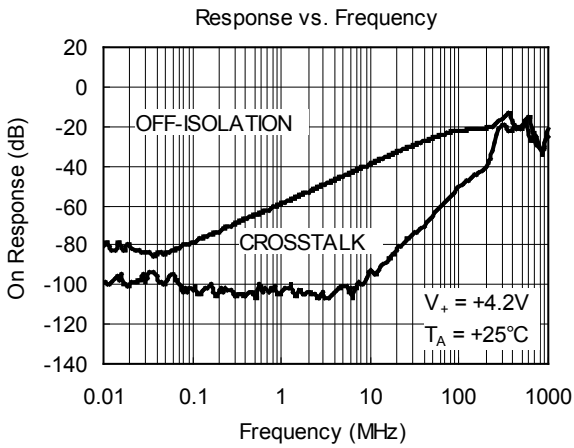
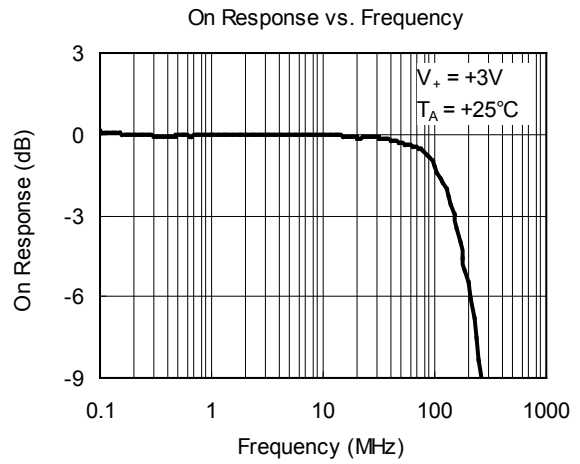
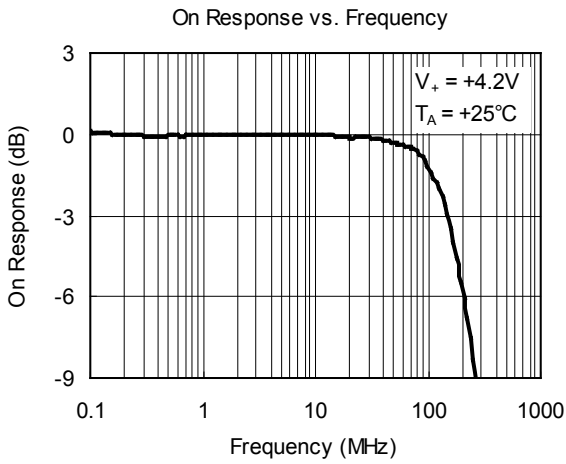
| PARAMETER | SYMBOL | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|--------------------------------------|--|---|--------------------------------|---------------|------|-------|----------|
| ANALOG SWITCH | | | | | | | |
| Analog Signal Range | $V_{X-}, V_{Y-}, V_{X+}, V_{Y+}$ | | $-40^\circ C$ to $+85^\circ C$ | 0 | | V_+ | V |
| On-Resistance | R_{ON} | $V_+ = 4.2V$, $I_{X-}, I_{Y-} = -100mA$, $V_{X+}, V_{Y+} = 1V$, Test Circuit 1 | $+25^\circ C$ | | 4 | 5.5 | Ω |
| | | | $-40^\circ C$ to $+85^\circ C$ | | | 6.5 | |
| On-Resistance Match Between Channels | ΔR_{ON} | $V_+ = 4.2V$, $I_{X-}, I_{Y-} = -100mA$, $V_{X+}, V_{Y+} = 1V$, Test Circuit 1 | $+25^\circ C$ | | 0.16 | 1 | Ω |
| | | | $-40^\circ C$ to $+85^\circ C$ | | | 1.5 | |
| On-Resistance Flatness | $R_{FLAT(ON)}$ | $V_+ = 4.2V$, $I_{X-}, I_{Y-} = -100mA$, $V_{X+}, V_{Y+} = 1V, 2.5V$, Test Circuit 1 | $+25^\circ C$ | | 1.6 | 2.2 | Ω |
| | | | $-40^\circ C$ to $+85^\circ C$ | | | 2.8 | |
| Source OFF Leakage Current | $I_{X(OFF)}, I_{Y(OFF)}$ | $V_+ = 4.2V$, $V_{X+}, V_{Y+} = 3.3V, 0.3V$, $V_{X-}, V_{Y-} = 0.3V, 3.3V$ | $-40^\circ C$ to $+85^\circ C$ | | | 1 | μA |
| Channel ON Leakage Current | $I_{X(ON)}, I_{Y(ON)}, I_{X(OFF)}, I_{Y(OFF)}$ | $V_+ = 4.2V$, $V_{X+}, V_{Y+} = 0.3V, 3.3V$, $V_{X-}, V_{Y-} = 0.3V, 3.3V$ or floating | $-40^\circ C$ to $+85^\circ C$ | | | 1 | μA |
| DIGITAL INPUTS | | | | | | | |
| Input High Voltage | V_{INH} | | $-40^\circ C$ to $+85^\circ C$ | 1.6 | | | V |
| Input Low Voltage | V_{INL} | | $-40^\circ C$ to $+85^\circ C$ | | | 0.5 | V |
| Input Leakage Current | I_{IN-} | $V_A, V_B = V_{ENABLE} = 0V$ or $4.2V$ | $-40^\circ C$ to $+85^\circ C$ | | | 1 | μA |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| Turn-On Time | t_{ON} | $V_{IN} = 1.5V$ to $0.5V$, V_X or $V_Y = 2.1V$ $R_L = 50\Omega$, $C_L = 35pF$, Test Circuit 2 | $+25^\circ C$ | | 17.0 | | ns |
| Turn-Off Time | t_{OFF} | | $+25^\circ C$ | | 9.0 | | |
| Address Transition Time | t_{TRANS} | $V_{IN} = 4.2V$ to $0V$, V_X or $V_Y = 2.1V$, $R_L = 50\Omega$, $C_L = 35pF$, Test Circuit 3 | $+25^\circ C$ | | 17.2 | | ns |
| Break-Before-Make Time Delay | t_D | $V_{IN} = 4.2V$ to $0V$, V_X or $V_Y = 2.1V$, $R_L = 50\Omega$, $C_L = 35pF$, Test Circuit 4 | $+25^\circ C$ | | 14.0 | | ns |
| Charge Injection | Q | $C_L = 1nF$, Test Circuit 5 | $+25^\circ C$ | | -18 | | pC |
| Off Isolation | O_{ISO} | Signal = 0dBm, $V_{BIAS} = 2.1V$, $R_L = 50\Omega$, $C_L = 35pF$, Test Circuit 6 | 1MHz | $+25^\circ C$ | | -60 | dB |
| | | | 10MHz | $+25^\circ C$ | | -40 | |
| Channel-to-Channel Crosstalk | X_{TALK} | Signal = 0dBm, $V_{BIAS} = 2.1V$, $R_L = 50\Omega$, $C_L = 35pF$, Test Circuit 6 | 1MHz | $+25^\circ C$ | | -105 | dB |
| | | | 10MHz | $+25^\circ C$ | | -92 | |
| -3dB Bandwidth | BW | Signal = 0dBm, $V_{BIAS} = 2.1V$, $R_L = 50\Omega$, Test Circuit 6 | $+25^\circ C$ | | 150 | | MHz |
| Channel ON Capacitance | $C_{X(ON)}, C_{Y(ON)}, C_{X(OFF)}, C_{Y(OFF)}$ | | $+25^\circ C$ | | 51.6 | | pF |
| POWER REQUIREMENTS | | | | | | | |
| Power Supply Range | V_+ | | $-40^\circ C$ to $+85^\circ C$ | 1.8 | | 4.2 | V |
| Power Supply Current | I_+ | $V_+ = 4.2V$, $V_A, V_B, V_{ENABLE} = 4.2V$ or $0V$ | $-40^\circ C$ to $+85^\circ C$ | | | 1 | μA |

ELECTRICAL CHARACTERISTICS (continued)

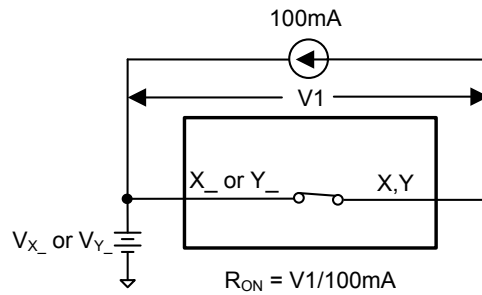
(V₊ = +2.7V to +3.6V, GND = 0V, V_{IH} = +1.6V, V_{IL} = +0.4V, T_A = -40°C to +85°C. Typical values are at V₊ = +3.0V, T_A = +25°C, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|---|--|--|----------------|-------|------|----------------|-------|
| ANALOG SWITCH | | | | | | | |
| Analog Signal Range | V _{X₋} , V _{Y₋} , V _{X₊} , V _{Y₊} | | -40°C to +85°C | 0 | | V ₊ | V |
| On-Resistance | R _{ON} | V ₊ = 2.7V, I _{X₋} , I _{Y₋} = -100mA, V _{X₊} , V _{Y₊} = 1V, Test Circuit 1 | +25°C | | 5 | 6 | Ω |
| | | | -40°C to +85°C | | | 7 | |
| On-Resistance Match Between Channels | ΔR _{ON} | V ₊ = 2.7V, I _{X₋} , I _{Y₋} = -100mA, V _{X₊} , V _{Y₊} = 1V, Test Circuit 1 | +25°C | | 0.03 | 1 | Ω |
| | | | -40°C to +85°C | | | 1.5 | |
| On-Resistance Flatness | R _{FLAT(ON)} | V ₊ = 2.7V, I _{X₋} , I _{Y₋} = -100mA, V _{X₊} , V _{Y₊} = 1V, 2.5V, Test Circuit 1 | +25°C | | 1.8 | 2.2 | Ω |
| | | | -40°C to +85°C | | | 2.8 | |
| Source OFF Leakage Current | I _{X(OFF)} , I _{Y(OFF)} | V ₊ = 3.6V, V _{X₋} , V _{Y₋} = 3.3V, 0.3V, V _{X₊} , V _{Y₊} = 0.3V, 3.3V | -40°C to +85°C | | | 1 | μA |
| Channel ON Leakage Current | I _{X(ON)} , I _{Y(ON)} , I _{X(ON)} , I _{Y(ON)} | V ₊ = 3.6V, V _{X₋} , V _{Y₋} = 0.3V, 3.3V, V _{X₊} , V _{Y₊} = 0.3V, 3.3V or floating | -40°C to +85°C | | | 1 | μA |
| DIGITAL INPUTS | | | | | | | |
| Input High Voltage | V _{INH} | | -40°C to +85°C | 1.5 | | | V |
| Input Low Voltage | V _{INL} | | -40°C to +85°C | | | 0.4 | V |
| Input Leakage Current | I _{IN₋} | V _A , V _B = V _{ENABLE} = 0V or 2.7V | -40°C to +85°C | | | 1 | μA |
| DYNAMIC CHARACTERISTICS | | | | | | | |
| Turn-On Time | t _{ON} | V _{IN} = 1.5V to 0.5V, V _X or V _Y = 1.5V, R _L = 50Ω, C _L = 35pF, Test Circuit 2 | +25°C | | 33.0 | | ns |
| Turn-Off Time | t _{OFF} | | +25°C | | 9.0 | | |
| Address Transition Time | t _{TRANS} | V _{IN} = 1.5V to 0V, V _X or V _Y = 1.5V, R _L = 50Ω, C _L = 35pF, Test Circuit 3 | +25°C | | 17.5 | | ns |
| Break-Before-Make Time Delay | t _D | V _{IN} = 1.5V to 0V, V _X or V _Y = 1.5V, R _L = 50Ω, C _L = 35pF, Test Circuit 4 | +25°C | | 14.5 | | ns |
| Charge Injection | Q | C _L = 1nF, Test Circuit 5 | +25°C | | -18 | | pC |
| Off Isolation | O _{ISO} | Signal = 0dBm, V _{BIAS} = 1.5V, R _L = 50Ω, C _L = 35pF, Test Circuit 6 | 1MHz | +25°C | | -60 | dB |
| | | | 10MHz | +25°C | | -40 | |
| Channel-to-Channel Crosstalk | X _{TALK} | Signal = 0dBm, V _{BIAS} = 1.5V, R _L = 50Ω, C _L = 35pF, Test Circuit 6 | 1MHz | +25°C | | -105 | dB |
| | | | 10MHz | +25°C | | -92 | |
| -3dB Bandwidth | BW | Signal = 0dBm, V _{BIAS} = 1.5V, R _L = 50Ω, Test Circuit 6 | +25°C | | 150 | | MHz |
| Channel ON Capacitance | C _{X(ON)} , C _{Y(ON)} , C _{X(ON)} , C _{Y(ON)} | | +25°C | | 51.6 | | pF |

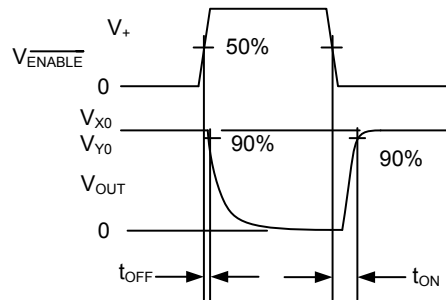
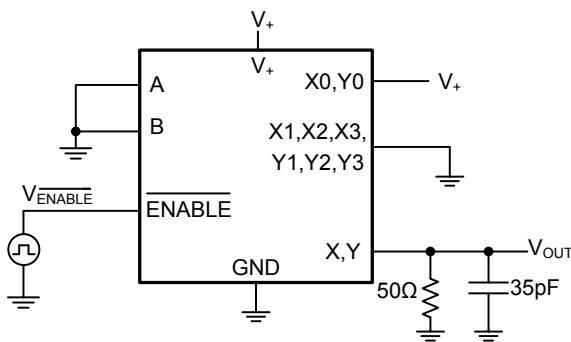
TYPICAL PERFORMANCE CHARACTERISTICS



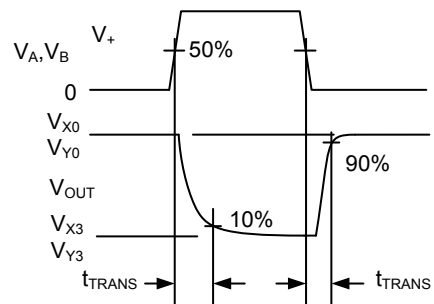
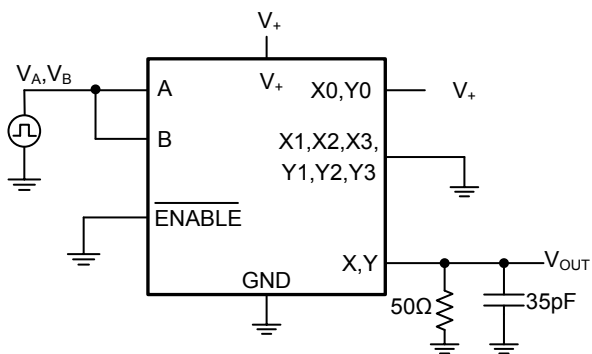
TEST CIRCUITS



Test Circuit 1. On Resistance

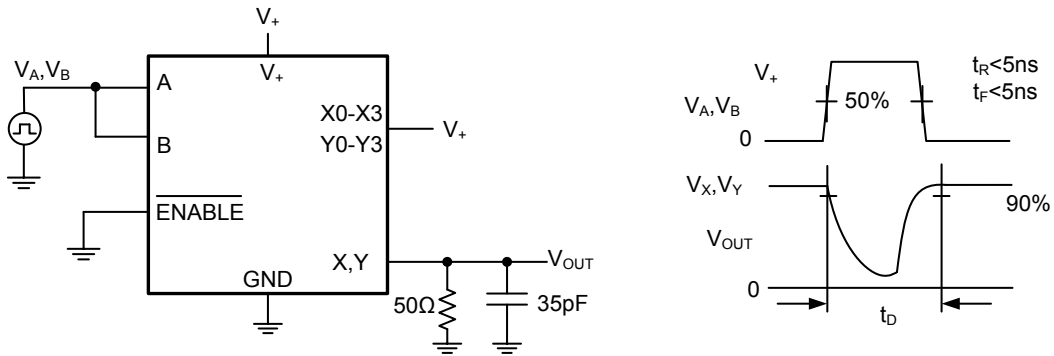


Test Circuit 2. Enable Switching Times (t_{ON} , t_{OFF})

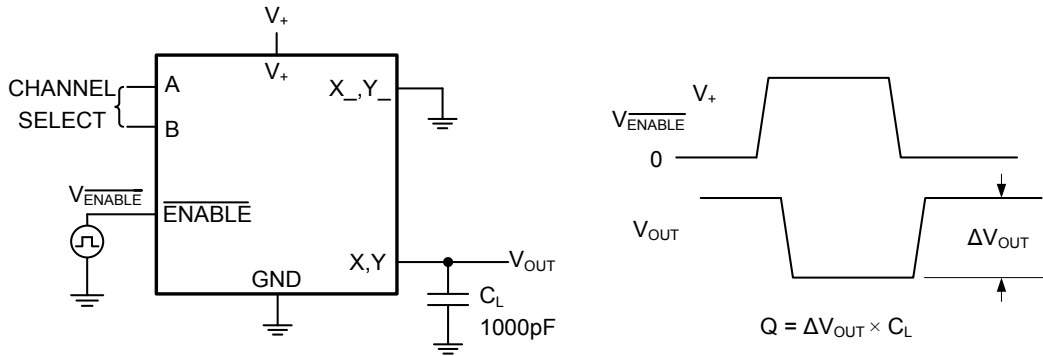


Test Circuit 3. Address Transition Times (t_{TRANS})

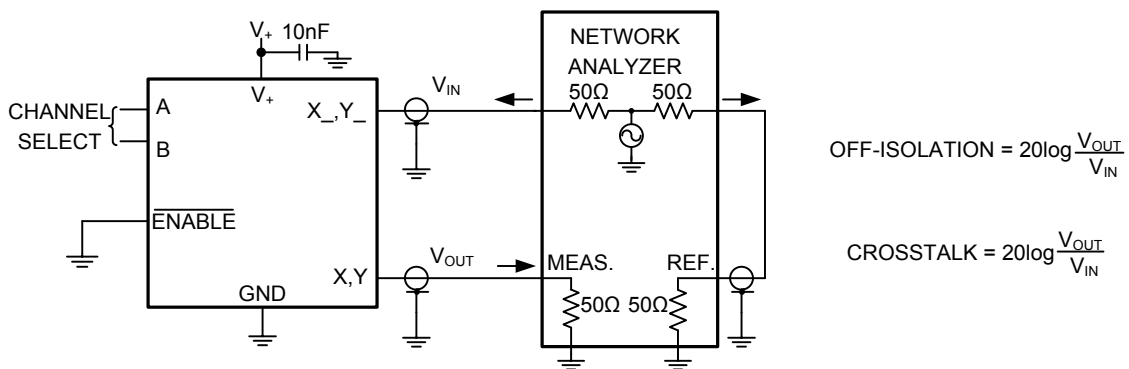
TEST CIRCUITS (continued)



Test Circuit 4. Break-Before-Make Interval (t_d)



Test Circuit 5. Charge Injection (Q)

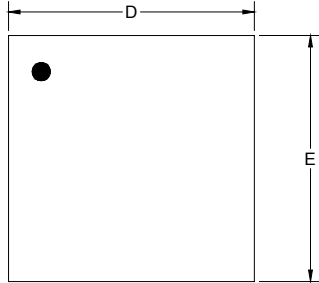


Test Circuit 6. -3dB Bandwidth, Off-Isolation and Crosstalk

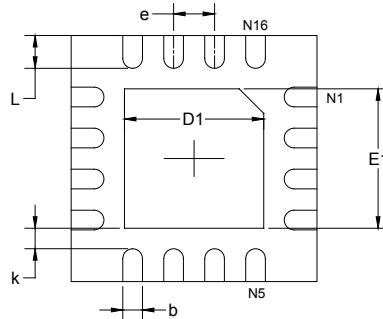
PACKAGE INFORMATION

PACKAGE OUTLINE DIMENSIONS

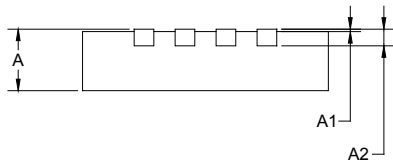
TQFN-3×3-16L



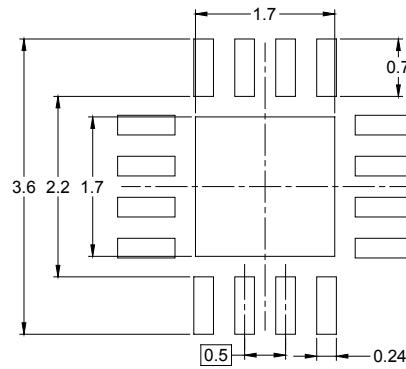
TOP VIEW



BOTTOM VIEW



SIDE VIEW

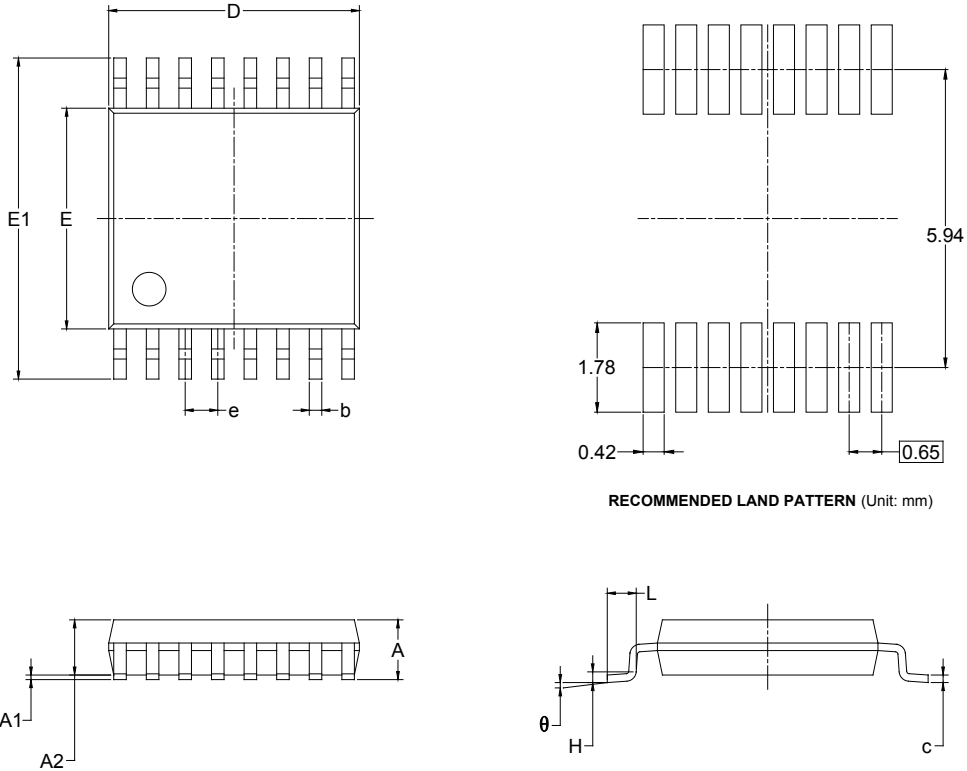


RECOMMENDED LAND PATTERN (Unit: mm)

| 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 | 2.900 | 3.100 | 0.114 | 0.122 |
| D1 | 1.600 | 1.800 | 0.063 | 0.071 |
| E | 2.900 | 3.100 | 0.114 | 0.122 |
| E1 | 1.600 | 1.800 | 0.063 | 0.071 |
| k | 0.200 MIN | | 0.008 MIN | |
| b | 0.180 | 0.300 | 0.007 | 0.012 |
| e | 0.500 TYP | | 0.020 TYP | |
| L | 0.300 | 0.500 | 0.012 | 0.020 |

PACKAGE OUTLINE DIMENSIONS

TSSOP-16

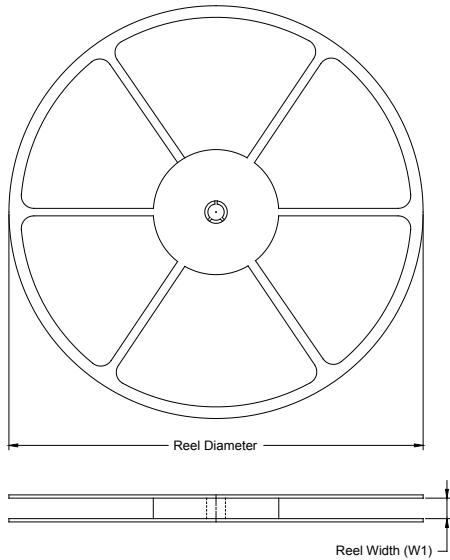


RECOMMENDED LAND PATTERN (Unit: mm)

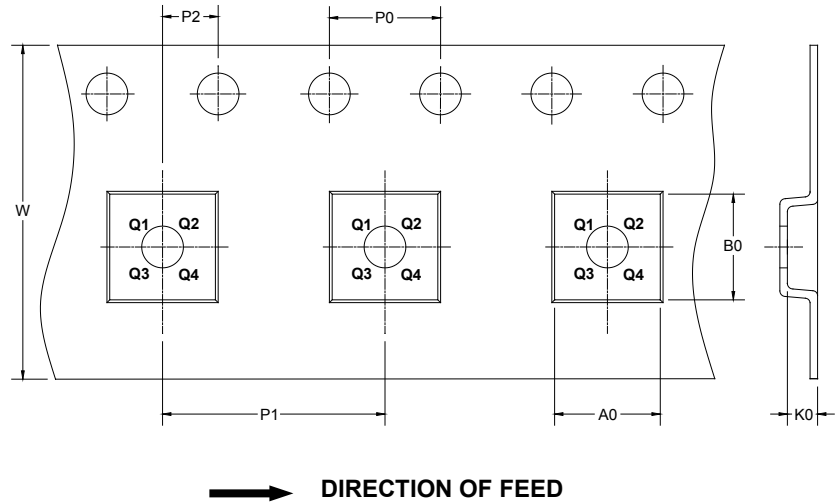
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | | 1.200 | | 0.047 |
| A1 | 0.050 | 0.150 | 0.002 | 0.006 |
| A2 | 0.800 | 1.050 | 0.031 | 0.041 |
| b | 0.190 | 0.300 | 0.007 | 0.012 |
| c | 0.090 | 0.200 | 0.004 | 0.008 |
| D | 4.860 | 5.100 | 0.191 | 0.201 |
| E | 4.300 | 4.500 | 0.169 | 0.177 |
| E1 | 6.200 | 6.600 | 0.244 | 0.260 |
| 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° |

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 |
|--------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| TQFN-3×3-16L | 13" | 12.4 | 3.35 | 3.35 | 1.13 | 4.0 | 8.0 | 2.0 | 12.0 | Q1 |
| TSSOP-16 | 13" | 12.4 | 6.90 | 5.60 | 1.20 | 4.0 | 8.0 | 2.0 | 12.0 | Q1 |

000001

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

单击下面可查看定价，库存，交付和生命周期等信息

[>>SGMICRO\(圣邦微电子\)](#)