# SGM3715
# 0.8Ω, High Voltage, Rail-to-Rail Negative Signal Passing, Dual, SPDT Analog Switch

## GENERAL DESCRIPTION

The SGM3715 is a dual SPDT (single-pole/double-throw) analog switch. It operates from a 2.7V to 12V single power supply and allows negative signal passing with low distortion.

The SGM3715 features low on-resistance, high voltage and fast switching times. The high performances make it very suitable for multiple applications. In addition, the SGM3715 can be used as a dual 2-to-1 multiplexer because it has two normally open and close switches, respectively.

The SGM3715 is available in Green WLCSP-1.27×2.13-15B package. It operates over an ambient temperature range of -40℃ to +85℃.

## FEATURES

- **Single Supply Voltage Range: 2.7V to 12V**
- **On-Resistance for Switches: 0.8Ω (TYP)**
- **$-V_{CC}$ to $+V_{CC}$ Rail-to-Rail Low Distortion Positive and Negative Signal Passing**
- **High Off-Isolation**
- **Very Low Crosstalk**
- **1.8V Logic Compatible Control Pin**
- **Break-Before-Make Switching**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in Green WLCSP-1.27×2.13-15B Package**

## APPLICATIONS

Portable Equipment

Battery-Powered Systems

# PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|---|---|---|---|---|---|
| SGM3715 | WLCSP-1.27×2.13-15B | -40℃ to +85℃ | SGM3715YG/TR | XXXXX<br>3715 | 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

$V_{CC}$ to GND ..... 0V to 13.2V
IN1, IN2, EN to GND ..... 0V to 6V
Analog Voltage Range (1) ..... ($-V_{CC}$ - 0.3V) to ($V_{CC}$ + 0.3V)
Continuous Current from NO to COM ..... ±350mA
Continuous Current from NC to COM ..... ±350mA
Peak Current from NO to COM ..... ±400mA
Peak Current from NC to COM ..... ±400mA
I/O Clamp Current ($V_I$ < 0) ..... -30mA
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM ..... 8000V
MM ..... 400V
CDM ..... 1000V

NOTE:
1. Internal diodes will clamp voltages at NC, NO, or COM that exceed $V_{CC}$ or GND. Limit the current through the forward diode to the maximum ratings.

## RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range ..... 2.7V to 12V
Operating Temperature Range ..... -40℃ to +85℃

## 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

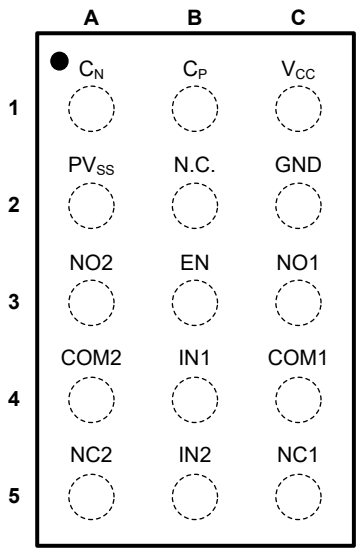
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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




WLCSP-1.27×2.13-15B

## PIN DESCRIPTION

| PIN | NAME | FUNCTION |
|---|---|---|
| A1 | $C_N$ | Charge Pump Flying Capacitor Negative Pin. |
| B1 | $C_P$ | Charge Pump Flying Capacitor Positive Pin. |
| C1 | $V_{CC}$ | Power Supply Pin. |
| A2 | $PV_{SS}$ | Negative Supply Voltage Output Pin. Connect one 0.1μF ceramic capacitor from $PV_{SS}$ to GND. |
| B2 | N.C. | No Connection. |
| C2 | GND | Ground. |
| A3 | NO2 | Normally-Open Pin. |
| B3 | EN | Enable Control Pin. When EN = “Low”, both NC and NO are disconnected with COM, negative charge pump does not work and the SGM3715 is in shutdown state. When EN = “High”, negative charge pump works, the SGM3715 is in working state, and NC or NO is connected with COM depending on the logical state of IN. |
| C3 | NO1 | Normally-Open Pin. |
| A4 | COM2 | Common Pin. |
| B4 | IN1 | Digital Control Pin. It is used to connect COM1 to NO1 or NC1. |
| C4 | COM1 | Common Pin. |
| A5 | NC2 | Normally-Closed Pin. |
| B5 | IN2 | Digital Control Pin. It is used to connect COM2 to NO2 or NC2. |
| C5 | NC1 | Normally-Closed Pin. |

NOTE: NO, NC and COM pins may be an input or output.

## FUNCTION TABLE

**Table 1. Function Table of Switch 1:**

| EN | IN1 | COM1 | NEGATIVE CHARGE PUMP |
|---|---|---|---|
| 0 | X | COM1 is disconnected with NO1 and NC1 | Turn off |
| 1 | 0 | COM1 = NC1 | Turn on |
| 1 | 1 | COM1 = NO1 | Turn on |

**Table 2. Function Table of Switch 2:**

| EN | IN2 | COM2 | NEGATIVE CHARGE PUMP |
|---|---|---|---|
| 0 | X | COM2 is disconnected with NO2 and NC2 | Turn off |
| 1 | 0 | COM2 = NC2 | Turn on |
| 1 | 1 | COM2 = NO2 | Turn on |

## ELECTRICAL CHARACTERISTICS

($V_{CC}$ = 3.3V, Full = -40℃ to +85℃. Typical values are at $T_A$ = +25℃, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **Analog Switch** | | | | | | | |
| Analog Signal Range | $V_{NO}$, $V_{NC}$, $V_{COM}$ | | Full | $-V_{CC}$ | | $+V_{CC}$ | V |
| On-Resistance | $R_{ON}$ | $-V_{CC} \le V_{NO}$, $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.8 | 1.1 | Ω |
| | | | Full | | | 1.7 | |
| On-Resistance Match between Channels | $\Delta R_{ON}$ | $-V_{CC} \le V_{NO}$ or $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.01 | 0.15 | Ω |
| | | | Full | | | 0.25 | |
| On-Resistance Flatness | $R_{FLAT(ON)}$ | $-V_{CC} \le V_{NO}$ or $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.05 | 0.15 | Ω |
| | | | Full | | | 0.2 | |
| Source Off Leakage Current | $I_{NC(OFF)}$, $I_{NO(OFF)}$ | $V_{NO}$ or $V_{NC}$ = -2.8V, 2.8V, $V_{COM}$ = 2.8V, -2.8V | +25℃ | -0.5 | 0.01 | 0.5 | μA |
| | | | Full | | | 1 | |
| Channel On Leakage Current | $I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$ | $V_{NO}$ or $V_{NC}$ = -2.8V, 2.8V, $V_{COM}$ = floating, or $V_{NO}$ or $V_{NC}$ = floating, $V_{COM}$ = -2.8V, 2.8V | +25℃ | -0.5 | 0.01 | 0.5 | μA |
| | | | Full | | | 1 | |
| **Digital Inputs** | | | | | | | |
| Input High Voltage | $V_{INH}$ | $V_{CC}$ = 2.7V to 12V | Full | 1.5 | | 5.5 | V |
| Input Low Voltage | $V_{INL}$ | $V_{CC}$ = 2.7V to 12V | Full | 0 | | 0.5 | V |
| Pull Down Resistor | $R_{PULL\ DOWN}$ | | +25℃ | | 600 | | kΩ |
| **Dynamic Characteristics** | | | | | | | |
| Turn-On Time | $t_{ON}$ | $V_{NO}$ or $V_{NC}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 2 | +25℃ | | 820 | | μs |
| Turn-Off Time | $t_{OFF}$ | $V_{NO}$ or $V_{NC}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 2 | +25℃ | | 180 | | μs |
| Break-Before-Make Delay Time | $t_D$ | $V_{NO1}$ or $V_{NC1}$ = $V_{NO2}$ or $V_{NC2}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 3 | +25℃ | | 680 | | μs |
| Off-Isolation | $O_{ISO}$ | f = 1kHz, $R_L$ = 32Ω, Signal = 0dBm, Test Circuit 4 | +25℃ | | -130 | | dB |
| | | f = 1MHz, $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 4 | | | -50 | | |
| Channel-to-Channel Crosstalk | $X_{TALK}$ | f = 1kHz, $R_L$ = 32Ω, Signal = 0dBm, Test Circuit 5 | +25℃ | | -120 | | dB |
| | | f = 1MHz, $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 5 | | | -60 | | |
| -3dB Bandwidth | BW | $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 6 | +25℃ | | 100 | | MHz |
| Channel On Capacitance | $C_{ON}$ | | +25℃ | | 60 | | pF |
| Charge Injection | Q | $V_G$ = GND, $R_G$ = 0Ω, $C_L$ = 1nF, Test Circuit 7 | +25℃ | | 1000 | | pC |
| Total Harmonic Distortion | THD | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{RMS}$, $R_L$ = 600Ω | +25℃ | | -113 | | dB |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{PP}$, $R_L$ = 600Ω | | | -115 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{PP}$, $R_L$ = 32Ω | | | -113 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $1V_{PP}$, $R_L$ = 600Ω | | | -112 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $1V_{PP}$, $R_L$ = 32Ω | | | -110 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $0.5V_{PP}$, $R_L$ = 600Ω | | | -108 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $0.5V_{PP}$, $R_L$ = 32Ω | | | -104 | | |
| Start-Up Time | $t_{START}$ | Switch $V_{EN}$ = 0V to $V_{EN}$ = 1.5V | +25℃ | | 0.5 | | ms |

## ELECTRICAL CHARACTERISTICS (continued)

($V_{CC}$ = 5V, Full = -40℃ to +85℃. Typical values are at $T_A$ = +25℃, unless otherwise noted.)

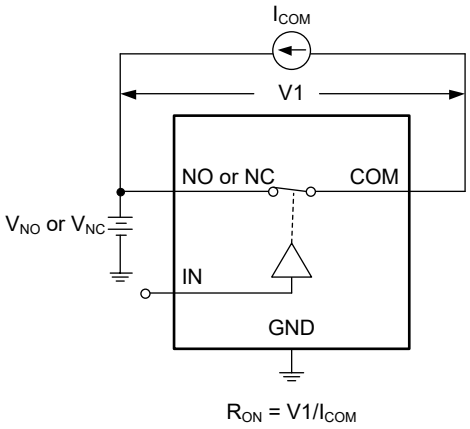
| PARAMETER | SYMBOL | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **Analog Switch** | | | | | | | |
| Analog Signal Range | $V_{NO}$, $V_{NC}$, $V_{COM}$ | | Full | $-V_{CC}$ | | $+V_{CC}$ | V |
| On-Resistance | $R_{ON}$ | $-V_{CC} \le V_{NO}$, $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.8 | 1.1 | Ω |
| | | | Full | | | 1.7 | |
| On-Resistance Match between Channels | $\Delta R_{ON}$ | $-V_{CC} \le V_{NO}$ or $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.01 | 0.15 | Ω |
| | | | Full | | | 0.25 | |
| On-Resistance Flatness | $R_{FLAT(ON)}$ | $-V_{CC} \le V_{NO}$ or $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.01 | 0.15 | Ω |
| | | | Full | | | 0.2 | |
| Source Off Leakage Current | $I_{NC(OFF)}$, $I_{NO(OFF)}$ | $V_{NO}$ or $V_{NC}$ = -4.5V, 4.5V, $V_{COM}$ = 4.5V, -4.5V | +25℃ | -0.5 | 0.01 | 0.5 | μA |
| | | | Full | | | 1 | |
| Channel On Leakage Current | $I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$ | $V_{NO}$ or $V_{NC}$ = -4.5V, 4.5V, $V_{COM}$ = floating, or $V_{NO}$ or $V_{NC}$ = floating, $V_{COM}$ = -4.5V, 4.5V | +25℃ | -0.5 | 0.01 | 0.5 | μA |
| | | | Full | | | 1 | |
| **Dynamic Characteristics** | | | | | | | |
| Turn-On Time | $t_{ON}$ | $V_{NO}$ or $V_{NC}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 2 | +25℃ | | 880 | | μs |
| Turn-Off Time | $t_{OFF}$ | $V_{NO}$ or $V_{NC}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 2 | +25℃ | | 190 | | μs |
| Break-Before-Make Delay Time | $t_D$ | $V_{NO1}$ or $V_{NC1}$ = $V_{NO2}$ or $V_{NC2}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 3 | +25℃ | | 720 | | μs |
| Off-Isolation | $O_{ISO}$ | f = 1kHz, $R_L$ = 32Ω, Signal = 0dBm, Test Circuit 4 | +25℃ | | -130 | | dB |
| | | f = 1MHz, $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 4 | | | -50 | | |
| Channel-to-Channel Crosstalk | $X_{TALK}$ | f = 1kHz, $R_L$ = 32Ω, Signal = 0dBm, Test Circuit 5 | +25℃ | | -120 | | dB |
| | | f = 1MHz, $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 5 | | | -60 | | |
| -3dB Bandwidth | BW | $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 6 | +25℃ | | 100 | | MHz |
| Channel On Capacitance | $C_{ON}$ | | +25℃ | | 60 | | pF |
| Charge Injection | Q | $V_G$ = GND, $R_G$ = 0Ω, $C_L$ = 1nF, Test Circuit 7 | +25℃ | | 1000 | | pC |
| Total Harmonic Distortion | THD | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{RMS}$, $R_L$ = 600Ω | +25℃ | | -117 | | dB |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{PP}$, $R_L$ = 600Ω | | | -115 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{PP}$, $R_L$ = 32Ω | | | -113 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $1V_{PP}$, $R_L$ = 600Ω | | | -112 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $1V_{PP}$, $R_L$ = 32Ω | | | -110 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $0.5V_{PP}$, $R_L$ = 600Ω | | | -108 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $0.5V_{PP}$, $R_L$ = 32Ω | | | -104 | | |
| Start-Up Time | $t_{START}$ | Switch $V_{EN}$ = 0V to $V_{EN}$ = 1.5V | +25℃ | | 0.5 | | ms |
| **Power Requirements** | | | | | | | |
| Power Supply Current | $I_{CC}$ | $V_{IN}$ = 0V or 1.5V, $V_{EN}$ = 1.5V | +25℃ | | 520 | 650 | μA |
| | | | Full | | | 680 | |
| Power Supply Current in Shutdown State | $I_{CC}$ | $V_{IN}$ = 0V or 1.5V, $V_{EN}$ = 0V | +25℃ | | 0.4 | 1 | μA |
| | | | Full | | | 1.5 | |

## ELECTRICAL CHARACTERISTICS (continued)

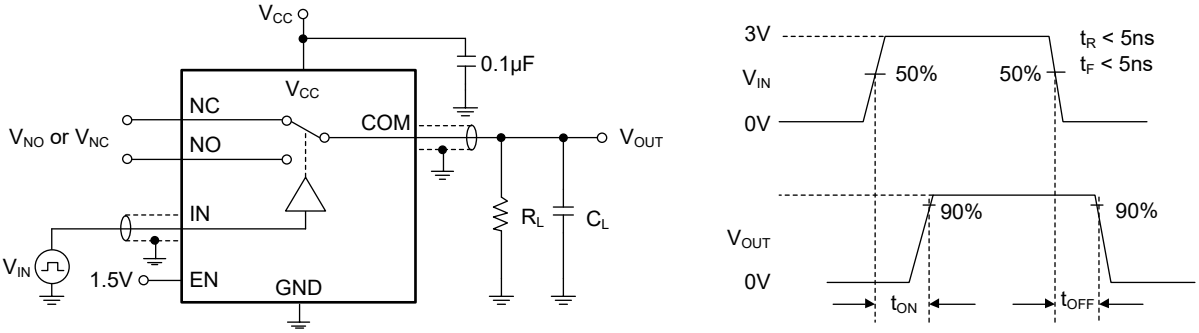
($V_{CC}$ = 12V, Full = -40℃ to +85℃. Typical values are at $T_A$ = +25℃, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| **Analog Switch** | | | | | | | |
| Analog Signal Range | $V_{NO}$, $V_{NC}$, $V_{COM}$ | | Full | $-V_{CC}$ | | $+V_{CC}$ | V |
| On-Resistance | $R_{ON}$ | $-V_{CC} \le V_{NO}$, $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.8 | 1.1 | Ω |
| | | | Full | | | 1.7 | |
| On-Resistance Match between Channels | $\Delta R_{ON}$ | $-V_{CC} \le V_{NO}$ or $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.01 | 0.15 | Ω |
| | | | Full | | | 0.25 | |
| On-Resistance Flatness | $R_{FLAT(ON)}$ | $-V_{CC} \le V_{NO}$ or $V_{NC} \le V_{CC}$, $I_{COM}$ = -50mA, Test Circuit 1 | +25℃ | | 0.01 | 0.15 | Ω |
| | | | Full | | | 0.2 | |
| Source Off Leakage Current | $I_{NC(OFF)}$, $I_{NO(OFF)}$ | $V_{NO}$ or $V_{NC}$ = -11.5V, 11.5V, $V_{COM}$ = 11.5V, -11.5V | +25℃ | -1.5 | 0.05 | 1.5 | μA |
| | | | Full | | | 9 | |
| Channel On Leakage Current | $I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$ | $V_{NO}$ or $V_{NC}$ = -11.5V, 11.5V, $V_{COM}$ = floating, or $V_{NO}$ or $V_{NC}$ = floating, $V_{COM}$ = -11.5V, 11.5V | +25℃ | -1.5 | 0.05 | 1.5 | μA |
| | | | Full | | | 9 | |
| **Dynamic Characteristics** | | | | | | | |
| Turn-On Time | $t_{ON}$ | $V_{NO}$ or $V_{NC}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 2 | +25℃ | | 1100 | | μs |
| Turn-Off Time | $t_{OFF}$ | $V_{NO}$ or $V_{NC}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 2 | +25℃ | | 200 | | μs |
| Break-Before-Make Delay Time | $t_D$ | $V_{NO1}$ or $V_{NC1}$ = $V_{NO2}$ or $V_{NC2}$ = 1V, $R_L$ = 50Ω, $C_L$ = 35pF, Test Circuit 3 | +25℃ | | 950 | | μs |
| Off-Isolation | $O_{ISO}$ | f = 1kHz, $R_L$ = 32Ω, Signal = 0dBm, Test Circuit 4 | +25℃ | | -130 | | dB |
| | | f = 1MHz, $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 4 | | | -50 | | |
| Channel-to-Channel Crosstalk | $X_{TALK}$ | f = 1kHz, $R_L$ = 32Ω, Signal = 0dBm, Test Circuit 5 | +25℃ | | -120 | | dB |
| | | f = 1MHz, $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 5 | | | -60 | | |
| -3dB Bandwidth | BW | $R_L$ = 50Ω, $C_L$ = 5pF, Signal = 0dBm, Test Circuit 6 | +25℃ | | 100 | | MHz |
| Channel On Capacitance | $C_{ON}$ | | +25℃ | | 60 | | pF |
| Charge Injection | Q | $V_G$ = GND, $R_G$ = 0Ω, $C_L$ = 1nF, Test Circuit 7 | +25℃ | | 1100 | | pC |
| Total Harmonic Distortion | THD | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{RMS}$, $R_L$ = 600Ω | +25℃ | | -117 | | dB |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{PP}$, $R_L$ = 600Ω | | | -115 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $2V_{PP}$, $R_L$ = 32Ω | | | -113 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $1V_{PP}$, $R_L$ = 600Ω | | | -112 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $1V_{PP}$, $R_L$ = 32Ω | | | -110 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $0.5V_{PP}$, $R_L$ = 600Ω | | | -108 | | |
| | | A-Weighting, Test Circuit 8; $V_{NO}$, $V_{NC}$ = $0.5V_{PP}$, $R_L$ = 32Ω | | | -104 | | |
| Start Up Time | $t_{START}$ | Switch $V_{EN}$ = 0V to $V_{EN}$ = 1.5V | +25℃ | | 0.5 | | ms |
| **Power Requirements** | | | | | | | |
| Power Supply Current | $I_{CC}$ | $V_{IN}$ = 0V or 1.5V, $V_{EN}$ = 1.5V | +25℃ | | 620 | 780 | μA |
| | | | Full | | | 800 | |
| Power Supply Current in Shutdown State | $I_{CC}$ | $V_{IN}$ = 0V or 1.5V, $V_{EN}$ = 0V | +25℃ | | 0.5 | 1.5 | μA |
| | | | Full | | | 2 | |

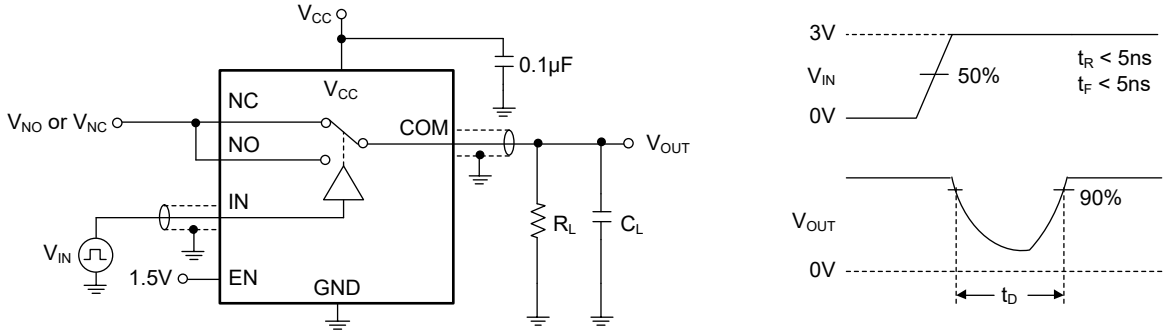
## TEST CIRCUITS




**Test Circuit 1. On-Resistance**

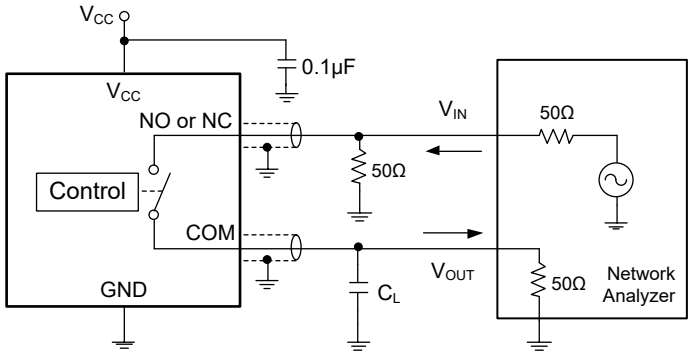



**Test Circuit 2. Switching Times ($t_{ON}$, $t_{OFF}$)**

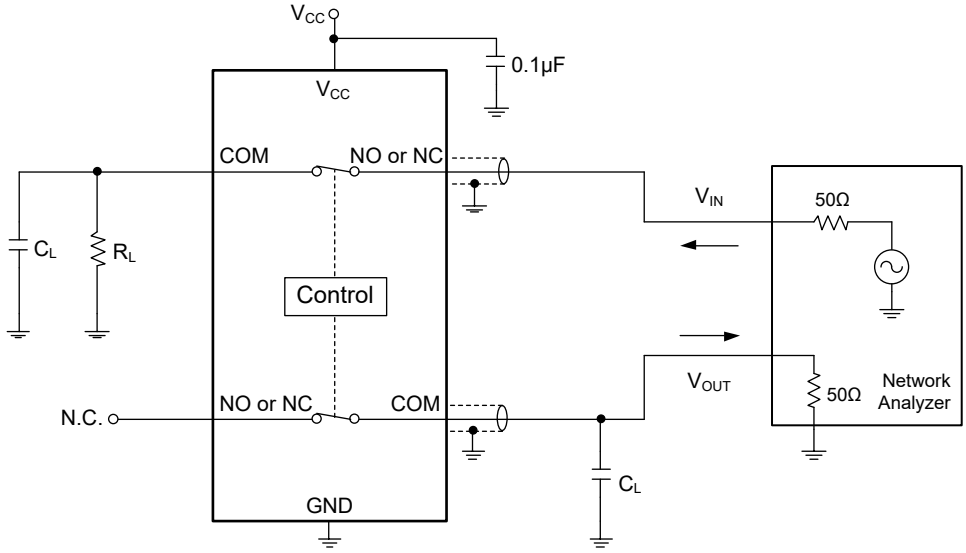



**Test Circuit 3. Break-Before-Make Delay Time ($t_D$)**

## TEST CIRCUITS (continued)

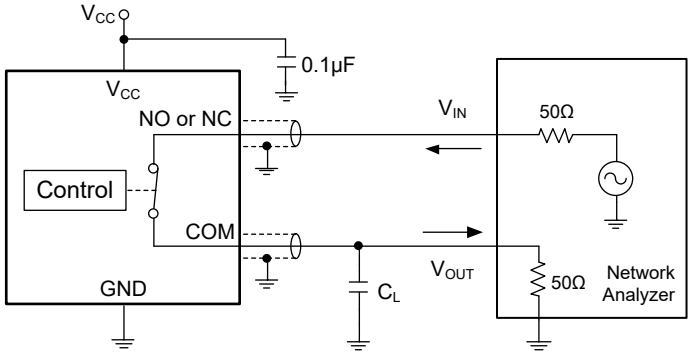



**Test Circuit 4. Off-Isolation**



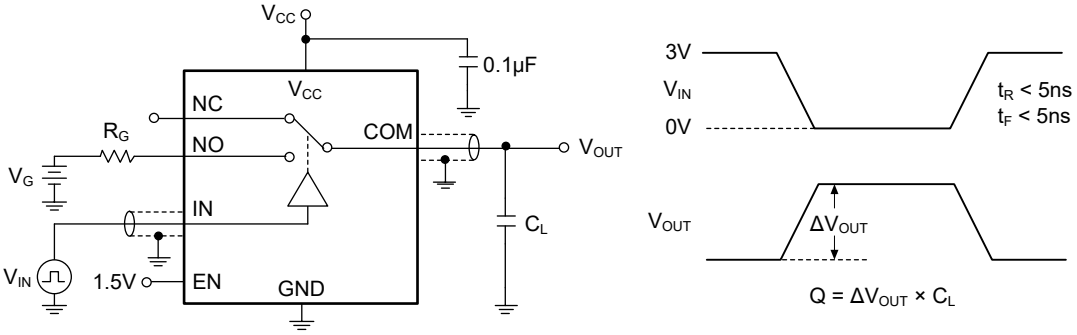

Channel-to-Channel Crosstalk = $-20\log(V_{IN}/V_{OUT})$

**Test Circuit 5. Channel-to-Channel Crosstalk**

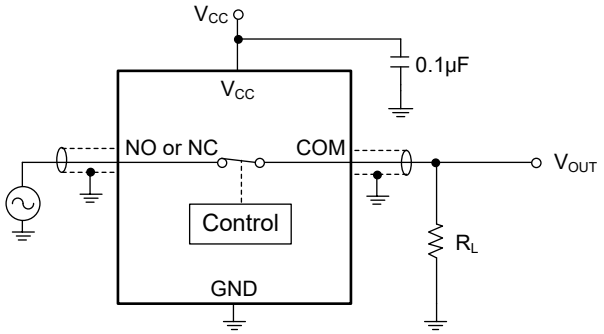



**Test Circuit 6. -3dB Bandwidth**

## TEST CIRCUITS (continued)




**Test Circuit 7. Charge Injection (Q)**




**Test Circuit 8. Total Harmonic Distortion (THD)**

## APPLICATION INFORMATION

The combination of Speaker and Receiver is always used in portable devices, and high voltage class D speaker driver is used to drive speaker in order to provide high audio volume. But the high output voltage of class D speaker driver will damage the receiver driver. The SGM3715 provides the safe isolation between receiver driver and high voltage class D speaker driver. The SGM3715 provides low $R_{ON}$ channels to pass the positive and negative signals from capless receiver driver. The circuit is shown in Figure 1.

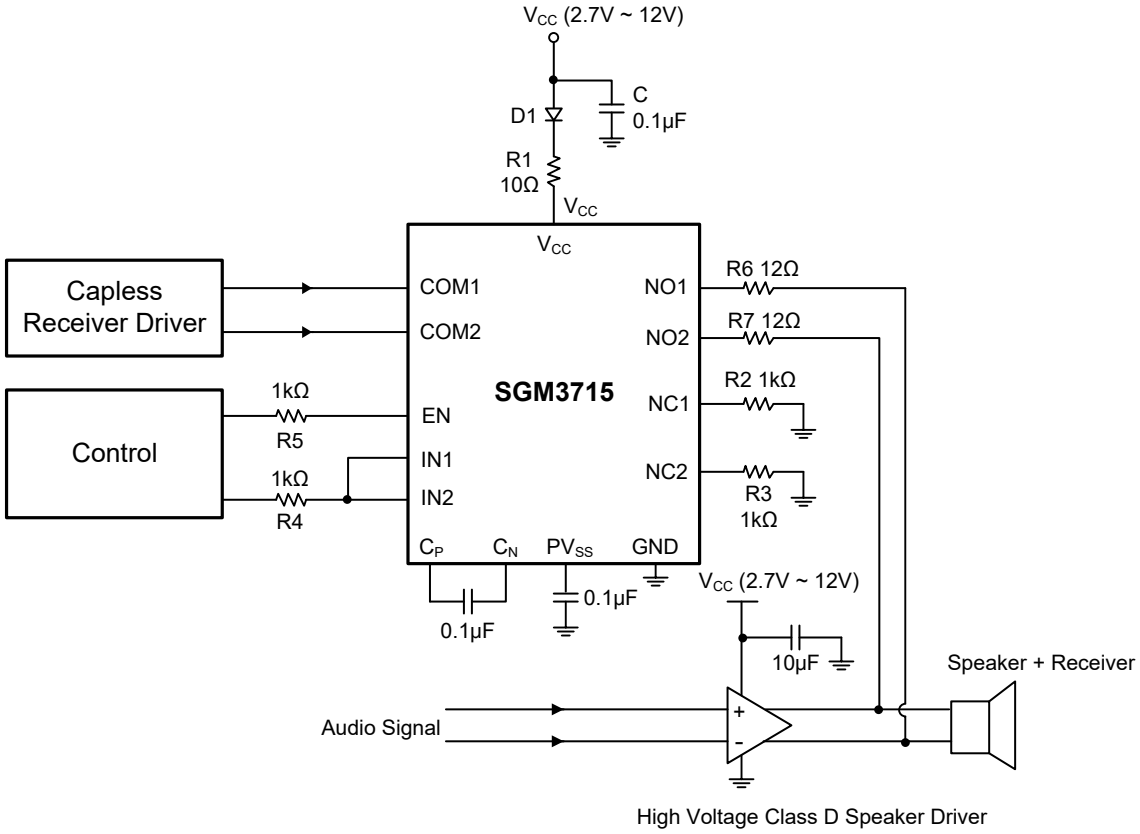



**Figure 1. Typical Application Circuit for Speaker + Receiver**

## APPLICATION INFORMATION (continued)

In order to improve audio performance of portable equipment, external speaker power amplifier is always selected to replace the internal integrated speaker power amplifier. Because the audio signal quality of audio line out or headset driver is better than that of the integrated speaker power amplifier, the audio signal of line out or headset driver is selected as the high performance audio signal source for external speaker power amplifier. High performance SGM3715 is used as the 1-to-2 HiFi signal switch in this application. The circuit is shown in Figure 2, and a stable 3.3V power supply is required in this circuit.

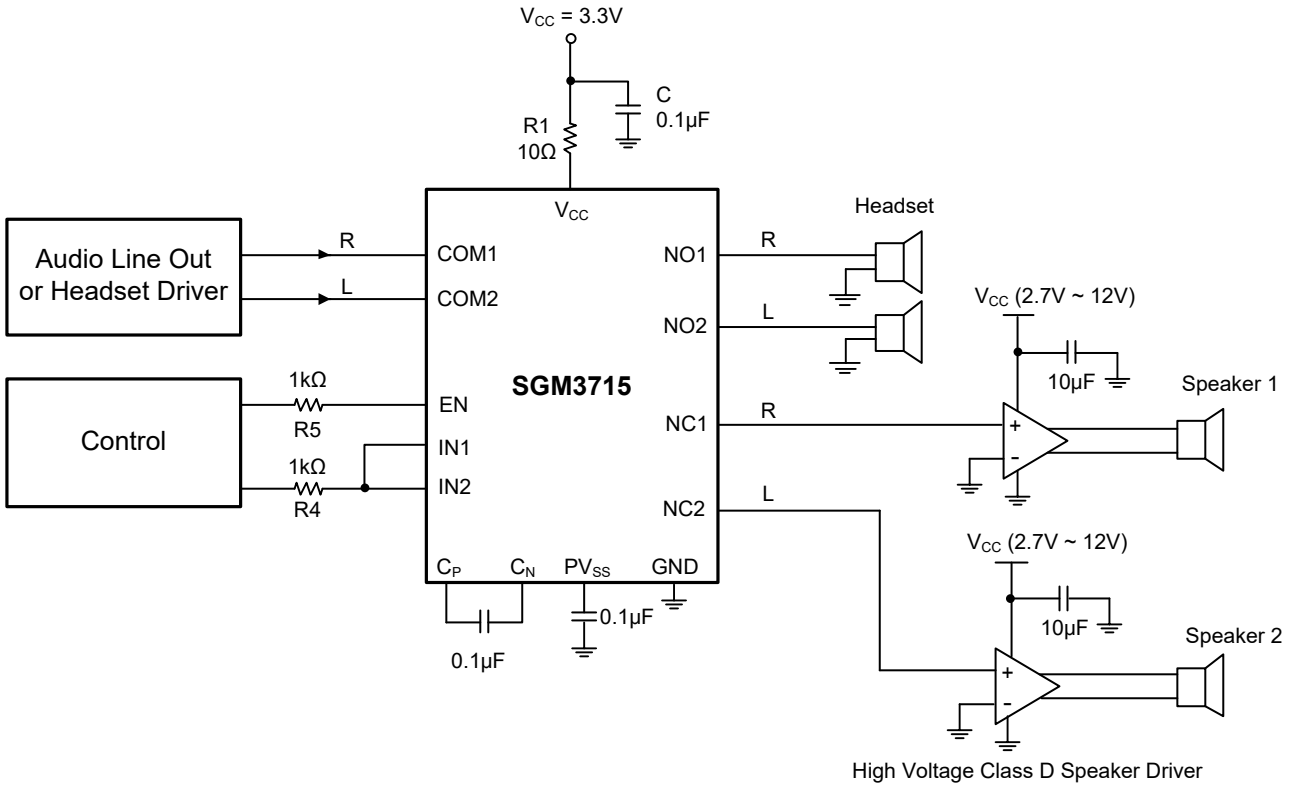



**Figure 2. Typical Application Circuit for 1-to-2 HiFi Audio Signal Switch**

## REVISION HISTORY

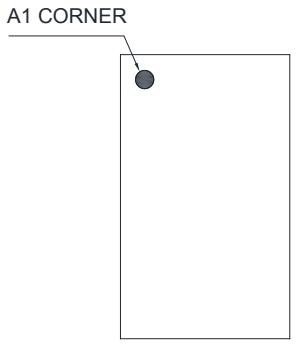
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

**Changes from Original (NOVEMBER 2017) to REV.A**

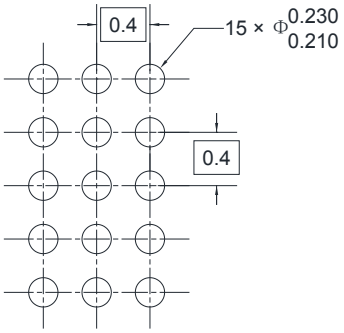
| | |
|---|---|
| Changed from product preview to production data | All |

# PACKAGE OUTLINE DIMENSIONS

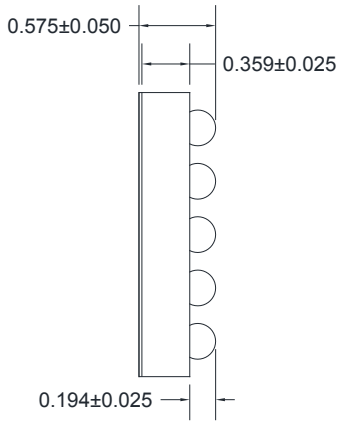
## WLCSP-1.27×2.13-15B



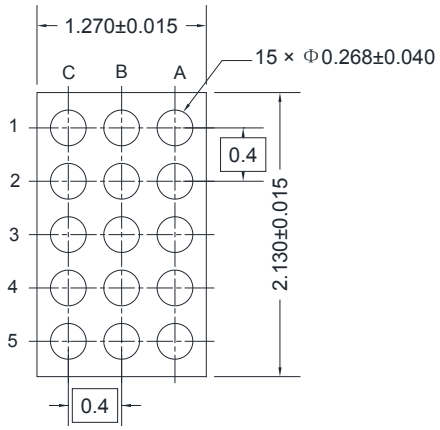

TOP VIEW




RECOMMENDED LAND PATTERN




SIDE VIEW

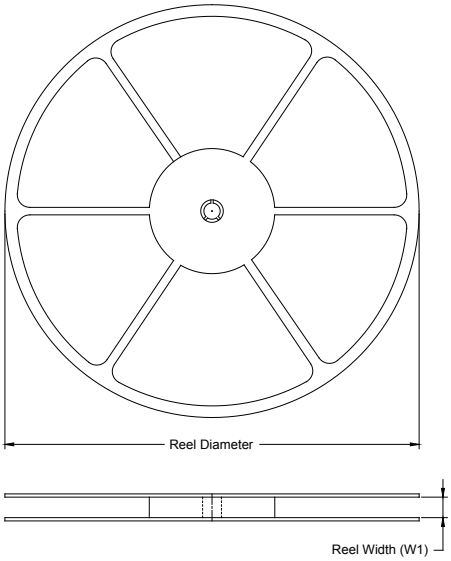



BOTTOM VIEW

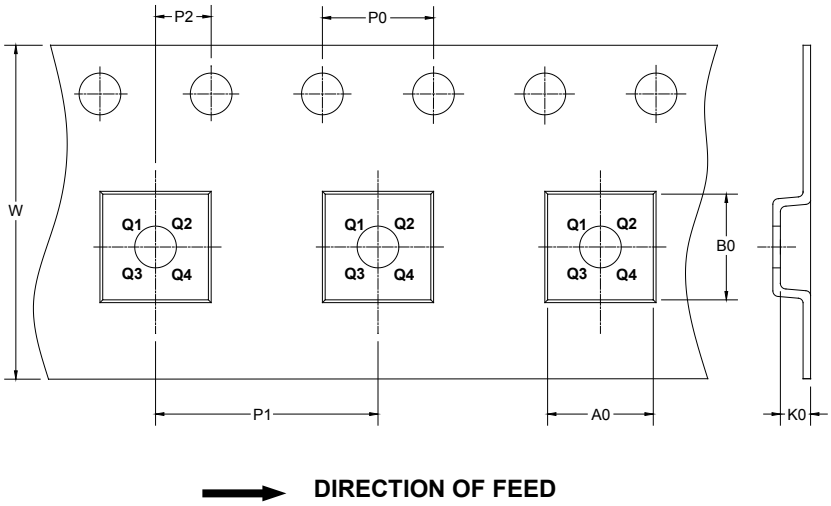
NOTE: All linear dimensions are in millimeters.

# TAPE AND REEL INFORMATION

### REEL DIMENSIONS




### TAPE DIMENSIONS



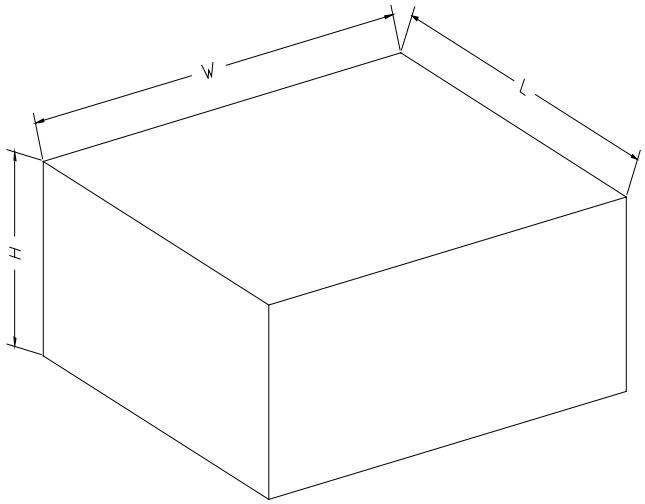

NOTE: The picture is only for reference. Please make the object as the standard.

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| WLCSP-1.27×2.13-15B | 7″ | 9.5 | 1.47 | 2.37 | 0.78 | 4.0 | 4.0 | 2.0 | 8.0 | 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 |
|---|---|---|---|---|
| 7″ (Option) | 368 | 227 | 224 | 8 |
| 7″ | 442 | 410 | 224 | 18 |

DD0002