SGM3798
Audio Headset Analog Switch with Reduced GND Switch R_{ON} and FM Capability

GENERAL DESCRIPTION

The SGM3798 is an audio headset analog switch that is used to detect 3.5mm accessories and switch SLEEVE and RING2 by external controller. The ground signal is routed through a pair of low-impedance ground FETs (75mΩ TYP), resulting minimal impact on audio crosstalk performance. The ground FETs of the device are designed to allow FM signal pass-through, making it possible to use the ground line of the headset as an FM antenna in mobile audio application.

The SGM3798 is available in Green WLCSP-1.2×1.2-9B package. It operates over an ambient temperature range of -40℃ to +85℃.

FEATURES

- **Ground FET Switches R_{ON} : 75mΩ (TYP)**
- **High Isolation Microphone Line Switches**
- **Supports FM Signal Transmission Through the Ground FETs**
- **Reduction of Click-Pop Noise**
- **Power Supply Voltage Range: 2.6V to 5.0V**
- **Total Harmonic Distortion (MIC): 0.01% (TYP)**
- **Low Current Consumption: 2μA (TYP)**
- **-40℃ to +85℃ Operating Temperature Range**
- **Available in Green WLCSP-1.2×1.2-9B Package**

APPLICATIONS

Mobile Phones/Tablet PCs
Notebook/Ultrabook Computers

TYPICAL APPLICATION

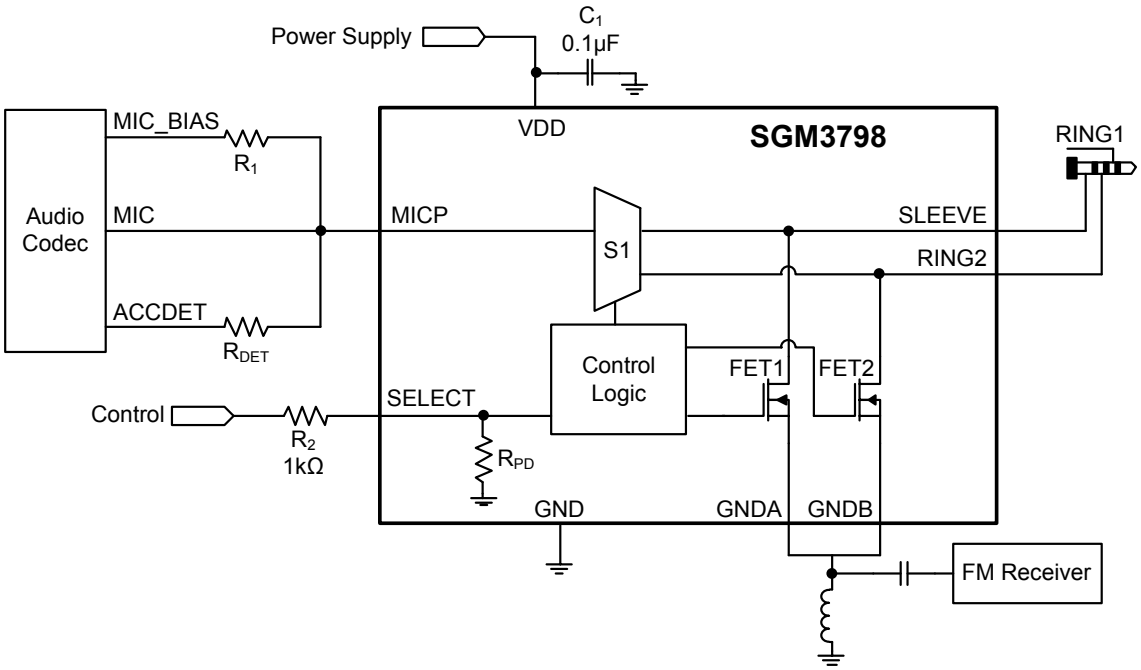


Figure 1. Typical Application Circuit

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM3798	WLCSP-1.2×1.2-9B	-40℃ to +85℃	SGM3798YG/TR	3798 XXXX	Tape and Reel, 3000

NOTE: XXXX = Date 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

Voltage Range on VDD ..... -0.3V to 6.0V
Voltage Range on SELECT, MICP, RING2, SLEEVE
.....-0.3V to V_{DD} + 0.3V
Junction Temperature .....+150℃
Storage Temperature Range .....-65℃ to +150℃
Lead Temperature (Soldering, 10s).....+260℃
ESD Susceptibility
HBM.....8000V
MM.....300V
CDM 1500V

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range .....2.6V to 5.0V
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

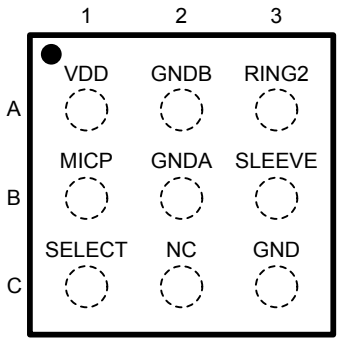
This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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



WLCSP-1.2×1.2-9B

PIN DESCRIPTION

PIN	NAME	I/O	FUNCTION
A1	VDD	–	Power Supply for the Chip.
A2	GNDB	–	FET2 Ground Reference.
A3	RING2	I/O	Connected to the RING2 Segment of the Jack. This pin will be routed to MICP or GNDB depending on the logic level of SELECT pin.
B1	MICP	I/O	Microphone Signal Connection to Codec. Microphone bias should be fed into this pin.
B2	GNDA	–	FET1 Ground Reference.
B3	SLEEVE	I/O	Connected to the SLEEVE Segment of the Jack. This pin will be routed to MICP or GNDA depending on the logic level of SELECT pin.
C1	SELECT	I	The Logic Signal Used to Control S1 Switch, FET1 and FET2.
C2	NC	–	No Connection.
C3	GND	–	Chip Ground Reference.

S1 SWITCH

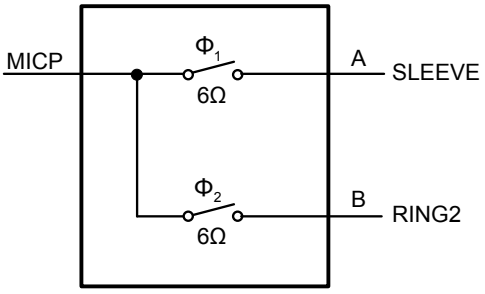


Figure 2. S1 Mux Detail

FUNCTION TABLE

SELECT	FUNCTION
0	MICP = A = SLEEVE, FET2 Turn On, FET1 Turn Off.
1	MICP = B = RING2, FET2 Turn Off, FET1 Turn On.

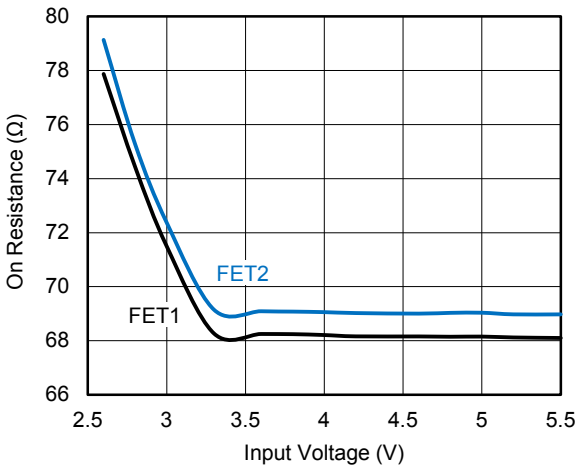
ELECTRICAL CHARACTERISTICS

(V_{DD} = 2.6V to 5.0V, Full = -40℃ to +85℃, typical values are at V_{DD} = 3.3V, T_A = +25℃, unless otherwise noted.)

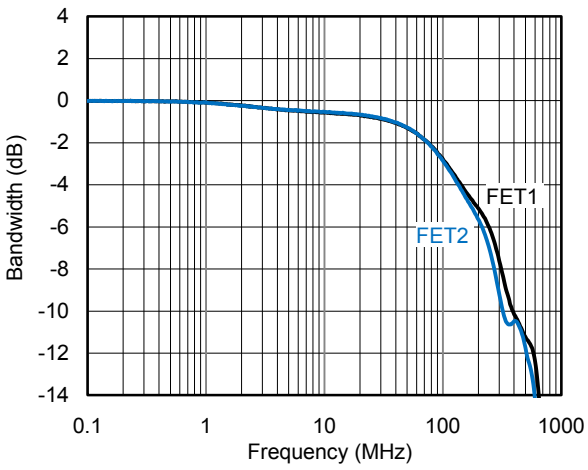
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
Input Voltage Range	V_{DD}		+25℃	2.6		5	V
Quiescent Current	I_Q	V_{DD} = 4.5V, V_{MICP} = 1.8V to V_{DD}, SELECT = Low or SELECT = High	+25℃		2	5	μA
Input/Output Voltage Range	V_{IO}	V_{DD} ≤ 3.3V	+25℃	0		V_{DD}	V
		V_{DD} ≥ 3.3V	+25℃	0		3.3	
Input Logic High for SELECT	V_{IH}	V_{DD} = 2.6V	Full	1.3		V_{DD}	V
		V_{DD} = 3.3V	Full	1.4		V_{DD}	
		V_{DD} = 4.5V	Full	1.55		V_{DD}	
Input Logic Low for SELECT	V_{IL}	V_{DD} = 2.6V	Full	0		0.3	V
		V_{DD} = 3.3V	Full	0		0.4	
		V_{DD} = 4.5V	Full	0		0.5	
Pull Down Resistor of Select Pin	R_{PD}		+25℃		550		kΩ
SWITCH RESISTANCE							
FET1 On Resistance	R_{F1}	V_{DD} = 2.6V, V_{GND} = 0V, I_{GND} = 10mA	+25℃		75	105	mΩ
FET2 On Resistance	R_{F2}		+25℃		75	105	
S1 On Resistance (Closed to A)	R_{S1A}	V_{DD} = 2.6V, $V_{SLEEVE/RING2}$ = 0V to 2.6V, I_{MIC} = ±10mA	+25℃		6	7.5	Ω
S1 On Resistance (Closed to B)	R_{S1B}		+25℃		6	7.5	
SWITCH LEAKAGE CURRENT							
FET1, FET2 Off Leakage Current	$I_{FET(OFF)}$	V_{DD} = 5.5V, V_{IN} = 0V to 3.3V, V_{OUT} = 0V, SELECT = 0V to 5.5V	+25℃			1	μA
S1A, S1B Off Leakage Current	$I_{S1AB(OFF)}$		+25℃			1	μA
S1A, S1B On Leakage Current	$I_{S1AB(ON)}$		+25℃			1	μA
SWITCH DYNAMIC CHARACTERISTICS							
FET1 Bandwidth	BW_{F1}	V = 60mV$_{PP}$, I_{BIAS} = 10mA	+25℃		100		MHz
FET2 Bandwidth	BW_{F2}		+25℃		100		MHz
Power Supply Rejection	PSRR	V_{DD} = 2.6V, V_{AC} = 200mV$_{PP}$, V_{DC} = 0V, f = 217Hz, R_S = R_L = 600Ω	+25℃		100		dB
		V_{DD} = 2.6V, V_{AC} = 200mV$_{PP}$, V_{DC} = 0V, f = 1kHz, R_S = R_L = 600Ω	+25℃		90		
		V_{DD} = 2.6V, V_{AC} = 200mV$_{PP}$, V_{DC} = 0V, f = 20kHz, R_S = R_L = 600Ω	+25℃		65		
		V_{DD} = 5V, V_{AC} = 200mV$_{PP}$, V_{DC} = 0V, f = 217Hz, R_S = R_L = 600Ω	+25℃		105		
		V_{DD} = 5V, V_{AC} = 200mV$_{PP}$, V_{DC} = 0V, f = 1kHz, R_S = R_L = 600Ω	+25℃		100		
		V_{DD} = 5V, V_{AC} = 200mV$_{PP}$, V_{DC} = 0V, f = 20kHz, R_S = R_L = 600Ω	+25℃		80		
SLEEVE or RING2 to MICP Isolation	ISO_{S1}	V = 200mV$_{PP}$, f = 20kHz, R_L = 50Ω	+25℃		-110		dB
SLEEVE to RING2 Separation	SEP_{S1}	V = 200mV$_{PP}$, f = 20kHz, R_L = 50Ω	+25℃		-110		dB
Total Harmonic Distortion	THD	V = 200mV$_{PP}$, f = 20-20kHz, R_S = 600Ω, BW = 80kHz	+25℃		0.01		%
DYNAMIC CHARACTERISTICS							
Turn-On Time	t_{ON}		+25℃		205		ns
Turn-Off Time	t_{OFF}		+25℃		210		ns
Break-Before-Make Time Delay	t_D		+25℃		27		ns

TYPICAL PERFORMANCE CHARACTERISTICS

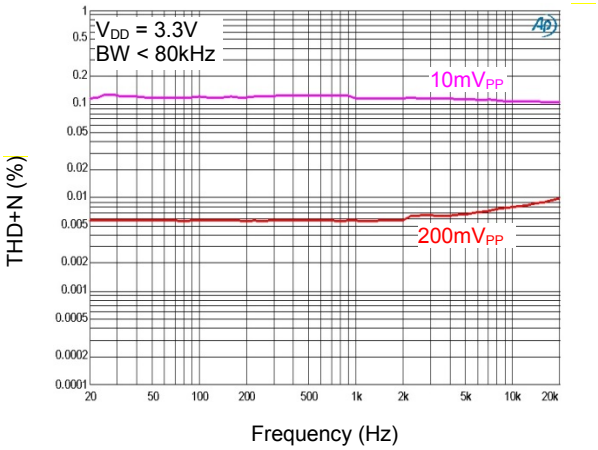
On Resistance vs. Input Voltage



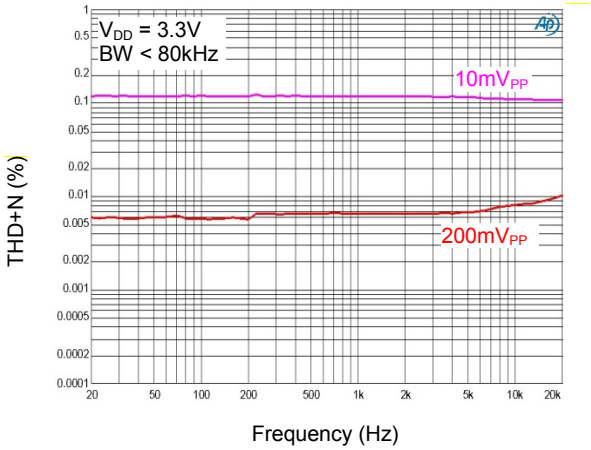
Bandwidth vs. Frequency



THD+N vs. Frequency (SLEEVE)

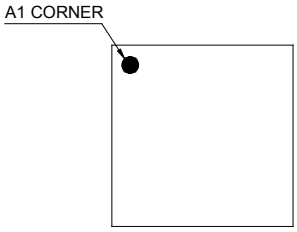


THD+N vs. Frequency (RING2)

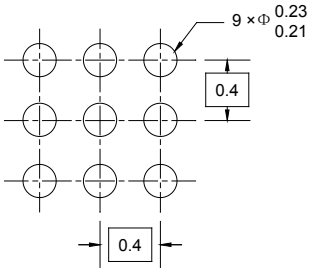


PACKAGE OUTLINE DIMENSIONS

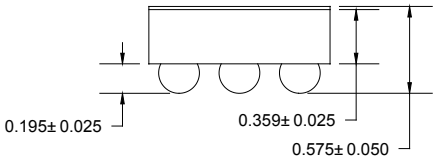
WLCSP-1.2×1.2-9B



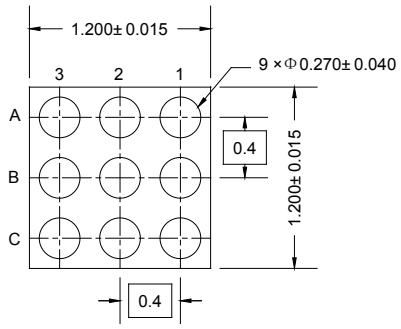
TOP VIEW



RECOMMENDED LAND PATTERN



SIDE VIEW

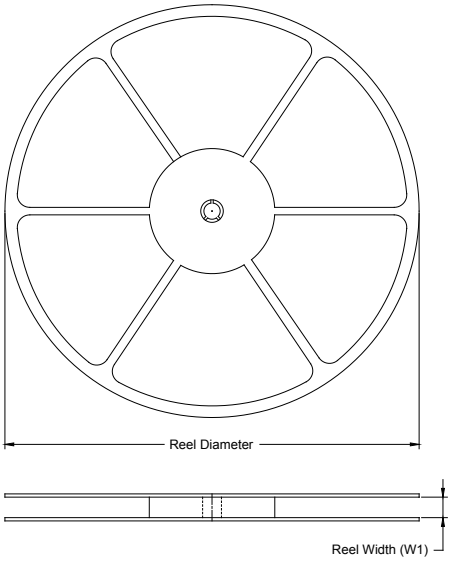


BOTTOM VIEW

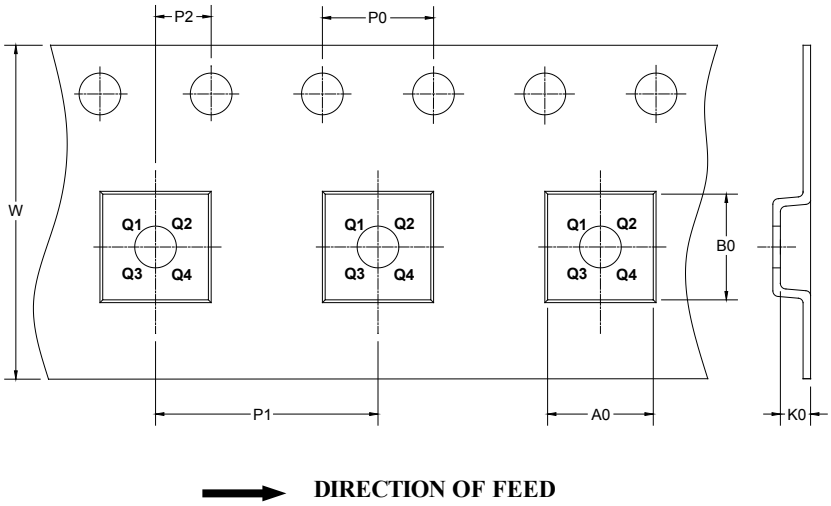
NOTE: All linear dimensions are in millimeters.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



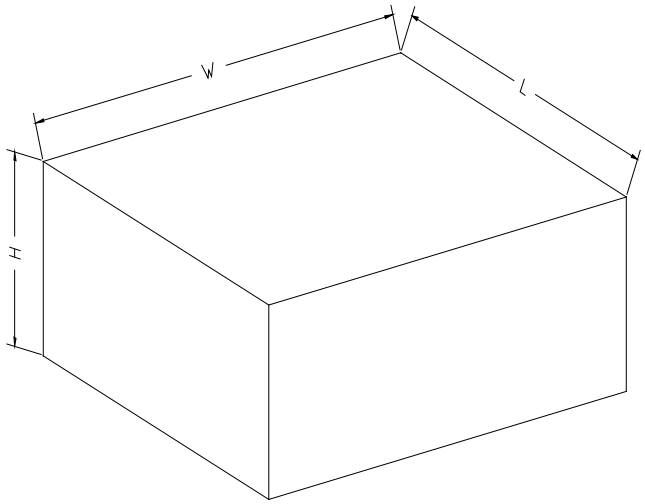
NOTE: The picture is only for reference. Please make the object as the standard.

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-1.2×1.2-9B	7″	9.5	1.35	1.35	0.73	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