



# SGM9114

## 8MHz 5th-Order Video Driver with 6dB Gain

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### GENERAL DESCRIPTION

The SGM9114 is a single rail-to-rail 5th-order output reconstruction filter which can operate from 3.0V to 5.5V single power supply, while consuming an ultra-low 6mA quiescent current. The device is optimized for low power, battery-operated applications.

The device has a -3dB bandwidth of 8MHz and 35V/ $\mu$ s slew rate, allowing DC-coupled output. An internal level shift circuit avoids synchronous pulse limit.

The power-down disable function can reduce the supply current and power consumption, and prolong battery life. SAG correction reduces AC-coupled capacitor size.

The SGM9114 is available in a Green SOT-23-6 package. It operates over an ambient temperature range of -40°C to +85°C.

### FEATURES

- **Supply Voltage Range: 3.0V to 5.5V**
- **5th-Order Reconstruction Filter**
- **Internal Gain: 6dB**
- **Quiescent Current: 6mA (TYP)**
- **Supply Current when Disabled: 0.1 $\mu$ A (TYP)**
- **AC- and DC-Coupled Input**
- **SAG Correction Reduces AC-Coupled Capacitor Size**
- **Rail-to-Rail Output**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green SOT-23-6 Package**

### APPLICATIONS

Video Amplifiers  
Video Recorders  
Video on Demand (VOD)  
Cable and Satellite Set-Top Boxes  
Portable and Handheld Products  
Communication Devices  
TVs

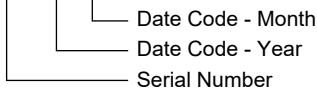
**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM9114	SOT-23-6	-40°C to +85°C	SGM9114YN6G/TR	S07XX	Tape and Reel, 3000

**MARKING INFORMATION**

NOTE: XX = Date Code.

**YYY X X**



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.

Input Voltage Range ..... GND - 0.3V to  $V_{CC} + 0.3V$   
 Supply Voltage,  $V_{CC}$ ..... 6.0V  
 Junction Temperature ..... 150°C  
 Storage Temperature Range..... -65°C to +150°C  
 Lead Temperature (Soldering, 10s) ..... 260°C  
 ESD Susceptibility  
 HBM..... 8000V  
 MM..... 400V  
 CDM ..... 2000V

**RECOMMENDED OPERATING CONDITIONS**

Operating Voltage Range..... 3.0V to 5.5V  
 Operating Temperature Range ..... -40°C to +85°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.

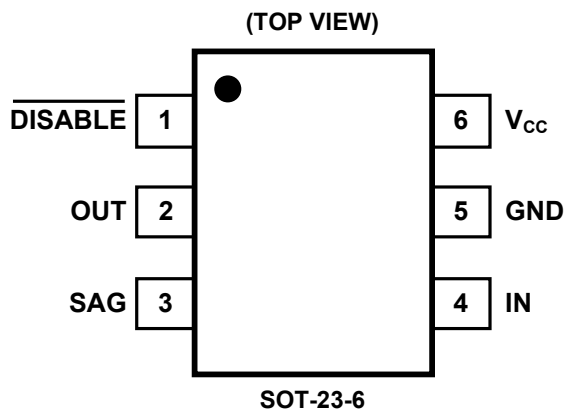
**ESD SENSITIVITY CAUTION**

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 CONFIGURATION



## PIN DESCRIPTION

PIN	NAME	FUNCTION
1	$\overline{\text{DISABLE}}$	Shutdown Input.
2	OUT	Signal Output.
3	SAG	SAG Correction.
4	IN	Signal Input.
5	GND	Ground.
6	$V_{CC}$	Power Supply.

**ELECTRICAL CHARACTERISTICS**

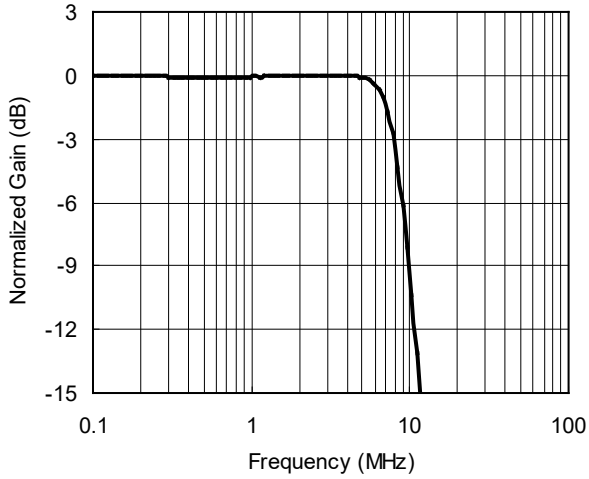
(At  $V_{CC} = 5V$ ,  $R_L = 150\Omega$  connected to GND,  $V_{IN} = 1V_{PP}$  and  $C_{IN} = 0.1\mu F$ , output AC-coupled, referenced to 400kHz, unless otherwise noted.)

PARAMETER	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
<b>Input Characteristics</b>						
Output Level Shift Voltage ( $V_{OLS}$ )	$V_{IN} = 0V$ , No load	+25°C		340	570	mV
		-40°C to +85°C			675	
Input Voltage Clamp ( $V_{CLAMP}$ )	$I_{IN} = -3.5mA$	+25°C	-285	-210		mV
		-40°C to +85°C	-390			
Clamp Charge Current	$V_{IN} = V_{CLAMP} - 100mV$	+25°C	-5.5	-4.8		mA
		-40°C to +85°C	-6.8			
Clamp Discharge Current	$V_{IN} = 500mV$	+25°C		1.9	2.7	$\mu A$
		-40°C to +85°C			3.2	
Voltage Gain ( $A_V$ )	$R_L = 150\Omega$	+25°C	5.6	6	6.4	dB
		-40°C to +85°C	5.55		6.45	
<b>Output Characteristics</b>						
Output Voltage High Swing	$V_{IN} = 3.0V$ , $R_L = 150\Omega$ to GND	+25°C	4.6	4.79		V
		-40°C to +85°C	4.5			
Output Short-Circuit Current ( $I_{SC}$ )	$V_{IN} = 1.5V$ , Out shorted to GND through $10\Omega$	+25°C	80	95		mA
		-40°C to +85°C	77			
	$V_{IN} = 0.5V$ , Out shorted to $V_{CC}$ through $10\Omega$	+25°C		-102	-87	mA
		-40°C to +85°C			-78	
<b>Power Supply</b>						
Operating Voltage Range ( $V_{CC}$ )		+25°C	3.0		5.5	V
Power Supply Rejection Ratio (PSRR)	$V_{CC} = 3.5V$ to $5.0V$	+25°C	40	50		dB
		-40°C to +85°C	38			
Quiescent Current ( $I_Q$ )	$V_{IN} = 0.5V$ , $\overline{DISABLE} = V_{CC}$ , $R_L = 0\Omega$	+25°C		6	9.5	mA
		-40°C to +85°C			11.5	
Supply Current when Disabled	$\overline{DISABLE} = 0V$	+25°C		0.1	18	$\mu A$
		-40°C to +85°C			20	
<b>Dynamic Performance</b>						
-0.1dB Bandwidth		+25°C		6		MHz
-3dB Bandwidth		+25°C		8		MHz
Filter Response (Normalized Gain)	$f_{IN} = 27MHz$	+25°C		47		dB
Slew Rate	2V Output step, 80% to 20%	+25°C		35		V/ $\mu s$
Differential Gain Error (DG)	PAL DC-coupled	+25°C		0.85		%
	PAL AC-coupled	+25°C		0.85		%
Differential Phase Error (DP)	PAL DC-coupled	+25°C		1		°
	PAL AC-coupled	+25°C		1.4		°
Group Delay Variation (D/DT)	Difference between 400kHz and 6.5MHz	+25°C		28		ns
Fall Time	2V Output step, 80% to 20%	+25°C		34		ns
Rise Time	2V Output step, 80% to 20%	+25°C		33		ns
<b>Power-Down Disable</b>						
$\overline{DISABLE}$ (Logic-Low Threshold)	$V_{CC} = 5V$	+25°C			0.4	V
$\overline{DISABLE}$ (Logic-High Threshold)	$V_{CC} = 5V$	+25°C	1.2			V

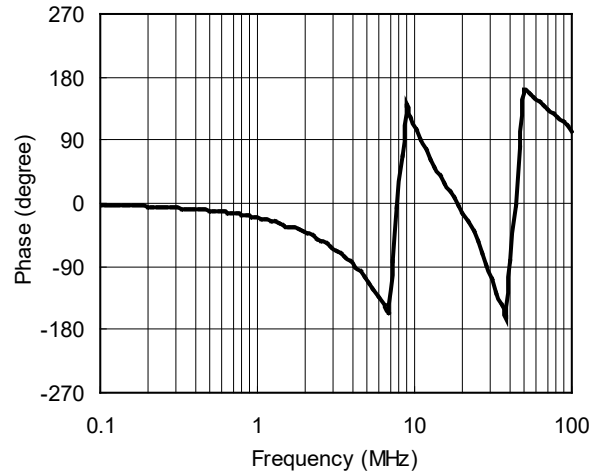
TYPICAL PERFORMANCE CHARACTERISTICS

At  $V_{CC} = 5V$ ,  $T_A = +25^{\circ}C$ ,  $R_L = 150\Omega$ , output AC-coupled, unless otherwise noted.

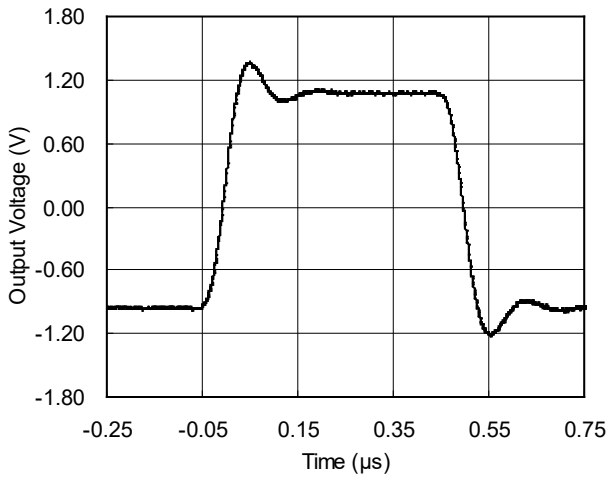
Gain vs. Frequency



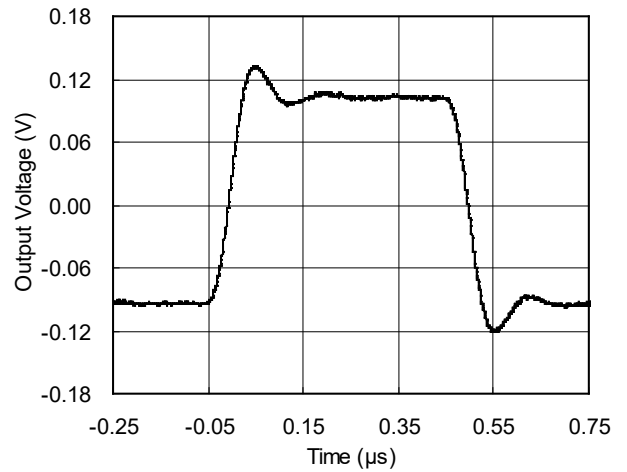
Phase vs. Frequency



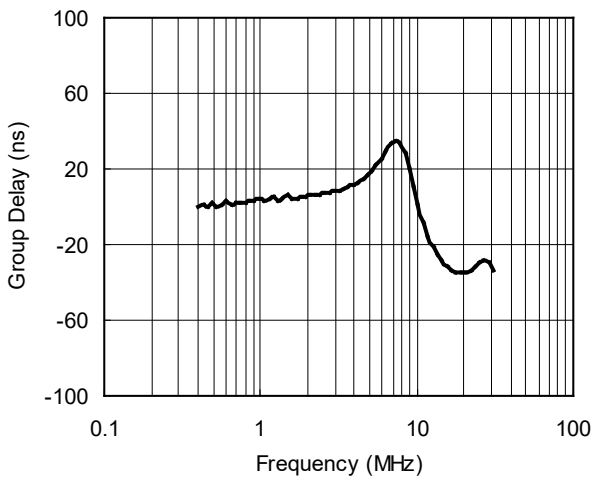
Large Signal Step Response



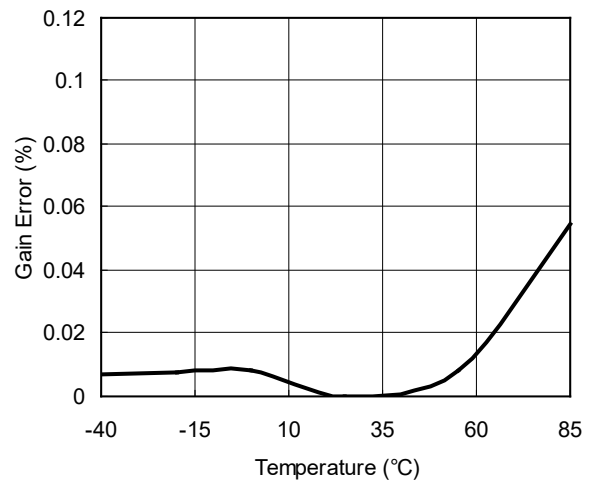
Small Signal Step Response



Group Delay vs. Frequency

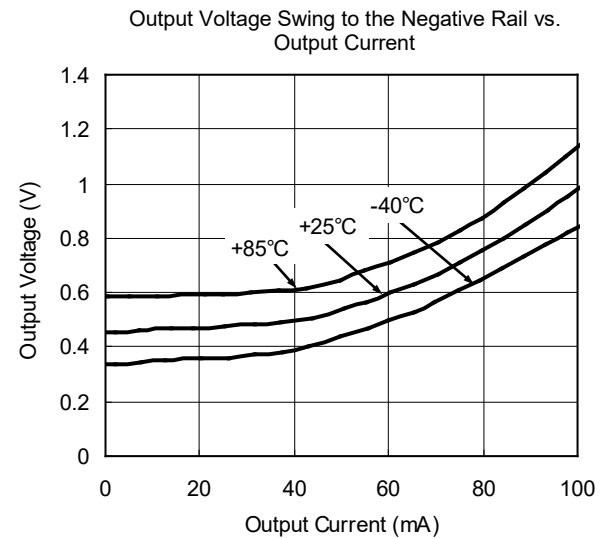
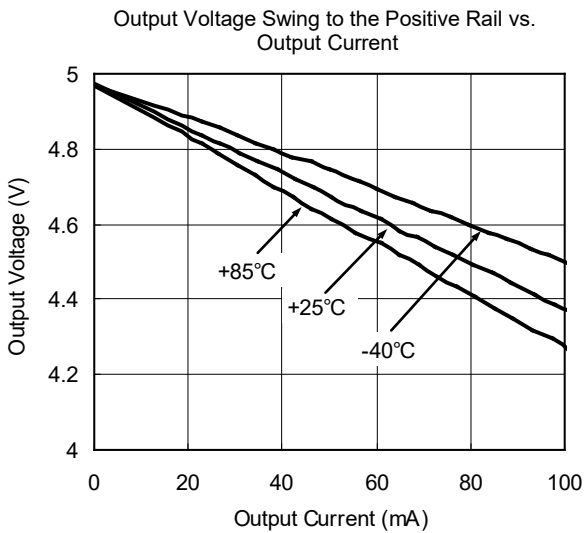
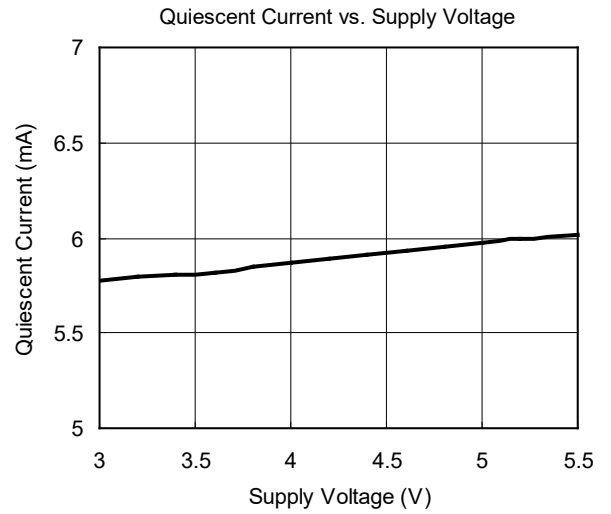
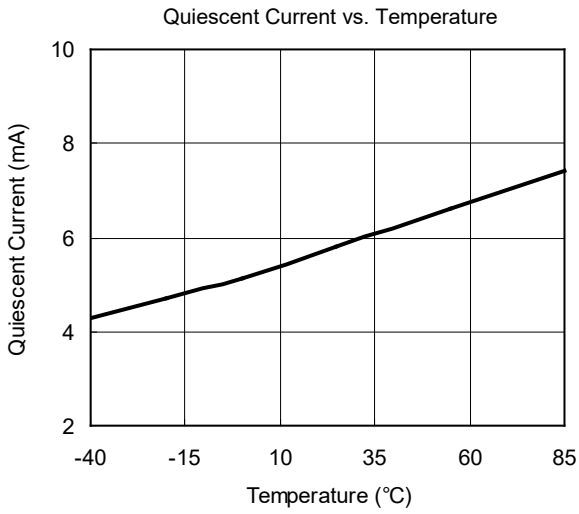


Gain Error vs. Temperature



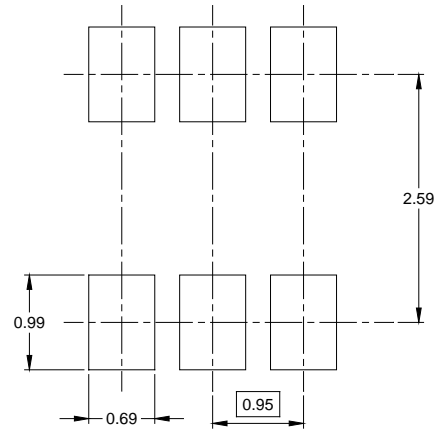
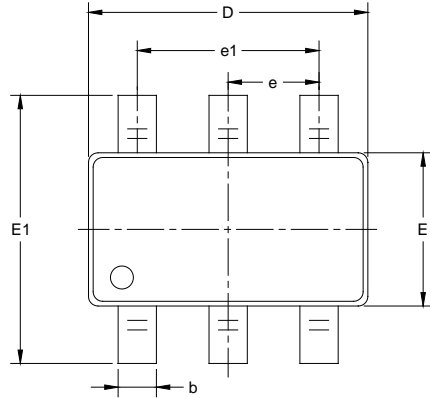
**TYPICAL PERFORMANCE CHARACTERISTICS (continued)**

At  $V_{CC} = 5V$ ,  $T_A = +25^\circ C$ ,  $R_L = 150\Omega$ , output AC-coupled, unless otherwise noted.

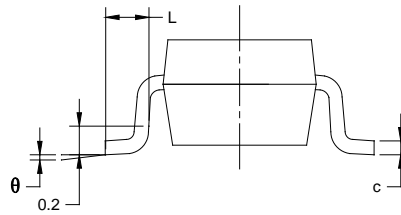
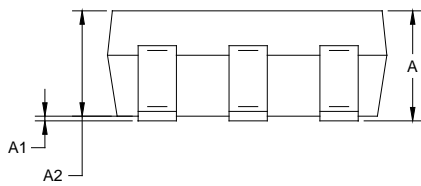


PACKAGE OUTLINE DIMENSIONS

SOT-23-6



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

NOTES:

1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

# PACKAGE INFORMATION

## 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
SOT-23-6	7"	9.5	3.17	3.23	1.37	4.0	4.0	2.0	8.0	Q3

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# 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
7" (Option)	368	227	224	8
7"	442	410	224	18

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