SGM8255-1, SGM8255-2, SGM8255-3
9MHz, High Voltage, High Precision, Low Noise, Rail-to-Rail Output Operational Amplifiers

PRODUCT DESCRIPTION

The SGM8255-1 (single), SGM8255-2 (dual) and SGM8255-3 (single with shutdown) are rail-to-rail output, low noise and high precision operational amplifiers which have low input offset voltage, and bias current. They are guaranteed to operate from 4.5V to 36V single supply.

The rail-to-rail output swing provided by the SGM8255-1/-2/-3 makes both high-side and low-side sensing easy. The combination of characteristics makes the SGM8255-1/-2/-3 good choices for temperature, position and pressure sensors, medical equipment and strain gauge amplifiers, or any other 4.5V to 36V application requiring precision and long term stability.

The SGM8255-1/-2/-3 are rated over the -40℃ to +125℃ temperature range. The SGM8255-1 single is available in the Green SOIC-8 package. The SGM8255-2 dual is available in the Green SOIC-8 package. The SGM8255-3 single with shutdown is available in the Green SOIC-8 package.

FEATURES

- **Low Offset Voltage: 10μV (TYP)**
- **Rail-to-Rail Output Swing**
- **4.5V to 36V Single Supply Operation**
- **Voltage Gain: 150dB (TYP) at +5V**
- **PSRR: 155dB (TYP)**
- **CMRR: 120dB (TYP)**
- **0.5μV_{P-P} Noise at 0.1Hz to 10Hz**
- **28nV/$\sqrt{Hz}$ Voltage Noise Density at 1kHz**
- **9MHz GBP**
- **Low Supply Current: 835μA/Amplifier (TYP)**
- **Overload Recovery Time: 0.5μs (at V_S = +5V)**
- **-40℃ to +125℃ Operating Temperature Range**
- **SGM8255-1/-2/-3 Available in Green SOIC-8 Package**

APPLICATIONS

Temperature Measurements
Pressure Sensors
Precision Current Sensing
Electronic Scales
Strain Gauge Amplifiers
Medical Instrumentation
Thermocouple Amplifiers
Handheld Test Equipment

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM8255-1	SOIC-8	-40℃ to +125℃	SGM8255-1XS8G/TR	SGM 82551XS8 XXXXX	Tape and Reel, 2500
SGM8255-2	SOIC-8	-40℃ to +125℃	SGM8255-2XS8G/TR	SGM 82552XS8 XXXXX	Tape and Reel, 2500
SGM8255-3	SOIC-8	-40℃ to +125℃	SGM8255-3XS8G/TR	SGM 82553XS8 XXXXX	Tape and Reel, 2500

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

Supply Voltage 40V
Input Voltage ..... $-V_S$ to $(+V_S)$ + 0.1V
Differential Input Voltage ..... -15V to +15V
Storage Temperature Range ..... -65℃ to +150℃
Junction Temperature ..... 150℃
Lead Temperature (Soldering 10 sec) ..... 260℃

RECOMMENDED OPERATING CONDITIONS

Input Voltage Range ..... 4.5V to 36V
Operating Temperature Range ..... -40℃ to +125℃

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

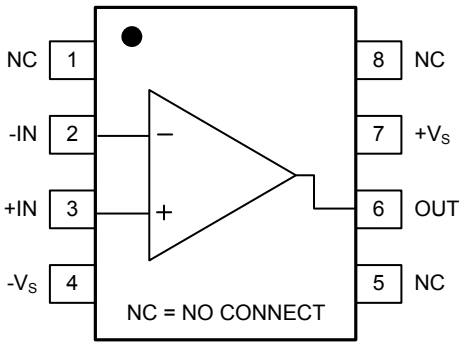
This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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

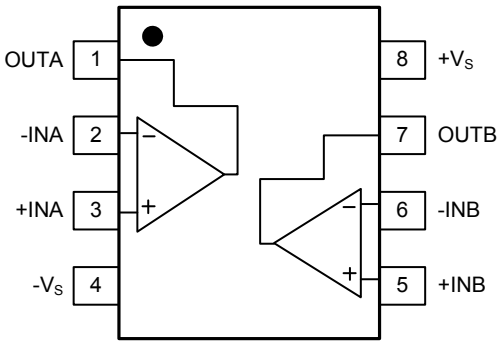
PIN CONFIGURATIONS

SGM8255-1 (TOP VIEW)



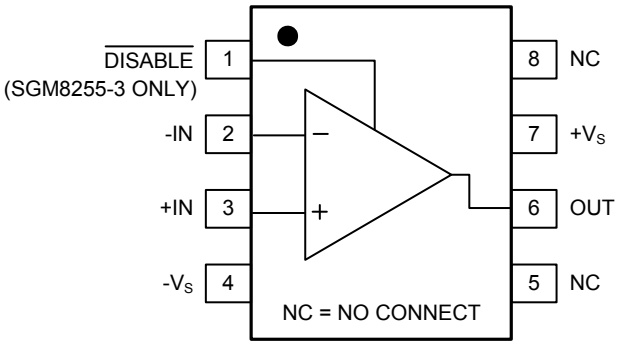
SOIC-8

SGM8255-2 (TOP VIEW)



SOIC-8

SGM8255-3 (TOP VIEW)



SOIC-8

ELECTRICAL CHARACTERISTICS

(V_S = +5V, V_{CM} = +2.5V, V_O = +2.5V, T_A = +25℃, unless otherwise noted.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT CHARACTERISTICS					
Input Offset Voltage (V_{OS})			10		μV
Input Bias Current (I_B)			200		pA
Input Offset Current (I_{OS})			200		pA
Input Voltage Range		0		3.5	V
Common Mode Rejection Ratio (1) (CMRR)	V_{CM} = 0V to 3.5V		110		dB
Large Signal Voltage Gain (A_{VO})	R_L = 10kΩ, V_O = 0.3V to 4.7V		136		dB
Input Offset Voltage Drift ($\Delta V_{OS}/\Delta_T$)	-40℃ ≤ T_A ≤ +125℃		30		nV/℃
OUTPUT CHARACTERISTICS					
Output Voltage High (V_{OH})	R_L = 10kΩ to -V_S		33		mV
Output Voltage Low (V_{OL})	R_L = 10kΩ to +V_S		10		mV
Short Circuit Limit (I_{SC})			23		mA
POWER SUPPLY					
Power Supply Rejection Ratio (1) (PSRR)	V_S = 4.5V to 36V		155		dB
Quiescent Current/Amplifier (I_Q)	V_O = +V_S/2		820		μA
Shutdown Current (I_{SD}) (SGM8255-3 Only)	V_O = +V_S/2		2		μA
DYNAMIC PERFORMANCE					
Gain-Bandwidth Product (GBP)	A_V = +100		9		MHz
Slew Rate (SR)	A_V = +1, R_L = 10kΩ, 2V Output Step		4		V/μs
Overload Recovery Time	A_V = -100, R_L = 10kΩ, V_{IN} = 200mV (RET to GND)		0.5		μs
Total Harmonic Distortion + Noise (THD + N)	f = 1kHz, G = +1, V_{OUT} =2V_{p-p}		0.001		%
NOISE PERFORMANCE					
Voltage Noise (e_n p-p)	0.1Hz to 10Hz		0.5		μV_{P-P}
Voltage Noise Density (e_n)	f = 1kHz		28		nV/$\sqrt{Hz}$

NOTE 1: PSRR and CMRR are affected by the matching between external gain-setting resistor ratios.

ELECTRICAL CHARACTERISTICS

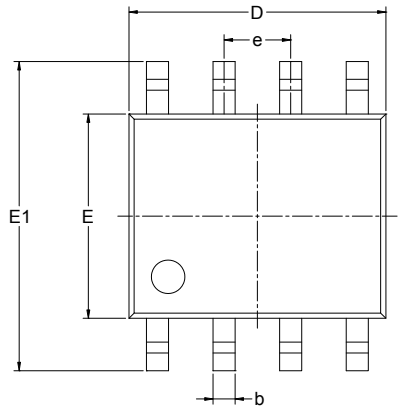
(V_S = +30V, V_{CM} = +15V, V_O = +15V, T_A = +25℃, unless otherwise noted.)

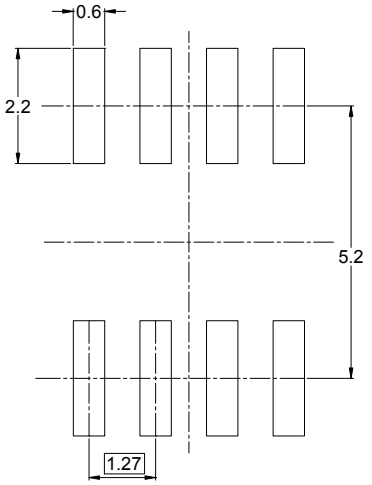
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
INPUT CHARACTERISTICS					
Input Offset Voltage (V_{OS})			10		μV
Input Bias Current (I_B)			200		pA
Input Offset Current (I_{OS})			200		pA
Input Voltage Range		0		28.5	V
Common Mode Rejection Ratio (1) (CMRR)	V_{CM} = 0V to 28.5V		120		dB
Large Signal Voltage Gain (A_{VO})	R_L = 10kΩ, V_O = 0.3V to 29.7V		150		dB
Input Offset Voltage Drift ($\Delta V_{OS}/\Delta_T$)	-40℃ ≤ T_A ≤ +125℃		30		nV/℃
OUTPUT CHARACTERISTICS					
Output Voltage High (V_{OH})	R_L = 10kΩ to -V_S		168		mV
Output Voltage Low (V_{OL})	R_L = 10kΩ to +V_S		43		mV
Short Circuit Limit (I_{SC})			44		mA
POWER SUPPLY					
Power Supply Rejection Ratio (1) (PSRR)	V_S = 4.5V to 36V		155		dB
Quiescent Current/Amplifier (I_Q)	V_O = +V_S/2		835		μA
Shutdown Current (I_{SD}) (SGM8255-3 Only)	V_O = +V_S/2		15		μA
DYNAMIC PERFORMANCE					
Gain-Bandwidth Product (GBP)	A_V = +100		9		MHz
Slew Rate (SR)	A_V = +1, R_L = 10kΩ, 2V Output Step		4		V/μs
Overload Recovery Time	A_V = -100, R_L = 10kΩ, V_{IN} = 200mV (RET to GND)		0.4		μs
Total Harmonic Distortion + Noise (THD + N)	f = 1kHz, G = +1, V_{OUT} =2V_{p-p}		0.0009		%
NOISE PERFORMANCE					
Voltage Noise (e_n p-p)	0.1Hz to 10Hz		0.5		μV_{P-P}
Voltage Noise Density (e_n)	f = 1kHz		28		nV/$\sqrt{Hz}$

NOTE 1: PSRR and CMRR are affected by the matching between external gain-setting resistor ratios.

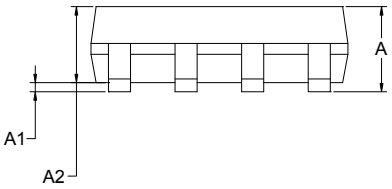
PACKAGE OUTLINE DIMENSIONS

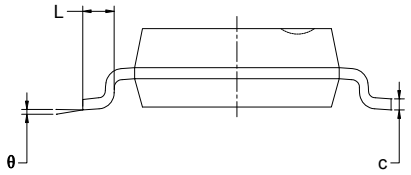
SOIC-8





RECOMMENDED LAND PATTERN (Unit: mm)

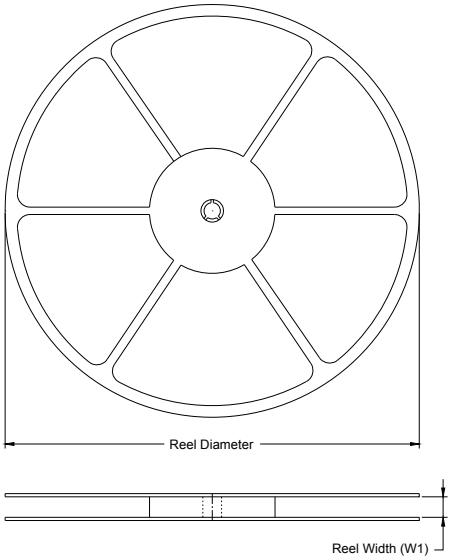




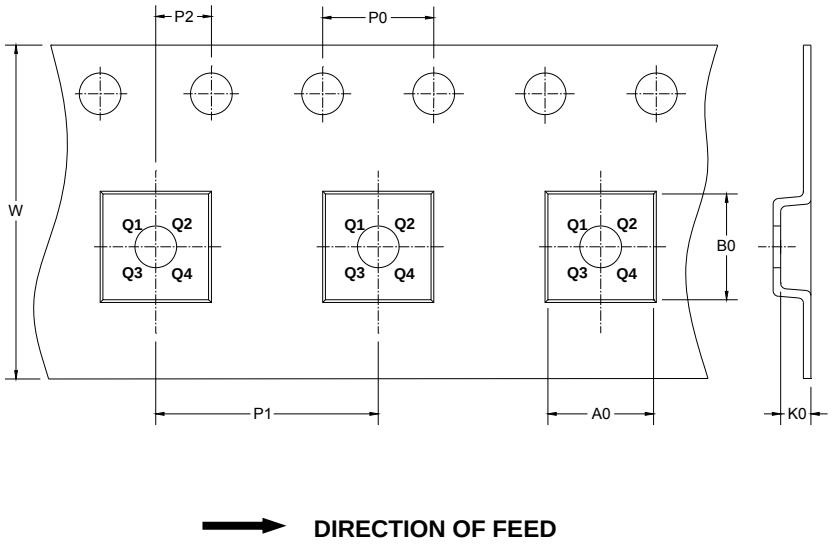
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



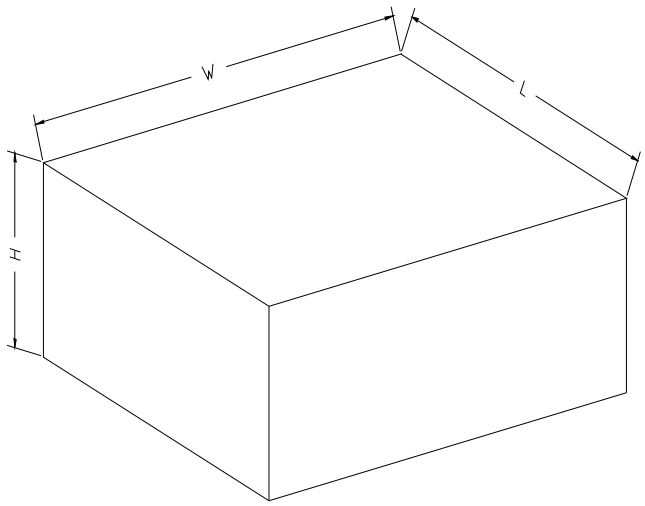
NOTE: The picture is only for reference. Please make the object as the standard.

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
SOIC-8	13″	12.4	6.4	5.4	2.1	4.0	8.0	2.0	12.0	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
13″	386	280	370	5

DD0002