

GENERAL DESCRIPTION

The SGM9124 is a rail-to-rail, 4-channel, 5th-order output reconstruction filter with input clamps which can operate from 3.3V to 5.5V single power supply, while consuming an ultra-low 30mA quiescent current. The device is optimized for low power, wide range of television and set-top box applications.

The device has a -3dB bandwidth of 8MHz and 35V/ μ s slew rate, allowing DC- or AC-coupled output. SGM9124 can be DC-coupled or AC-coupled with input video signal to eliminate out-of-band noise, such as the output stage of DAC.

The SGM9124 is available in a Green MSOP-10 package. It operates over an ambient temperature range of -40°C to +85°C.

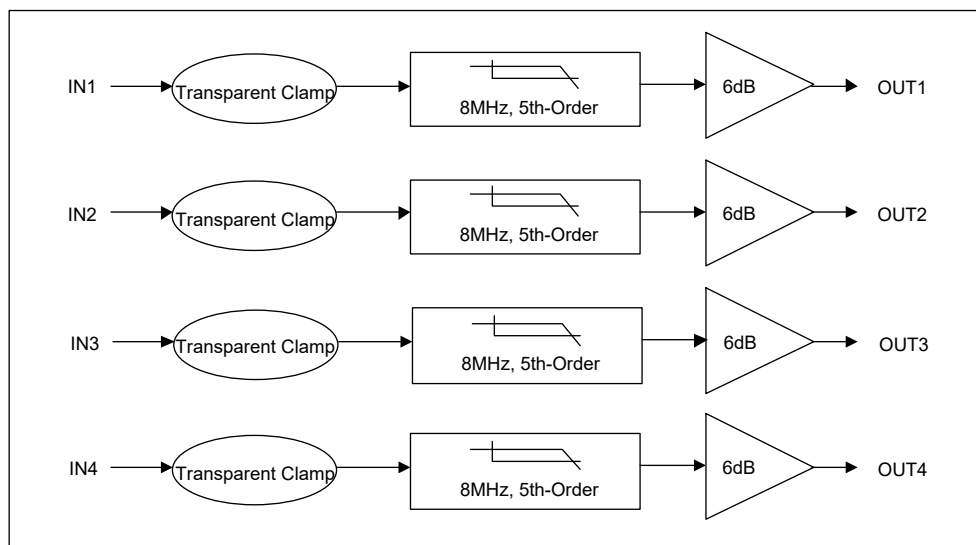
FEATURES

- **Supply Voltage Range: 3.3V to 5.5V**
- **4-Channel 5th-Order 8MHz (SD) Filter**
- **Transparent Input Clamping**
- **Internal Gain: 6dB**
- **Quiescent Current: 30mA (TYP)**
- **AC- or DC-Coupled Inputs**
- **AC- or DC-Coupled Outputs**
- **Rail-to-Rail Output**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green MSOP-10 Package**

APPLICATIONS

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

BLOCK DIAGRAM



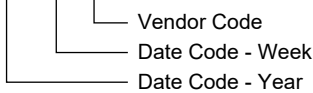
PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|---------|---------------------|-----------------------------|------------------|---------------------------|---------------------|
| SGM9124 | MSOP-10 | -40°C to +85°C | SGM9124YMS10G/TR | SGM9124 YMS10 XXXXX | Tape and Reel, 3000 |

MARKING INFORMATION

NOTE: XXXXX = Date Code and Vendor Code.

XXXXX



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

RECOMMENDED OPERATING CONDITIONS

Operating Voltage Range..... 3.3V 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.

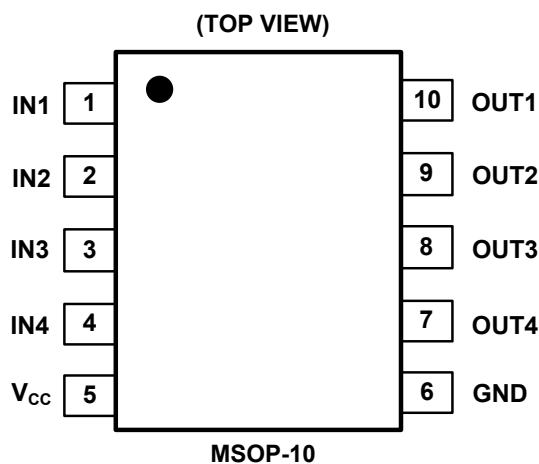
ESD SENSITIVITY CAUTION

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 | IN1 | Video Input for Channel 1. |
| 2 | IN2 | Video Input for Channel 2. |
| 3 | IN3 | Video Input for Channel 3. |
| 4 | IN4 | Video Input for Channel 4. |
| 5 | V _{CC} | Power Supply. |
| 6 | GND | Ground. |
| 7 | OUT4 | Filtered Output for Channel 4. |
| 8 | OUT3 | Filtered Output for Channel 3. |
| 9 | OUT2 | Filtered Output for Channel 2. |
| 10 | OUT1 | Filtered Output for Channel 1. |

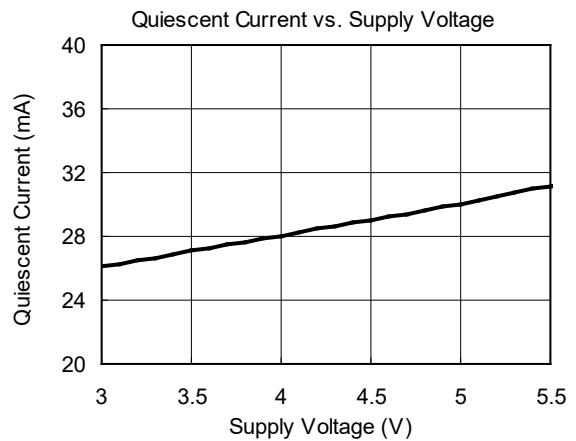
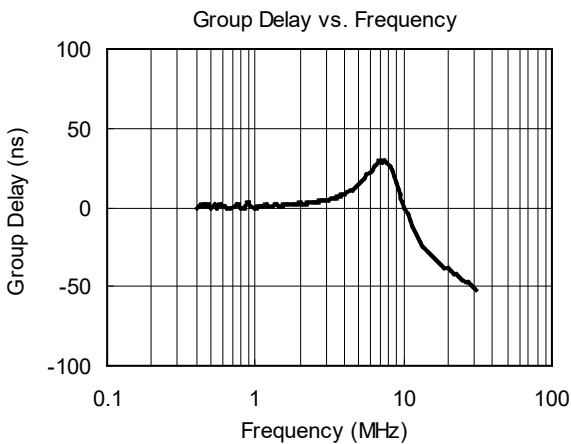
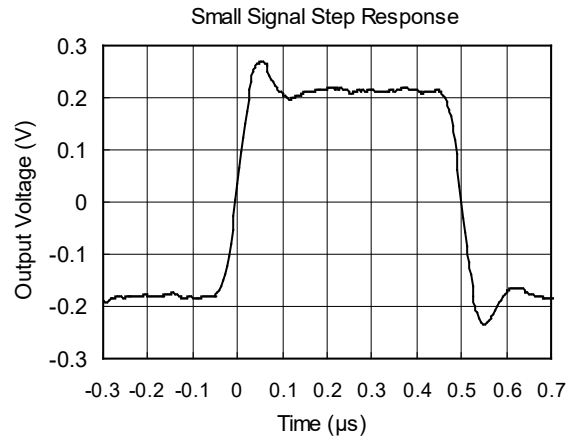
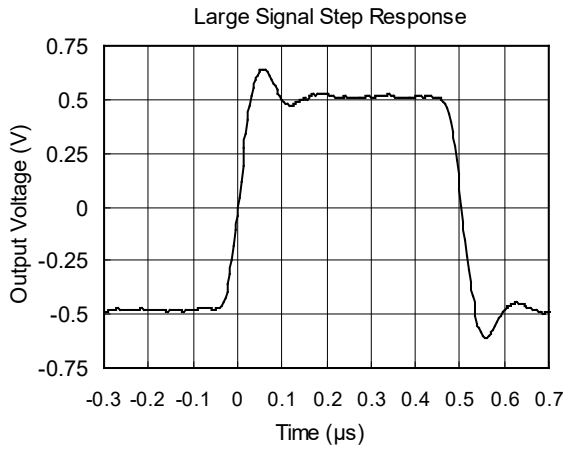
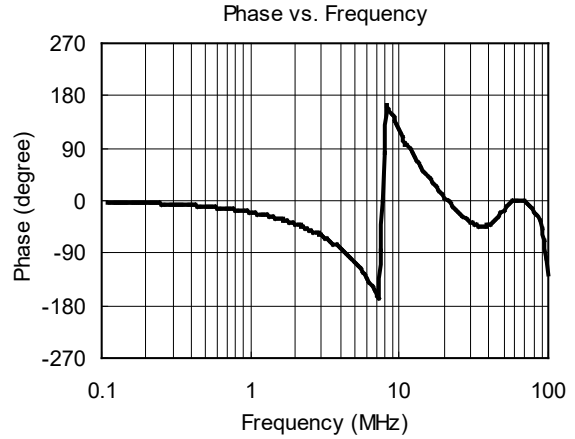
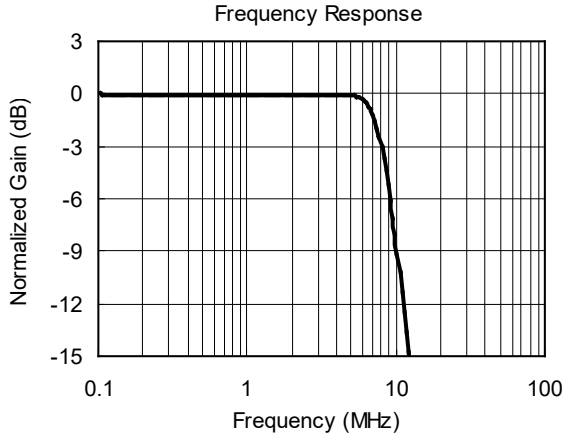
ELECTRICAL CHARACTERISTICS

(At $R_L = 150\Omega$ connected to GND, $V_{IN} = 1V_{PP}$ and $C_{IN} = 0.1\mu F$, all outputs AC-coupled with $220\mu F$, referenced to 400kHz, unless otherwise noted.)

| PARAMETER | CONDITIONS | TEMP | MIN | TYP | MAX | UNITS |
|--|--|----------------|------|------|-----|------------|
| Input Characteristics | | | | | | |
| Output Level Shift Voltage (V_{OLS}) | $V_{IN} = 0V$, No load | +25°C | | 458 | 600 | mV |
| | | -40°C to +85°C | | | 754 | |
| Input Voltage Clamp (V_{CLAMP}) | $I_{IN} = -3.5mA$ | +25°C | -180 | -100 | | mV |
| | | -40°C to +85°C | -283 | | | |
| Clamp Charge Current | $V_{IN} = V_{CLAMP} - 100mV$ | +25°C | -6.0 | -4.7 | | mA |
| | | -40°C to +85°C | -7.8 | | | |
| Voltage Gain (A_V) | $R_L = 150\Omega$ | +25°C | 5.7 | 6 | 6.4 | dB |
| | | -40°C to +85°C | 5.5 | | 6.6 | |
| Output Characteristics | | | | | | |
| Output Voltage High Swing | $V_{IN} = 3V$, $R_L = 150\Omega$ to GND | +25°C | 4.6 | 4.74 | | V |
| | | -40°C to +85°C | 4.51 | | | |
| Power Supply | | | | | | |
| Operating Voltage Range | | +25°C | 3.3 | | 5.5 | V |
| Power Supply Rejection Ratio (PSRR) | $V_{CC} = 3.5V$ to $5.0V$ | +25°C | 44 | 50 | | dB |
| | | -40°C to +85°C | 43 | | | |
| Quiescent Current (I_Q) | $V_{IN} = 0V$ | +25°C | | 30 | 38 | mA |
| | | -40°C to +85°C | | | 44 | |
| AC Performance | | | | | | |
| -0.1dB Bandwidth | $R_L = 150\Omega$ | +25°C | | 5.9 | | MHz |
| -3dB Bandwidth | $R_L = 150\Omega$ | +25°C | | 8 | | MHz |
| Filter Response (Normalized Gain) | $f_{IN} = 27MHz$ | +25°C | | 42 | | dB |
| Slew Rate | 2V Output step, 80% to 20% | +25°C | | 35 | | V/ μs |
| Differential Gain (DG) | PAL DC-coupled | +25°C | | 0.15 | | % |
| | PAL AC-coupled | +25°C | | 0.21 | | % |
| Differential Phase (DP) | PAL DC-coupled | +25°C | | 1.11 | | ° |
| | PAL AC-coupled | +25°C | | 1.20 | | ° |
| Group Delay Variation (D/DT) | Difference between 400kHz and 6.5MHz | +25°C | | 28 | | ns |
| Crosstalk (channel-to-channel) | $f = 1MHz$ | +25°C | | -58 | | dB |
| Fall Time | 2V Output step, 80% to 20% | +25°C | | 34 | | ns |
| Rise Time | 2V Output step, 80% to 20% | +25°C | | 35 | | ns |

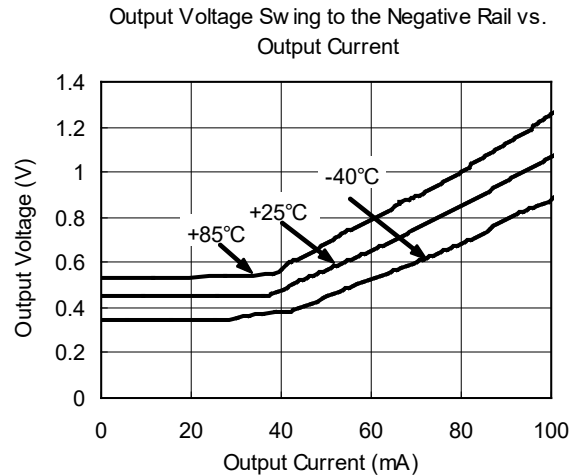
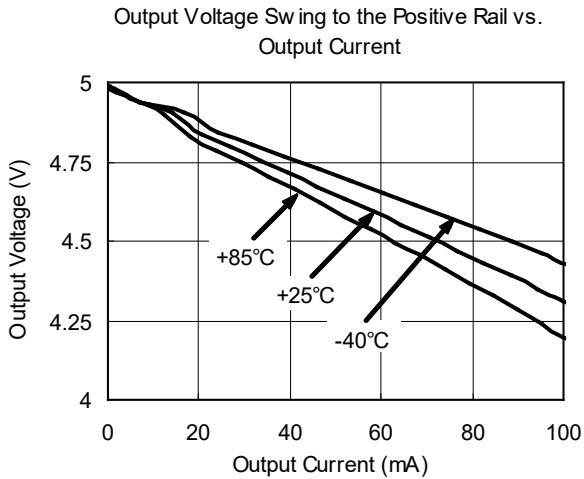
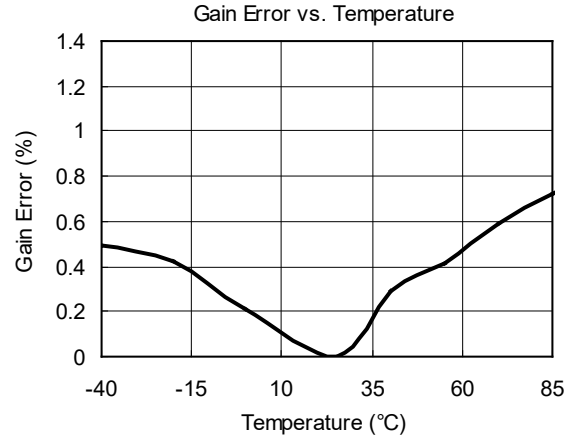
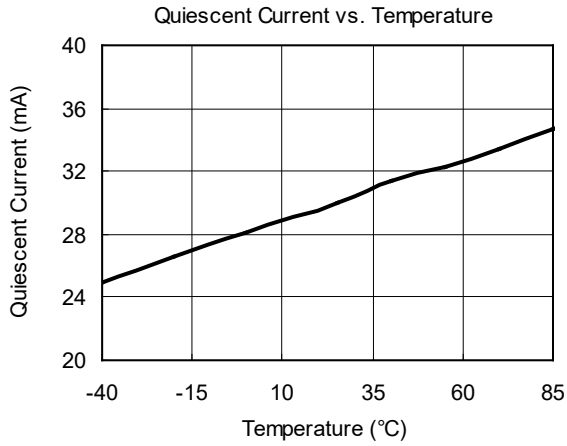
TYPICAL PERFORMANCE CHARACTERISTICS

At $V_{CC} = 5V$, $T_A = +25^{\circ}C$, $R_L = 150\Omega$, all outputs AC-coupled with $220\mu F$, unless otherwise noted.



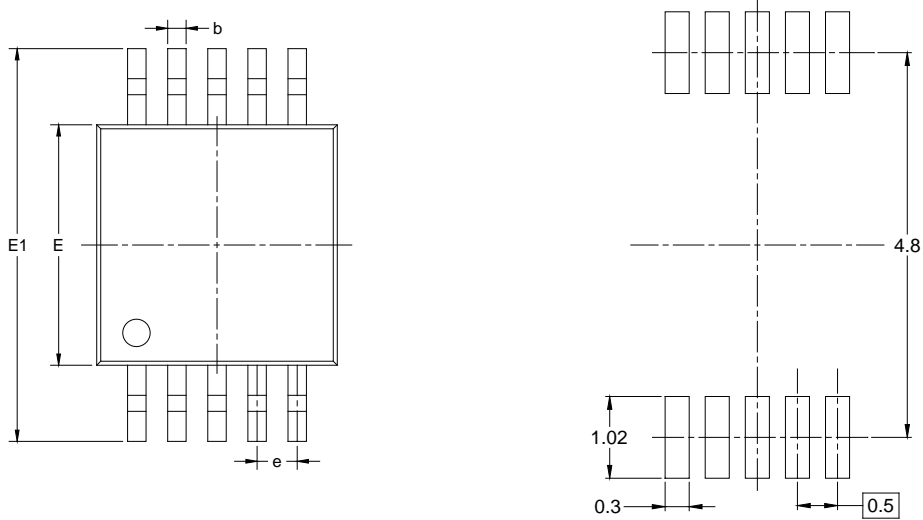
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $V_{CC} = 5V$, $T_A = +25^\circ C$, $R_L = 150\Omega$, all outputs AC-coupled with $220\mu F$, unless otherwise noted.

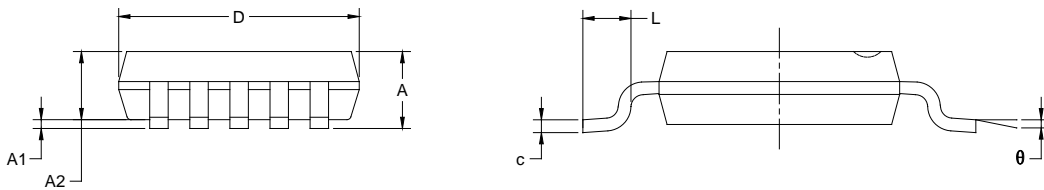


PACKAGE OUTLINE DIMENSIONS

MSOP-10



RECOMMENDED LAND PATTERN (Unit: mm)



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.820 | 1.100 | 0.032 | 0.043 |
| A1 | 0.020 | 0.150 | 0.001 | 0.006 |
| A2 | 0.750 | 0.950 | 0.030 | 0.037 |
| b | 0.180 | 0.280 | 0.007 | 0.011 |
| c | 0.090 | 0.230 | 0.004 | 0.009 |
| D | 2.900 | 3.100 | 0.114 | 0.122 |
| E | 2.900 | 3.100 | 0.114 | 0.122 |
| E1 | 4.750 | 5.050 | 0.187 | 0.199 |
| e | 0.500 BSC | | 0.020 BSC | |
| L | 0.400 | 0.800 | 0.016 | 0.031 |
| θ | 0° | 6° | 0° | 6° |

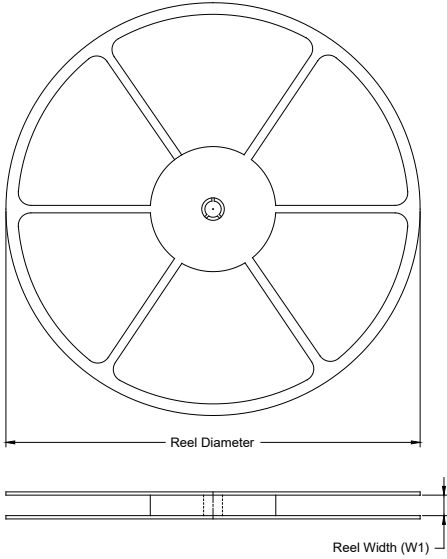
NOTES:

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

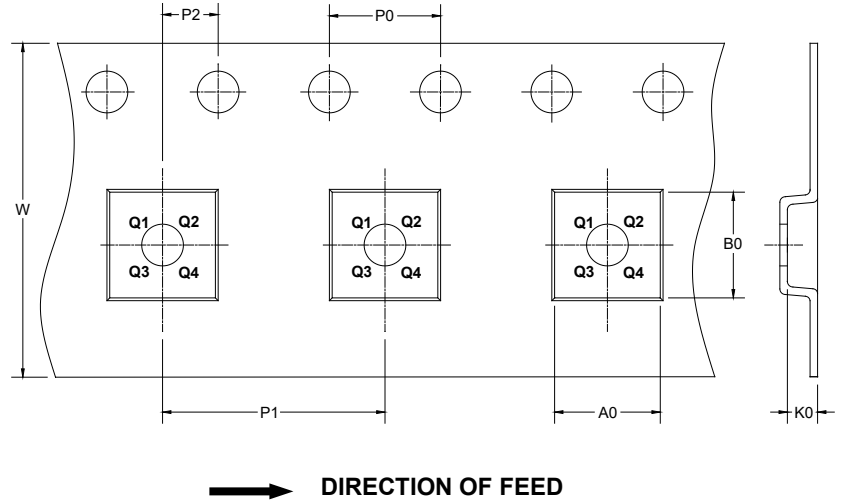
PACKAGE INFORMATION

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 |
|--------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| MSOP-10 | 13" | 12.4 | 5.20 | 3.30 | 1.20 | 4.0 | 8.0 | 2.0 | 12.0 | Q1 |

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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 |
|-----------|-------------|------------|-------------|--------------|
| 13" | 386 | 280 | 370 | 5 |

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