# SGM48524Q
# Dual 5A, High-Speed, Low-Side Gate Driver with Negative Input Voltage Capability

## GENERAL DESCRIPTION

The SGM48524Q is a dual high-speed low-side gate driver for MOSFET and IGBT power switches. It has rail-to-rail driving capability and can sink and source up to 5A peak current with capacitive loads. The propagation delays are very short and well matched between the two channels that make the device very fit for applications that need accurate dual gate driving such as synchronous rectifiers. The matched propagation delays also allow for paralleling the two channels when higher driving current is required, such as for paralleled switches. The input voltage thresholds are fixed, independent of supply voltage ($V_{DD}$) and are compatible with low voltage TTL and CMOS logic. Noise immunity is excellent due to the wide hysteresis window between the input low and high thresholds. The device has internal pull-up/pull-down resistors on the input pins to ensure low state on the driver output when the inputs are floating.

The SGM48524Q is a dual non-inverting driver. It has independent enable pins (ENA and ENB) for each channel with active-high logic that can be left open for normal operation because of internal pull-up to VDD.

The SGM48524Q is available in a Green SOIC-8 package. It operates over a temperature range of -40℃ to +125℃.

This device is AEC-Q100 qualified (Automotive Electronics Council (AEC) standard Q100 Grade 1) and it is suitable for automotive applications.

## FEATURES

- **AEC-Q100 Qualified for Automotive Applications**
  - **Device Temperature Grade 1**
  - **$T_A$ = -40℃ to +125℃**
- **Two Independent Gate Drive Channels**
- **4.5V to 18V Single Supply Range ($V_{DD}$)**
- **5A Peak Source/Sink Pulse Current Drive**
- **Independent Enable Pin for Each Channel**
- **TTL and CMOS Compatible Logic Threshold**
- **Logic Levels Independent of Supply Voltage**
- **Hysteretic Input Logic for High Noise Immunity**
- **Outputs are Logic Low when Inputs are Floating**
- **Negative Voltage Handling Capability:**
  - **-8V DC at Inputs**
  - **-2V, 200ns Pulse for Outputs (OUTx)**
- **Glitch-Free Operation at Power-Up and Power-Down: Outputs Pulled Low during Supply UVLO**
- **Fast Propagation Delays: 18ns (TYP)**
- **Fast Rise Time: 7ns (TYP)**
- **Fast Fall Time: 8ns (TYP)**
- **Delay Matching between Two Channels: 1ns (TYP)**
- **Channels can be Paralleled for Higher Drive Current**
- **Available in a Green SOIC-8 Package**

## APPLICATIONS

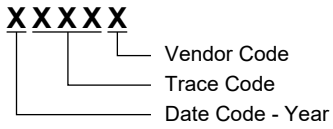
Power MOSFETs
IGBT Driving for Power Supplies
DC/DC Converters
Solar Power, Motor Drivers
Gate Drive for Emerging Wide Bandgap Devices

# PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE TOP MARKING | PACKING OPTION |
|---|---|---|---|---|---|
| SGM48524Q | SOIC-8 | -40℃ to +125℃ | SGM48524QS8G/TR | SGM<br>009S8<br>XXXXX | Tape and Reel, 4000 |

## MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace 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, $V_{DD}$ ..... -0.3V to 20V
INA, INB, ENA, ENB Voltage ..... -8V to 20V
OUTA, OUTB Voltage (DC) ..... -0.3V to $V_{DD}$ + 0.3V
OUTA, OUTB Voltage (Pulse < 200ns) ..... -2V to $V_{DD}$ + 0.3V
Maximum Output Pulsed Source/Sink Current (0.5μs), $I_{OUT_PULSED}$ ..... 5A
Package Thermal Resistance
SOIC-8, $\theta_{JA}$ ..... 120℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM ..... 4000V
CDM ..... 1000V

## RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range ..... 4.5V to 18V
Input Voltage, INA, INB ..... -2V to 18V
Enable Voltage, ENA and ENB ..... -2V to 18V
Operating Ambient Temperature Range ..... -40℃ to +125℃

## 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.

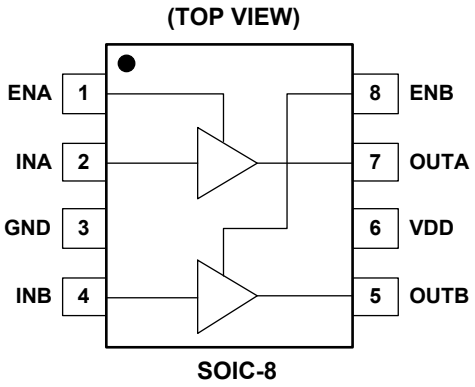
## ESD SENSITIVITY CAUTION

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



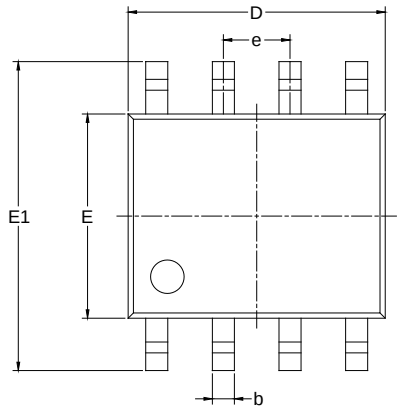

## PIN DESCRIPTION

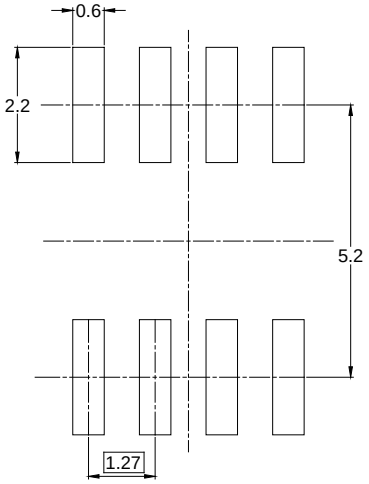
| PIN | NAME | I/O | FUNCTION |
|---|---|---|---|
| 1 | ENA | I | Channel A Enable Input. Pull ENA high or leave it floating to enable OUTA output. Pull ENA low to disable OUTA output, ignoring INA state. |
| 2 | INA | I | Channel A Non-Inverting Input. OUTA is logic low if INA is unbiased or left floating. |
| 3 | GND | — | Ground. Reference pin for all signals. |
| 4 | INB | I | Channel B Non-Inverting Input. OUTB is logic low if INB is unbiased or left floating. |
| 5 | OUTB | O | Channel B Output. |
| 6 | VDD | I | Power Supply Input. |
| 7 | OUTA | O | Channel A Output. |
| 8 | ENB | I | Channel B Enable Input. Pull ENB high or leave it floating to enable OUTB output. Pull ENB low to disable OUTB output, ignoring INB state. |

NOTE: I: Input; O: Output.

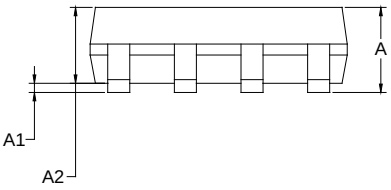
# PACKAGE OUTLINE DIMENSIONS

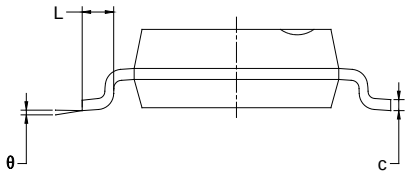
## SOIC-8




**RECOMMENDED LAND PATTERN** (Unit: mm)



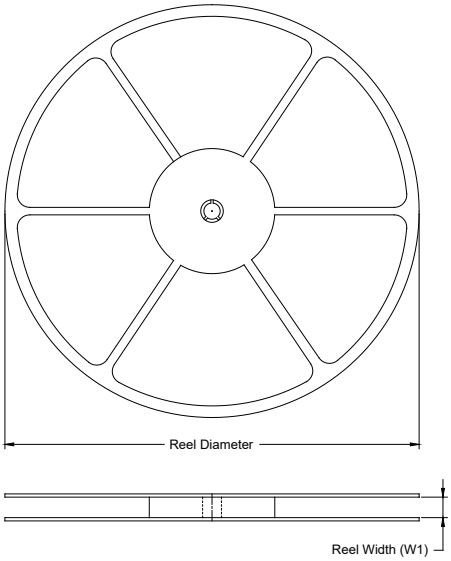




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| 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° |

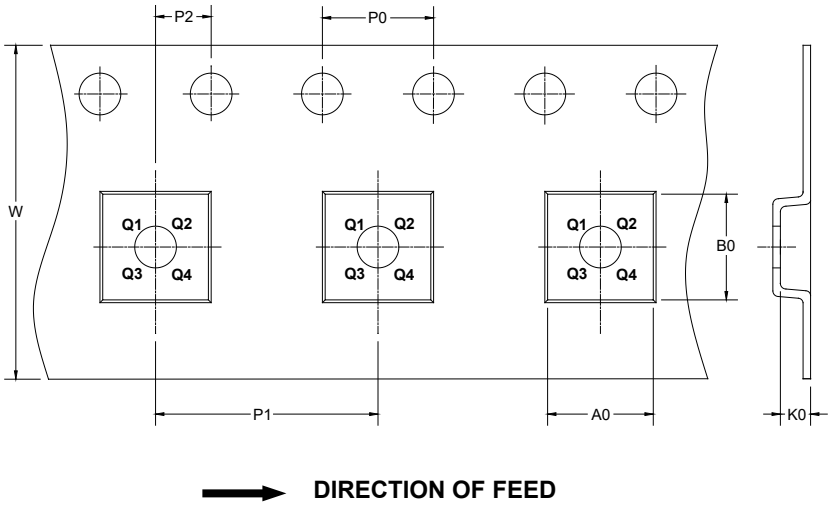
NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

# TAPE AND REEL INFORMATION

### REEL DIMENSIONS




### TAPE DIMENSIONS



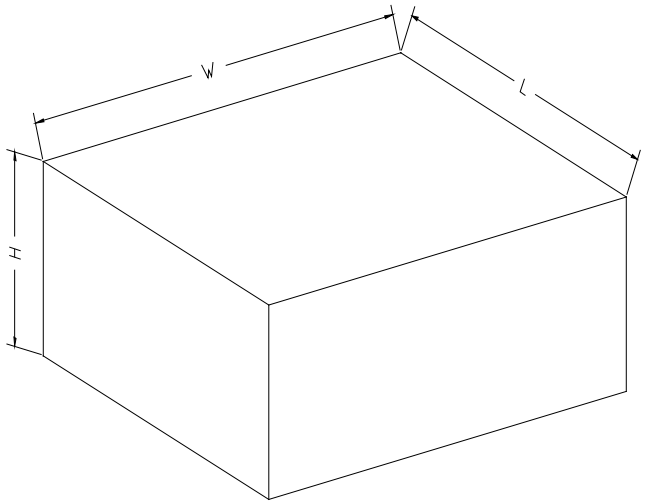

NOTE: The picture is only for reference. Please make the object as the standard.

## 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 | 6.40 | 5.40 | 2.10 | 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