

### GENERAL DESCRIPTION

The high-speed, single-channel low-side driver SGM48521 is designed to drive GaN FETs and logic level MOSFETs. Application areas include LiDAR, time of flight, facial recognition, and power converters using low-side drivers. The SGM48521 provides 7A source and 6A sink output current capability. Split output configuration allows individual turn-on and turn-off time optimization depending on FET. Package and pinout with minimum parasitic inductances reduce the rise and fall time and limit the ringing. Additionally, the 2.2ns propagation delay with minimized tolerances and variations allows efficient operation at high frequencies.

The driver has internal under-voltage lockout and over-temperature protection against overload and fault events.

The SGM48521 is available in Green WLCSP-0.88×1.28-6B and TDFN-2×2-6AL packages.

### FEATURES

- **5V Supply Voltage**
- **7A Peak Source and 6A Peak Sink Currents**
- **Ultra-Fast, Low-side Gate Driver for GaN and Si FETs**
- **Minimum Input Pulse Width: 1ns**
- **Up to 60MHz Operation**
- **Propagation Delay: 2.2ns (TYP), 3.6ns (MAX)**
- **Rise Time:**
  - ♦ **WLCSP-0.88×1.28-6B: 640ps (TYP)**
  - ♦ **TDFN-2×2-6AL: 620ps (TYP)**
- **Fall Time:**
  - ♦ **WLCSP-0.88×1.28-6B: 560ps (TYP)**
  - ♦ **TDFN-2×2-6AL: 610ps (TYP)**
- **Protection Features:**
  - ♦ **Under-Voltage Lockout (UVLO)**
  - ♦ **Over-Temperature Protection (OTP)**
- **Available in Green WLCSP-0.88×1.28-6B and TDFN-2×2-6AL Packages**

### APPLICATIONS

- Laser Distance Measuring System
- 5G RF Communication System
- Wireless Charging System
- GaN DC/DC Conversion System

### TYPICAL APPLICATION

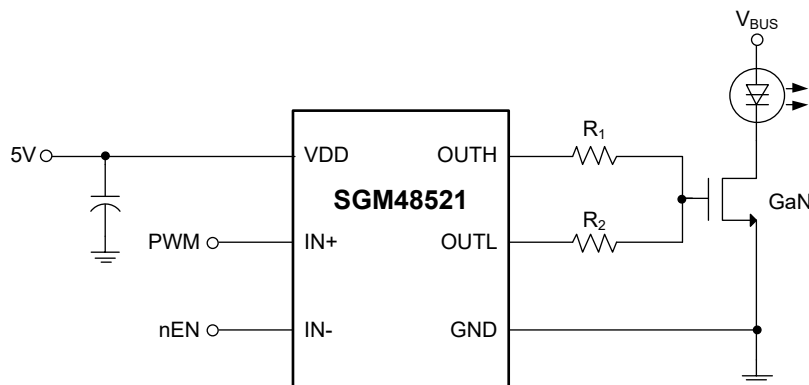


Figure 1. Typical Application Circuit

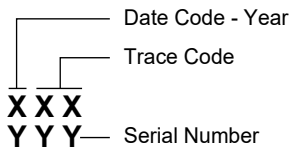
**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM48521	WLCSP-0.88×1.28-6B	-40°C to +125°C	SGM48521XG/TR	XXX 063	Tape and Reel, 3000
	TDFN-2×2-6AL	-40°C to +125°C	SGM48521XTDI6G/TR	062 XXXX	Tape and Reel, 3000

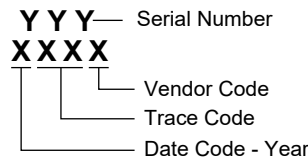
**MARKING INFORMATION**

NOTE: XXX = Date Code and Trace Code. XXXX = Date Code, Trace Code and Vendor Code.

**WLCSP-0.88×1.28-6B**



**TDFN-2×2-6AL**



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,  $V_{DD}$ .....6V
- IN+, IN- Pin Voltage,  $V_{INx}$ ..... -0.3V to 6V
- OUTH Pin Voltage,  $V_{OUTH}$ .....-0.3V to  $V_{DD} + 0.3V$
- OUTL Pin Voltage,  $V_{OUTL}$ ..... -0.3V to 6V
- Package Thermal Resistance
- WLCSP-0.88×1.28-6B,  $\theta_{JA}$  ..... 133°C/W
- TDFN-2×2-6AL,  $\theta_{JA}$ ..... 63°C/W
- Junction Temperature.....+150°C
- Storage Temperature Range.....-65°C to +150°C
- Lead Temperature (Soldering, 10s).....+260°C
- ESD Susceptibility
- HBM.....4000V
- CDM ..... 1500V

**RECOMMENDED OPERATING CONDITIONS**

- Supply Voltage,  $V_{DD}$ .....4.5V to 5.5V
- IN+, IN- Pin Voltage,  $V_{INx}$ .....0V to 5.5V
- Operating Junction Temperature Range.....-40°C to +125°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.

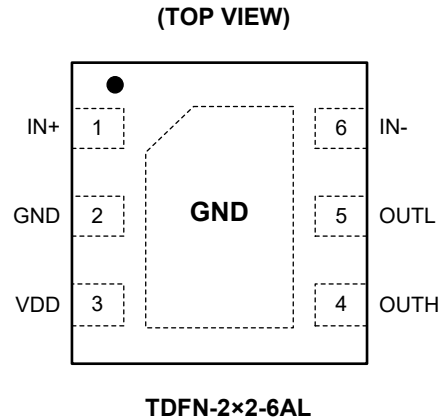
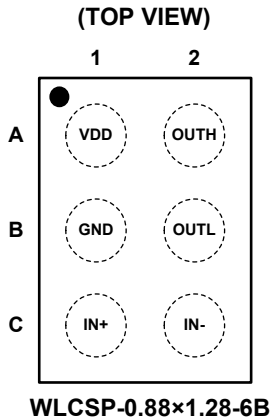
**ESD SENSITIVITY CAUTION**

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 CONFIGURATIONS



PIN DESCRIPTION

PIN		NAME	I/O	FUNCTION
WLCSP-0.88x1.28-6B	TDFN-2x2-6AL			
A1	3	VDD	I	Input Voltage Supply. Bypass to GND with a low inductance ceramic capacitor.
A2	4	OUTH	O	Pull-Up Gate Drive Output. Connect it to the gate of the target transistor with an optional resistor.
B1	2	GND	—	Ground.
B2	5	OUTL	O	Pull-Down Gate Drive Output. Connect it to the gate of the target transistor with an optional resistor.
C1	1	IN+	I	Non-Inverting Logic Input.
C2	6	IN-	I	Inverting Logic Input.
—	Exposed Pad	GND	—	Exposed Pad. It is internally connected to GND through substrate. Connect this pad to large copper area, generally a ground plane.

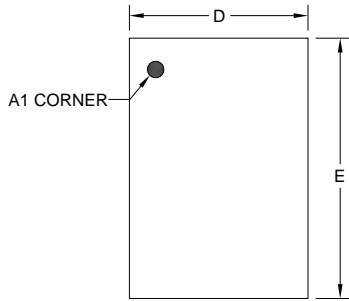
NOTE: I: input, O: output.

FUNCTION TABLE

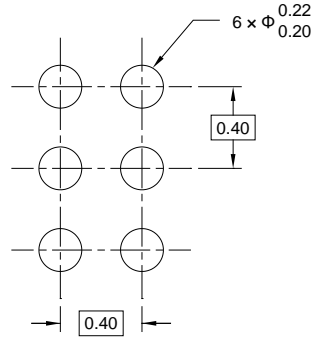
IN- Pin	IN+ Pin	OUTH Pin	OUTL Pin
L	L	Open	L
L	H	H	Open
H	L	Open	L
H	H	Open	L

PACKAGE OUTLINE DIMENSIONS

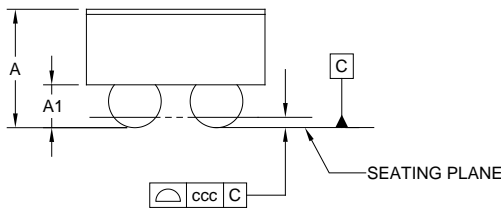
WLCSP-0.88x1.28-6B



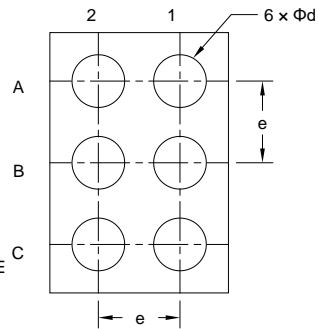
TOP VIEW



RECOMMENDED LAND PATTERN (Unit: mm)



SIDE VIEW



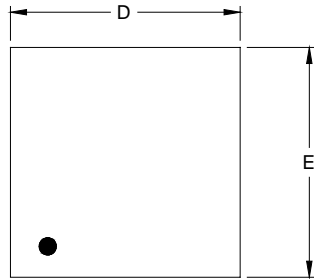
BOTTOM VIEW

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.535	0.580	0.625
A1	0.190	0.210	0.230
D	0.845	0.875	0.905
E	1.245	1.275	1.305
d	0.238	0.258	0.278
e	0.400 BSC		
ccc	0.050		

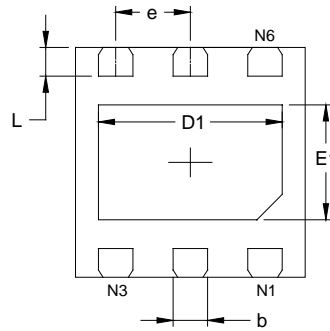
NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

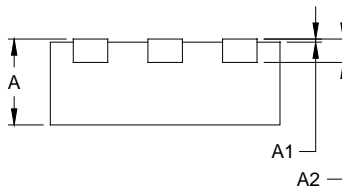
TDFN-2x2-6AL



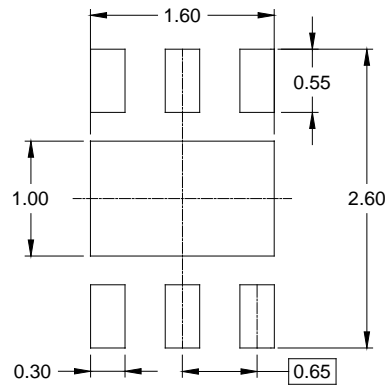
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

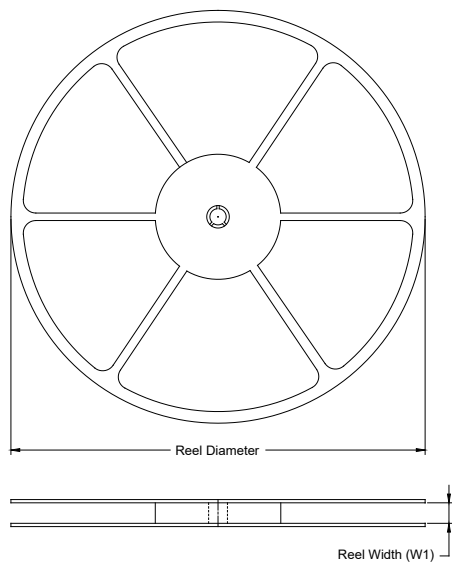
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.500	1.700	0.059	0.067
E	1.900	2.100	0.075	0.083
E1	0.900	1.100	0.035	0.043
b	0.250	0.350	0.010	0.014
e	0.650 BSC		0.026 BSC	
L	0.174	0.326	0.007	0.013

NOTE: This drawing is subject to change without notice.

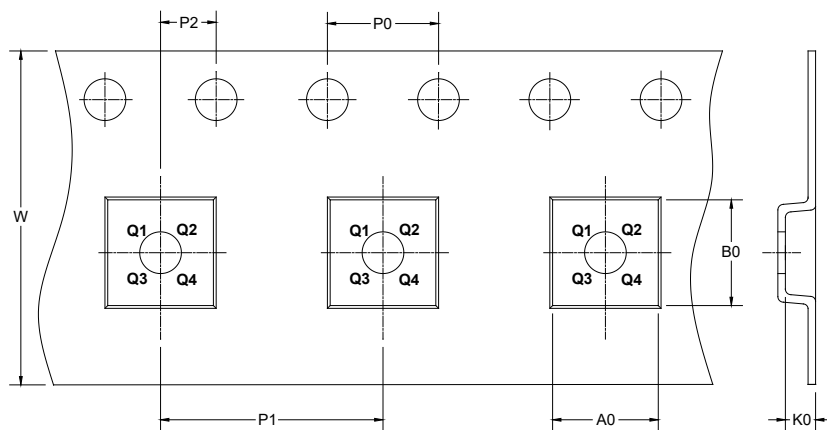
# PACKAGE INFORMATION

## TAPE AND REEL INFORMATION

### REEL DIMENSIONS



### TAPE DIMENSIONS



➔ DIRECTION OF FEED

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

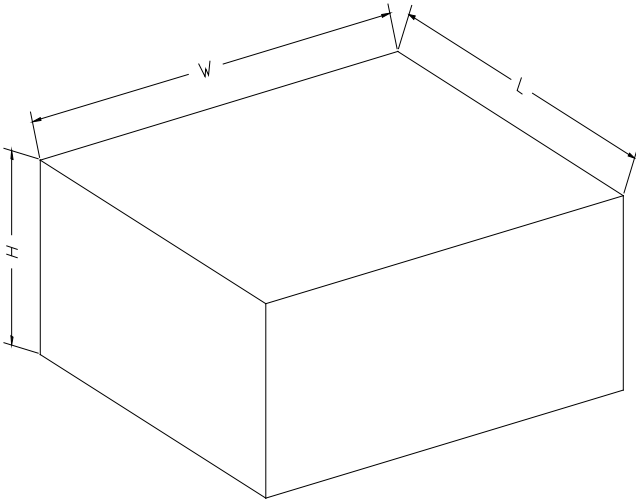
### KEY PARAMETER LIST OF TAPE AND REEL

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-0.88×1.28-6B	7"	9.5	0.99	1.38	0.69	4.0	4.0	2.0	8.0	Q1
TDFN-2×2-6AL	7"	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q2

D00001

# 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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