

### GENERAL DESCRIPTION

The SGM42540A is an integrated driver IC for driving one brushed DC motor in industrial applications. The device operates from a single power supply and supports a wide input supply range from 8V to 50V.

The PHASE and ENBL pins allow simple interfacing to controller circuits. The device has one H-bridge driver for driving a DC motor.

With proper heatsinking, the SGM42540A can deliver up to 5A peak or 3.5A continuous output current (at  $V_M = 24V$  and  $T_J = +25^\circ C$ ). Five input pins (ISET0 - ISET4) are used for 32 current levels. The decay mode can be selected by DECAY pin.

A number of protection features are provided in the device including over-current, short-circuit, under-voltage lockout and thermal shutdown.

The SGM42540A is available in a Green TSSOP-28 (Exposed Pad) package.

### FEATURES

- **Motor Supply Voltage Range: 8V to 50V**
- **Single H-Bridge Motor Driver**
- **5-Bit Current Control Supports up to 32 Current Levels**
- **5A Peak Output Current at  $V_M = 24V$ ,  $T_J = +25^\circ C$**
- **Built-in 3.3V Internal Reference**
- **Full Set of Protections**
  - ◆ **Over-Current Protection (OCP)**
  - ◆ **Under-Voltage Lockout (UVLO)**
  - ◆ **Thermal Shutdown (TSD)**
  - ◆ **Active-Low Fault Indication Pin (nFAULT)**
- **Available in a Green TSSOP-28 (Exposed Pad) Package**

### APPLICATIONS

Massage Chair  
Robotics  
Electric Curtains  
Gaming Machines  
Factory Automation  
Office Automation Machines

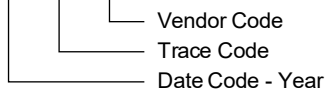
**PACKAGE/ORDERING INFORMATION**

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM42540A	TSSOP-28 (Exposed Pad)	-40°C to +125°C	SGM42540AXPTS28G/TR	SGM42540A XPTS28 XXXXX	Tape and Reel, 4000

**MARKING INFORMATION**

NOTE: XXXXX = Date Code, Trace 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.

**ABSOLUTE MAXIMUM RATINGS**

- Power Supply Voltage Range,  $V_M$ ..... -0.3V to 60V
- Digital Pins Voltage Range ..... -0.5V to 6V
- VREF Input Voltage Range,  $V_{REF}$  ..... -0.3V to 5.5V
- ISEN Pin Voltage Range <sup>(1)</sup> ..... -0.5V to 0.7V
- Package Thermal Resistance
- TSSOP-28 (Exposed Pad),  $\theta_{JA}$  ..... 26.4°C/W
- TSSOP-28 (Exposed Pad),  $\theta_{JB}$  ..... 7.2°C/W
- TSSOP-28 (Exposed Pad),  $\theta_{JC(TOP)}$  ..... 15.2°C/W
- TSSOP-28 (Exposed Pad),  $\theta_{JC(BOT)}$  ..... 1°C/W
- Junction Temperature ..... +150°C
- Storage Temperature Range..... -65°C to +150°C
- Lead Temperature (Soldering, 10s) ..... +260°C
- ESD Susceptibility <sup>(2) (3)</sup>
- HBM..... ±4000V
- CDM ..... ±1000V

**RECOMMENDED OPERATING CONDITIONS**

- Power Supply Voltage Range,  $V_M$ ..... 8V to 50V
- VREF Input Voltage Range <sup>(4)</sup>,  $V_{REF}$  ..... 1V to 3.5V
- V3P3 Load Current,  $I_{V3P3}$  ..... 0mA to 10mA
- Externally Applied PWM Frequency,  $f_{PWM}$ ..... 0kHz to 100kHz
- Operating Junction Temperature Range ..... -40°C to +125°C

NOTES:

1. Transients of ±1V for less than 25ns are acceptable.
2. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
3. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.
4. Operational at  $V_{REF}$  from 0V to 1V, but accuracy is degraded.

**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.

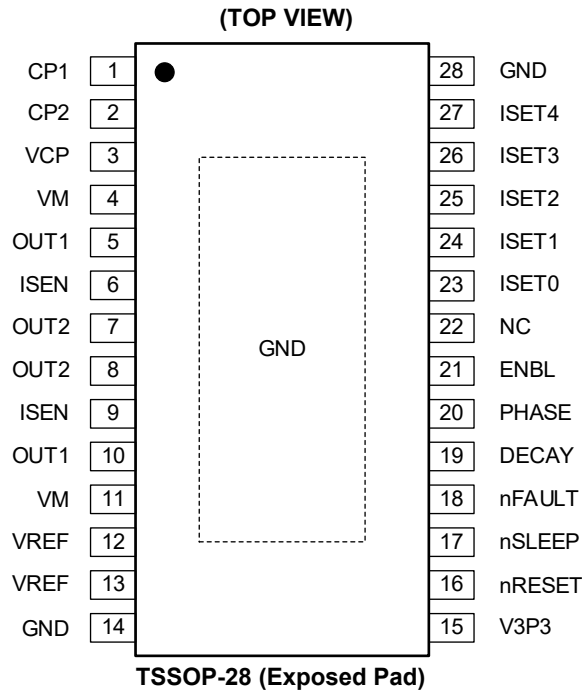
**ESD SENSITIVITY CAUTION**

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



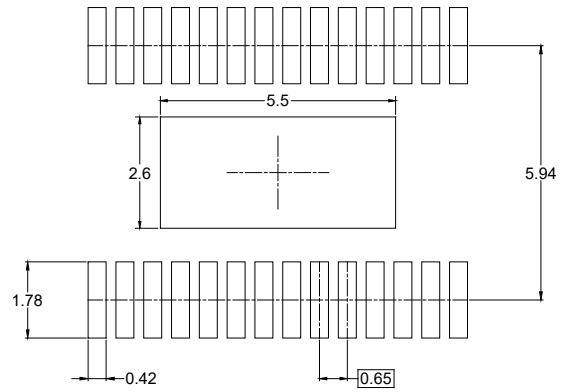
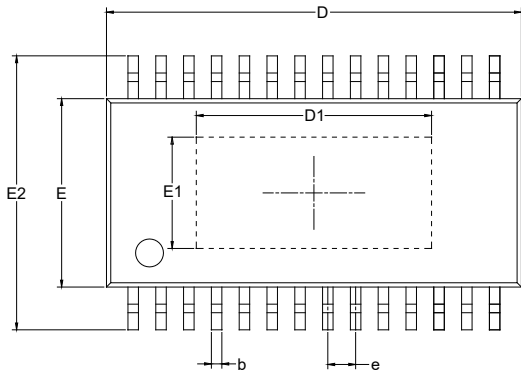
PIN DESCRIPTION

PIN	NAME	TYPE	FUNCTION
1	CP1	I/O	Charge Pump Flying Capacitor Connection Pins. A 0.01μF/50V capacitor is used between CP1 and CP2 pins.
2	CP2	I/O	
3	VCP	I/O	High-side Gate Drive Voltage. Connect a 0.1μF/16V ceramic capacitor and a parallel 1MΩ resistor between this pin and VM.
4, 11	VM	-	H-Bridge Power Supply. Connect these pins to the same motor supply (8V to 50V).
14, 28	GND	-	Device ground.
15	V3P3	O	3.3V Regulator Output. A 0.47μF/6.3V ceramic capacitor is used between V3P3 and GND pins. This source can be used to supply VREF reference input.
12, 13	VREF	I	Current Set Reference Voltage Input. Apply the reference voltage to set the winding current value. These pins should be tied together on the PCB.
16	nRESET	I	Active-Low Reset Input. Active-low reset with weak internal pull-down to initialize logic and disable H-bridge outputs.
17	nSLEEP	I	Active-Low Sleep Mode Input. Active-low logic input with weak internal pull-down. Apply high to enable device, and low to enter into the low-power sleep mode.
19	DECAY	I	Decay (Brake) Mode Selection Input. Low = slow decay (brake), high = fast decay (coast). Internal pull-down and pull-up.
20	PHASE	I	H-Bridge Phase (Direction) Input. Logic high for sourcing from OUT1 and sinking into OUT2. Internal pull-down.
21	ENBL	I	Enable Input for H-Bridge. Logic high on this pin enables H-bridge. Internal pull-down.
23 ~ 27	ISET0 ~ ISET4	I	Current Set Inputs. Set winding current as a percentage of full-scale. Internal pull-down.
18	nFAULT	OD	Active-Low Fault Flag. Logic low when in fault conditions (over-temperature, over-current).
5, 10	OUT1	O	H-Bridge Output 1. Connect to motor winding. These pins should be tied together on the PCB.
6, 9	ISEN	I/O	H-Bridge I <sub>SENSE</sub> (GND). Connect through a current sense resistor to GND. These pins should be tied together on the PCB.
7, 8	OUT2	O	H-Bridge Output 2. Connect to motor winding. These pins should be tied together on the PCB.
Exposed Pad	GND	-	Ground.

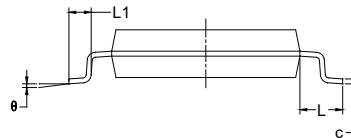
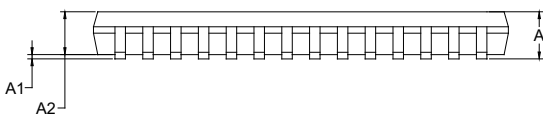
NOTE: I = input, O = output, OD = open-drain output, I/O = input/output.

PACKAGE OUTLINE DIMENSIONS

TSSOP-28 (Exposed Pad)



RECOMMENDED LAND PATTERN (Unit: mm)



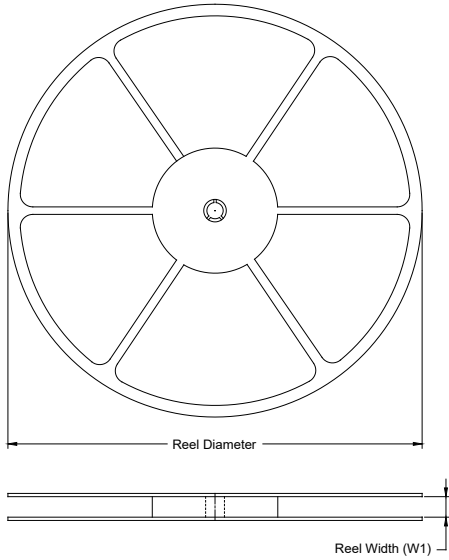
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	9.600	9.800	0.378	0.386
D1	5.300	5.700	0.209	0.224
E	4.300	4.500	0.169	0.177
E1	2.400	2.800	0.094	0.110
E2	6.200	6.600	0.244	0.260
e	0.650 BSC		0.026 BSC	
L	1.000 BSC		0.039 BSC	
L1	0.450	0.750	0.018	0.030
$\theta$	0°	8°	0°	8°

NOTES:

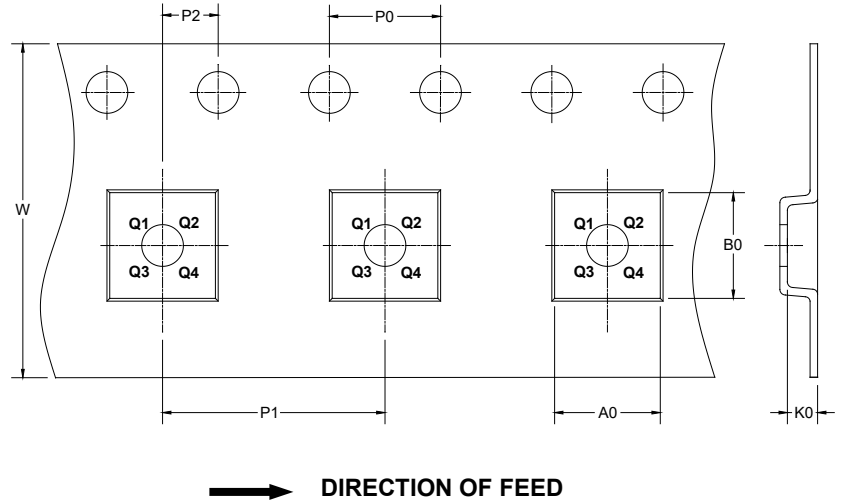
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.
3. Reference JEDEC MO-153.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

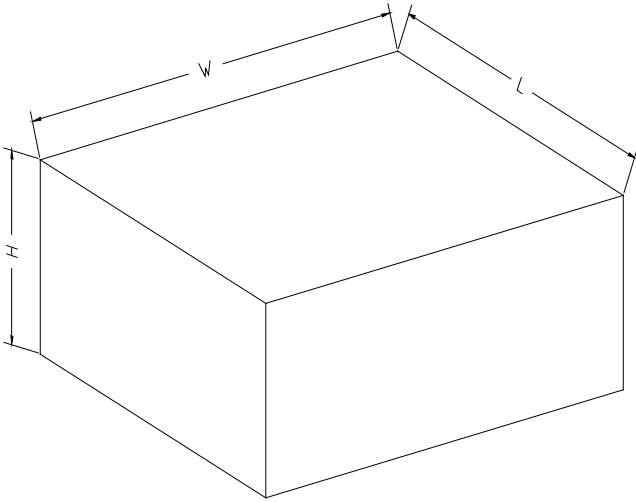
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TSSOP-28 (Exposed Pad)	13"	16.4	6.80	10.25	1.60	4.0	8.0	2.0	16.0	Q1

DD0001

# 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

DD0002