

GENERAL DESCRIPTION

The SGM42406 consists of 8 identical low-side drivers with series protection functions. The device integrates diodes for inductive load demagnetizing, and can drive different kinds of loads. For example, brushed motor, relays, LEDs, unipolar stepper motor and so on.

The SGM42406 can provide continuous output current up to 930mA (1-channel on) or 310mA/channel (8-channel on) by TSSOP-16 package at +25°C. And it can provide continuous output current up to 1000mA (1-channel on) or 510mA/channel (8-channel on) by TSSOP-16 (Exposed Pad) package at +25°C. The SGM42406 provides a serial interface, which can read/write the data register/control register (configuring the energizing time & PWM duty cycle) through the serial interface, and also can diagnose the open-load or over-current fault condition. Multiple devices can be daisy-chain connected together to save the microcontroller resource.

The device has multiple protection functions, including open-load detection, over-temperature shutdown, over-current and short-circuit protections. Fault conditions are indicated on the nFAULT pin.

The SGM42406 is available in Green TSSOP-16 and TSSOP-16 (Exposed Pad) packages.

SIMPLIFIED SCHEMATIC

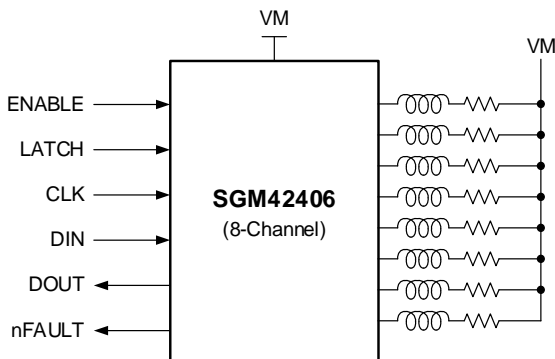


Figure 1. Simplified Schematic

FEATURES

- Power Supply Voltage Range: 8V to 38V
- 8-Channel Serial Interface Low-side Driver
- Each Channel with Independent Over-Current Protection and Open-Load Detection
- Integrated Diode for Inductive Load
- Configurable PWM Chopping Duty Cycle
- Configurable Energizing Time
- Output Current Capability at $T_J = +25^\circ\text{C}$:
 - TSSOP-16 Package:
 - ◆ 930mA (1-Channel On)
 - ◆ 310mA (8-Channel On)
 - TSSOP-16 (Exposed Pad) Package:
 - ◆ 1000mA (1-Channel On)
 - ◆ 510mA (8-Channel On)
 - ◆ Can be Paralleled for Higher Current Capability
- Enable Control:
 - ◆ SGM42406A: Active-High
 - ◆ SGM42406B: Active-Low
- Noise Filter for Serial Interface
- Data Output can be Read Back for Reliable Verification
- Protection and Features:
 - ◆ Under-Voltage Lockout (UVLO)
 - ◆ Open-Load Detection (OL)
 - ◆ Over-Temperature Shutdown (OTS)
 - ◆ Over-Current Protection (OCP)
 - ◆ Individual Channel Status Report
 - ◆ Active-Low Fault Indication Pin
- Available in Green TSSOP-16 and TSSOP-16 (Exposed Pad) Packages

APPLICATIONS

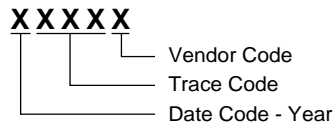
Home Appliances

PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|----------------------------|---------------------------|-----------------------------|---------------------|---------------------------|---------------------|
| SGM42406A (Active-High) | TSSOP-16 | -40°C to +85°C | SGM42406AYTS16G/TR | SGMMCV YTS16 XXXXX | Tape and Reel, 4000 |
| | TSSOP-16 (Exposed Pad) | -40°C to +85°C | SGM42406AYPTS16G/TR | SGMMCW YPTS16 XXXXX | Tape and Reel, 4000 |
| SGM42406B (Active-Low) | TSSOP-16 | -40°C to +85°C | SGM42406BYTS16G/TR | SGMMCX YTS16 XXXXX | Tape and Reel, 4000 |
| | TSSOP-16 (Exposed Pad) | -40°C to +85°C | SGM42406BYPTS16G/TR | SGMMCX YPTS16 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

- Power Supply Voltage Range, V_M -0.3V to 40V
- Digital Input Current Range, ENABLE/nENABLE, LATCH, CLK, DIN..... 0mA to 20mA
- Digital Output Voltage Range, DOUT, nFAULT -0.5V to 7V
- Output Voltage Range, OUTx -0.3V to 40V
- Output Current Range, OUTx Internally limited
- Package Thermal Resistance
 - TSSOP-16, θ_{JA} 98.3°C/W
 - TSSOP-16 (Exposed Pad), θ_{JA} 36.4°C/W
 - TSSOP-16, θ_{JC} 32.6°C/W
 - TSSOP-16 (Exposed Pad), $\theta_{JC(TOP)}$ 37.3°C/W
 - TSSOP-16 (Exposed Pad), $\theta_{JC(BOT)}$ 3.3°C/W
- Package Thermal Characterization Parameter
 - TSSOP-16, ψ_{JT} 5.9°C/W
 - TSSOP-16 (Exposed Pad), ψ_{JT} 1.8°C/W
- Junction Temperature +150°C
- Storage Temperature Range..... -65°C to +150°C
- Lead Temperature (Soldering, 10s) +260°C
- ESD Susceptibility
 - HBM..... 2000V
 - CDM 2000V

- Low-side Driver Current Capability, I_{OUT}
 - TSSOP-16 930mA
 - TSSOP-16 (Exposed Pad)..... 1000mA
- Operating Ambient 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.

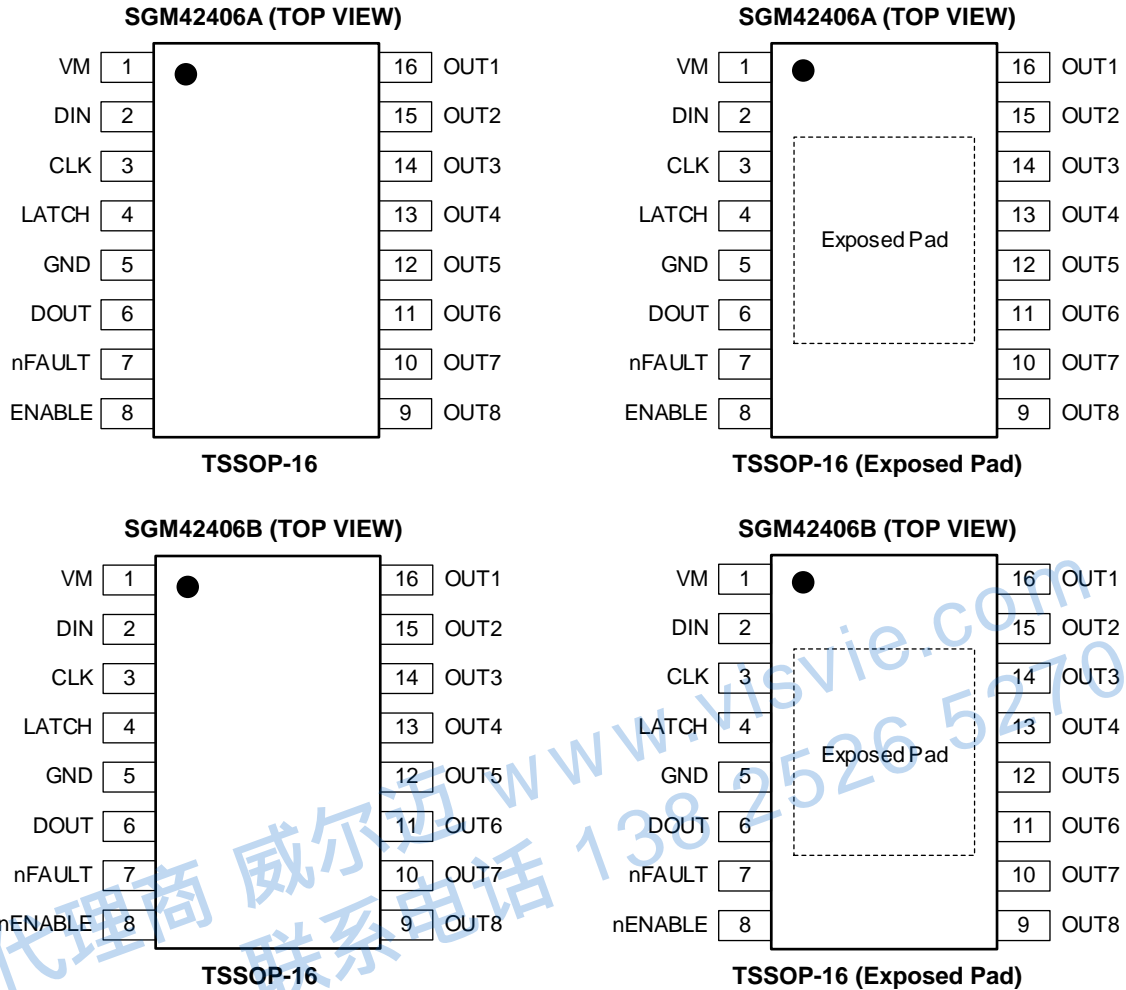
RECOMMENDED OPERATING CONDITIONS

- Power Supply Voltage Range, V_M 8V to 38V

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATIONS



PIN DESCRIPTION

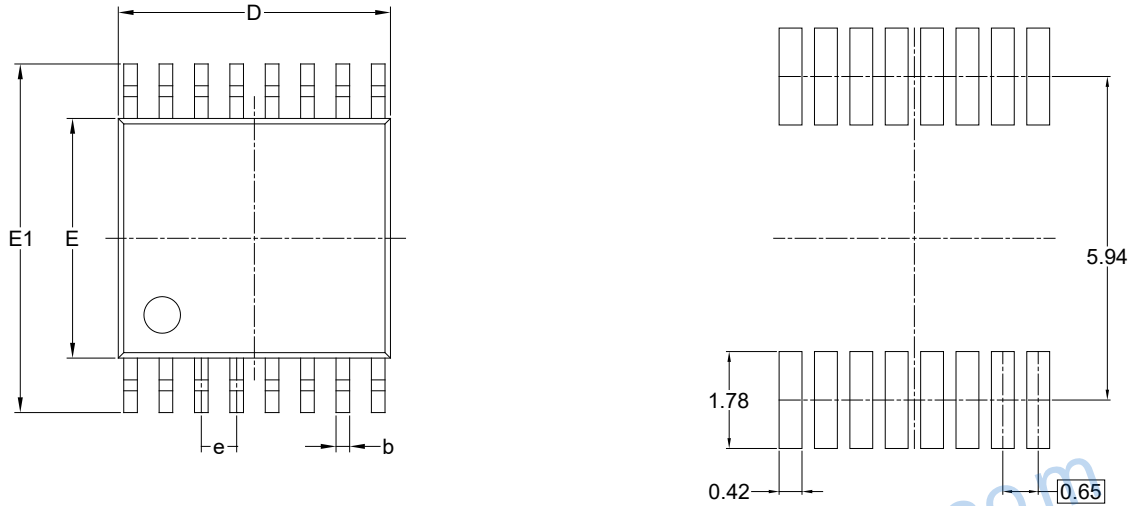
| PIN | NAME | FUNCTION |
|-------------|-----------------------|---|
| 1 | VM ⁽¹⁾ | Power Supply. Connect a 0.1μF bypass capacitor and a 10μF ceramic capacitor between VM and GND pins. |
| 2 | DIN | Data Input Signal. Internal pull-down. |
| 3 | CLK | Clock Input Signal. Data is clocked into the device when CLK rising edge, and data is clocked out when CLK falling edge. |
| 4 | LATCH | Serial Latch Signal. Internal pull-down. |
| 5 | GND | Ground. |
| 6 | DOUT | Serial Data Output Signal. Output open-drain, pull-up internally. |
| 7 | nFAULT ⁽²⁾ | Active-Low Fault Flag. Go low when a fault occurs (over-temperature, over-current or open-load). Output open-drain, external pull-up is required. |
| 8 | ENABLE | Enable Input. Active-high for SGM42406A (ENABLE). |
| | nENABLE | Enable Input. Active-low for SGM42406B (nENABLE). |
| 9 ~ 16 | OUT8 ~ OUT1 | Low-side Outputs. |
| Exposed Pad | - | TSSOP-16 (Exposed Pad) Package Only. Connect to ground. |

NOTES:

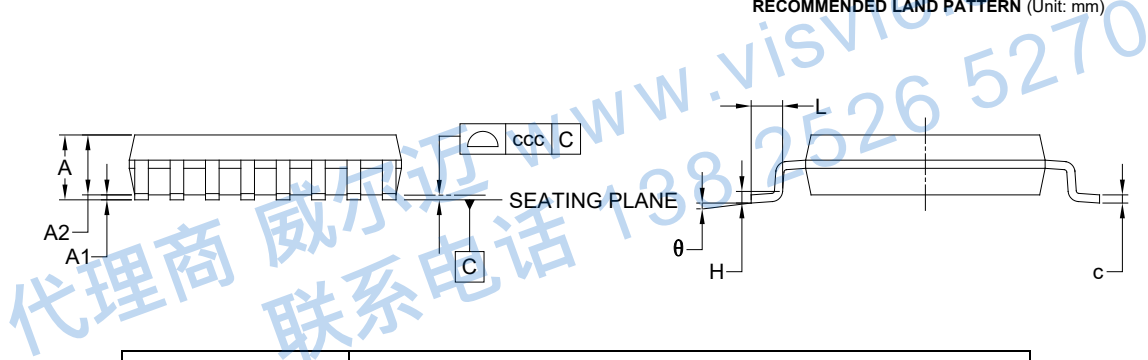
1. A 0.1μF ceramic capacitor and a 10μF electrolytic capacitor are rated for VM.
2. It is recommended to use $R_{nFAULT} (> 4.7k\Omega)$ between V3P3 and nFAULT. V3P3 is not a device pin, but an external V3P3 pull-up is required for nFAULT (open-drain output).

PACKAGE OUTLINE DIMENSIONS

TSSOP-16



RECOMMENDED LAND PATTERN (Unit: mm)



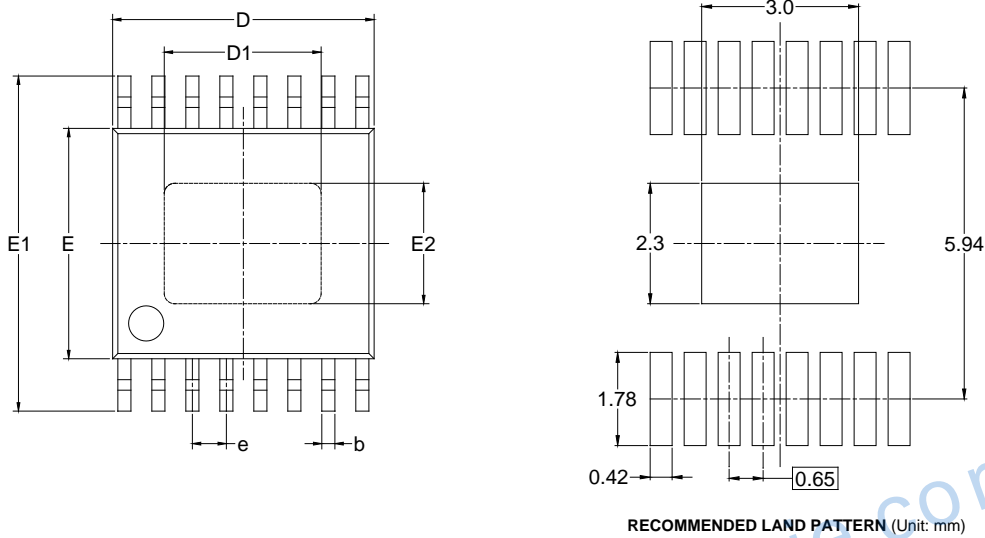
| Symbol | Dimensions In Millimeters | | |
|--------|---------------------------|-----|-------|
| | MIN | MOD | MAX |
| A | - | - | 1.200 |
| A1 | 0.050 | - | 0.150 |
| A2 | 0.800 | - | 1.050 |
| b | 0.190 | - | 0.300 |
| c | 0.090 | - | 0.200 |
| D | 4.860 | - | 5.100 |
| E | 4.300 | - | 4.500 |
| E1 | 6.200 | - | 6.600 |
| e | 0.650 BSC | | |
| L | 0.450 | - | 0.750 |
| H | 0.250 TYP | | |
| θ | 0° | - | 8° |
| ccc | 0.100 | | |

NOTES:

1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-153.

PACKAGE OUTLINE DIMENSIONS

TSSOP-16 (Exposed Pad)



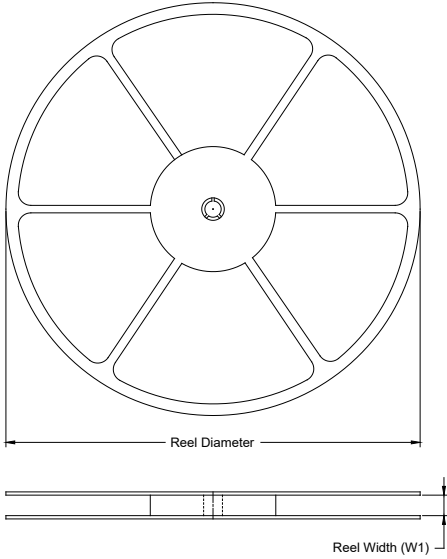
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 联系电话 138 2526 5270
 www.visvie.com

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | | 1.100 | | 0.043 |
| A1 | 0.050 | 0.150 | 0.002 | 0.006 |
| A2 | 0.800 | 1.000 | 0.031 | 0.039 |
| b | 0.190 | 0.300 | 0.007 | 0.012 |
| c | 0.090 | 0.200 | 0.004 | 0.008 |
| D | 4.900 | 5.100 | 0.193 | 0.201 |
| D1 | 2.900 | 3.100 | 0.114 | 0.122 |
| E | 4.300 | 4.500 | 0.169 | 0.177 |
| E1 | 6.250 | 6.550 | 0.246 | 0.258 |
| E2 | 2.200 | 2.400 | 0.087 | 0.094 |
| e | 0.650 BSC | | 0.026 BSC | |
| L | 0.500 | 0.700 | 0.02 | 0.028 |
| H | 0.25 TYP | | 0.01 TYP | |
| θ | 1° | 7° | 1° | 7° |

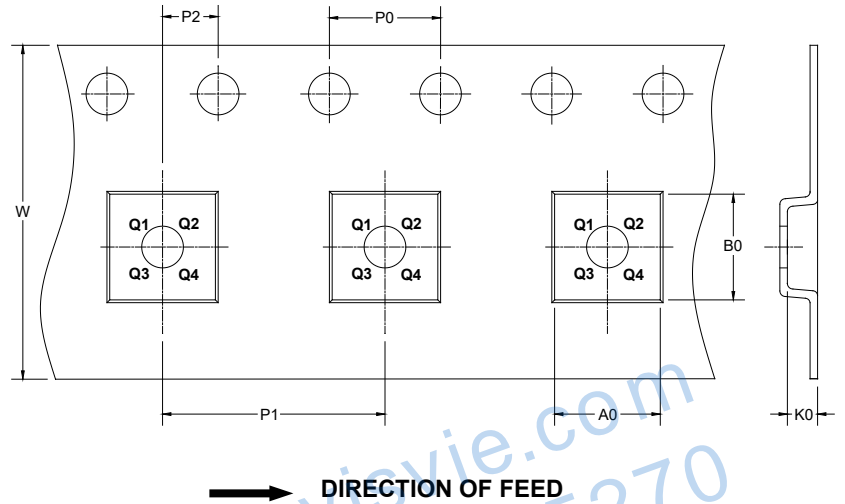
NOTES:
 1. Body dimensions do not include mode flash or protrusion.
 2. This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

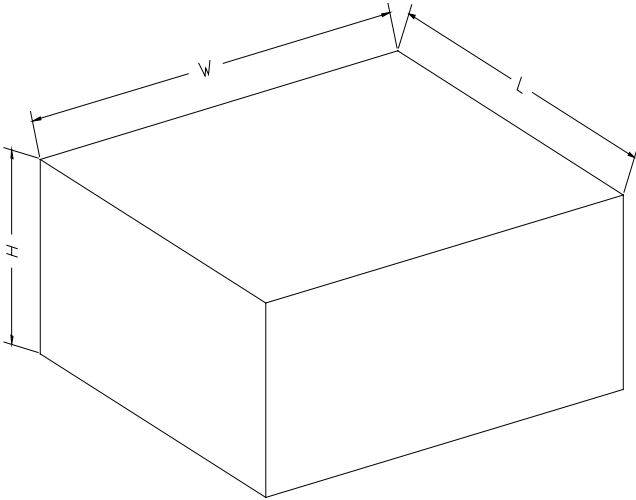
KEY PARAMETER LIST OF TAPE AND REEL

| Package Type | Reel Diameter | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|------------------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| TSSOP-16 | 13" | 12.4 | 6.80 | 5.40 | 1.50 | 4.0 | 8.0 | 2.0 | 12.0 | Q1 |
| TSSOP-16 (Exposed Pad) | 13" | 12.4 | 6.80 | 5.40 | 1.50 | 4.0 | 8.0 | 2.0 | 12.0 | 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

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