

characteristic

- GP8413 pass I2C Interface, linear conversion 0-5V/0-10V Two analog voltage outputs.
- one I2C Interface support 8 road GP8413 Parallel connection, through three-bit hardware address A2/A1/A0 choose.
- $V_{OUT} = 5V * DATA / 0x7FFF$ or $V_{OUT} = 10V * DATA / 0x7FFF$
- Input signal range 15Bit, 0x0000-0x7FFF
- enter I2C Signal high level: 2.7V-5.5V
- Output voltage error: <0.2%
- Output voltage linearity error: 0.01%
- Output short-circuit protection: when the output pin is short-circuited to ground, the chip enters protection mode and stops outputting.
- Supply voltage: 9V-36V
- Power consumption: <5mA
- Start Time: 2ms
- Operating temperature: -40°C to 85°C

describe

GP8413 is a I2C Signal to analog signal converter, i.e. DAC, this chip can 15Bit Digital quantity 0x0000-0x7FFF Linear conversion into two independent 0-5V/0-10V Analog voltage, the output voltage error is 0.2%, the linearity can reach 0.01%.

application

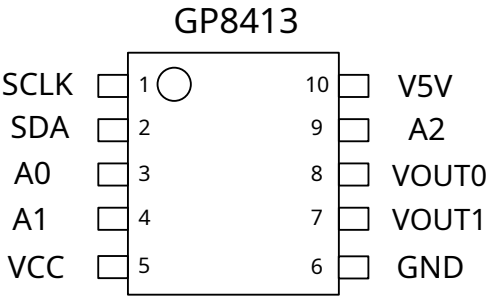
- General signal conversion
- Motor speed control, led Dimming
- Inverter, power supply
- Industrial analog signal isolation



1.Pin Definition

Pin Name	Pin Function
SCLK	I2CProtocol clock signal
SDA	I2CProtocol data signal
VCC	power supply
GND	land
V5V	internalLDO,5VOutput, must be connected externally1uFcapacitance.
A0	No.0Bit hardware address
A1	No.1Bit hardware address
A2	No.2Bit hardware address
VOUT0	The first analog voltage output must be connected to an external0.1uFcapacitance
VOUT1	The second analog voltage output must be connected to an external0.1uFcapacitance

surface-APin Distribution



2.Maximum Ratings

Industrial operating temperature	- 40°Cto 85°C
Storage temperature	- 50°Cto 125°C
Input voltage	- 0.3 V to VCC + 0.3 V
Maximum voltage	36 V
ESDProtect	> 2000 V

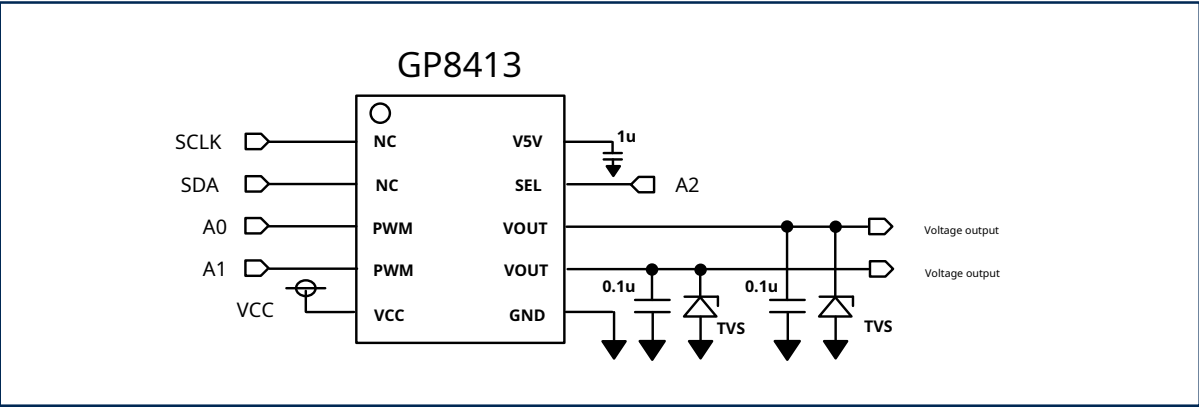
* Stresses above those listed under "Maximum Ratings" may cause permanent damage to the device. Device operation beyond those conditions listed in the specifications is not guaranteed. Exposure to extreme conditions for extended periods may affect device reliability or functionality.



3. Typical Applications

3.1 Basic functions (typical circuit)

When the chip is used in the circuit on the board, the capacitance and TVS stabilize and protect the circuit.

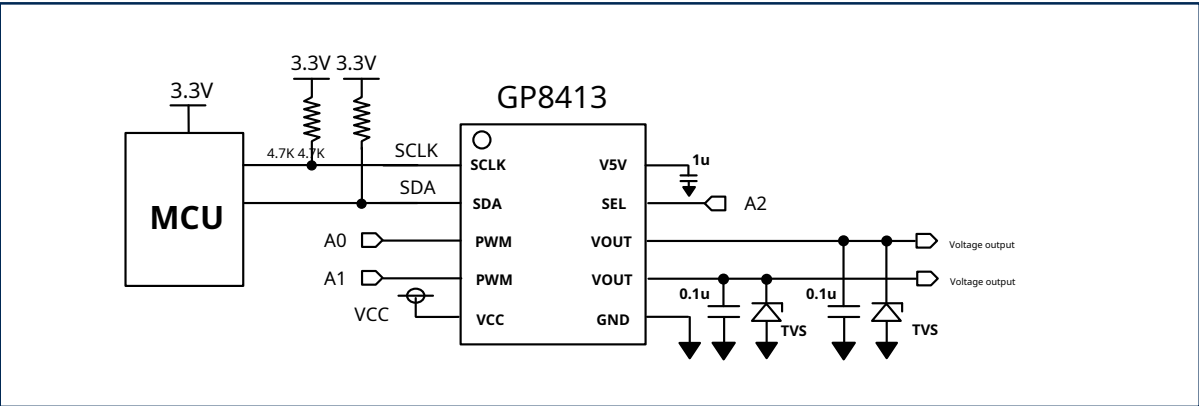


Notice:

1, V5V Greater than 1uF Capacitor is required

2, VOUT When used as a board-level interface, add 12V unidirectional TVS, reverse polarity and surge protection.

3.2 and 3.3V MCU interface



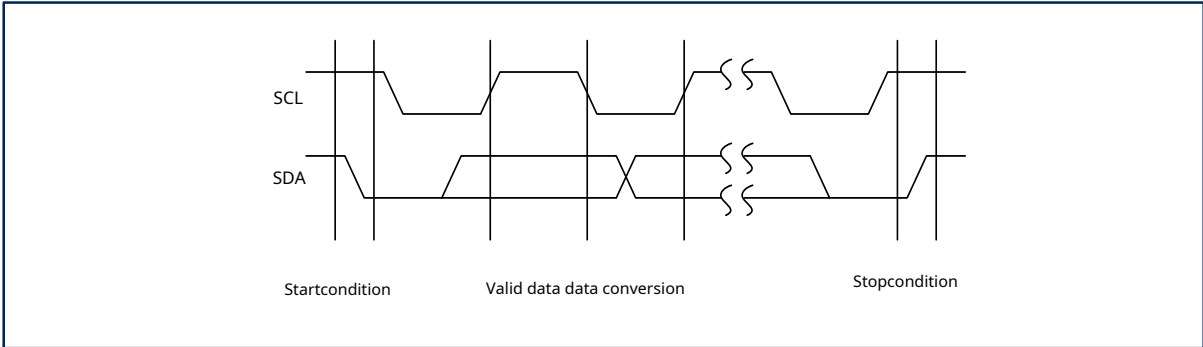
MCU Output 3.3V of I2C Interface connected to GP8413 superior.



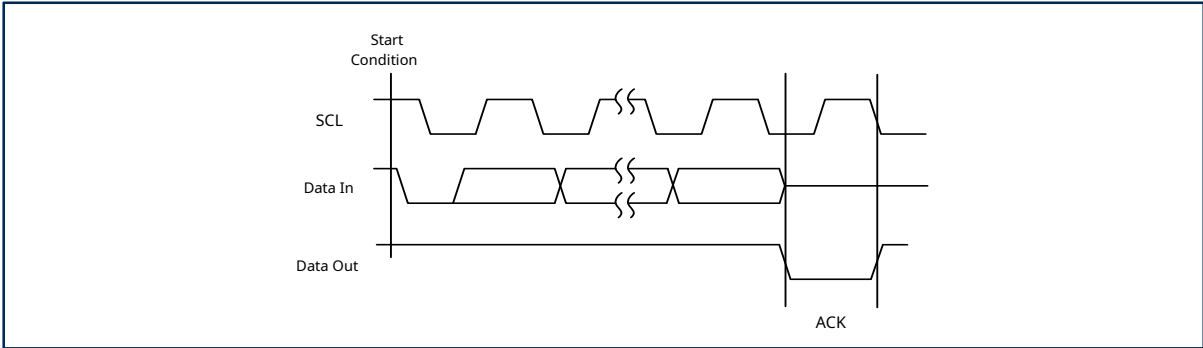
3. Typical Applications

3.3 How to operate

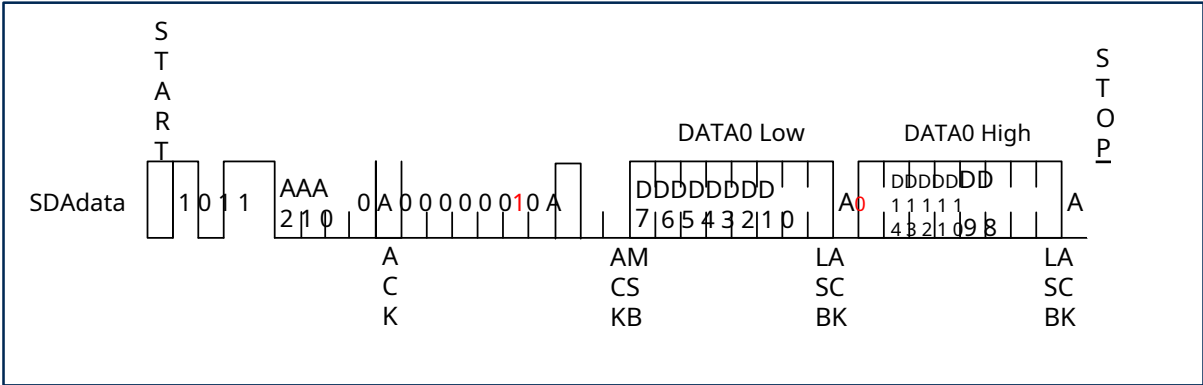
3.3.1 Start, Stop Conditions, valid data, data conversion format



3.3.2 ACK Format



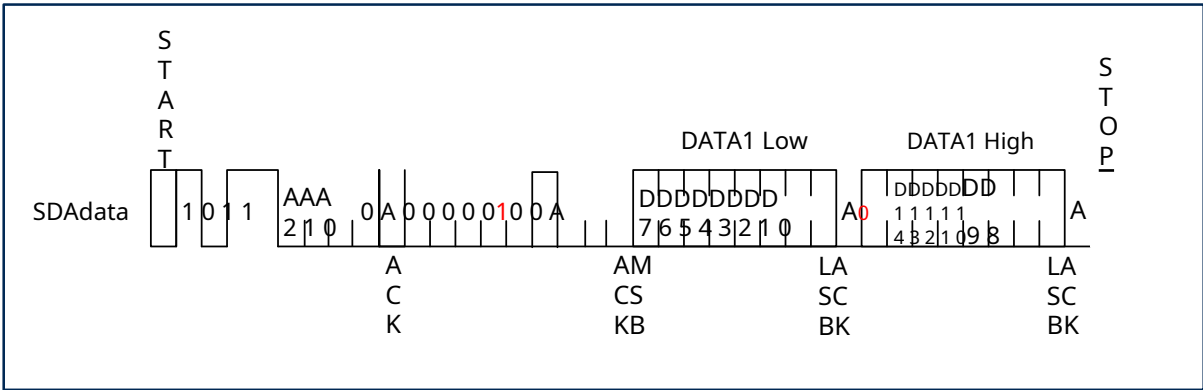
3.3.3 Set the red configuration bit in the figure below, set the address to 02, and then operate VOUT0. Divide the 15-bit DATA data into DATA0 Low and DATA0 High. Write DATA0 Low as the low byte and DATA0 High as the high byte. For example, in 0-10V mode, the corresponding output voltage is: $VOUT = DATA0/0x7FFF * 10V$. The I2C command contains a 3-bit hardware address bit, which can realize the parallel use of 8 GP8413 chips.



3. Typical Applications

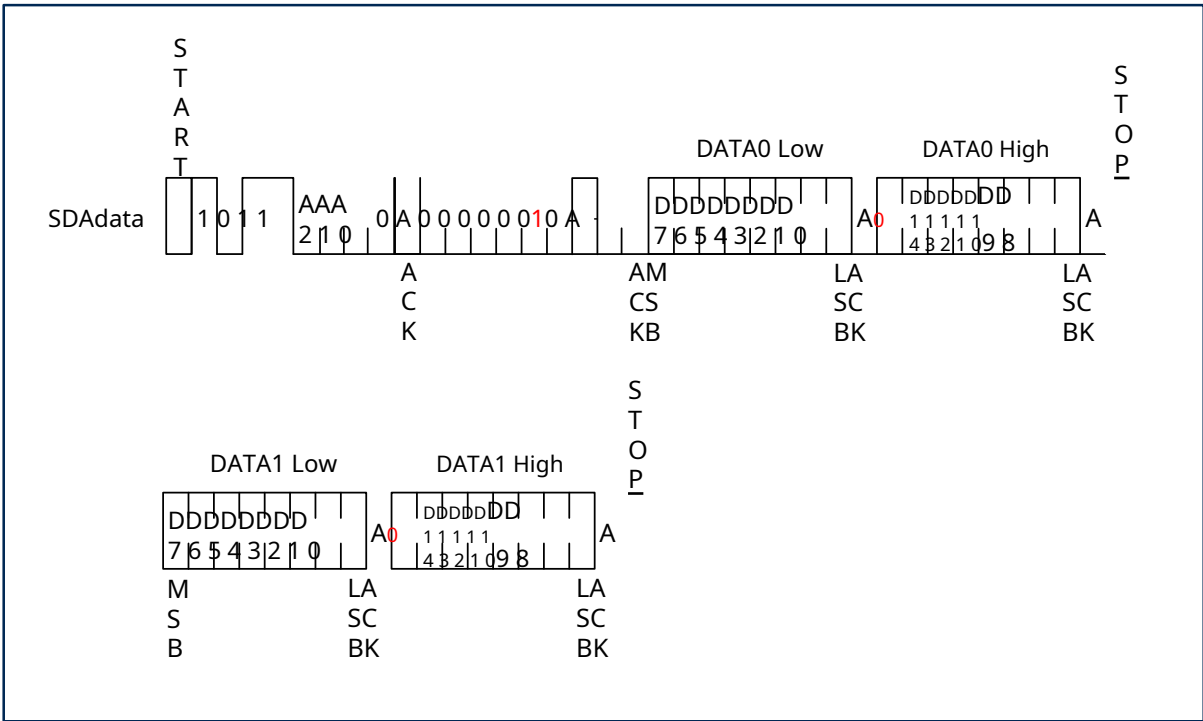
3.3 How to operate

3.3.4 Set the red configuration bit in the figure below, set the address to 04, and then operate VOUT1. Write the 15-bit DATA data into DATA Low and DATA High, DATA Low is the low byte, and DATA High is the high byte. For example, in the 0-10V mode, the corresponding output voltage is: $VOUT=DATA/0x7FFF*10V$.



3.3.5 Set the red configuration bit in the figure below, set the address to 02, and operate VOUT0 and VOUT1 at the same time. Write the 15-bit DATA0 data into DATA0 Low and DATA0 High, DATA0 Low is the low byte, and DATA0 High is the high byte. For example, in 0-10V mode, the corresponding output voltage is: $VOUT0=DATA0/0x7FFF*10V$.

Similarly, write the 15-bit DATA1 data into DATA1 Low and DATA1 High, DATA1 Low is the low byte, and DATA1 High is the high byte. For example, in 0-10V mode, the corresponding output voltage is: $VOUT0=DATA1/0x7FFF*10V$.

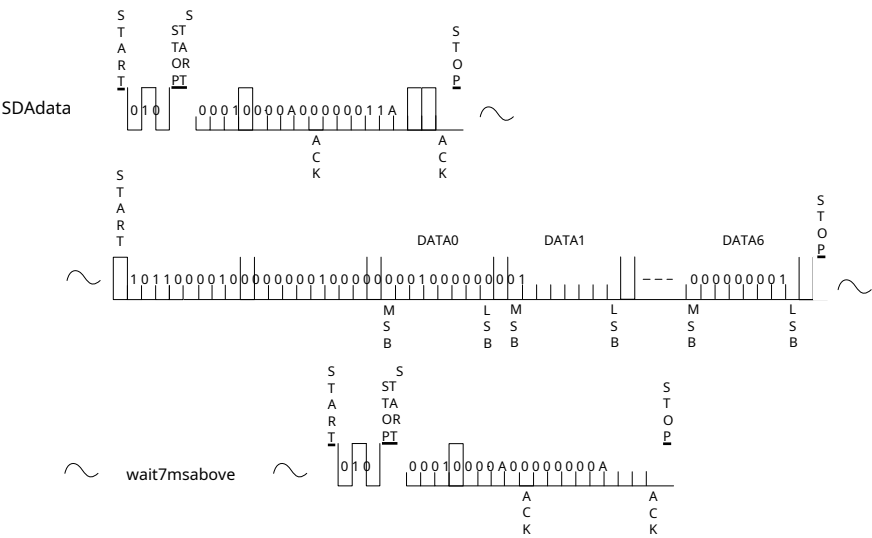


3. Typical Applications

3.3 How to operate

3.3.6 GP8413 Supports saving voltage data in the chip to ensure that the corresponding voltage output state can still be achieved after power failure.

By sending the data shown in the figure below, the written data can be solidified into the chip.

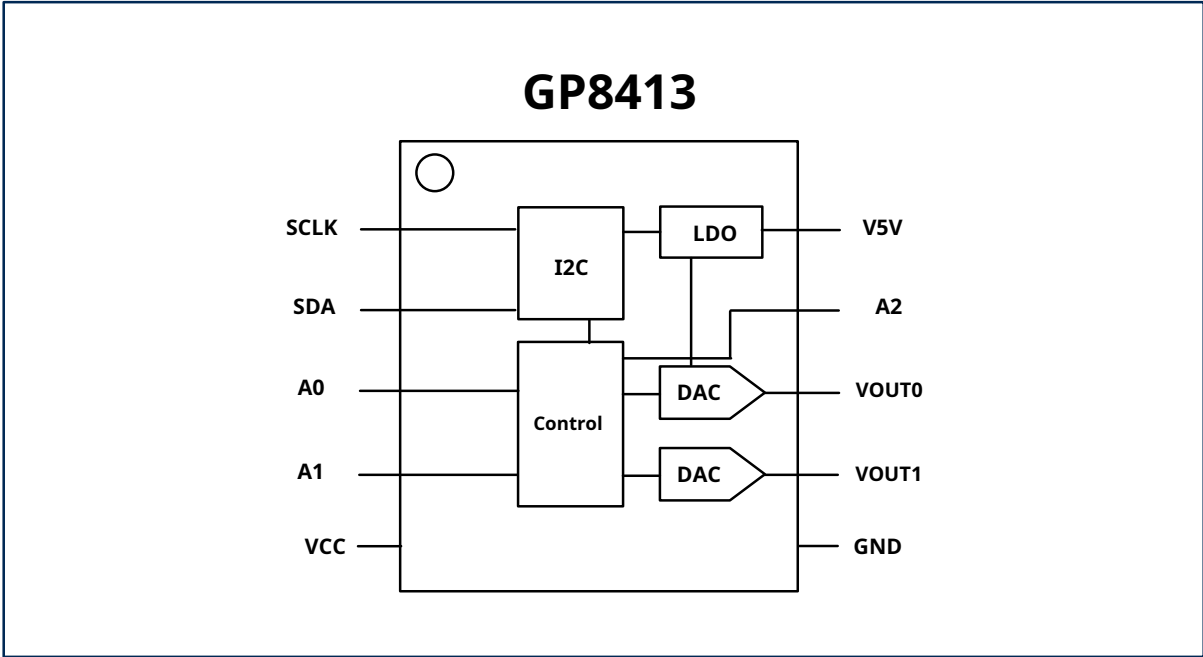


DAC (Digital to Analog Converter)
15bit DAC Dual I2C to 0-10V

4. Device Function

GP8413 is a high-performance dual-channel DAC chip (I2C to analog voltage converter), through I2C will 15-bit data be converted into an analog voltage, and the output voltage range is 0-5V/0-10V, selected through the chip's internal configuration. The chip has a hardware address A0/A1/A2. Support single-channel I2C control. GP8413.

GP8413 The default output voltage accuracy is 0.2%, when GP8413 The chip is used as the interface chip of the system and needs to be VOUT. Connect a ground to the output pin 0.1uF capacitor and a 12V one-way TVS, ensuring the chip's hot-swap, static electricity, reverse connection and other protections.



P-8

GP8413

DAC (Digital toAnalogConverter)
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5.AC Characteristics

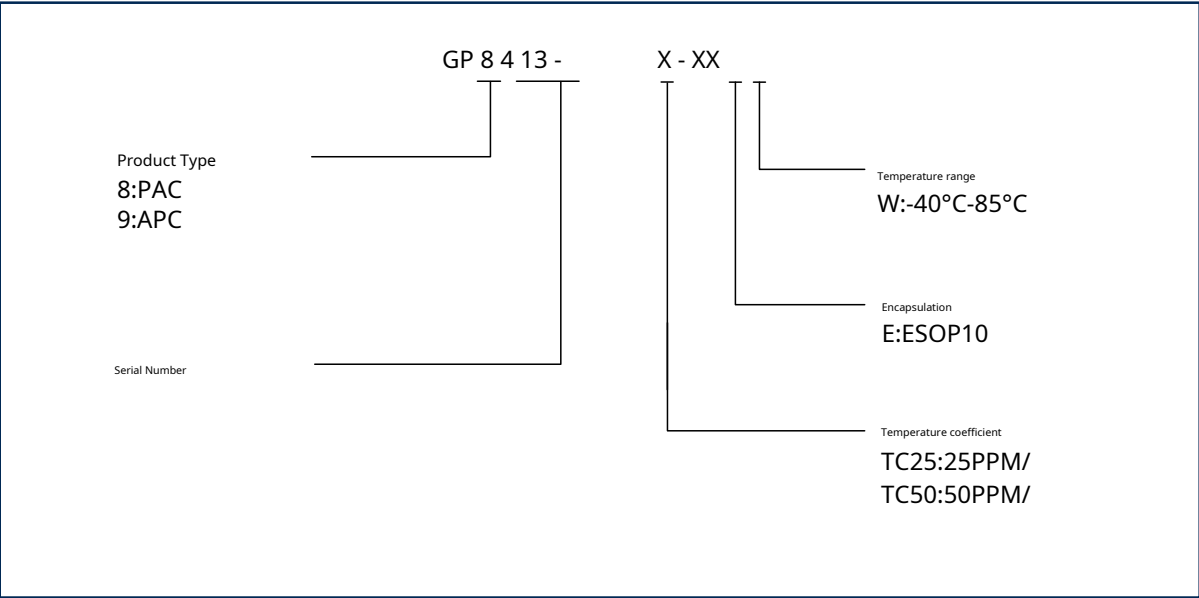
symbol	describe	Minimum	default	maximum	unit
f _{sclk}	I2CClock frequency			400K	Hz

6.DC Characteristics

symbol	describe	Test conditions	Minimum	typical	maximum	unit
VCC	Supply voltage		9	12	36	V
ICC	Power consumption	VCC @12VNo load		2	5	mA
VOUT	Output voltage		0		10	V
ΔVOUT	Output voltage error	andVOUTOutput range ratio			0.2	%
Lout	Output voltage linearity			0.1		%
TC	Temperature coefficient				50	PPM/°C



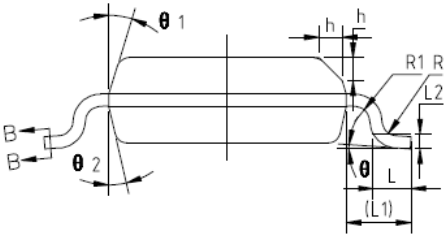
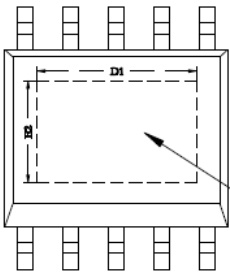
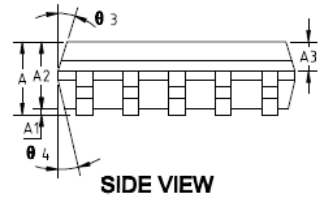
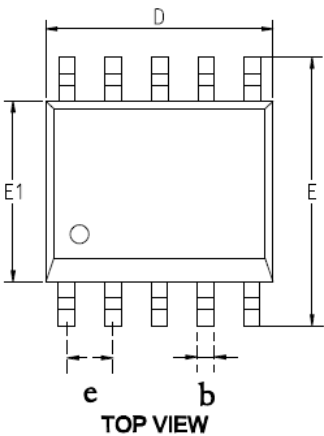
7.Ordering Information



Temperature coefficient	Accuracy	Encapsulation	Operating temperature	Ordering code
25PPM/°C	0.2%	ESOP10	- 40°C-85°C	GP8413-TC25-EW
50PPM/°C	0.2%	ESOP10	- 40°C-85°C	GP8413-TC50-EW



8.Packaging information



SYMBOL	MIN	NOM	MAX
A	1.35	1.50	1.65
A1	0.05	0.10	0.15
A2	1.35	1.40	1.50
A3	0.50	0.60	0.7
b	0.31	0.35	0.39
D	4.80	4.90	5.00
D1	3.20	3.30	3.40
e	1.0BSC		
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
E2	2.00	2.10	2.20
L	0.45	0.60	0.80
L1	1.04REF		
L2	0.25BSC		
R	0.07	—	—
R1	0.07	—	—
h	0.30	0.40	0.50
θ	0°	—	8°
θ1	6°	8°	10°
θ2	6°	8°	10°
θ3	5°	7°	9°
θ4	5°	7°	9°

NOTES:
1. ALL DIMENSIONS REFER TO JEDEC STANDARD MO-157E
2. DIMENSION D DOES NOT INCLUDE MOLD FLASH
3. DIMENSION E1 DOES NOT INCLUDE MOLD FLASH
4. FLASH OR PROTRUSION SHALL NOT EXCEED 0.25mm PER SIDE.

