GP8403

12bit DAC dual channel I2C to 0-5V/0-10V

DAC (Digital to Analog Convertor)

Datasheet

characteristic

ÿ GP8403 converts linearly to 0-5V or 0-10V through I2C interface. analog voltage output.

ÿ One I2C interface supports parallel connection of 8 channels of GP8403, which can be selected by the three-bit hardware address A2/A1/A0. ÿ Input signal range is 12Bit, 0x000-0xFFF ÿ 0-5V/0-10V output voltage is controlled by internal data ÿ Input I2C signal high level: 2.7V-5.5V ÿ Output voltage error: < 0.5% ÿ Output voltage linearity error : 0.1% ÿ Output short-circuit protection, when the output pin is short-circuited to ground, the chip enters the protection mode and stops the output. ÿ Power supply voltage: 8V-30V ÿ Power consumption: <5mA ÿ Start-up time: <2ms ÿ Operating temperature: -40°C to 125°C

describe

GP8403 is an I2C signal to analog signal converter, namely DAC. This chip can linearly convert 12Bit digital quantity 0x000-0xFFF into two independent 0-5V or 0-10V analog voltages, and the output voltage error is 0.5%. Note: Please be sure to download the latest version of DATASHEET from the official website.

application

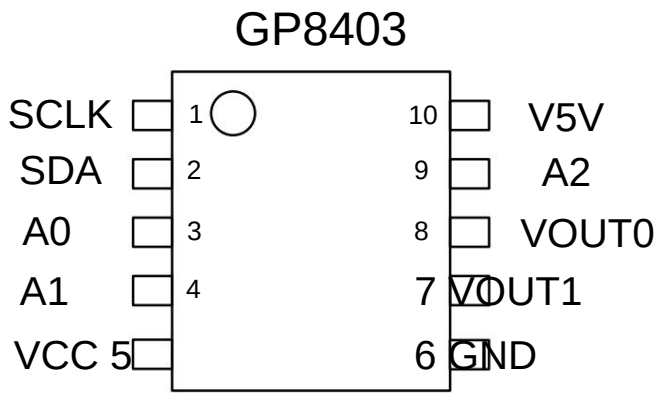
ÿ Universal signal conversion

ÿ Motor speed regulation, LED dimming ÿ Inverter, power supply ÿ Industrial analog signal isolation

1. Pin Definition

Table-A Pinout

Pin Name	Pin Function
SCLK	I2C protocol clock signal
SDA	I2C protocol data signal
VCC	power supply
GND	ground
V5V	Internal LDO, 5V output, must be connected with a capacitor greater than 1uF.
A0	Bit 0 hardware address
A1	Bit 1 hardware address
A2	Bit 2 hardware address
The first analog voltage output of VOUT0 must be connected with a 0.1uF capacitor	
The second analog voltage output of VOUT1 must be connected with a 0.1uF capacitor	



2. Absolute Maximum Ratings

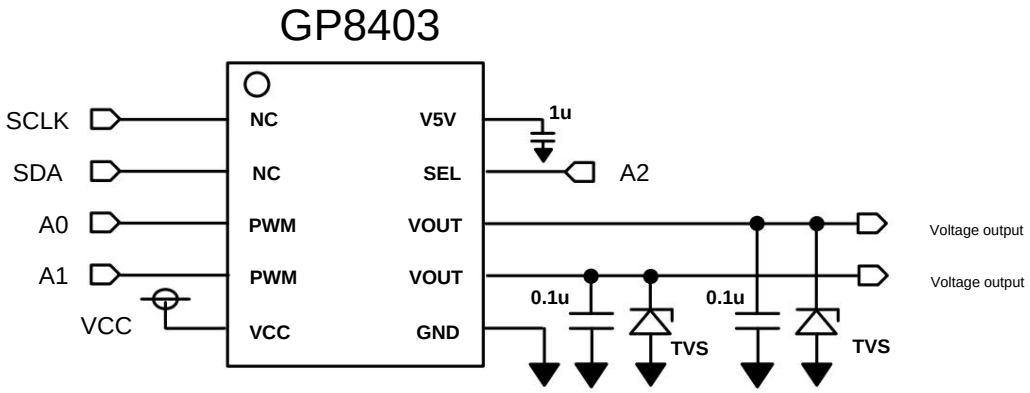
Industrial Operating	-40°C to 125°C
Temperature: Storage	-50ÿ to 125ÿ
Temperature: Input	-0.3v VCC + 0.3v
Voltage: Maximum	33v
Voltage: ESD Protection:	> 2000v

*Exceeding the values listed in "Absolute Maximum Ratings" may cause permanent damage to the device. not guaranteed device operating under conditions beyond those listed in the specification. Prolonged exposure to extreme conditions may affect equipment reliability or functionality.

3. Typical applications

3.1 Basic functions (typical circuit)

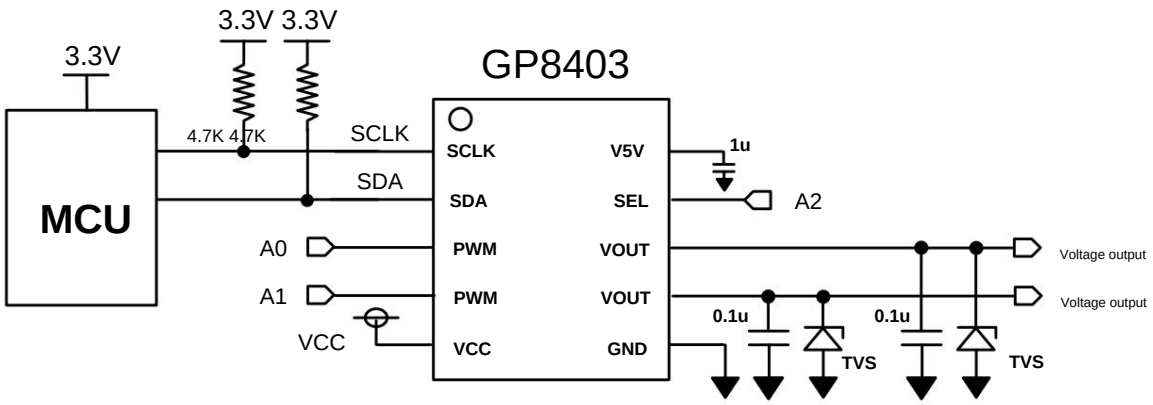
When the chip is used in the on-board circuit, the capacitor and TVS can be appropriately increased to stabilize and stabilize the circuit.
Protect.



Notice:

1. Capacitors greater than 1uF on V5V are required
2. When VOUT is used as a board-level interface, add 12V unidirectional TVS, reverse connection and surge protection.

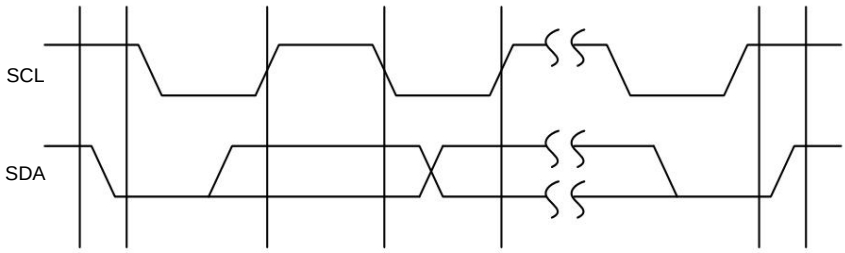
3.2 Interface **with 3.3V MCU**



The I2C interface of MCU output 3.3V is connected to GP8403.

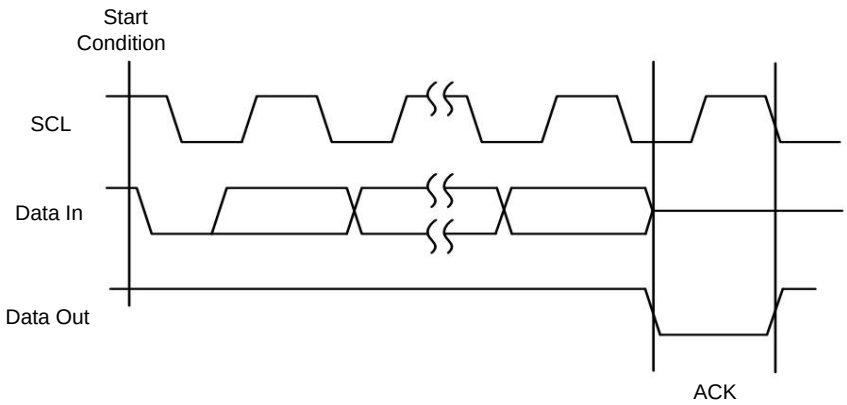
3.3 How to operate

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



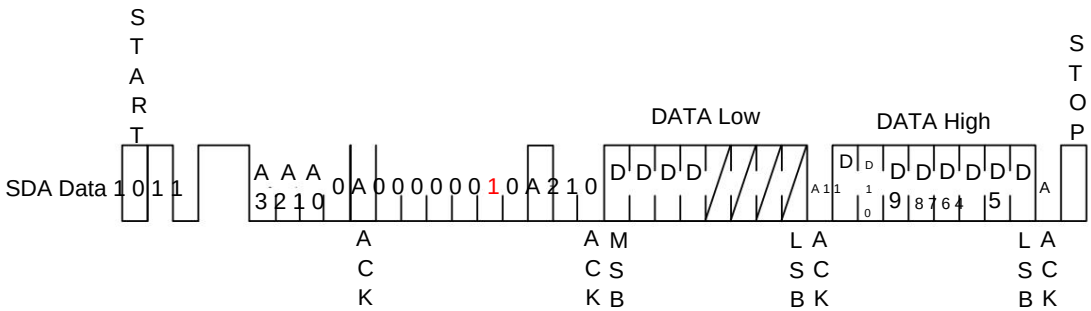
Start condition valid data data transformation Stop condition

3.3.2 ACK format

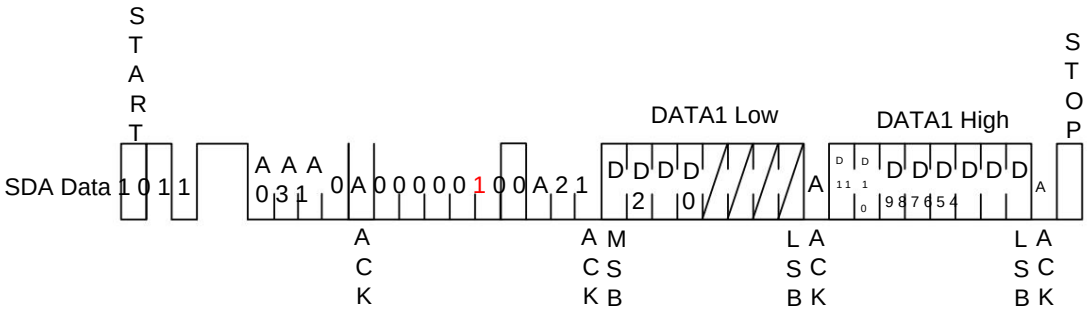


3.3.3 Set the red configuration bit in the figure below, and the address is set to 02, then operate on VOUT0. Divide 12bit DATA data into DATA0 Low and DATA0 High for writing, DATA0 Low is low byte, DATA0 High is high byte, and the lower 4 bits of DATA0 Low are ignored. If it is 0-10V mode, the corresponding output voltage is: VOUT=DATA0/0xFFF*10V. If it is 0-5V mode, the corresponding output voltage is: VOUT=DATA0/0xFFF*5V.

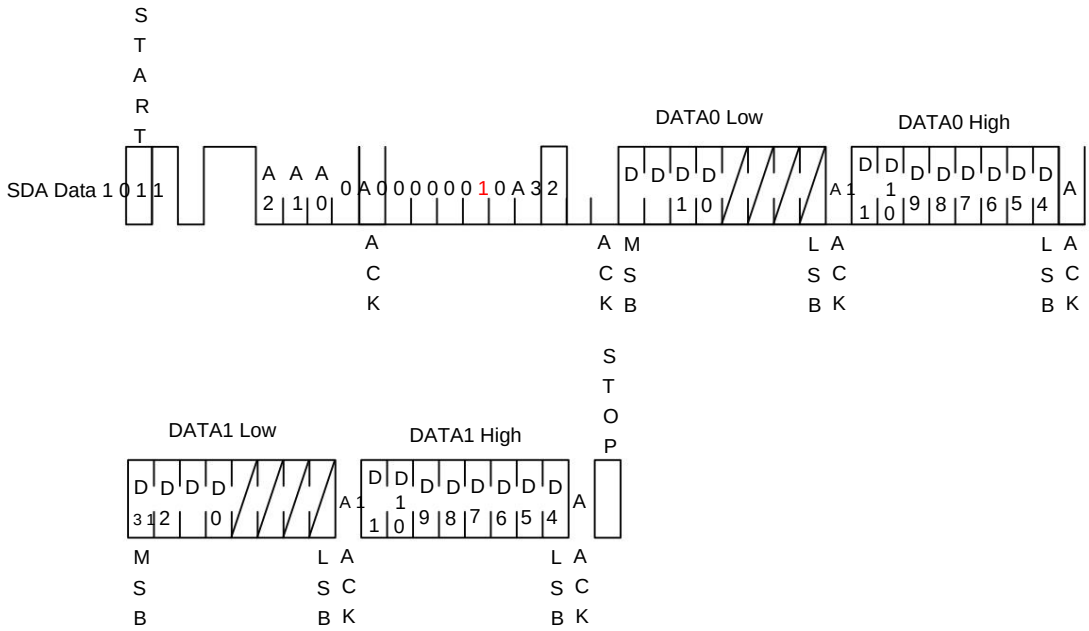
In the I2C command, it contains 3bit hardware address bits, which can realize the parallel use of 8 pieces of GP8403 chips



3.3.4 Set the red configuration bit in the figure below, and the address is set to 04, then operate on VOUT1. Divide 12bit DATA data into DATA Low and DATA High for writing, DATA Low is low byte, DATA High is high byte, and the lower 4 bits of DATA Low are ignored. If it is 0-10V mode, the corresponding output voltage is: VOUT=DATA/0xFFF*10V. If it is 0-5V mode, the corresponding output voltage is: VOUT=DATA/0xFFF*5V.



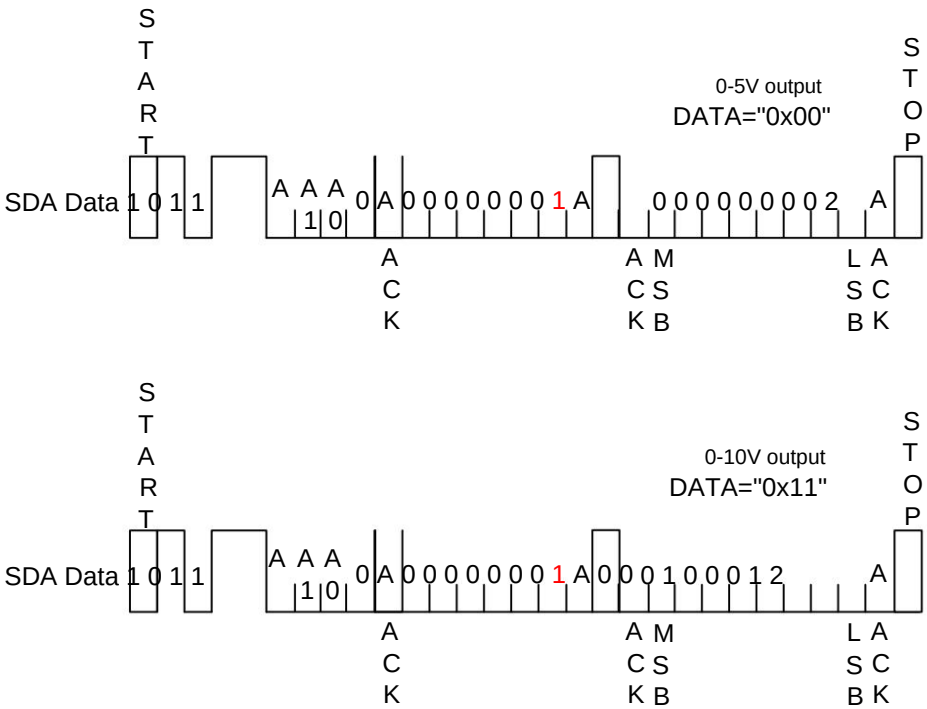
3.3.5 Set the red configuration bit in the figure below, the address is set to 02, and operate on VOUT0 and VOUT1 at the same time. Divide 12bit DATA0 data into DATA0 Low and DATA0 High to write, DATA0 Low is low byte, DATA0 High is high byte, and ignore the lower 4 bits of DATA0 Low. If it is 0-10V mode, the corresponding output voltage is: VOUT0=DATA0/0xFFF*10V. If it is 0-5V mode, the corresponding output voltage is: VOUT0=DATA0/0xFFF*5V. Similarly, 12bit DATA1 data is divided into DATA1 Low and DATA1 High for writing, DATA1 Low is low byte, DATA1 High is high byte, and the lower 4 bits of DATA1 Low are ignored. If it is 0-10V mode, the corresponding output voltage is: VOUT0=DATA1/0xFFF*10V. If it is 0-5V mode, the corresponding output voltage is: VOUT1=DATA1/0xFFF*5V.



3.3.6 Set the red configuration bit in the figure below, the address is set to 01, if write data 0x00,

Then the chip output voltage selects 0-5V; if the write data is 0x11, the chip output voltage

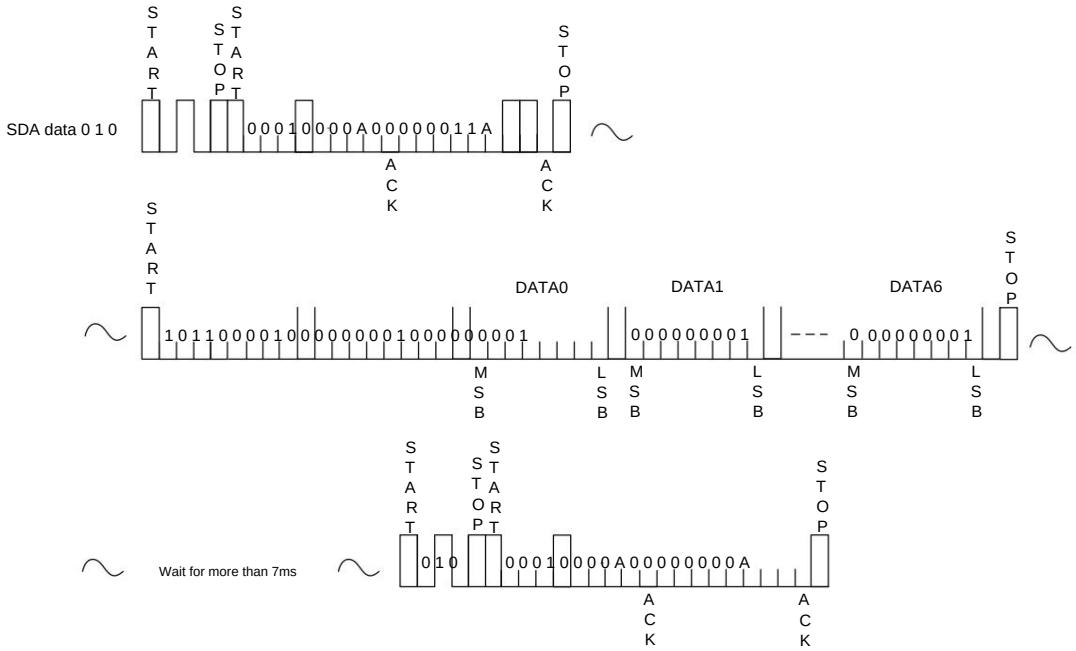
The selection is 0-10V.



3.3.7 GP8403 supports saving voltage data in the chip to ensure that it can still be

in the corresponding voltage output state.

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



4. Device function

GP8403 is a high performance dual channel DAC chip (I2C to analog voltage converter),

Convert 12BIT data to analog voltage through I2C, the output voltage range is 0-5V or 0-10V,

Selected by the internal configuration of the chip. Refer to Section 3.3.6 for details. The chip has hardware address A0A1A2

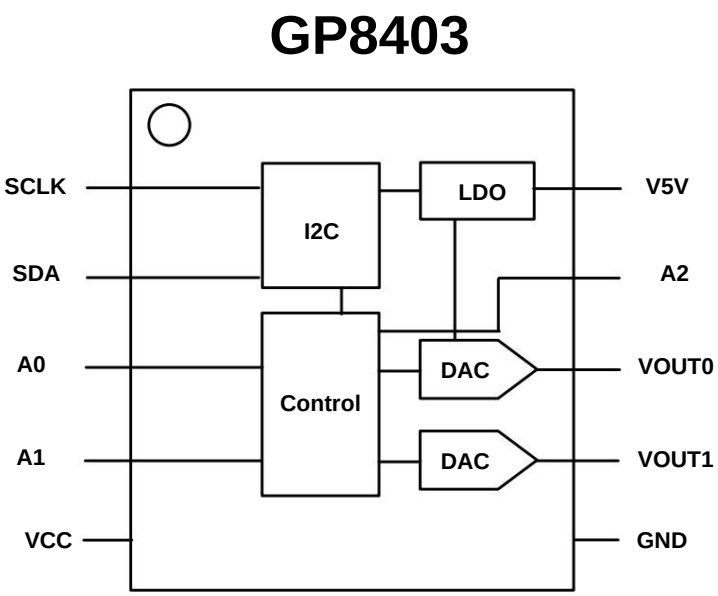
Holds a single I2C to control 8 channels of GP8403.

The default output voltage accuracy of GP8403 is 0.5%,

When the GP8403 chip is used as the interface chip of the system, it needs to be connected to the VOUT output pin.

Connect a 0.1uF capacitor and a 12V unidirectional TVS to the ground to ensure that the chip is hot-swappable, electrostatic, reverse

Waiting for protection.



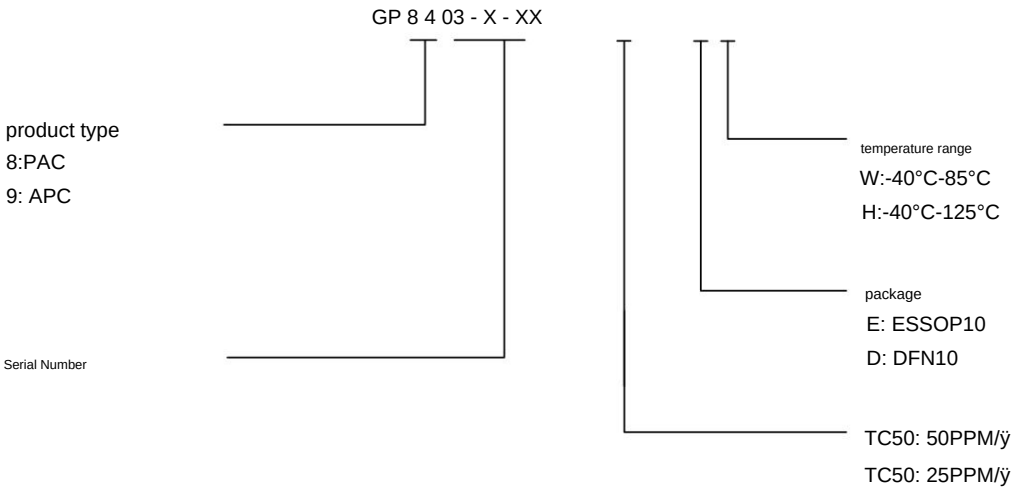
5. Table-B AC Characteristics

Symbol	Description	min	default	max		unit
fsclk	I2C Clock Frequency				400K	Hz

6. Table-C DC Characteristics

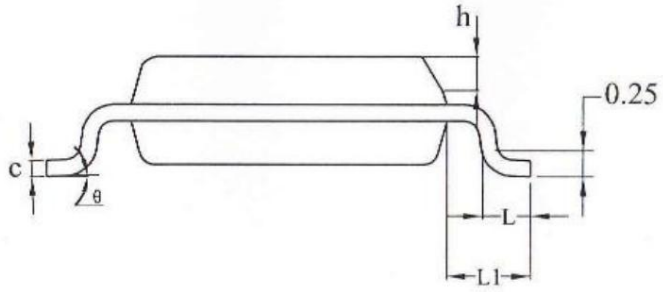
Symbol	description	Test Conditions	Minimum	Typical	Maximum	Unit
VCC	power supply voltage*1		8	12	30	V
ICC	power consumption	VCC @12V no load		2	5	mA
VOUT	output voltage	SEL ground	0		5	V
		SEL to V5V	0		10	V
ÿVOUT	output voltage error ratio	to VOUT output range			0.5%	
Lout	output voltage linearity			0.1		%
TC	temperature coefficient				50PPM/ÿ	

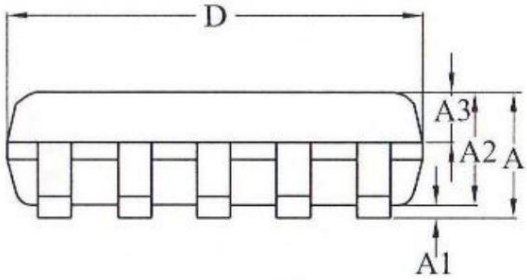
7.4 Ordering instructions

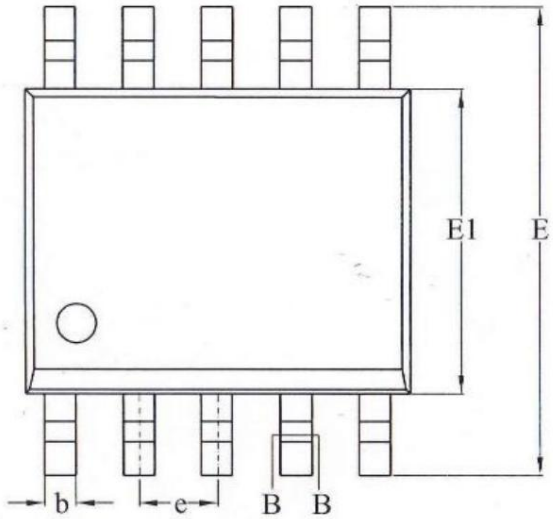


Temperature Coefficient Accuracy		Package operating temperature	order code
50PPM/ÿ	**0.5%**	**ESSOP10 -40ÿ-125ÿ**	**GP8403-TC50-EH**

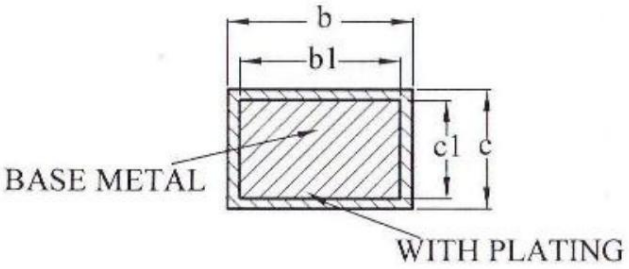
7. Package Information







SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.00BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0	—	8°



SECTION B-B