GP7101

I2C PWM driver chip

DPC (Digital to PWM Convertor) Datasheet

Summary

- I2C bus data input
- 0% - 100% duty cycle PWM signal output.
- Built-in over-voltage protection
- Supports 8-bit and 16-bit PWM values
- 1Hz to 100KHz PWM frequency
- 2.7-5.V PWM output voltage
- <1% maximum PWM duty cycle level
- <0.5% linearity error in PWM duty cycle
- 2.7-5.5V VCC supply
- <5mA power consumption
- <2mS startup time
- Operating temperature: - 40 ° C to 85 ° C

Description

GP7101 is an I^2C Digital to PWM Converter (DPC) chip.

This chip linearly converts data values sent over the I^2C protocol into PWM signals with a duty cycle of 0% to 100% and less than 0.5% nonlinearity.

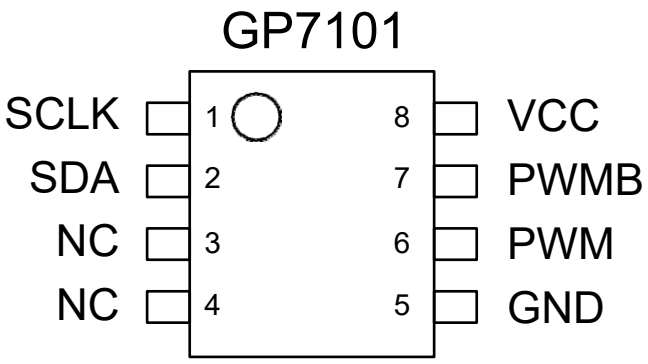
Applications

- DC motor speed regulation
- LED intelligent dimming
- Industrial analog signal isolation
- AC Inverter
- Power Supply

1. Pin definitions

Table A: Pin definitions

Pin name	Pin function
SCLK	I2C protocol clock signal
SDA	I2C protocol data signal
VCC	Power Supply
GND	Ground
NC	Levitation
PWM	PWM duty cycle signal output
PWMB	Reverse signal of PWM signal.



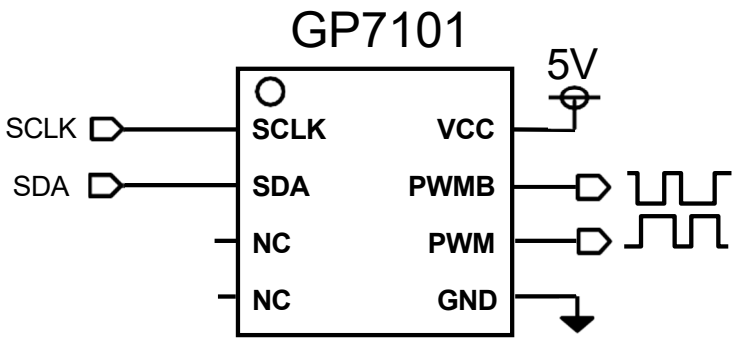
2. Absolute maximum ratings

Industrial operating temperature:	- 40 ℃ to 85 ℃
Storage temperature:	- 50 ℃ to 125 ℃
Input voltage:	- 0.3 v VCC+0.3 v
Maximum voltage:	5.5v
ESD protection:	> 2000 v

Exceeding the parameter values listed under "Absolute Maximum Ratings" may cause permanent damage to the device. The device is not guaranteed to operate under conditions beyond those listed in the specifications. Prolonged exposure to extreme conditions may affect device reliability or functionality.

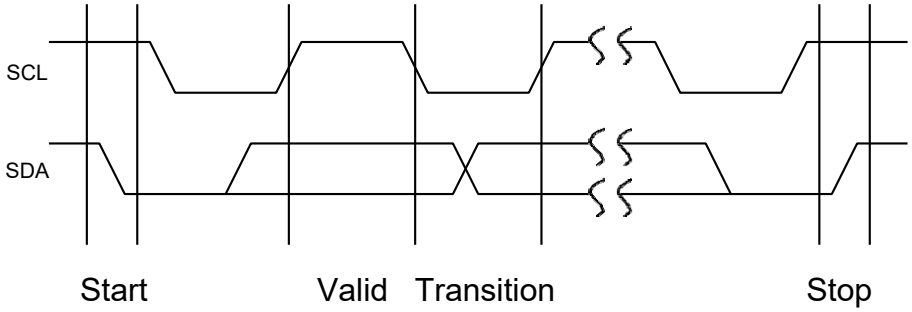
3. Typical Applications

3.1 Basic function

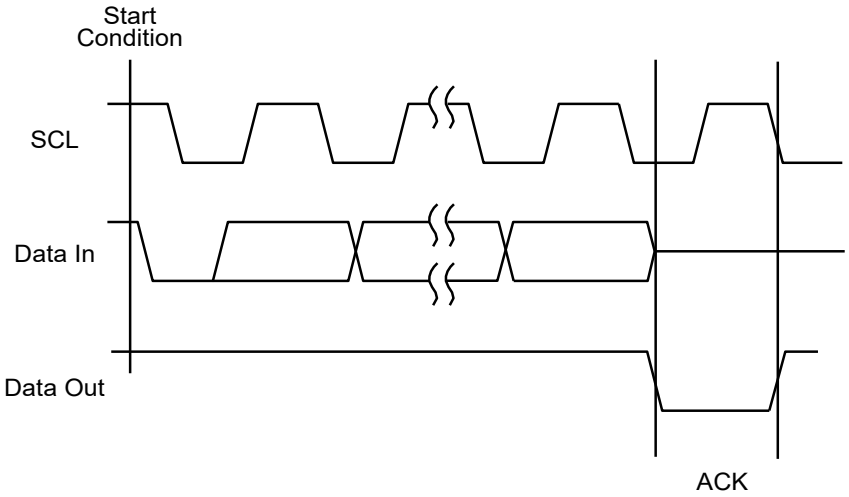


3.2 Operation method

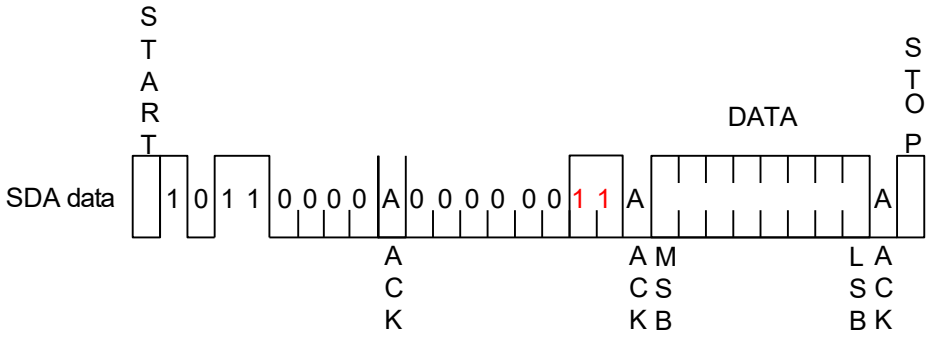
3.2.1 Start, Stop conditions, valid data, data transition format



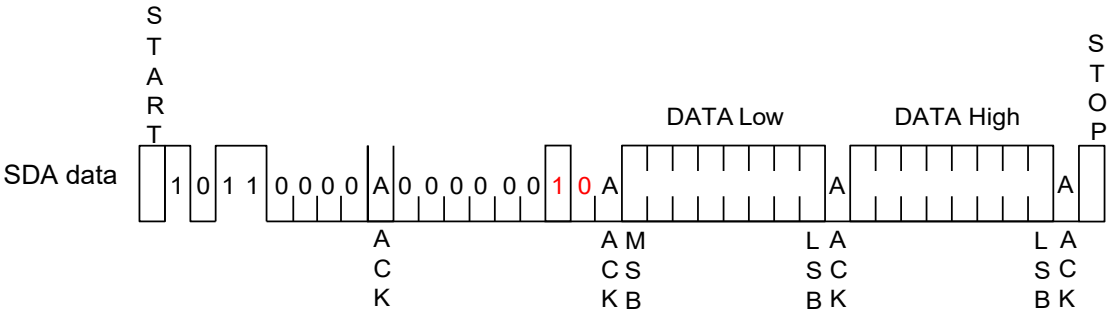
3.2.2 ACK format



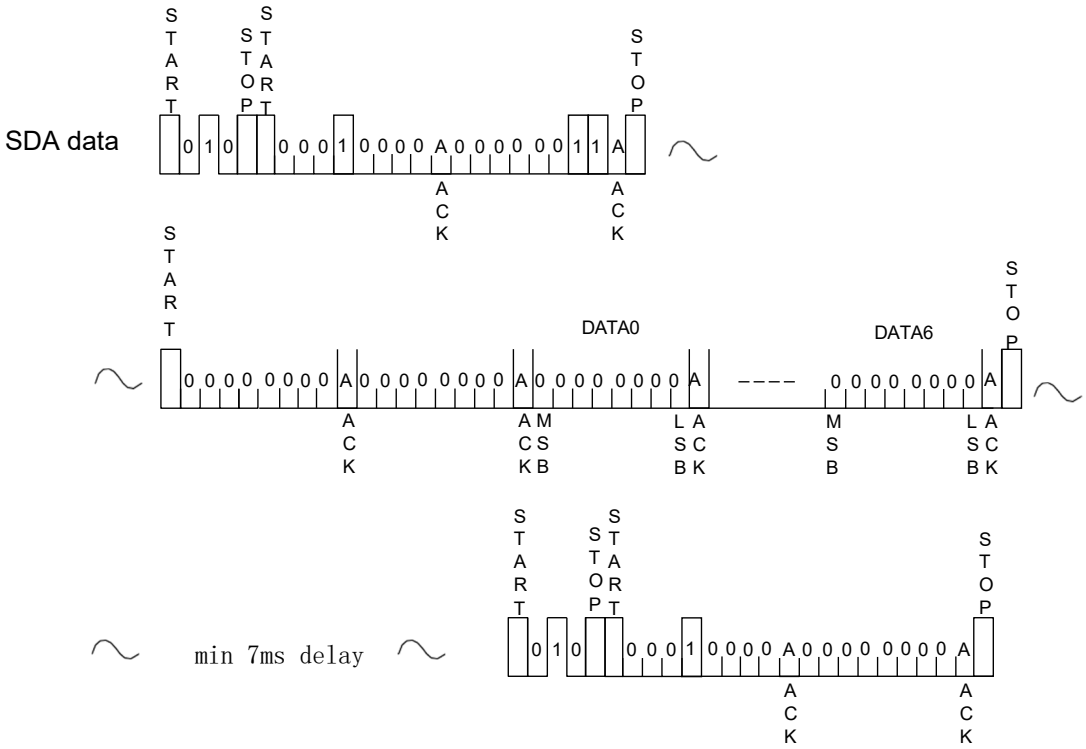
3.2.3 8-bit PWM mode, set the red configuration bits below, write DATA and the PWM duty cycle will be DATA/8'HFF.



3.2.4 16-bit PWM mode, set the red configuration bits below and divide DATA into DATA Low and DATA High writes. Duty cycle is DATA/16' HFF.

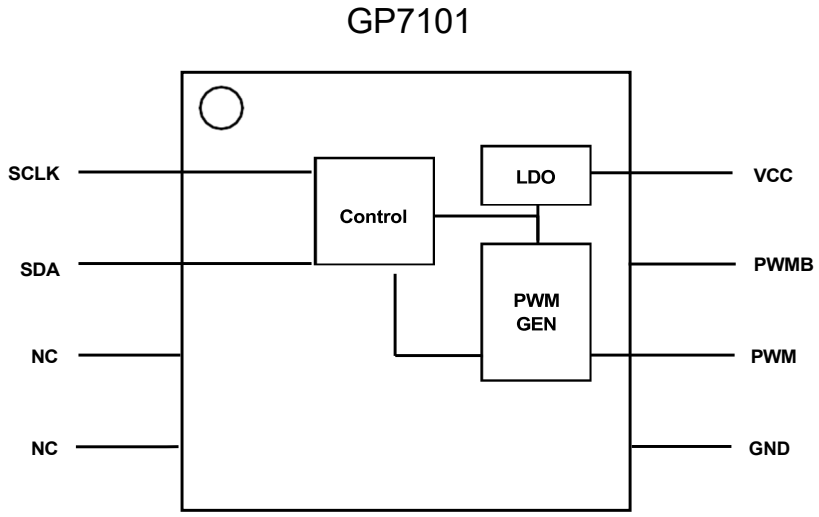


3.2.5 GP7101 supports saving data in the chip to ensure that it can still be in the corresponding PWM output state after power failure and startup. Send the command below to save the state.



4. Device function

GP7101 is a high-performance DPC chip (digital to PWM signal converter). The frequency of PWM signal output can be selected from 1Hz to 100KHz. Input signal is based on I2C protocol, input 8Bit data DIN, from 8'H00-8'HFF, PWM signal duty cycle is 0% to 100%, DPWM=DIN/ 8'HFF.



5. Table B: AC Characteristics

Value	Description	Min	Nom	Max	Unit
fPWM	PWM output frequency[1]	1	1K	100K	Hz
ΔfPWM	PWM frequency tolerance	-3	0	3	%
ΔDPWM	PWM duty cycle tolerance		0.5	1	%
DPWM	PWM duty cycle range[2]	0		100	%
JPWM	PWM signal jitter[3]		0.1	0.2	%p-p

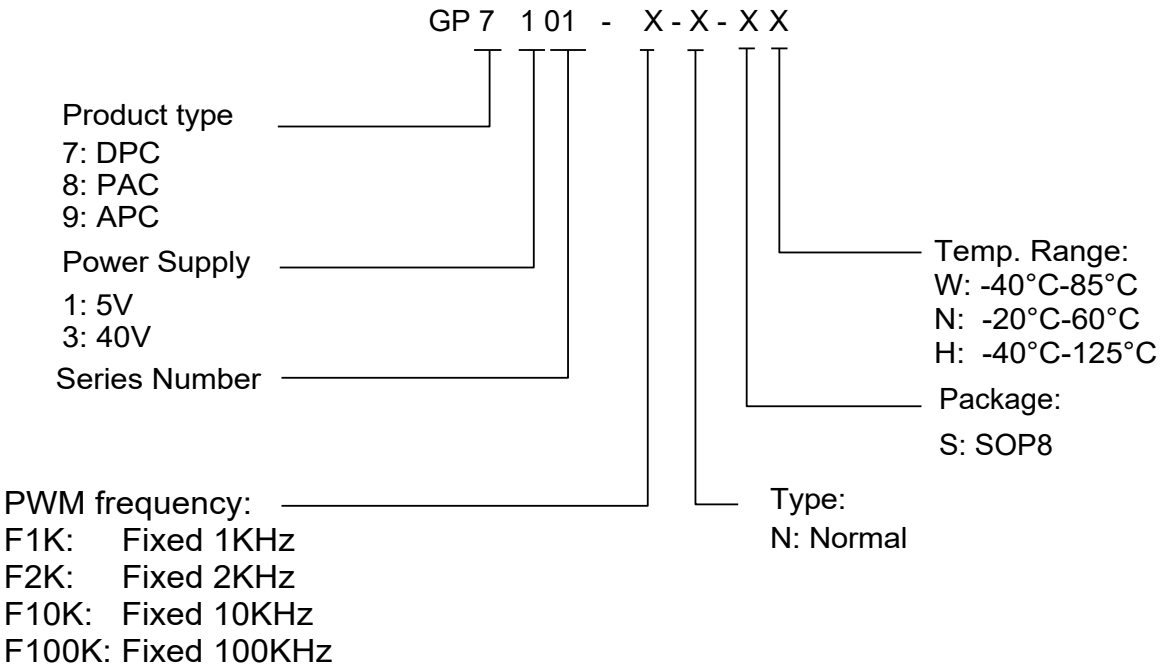
Remarks on AC characteristics:

1. PWM signal frequency can be adjusted in the range of 1Hz to 100KHz on models without fixed PWM frequency. The default value is 1KHz.
2. PWM duty cycle is defined as the average duty cycle.
   Due to cycle jitter, the duty cycle of each cycle is not perfectly uniform.
3. Jitter is the ratio of the peak-to-peak deviation of the cycle to the average value of the cycle. PWM jitter is measured at 1KHz PWM frequency.

6. Table C: DC Characteristics

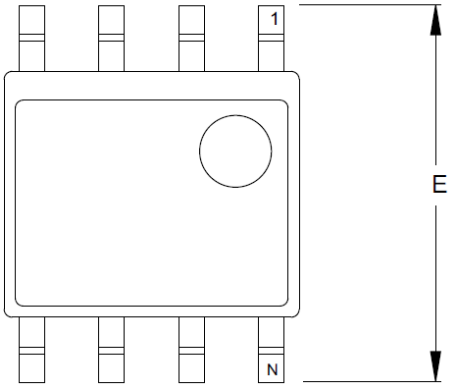
Symbol	Description	Test conditions	Min	Nom	Max	Unit
VCC	supply voltage		2.7	5	5.5	V
ICC	Power consumption	VCC @ 15.0V		2	5	mA
IIL	Input leakage current	VIN = VCC or VSS			3	μA
ILO	Output leakage current	VIN = VCC or VSS			3	μA
VOL	Output low level	VCC @ 15.0V, IOL = 10 mA			0.4	V
VOH	Output high level	VCC @ 15.0V, IOL = 10 mA			VCC - 0.4	V
Tr	Output rise time	VCC @ 15.0V, Cload = 5pF		20	40	ns
Tf	Output falling time	VCC @ 15.0V, Cload = 5pF		20	40	ns

7. Ordering Information

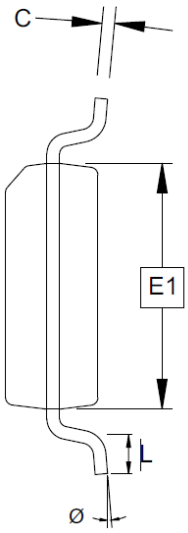


Package	Temp. Range	Input Voltage	Max. PWM frequency	PWM type	Order code
SOP8	-40℃-85℃	8V-40V	1KHz	L1H1	GP7101-F1K-L1H1-SW
SOP8	-40℃-85℃	8V-40V	2KHz	L5H1	GP7101-F2K- L5H1-SW
SOP8	-40℃-85℃	8V-40V	10KHz	Normal	GP7101-F10K-N-SW
SOP8	-40℃-85℃	8V-40V	100KHz	Normal	GP7101-F100K-N-SW

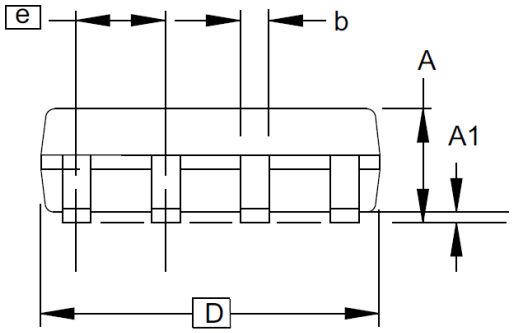
8. Encapsulation information



TOP VIEW



END VIEW



SIDE VIEW

(Unit of measurement: mm)

Dim.	Min	Nom	Max
A1	0.10	–	0.25
A	1.35	–	1.75
b	0.31	–	0.51
C	0.17	–	0.25
D	4.80	–	5.05
E1	3.81	–	3.99
E	5.79	–	6.20
e	1.27 BSC		
L	0.40	–	1.27
Ø	0°	–	8°

CAUTION:

This figure is for general reference only.
Refer to JEDEC drawing MS-012 for proper dimensions, tolerances, datums, etc.