

Dual Channel 5V 256u-step STM driver

Chip description:

GC6209 is Dual Channel 5V low voltage Stepper motor driver , with low noise , low vibration features, particularly suitable for applications as camera's zoom&focus system 、 gimbal and other precision、 low noise STM control systems.

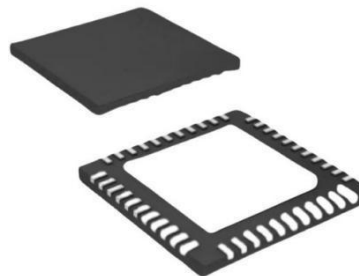
The chip integrated a 256-micro steps driver for each channel. With SPI interface, Customers can easy adjust the parameters of the driver.

Chip application:

- Camcorder
- Security-camera
- Consumer Products
- Robotics
- Medical Devices

Chip features:

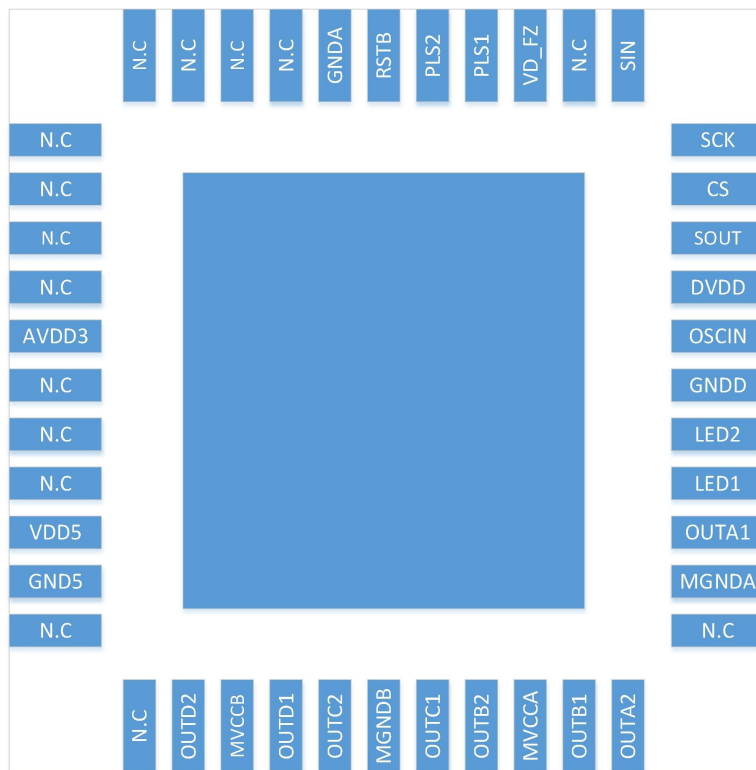
- Built in 2 STM driver for zoom and focus
- 256 u-step driving technology for STM , features super low noise
- Output drive current up to 0.8A
- 2 systems of open-drain for driving LED
- Over temperature protection
- Under voltage protection
- QFN44(05x05) Package



Product name	Package Type	Detail description
GC6209	QFN44L(5x5)	5.0*5.0, e=0.35

Packaging Introduction

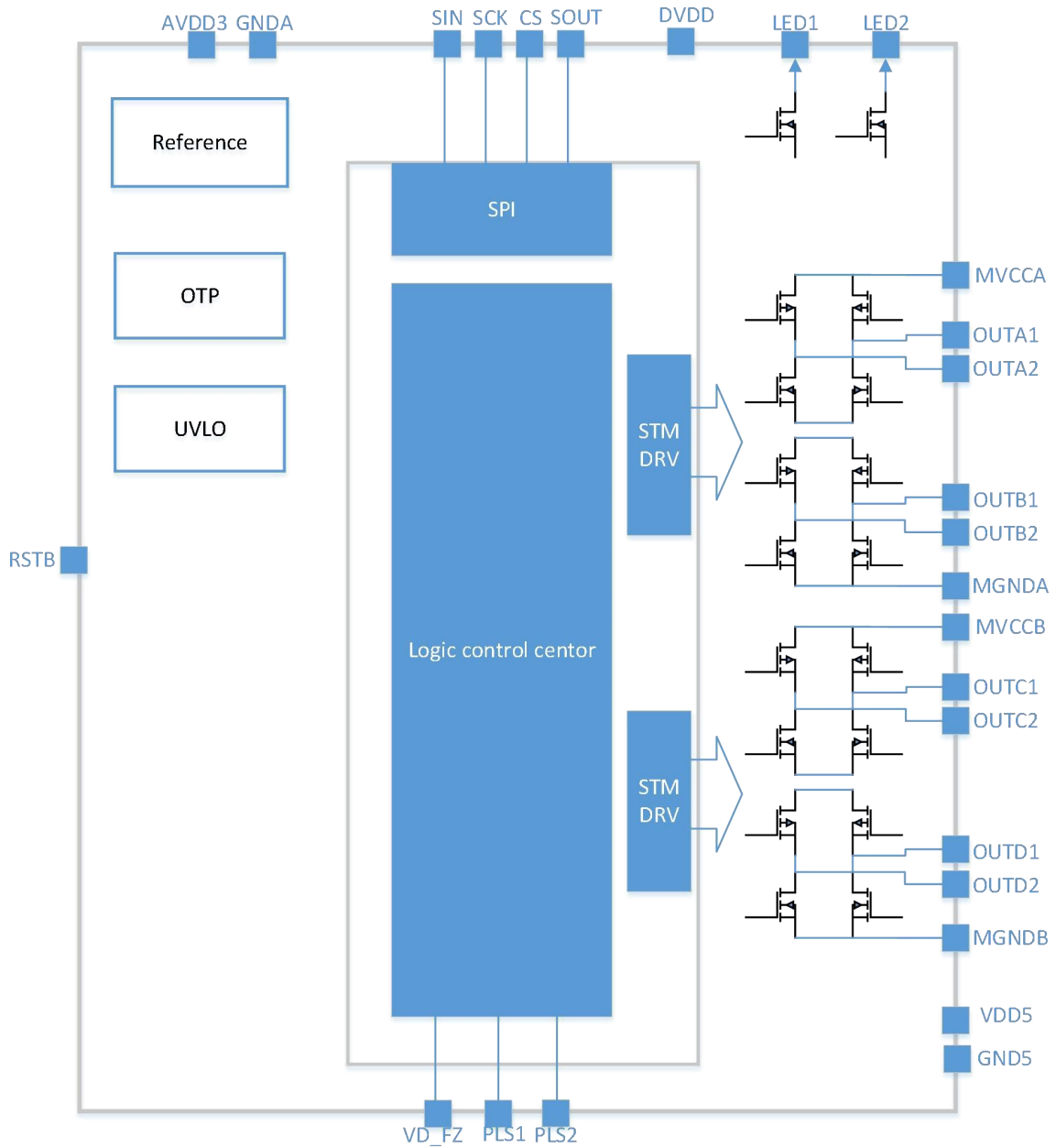
Per Tray	Per Box	Per Case
4K	5K	64K

Pin Map:


Pin Description:

Pin No.	Pin Name	I/O	Pin Function
1,2,3,4,6,7,8,11, 12,23,35,41,42,43,44	N.C	n.c	No Connect
5	AVDD3	Power	3.3V Analog power
9	VDD5	Power	5V Analog power
10	GND5	gnd	Analog ground 5
13	OUTD2	O	Motor output D2
14	MVCCB	Power	Motor B supply
15	OUTD1	O	Motor output D1
16	OUTC2	O	Motor output C2
17	MGNDB	Gnd	Motor B ground
18	OUTC1	O	Motor output C1
19	OUTB2	O	Motor output B2
20	MVCCA	ground	Motor A ground
21	OUTB1	O	Motor output B1
22	OUTA2	O	Motor output A2
24	MGNDA	Gnd	Motor A ground
25	OUTA1	O	Motor output A1
26	LED1	O	LED1 OUT (open drain)
27	LED2	O	LED2 OUT (open drain)
28	GNDD	Gnd	Ground pin for digital circuit
29	OSCIN	I	System clock input
30	DVDD	Power	Digital power supply
31	SOUT	O	SPI output
32	CS	I	SPI chip select
33	SCK	I	SPI clock input
34	SIN	I	SPI data in
36	VD_FZ	I	Sync signal input for zoom&focus
37	PLS1	O	Pulse 1 output
38	PLS2	O	Pulse 2 output
39	RSTB	I	Reset signal input
40	GNDA	Gnd	Ground pin for analog

Block Diagram :



Absolute Maximum Ratings:

(over operating free-air temperature range (unless otherwise noted))

Symbol	Parameter	Rating	Unit
AVDD3	3.3V Analog supply voltage	-0.3~4.0	V
DVDD	3.3V Digital supply voltage	-0.3~4.0	V
MVCCA/B	STM motor supply voltage	-0.3~6.0	V
VDD5	5V analog power	-0.3~6.0	V
Topr	Operating ambient temperature	-40~100	°C
Tstg	Storage temperature	-55~150	°C
Istm	STM motor current	1.0	A
LED	LED pull down current	30	mA
ESD	Human Body Model	3000	V

Electrical Characteristics:

Recommended Operating Conditions

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Motor power supply	MVCCA,M VCCB		3.0	5	5.5	V
5V analog supply	VDD5		3.0	5	5.5	V
Analog&Logic power supply	AVDD3,DV DD		2.7	3.3	3.6	V
Logic input Range	Vlogicin	OSCIN,CS,SCK,SIN,VD_FZ ,RSTB	-0.3		DVDD+ 0.3	V
Logic output Range	Vlogicout	PLS1,PLS2,SOUT	-0.3		DVDD+ 0.3	V
Motor current	ISTM	OUTA1,OUTA2,OUTB1,OU TB2,OUTC1,OUTC2,OUTD 1,OUTD2	-0.8		+0.8	A

Electrical Characteristics: (unless otherwise specified, T=25°C, DVDD=AVDD=3.3V, MVCCx=VDD5=5V)

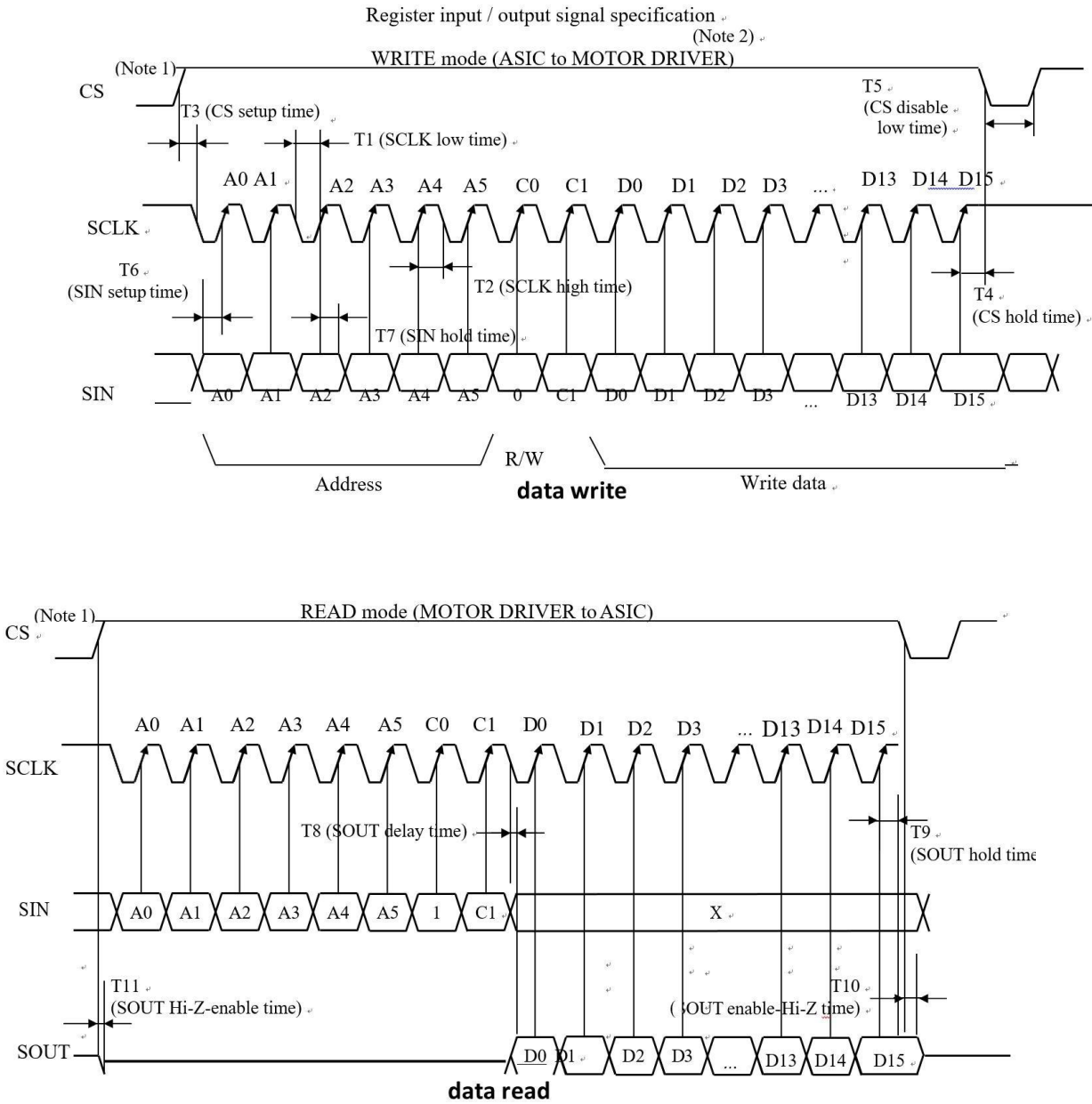
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
MVCC current on Reset	Ivreset	No load, no 27MHz inputs,RSTB=0		0	2.0	uA

MVCC current	Ivmon	Output open		0.5	15	mA
DVDD,AVDD standby current	Ivddreset	no 27MHz inputs, RSTB=1		0	10	uA
DVDD,AVDD current	Ivddon	No load,RSTB=0		7	20	mA
VDD5 standby current	Ivdd5reset	no 27MHz inputs, RSTB=1		0	10	uA
VDD5 current	Ivdd5on	No load,RSTB=0		0.1	1	mA
STM OUT H-bridge driver (focus&zoom)						
Rdson,up+down4	RdsON1	Io=100mA;T=25°		1.2	1.8	Ω
When off leakage current	IOFF1	Vout=0V	-10		10	uA
LED DRIVERS						
Output on resistance	Rdson3				5	Ω
When off leakage current	IOFF2		-10		10	uAs
Logic inputs/output						
Input logic-low voltage	V _{IL}	OSCIN,CS,SCK,SIN,VD_FZ,RSTB	-0.3	1.02	0.2*D _V D	V
Input logic-high voltage	V _{IH}	OSCIN,CS,SCK,SIN,VD_FZ,RSTB	0.54*D _V DD	1.36	D _V DD+0.3	V
output logic-l voltage	V _{OH}	PLS1,PLS2,SOUT,1mA Sink			0.5	V
Outpu logic-high voltage	V _{OL}	PLS1,PLS2,SOUT,1mA Source	0.9*D _V DD			
Pulldown resistance	R _{pd}	RSTB		100		kΩ
PROTECTION CIRCUITS						
Over temperature protection	TSD		155	169	180	°C
Over temperature protection hysteresis	ΔTSD			26		°C
Under voltage lockout	V _{UVLO1}	DVDD,AVDD		2.27		V
Under voltage lockout hysteresis	ΔV _{UVLO1}	DVDD,AVDD		0.2		V
Under voltage lockout	V _{UVLO2}	MVCCA,MVCCB,VDD5		2.20		V
Under voltage lockout hysteresis	ΔV _{UVLO2}	MVCCA,MVCCB,VDD5		0.2		V

Function description

(1) Serial interface

Timing chart:



TA = 25°C, VCC = 5 V, RL = 20 Ω

Parameter	condition	range		Unit
		Min	Max	
SPI Speed	Serial clock	1	5	MHz
T1	SCLK low time	100	-	ns
T2	SCLK high time	100	-	ns
T3	CS setup time	60	-	ns
T4	CS hold time	60		ns
T5	CS disable low time	100		ns
T6	SIN setup time	50		ns
T7	SIN HOLD time	50	-	ns
T8	SOUT delay time	-	60	us
T9	SOUT hold time	60		ns
T10	SOUT enable-Hiz time	-	60	ns
T11	SOUT Hiz-enable time	-	60	ns
Cload	SOUT Capacitor load	-	40	pF

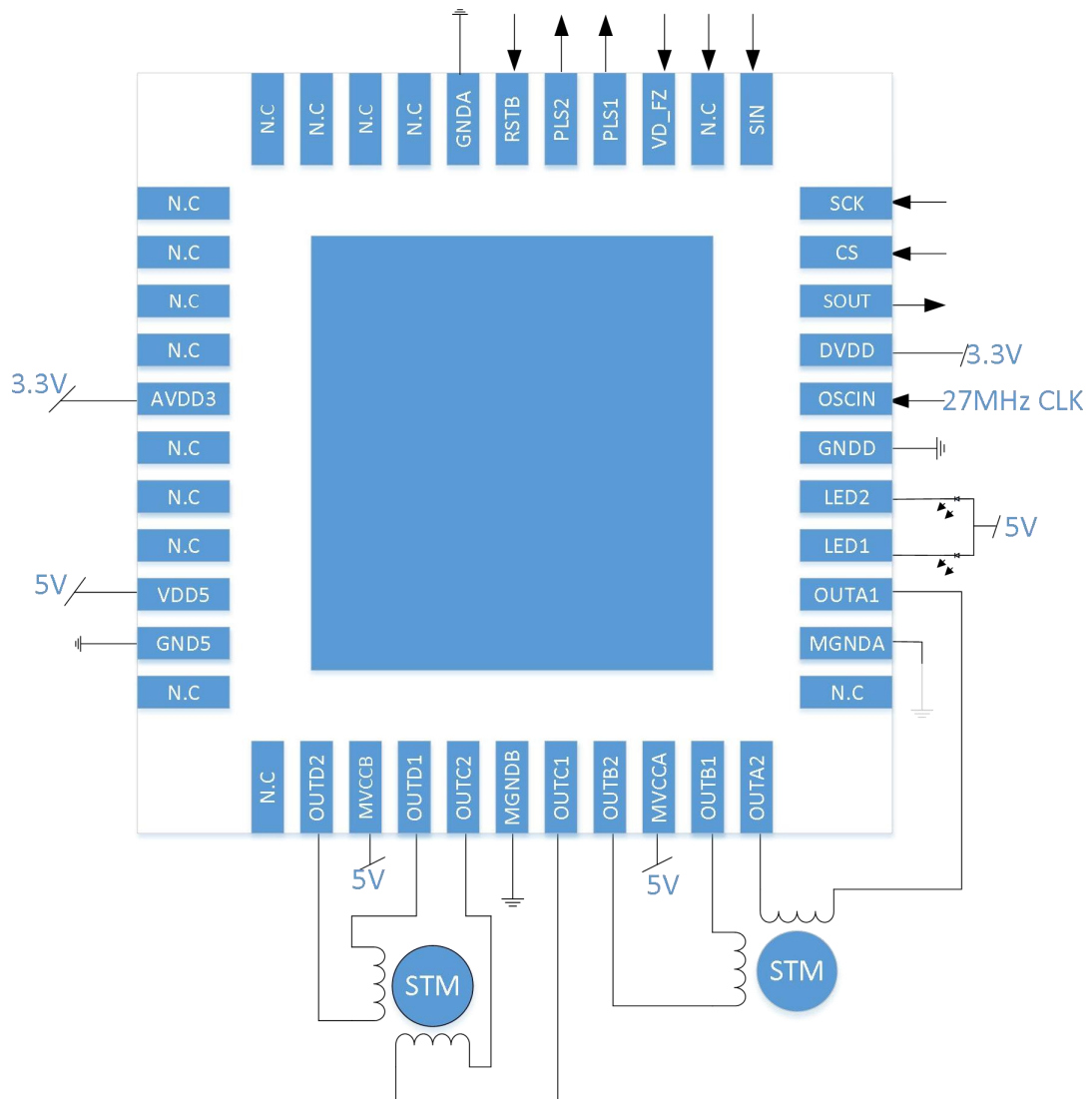
(2) register map

	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
0BH							MODE SEL_FZ		TEST EN1							
20H		PWMRES[1: 0]		PWMMODE[4:0]				DT1[7:0]								
21H									TEST EN2			FZTEST[4:0]				
22H			PHMODAB[5:0]					DT2A[7:0]								
23H	PPWB[7:0]								PPWA[7:0]							
24H			MICROAB [1:0]	LEDB	ENDIS AB	BRAKE AB	CCWCW AB	PSUMAB[7:0]								
25H	INTCTAB[15:0]															
27H			PHMODCD[5:0]					DT2B[7:0]								
28H	PPWD[7:0]								PPWC[7:0]							
29H			MICROCD [1:0]	LEDA	ENDIS CD	BRAKE CD	CCWC WCD	PSUMCD[7:0]								
2AH	INTCTCD[15:0]															

(3) register description

Address	Register	Function	
0Bh	TESTEN1	Test mode enable 1	
	MODESEL_FZ	VD_FZ polarity selection	
20h	DT1[7:0]	Start point wait time	
	PWMODE[4:0]	Micro step output PWM frequency	
	PWMRES[1:0]	Micro step output PWM resolution	
21h	FZTEST[4:0]	PLS1/2 pin output signal selection	
	TESTEN2	Test mode enable 2	
22h	DT2A[7:0]	α motor start point excitation wait time	
	PHMODAB[5:0]	α motor phase correction	
23h	PPWA[7:0]	Driver A peak pulse width	
	PPWB[7:0]	Driver B peak pulse width	
24h	PSUMAB[7:0]	α motor step count number	
	CCWCWAB	α motor rotation direction	
	BRAKEAB	α motor brake	
	ENDISAB	α motor enable/disable control	
	LEDB	LED B output control	
	MICROAB[1:0]	α motor sine wave division number	
25h	INTCTAB[15:0]	α motor step cycle	
27h	DT2B[7:0]	β motor start point excitation wait time	
	PHMODCD[5:0]	β motor phase correction	
28h	PPWC[7:0]	Driver C peak pulse width	
	PPWD[7:0]	Driver D peak pulse width	
29h	PSUMCD[7:0]	β motor step count number	
	CCWCWCD	β motor rotation direction	
	BRAKECD	β motor brake	
	ENDISCD	β motor enable/disable control	
	LEDA	LED A output control	
	MICROCD[1:0]	β motor sine wave division number	
2Ah	INTCTCD[15:0]	β motor step cycle	

Typical Application



GC6209 typical application

Package Information
