CM04I02A

Data Sheet

20V 3-Phase IPM

Embedded 5V LDO

Version: 0.0

Features

- IPM VM supply range from 10 ~ 20 V
- 5V input logic compatible
- Cross conduction prevention
- Built-in 5V / 30mA regulator

Applications

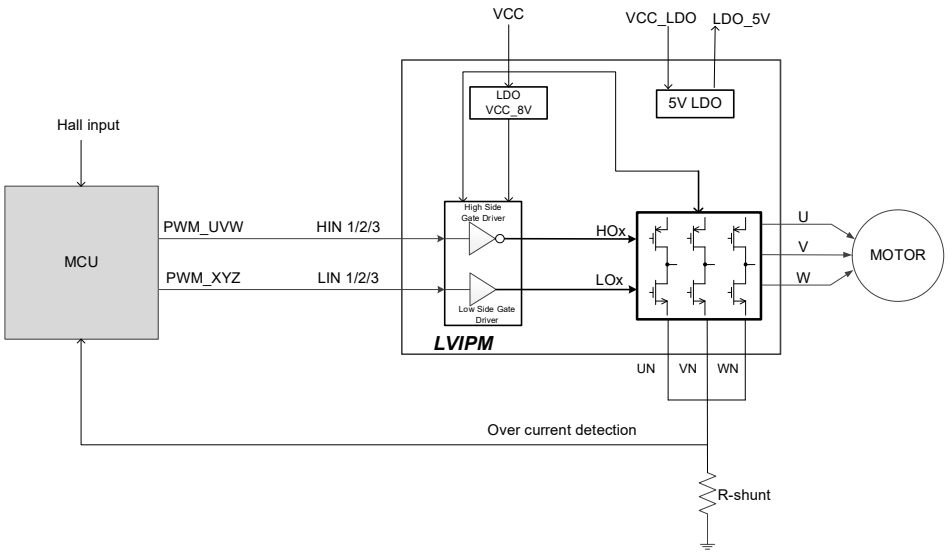
- 12V small fans
- 12V water pumps

List of Contents

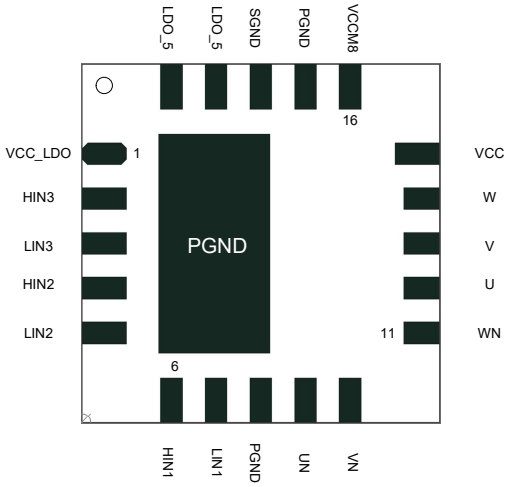
1 Description

The CM04I02A is an IPM for a 12V BLDC motor with a built-in 5V/30mA LDO and used in 12V small fans and water pumps.

2 Block Diagram



3 Pin Instruction (QFN4X4)



4 Pin Definitions

QFN40 PIN N.O.	Name	Type	Description
1	VCC_LDO	Power	LDO 5V power supply.
2	HIN3	I	Phase W logic input for high side gate driver. (P MOS)
3	LIN3	I	Phase W logic input for low side gate driver. (N MOS).
4	HIN2	I	Phase V logic input for high side gate driver. (P MOS)
5	LIN2	I	Phase V logic input for low side gate driver. (N MOS).
6	HIN1	I	Phase U logic input for high side gate driver. (P MOS)
7	LIN1	I	Phase U logic input for low side gate driver. (N MOS).
8	PGND	Ground	Power ground.
9	UN	--	Phase U GND of 3-phase inverter
10	VN	--	Phase V GND of 3-phase inverter
11	WN	--	Phase W GND of 3-phase inverter
12	U	Power	Phase U output
13	V	Power	Phase V output
14	W	Power	Phase W output
15	VCC	Power	Supply voltage input.
16	VCCM8	O	LDO VCCM8 output
17	PGND	Ground	Power ground.
18	SGND	Ground	Logic ground
19 / 20	LDO_5	Power	5V output of LDO.

5 Absolute Maximum Ratings

Item	Min.	Typ.	Max.
VCC Input Voltage	V_{SS}-0.3V		V_{cc}+0.3V
Operating Temperature with LDO_5 30mA	-40℃		85℃
Operating Temperature w/o LDO_5	-40℃		105℃
Output Pin Current (U, V, W)		4A	
Θ_{JA} Thermal Resistance, Junction-to-ambient (SSOP-28L)		82℃/W	
Θ_{JA} Thermal Resistance, Junction-to-ambient (QFN32-4x4)		30℃/W	
Storage Temperature	-50℃		150℃
Operating Temperature	-20℃		105℃
I_{OH} Total		-80mA	
I_{OL} Total		80mA	
Total Power Dissipation		500mW	
Electrostatic Discharge Capability – Human Body Mode		1500 (KV)	
Electrostatic Discharge Capability – Machine Mode		200 (V)	

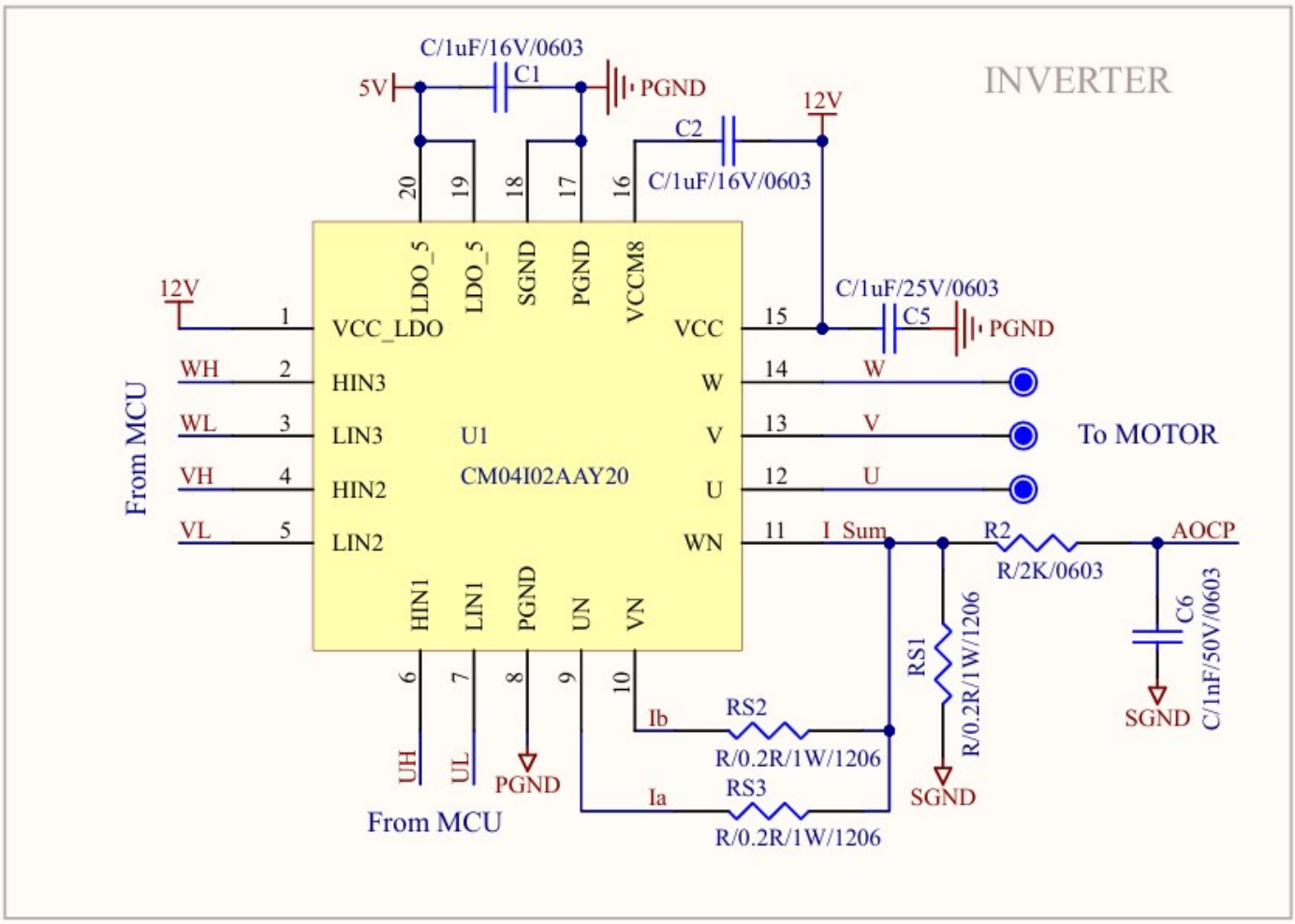
6 D.C. Characteristics

Ta=25℃

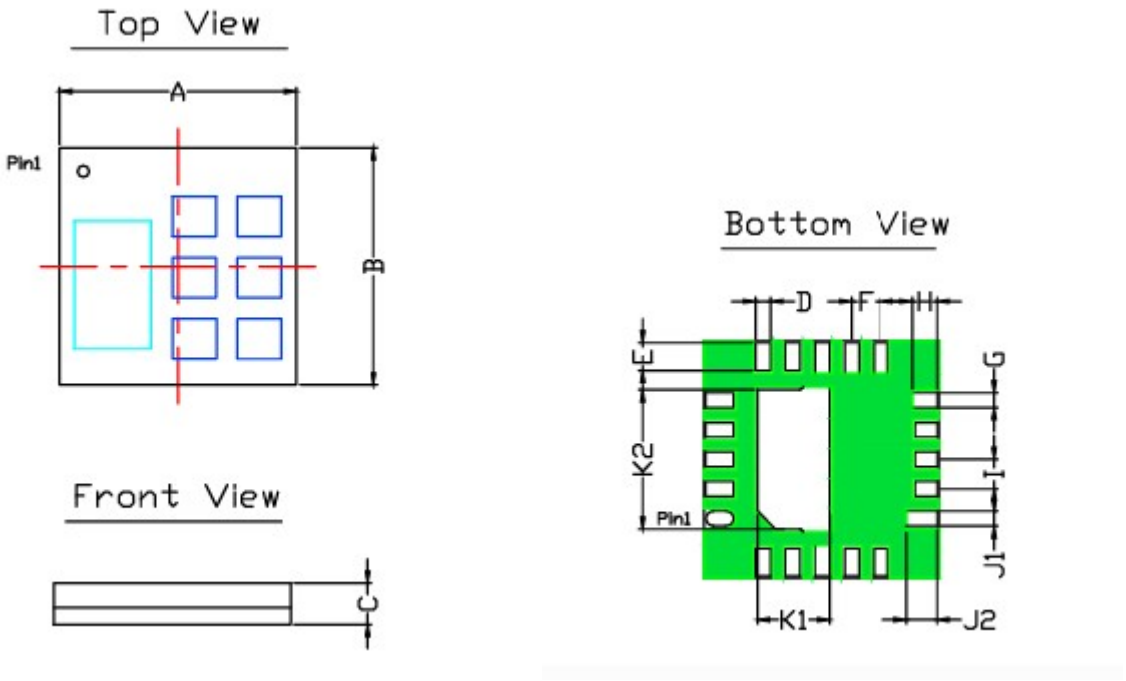
VCC=15V, Ta=25℃, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VCC	DC Voltage Input		10	—	20	V
MOS Rdson	Rds-on	V_{GS}=-10V, Io =-1A (H+L)		55	65	mΩ
VIH_1/2/3	Logic "1" Input Voltage	Vcc = 10V to 20V	2.4	—	—	V
VIL_1/2/3	Logic "0" Input Voltage	Vcc = 10V to 20V	—	—	0.8	
IQCC	Quiescent VCC supply current	VIN = 0V or 5V			800	μA
RIN	HI_1/2/3, LI_1/2/3 Pin Pull Low Resistor			100		KΩ
VCCM8 LDO Characteristics						
VCCM8	VCCM8 Regulator Output Voltage	VCC = 20V, Io = 6mA		12		V
5V LDO Characteristics						
VLDO	Regulator Output Voltage	VCC = 20V, Io = 30mA		5.0		V

7 Typical Application Circuit

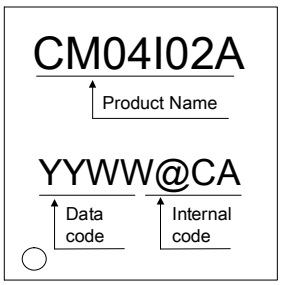


8 Package Information (QFN20-4x4x0.7 mm (AY20) Outline Dimensions)



Unit	DIMENSIONS IN MILLIMETERS		
PKG	QFN20L 4X4X0.7MM		
Symbols	Min.	Nom.	Max.
A	3.90	4.00	4.10
B	3.90	4.00	4.10
C	0.65	0.70	0.75
D	0.20	0.25	0.30
E	0.42	0.47	0.52
F	0.45	0.50	0.55
G	0.20	0.25	0.30
H	0.37	0.42	0.47
I	0.45	0.50	0.55
J1	0.20	0.25	0.30
J2	0.47	0.52	0.57
K1	1.168	1.218	1.268
K2	2.30	2.35	2.40

9 Marking Distinguish (Standard Ink)



10 Ordering Information

CM 04I02A AY20

CheerGoal	Product Name	Package AY20 : QFN20-4x4

11 Revision History

Update Date	Version	Modify content
2026 / 01 / 22	V0.0	1. Preliminary edition