Charge Control C
Datasheet

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Contents

Revisions

Revision	Release Date	Changes
3	April 5, 2019	added information about which EIA-485 supports failsafe biasing, added information about included software licenses, added absolute maximum ratings for digital inputs, corrected error in variant table stating that Charge Control C 100 does not have ”PWM to PEV”
2	January 11, 2019	clarified that size is without case, added symbol declaration Vcc to ,,DC supply voltage”, clarified that no available variant has the CAN interface, removed second (not isolated RS-485) from HW variant 200, corrected typos, decreased max EIA-485 Baudrate, removed invalid order codes, moved informations to user guide, extended product variant table to list common interfaces and not just differences
1	October 11, 2018	initial release

1 Introduction

Charge Control C is an ISO 15118 compliant charging controller for Electric Vehicle Supply Equipment (EVSE). It enables the charge controller to communicate with electric vehicles (EVs) that are ISO 15118 / DIN 70121 compliant. For communication between EVSE and PEV it supports CP (control pilot), PP (proximity pilot) as well as PWM signaling including Green PHY communication. This charging controller is also capable of controlling and sensing different kind of actuators and sensors like LED, relays, contactors and RCDs through its digital I/Os. The board is provided with a Linux operating system.

Features:

- HomePlug Green PHY^{TM} compatible QCA7000 Chip for control pilot communication
- HomePlug Green PHY^{TM} compatible QCA7000 Chip for mains communication
- Filtered output for an auxiliary power supply to improve PLC performance
- Standards: Supported Standards: ISO 15118, Ethernet (IEEE 802.3), EIA-485 (RS-485), ARP, ICMP, IGMPv2, IPv4, IPv6, DHCPv4, TCP, UDP, HTTP, IEC 61851, IEC 60950-1
- Network interface for Backend Connectivity: Fast Ethernet 100 Mbit/s and HomePlug AV GreenPHY 10 Mbit/s
- charging stack for ISO 15118 (AC only) with an optional MQTT interface
- Running a Linux Operating System that allows you to adapt the behaviour of the charging station by writing your own control software around the charging stack.

Parameter	Value
Power supply	12 V
Power consumption	max. 13 W
Temperature range	-20 °C - +85 °C
Outline dimension	120 mm ($\pm$300 μm) x 107.3 mm ($\pm$300 μm) x 27.6 mm (w/o case)
Weight	110 g
RoHS	this product is manufactured RoHS compliant.

2 Applications

- charge controller in electric vehicle supply equipment (EVSE)
- simulators for tests of PEV

3 Technical Data

3.1 Electrical Characteristics

3.1.1 Absolute maximum ratings

Safety parameter

SAFETY PARAMETER	
Insulation coordination according to	IEC 60950-1:2006
Overvoltage category	III
Pollution degree	2
Altitude	max. 2000 m above sea level

Maximum parameter

MAX PARAMETER	**MIN**	**MAX**	**UNIT**
DC supply voltage (Vcc)	-0.3	+28	V
Proximity pilot voltage	-0.3	+3.3	V
EIA-485 common mode input voltage	-10	15	V
1-Wire input voltage	-0.5	6	V
USB Vbus		5	V
USB D+, D-	-0.3	5.5	V
CANH, CANL	-12	12	V
fan tach voltage	0	3.3	V
digital inputs voltage	-0.3	18.5	V

3.1.2 Recommended operating conditions

Supply parameter

SUPPLY PARAMETER	**MIN**	**TYP**	**MAX**	**UNIT**
DC supply voltage	11	12	13	V
AC supply voltage	85	110 / 230	250	V
AC supply frequency	-	60 / 50	-	Hz
required AC fuse (installation side)	-	-	6	A
Filtered AC output current (L' / N')	-	-	0.25	A

EIA-485 parameter

EIA-485 PARAMETER	MIN	TYP	MAX	UNIT
Common mode input voltage	-7		12	V
Max driver output capability		$\pm$ 60		mA
Receiver input sensitivity		$\pm$ 200		mV
Data rate			115.2	Kbps
Short-circuit output current			250	mA
Unit load		1*		
Isolation voltage	500 **			V

* : up to 32 Devices on the bus
** : only for the isolated EIA-485 (X7)

Control pilot parameter

CP PARAMETER	MIN	TYP	MAX	UNIT
Control pilot voltage	-12.5		+12.5	V

Fan parameter

FAN PARAMETER	MIN	TYP	MAX	UNIT
fan supply voltage	Vcc - 0.8	Vcc-0.55	Vcc	V
fan supply current	-	-	125	mA

1-Wire parameter

1-WIRE PARAMETER	MIN	TYP	MAX	UNIT
Input low			0.6	V
Input high	2			V

Ethernet parameter

ETHERNET PARAMETER	MIN	TYP	MAX	UNIT
* compliant with IEEE802.3/802.3u (Fast Ethernet), ISO 802-3/IEEE 802.3 (10BASE-T)				

Mains powerline communication parameter

PLC ON MAINS PARAMETER	MIN	TYP	MAX	UNIT
Reach			300	m
Data rate			10	Mbit/s

GreenPHY powerline communication parameter

PLC ON CONTROL PILOT PARAMETER	MIN	TYP	MAX	UNIT
Reach			300	m
Data rate			10	Mbit/s

USB parameter

USB PARAMETER	MIN	TYP	MAX	UNIT
Input voltage (Product as device)		5		V
Output voltage (Product as host)		5		V
Output current (Product as host)			500	mA

CAN bus parameter

CAN Bus PARAMETER	MIN	TYP	MAX	UNIT
Data rate			1	Mb/s
CANH; CANL recessive bus output voltage	2.0	2.5	3.0	V
Reccessive output current	-5	-	5	mA
CANH dominant output voltage	2.75	3.5	4.50	V
CANL dominant output voltage	0.50	1.5	2.25	V
Symmetry of dominant output voltage (5V - VCANH - VCANL)	-400	0	400	mV
Dominant differential output voltage	1.5	2.0	3.0	V
Recessive differential output voltage	-500	0	50	mV
CANH short circuit output current	-100	-85	-	mA
CANL short circuit output current	-	75	100	mA

Motor driver parameter

MOTOR DRIVER PARAMETER	MIN	TYP	MAX	UNIT
Output voltage		12		V
Peak output current			3.6	A
Output current	0		3.5	A

Digital input parameter

DIGITAL INPUT PARAMETER	MIN	TYP	MAX	UNIT
Input voltage	0		12	V

Digital output parameter

DIGITAL OUT PARAMETER	MIN	TYP	MAX	UNIT
Output current			100	mA
Output voltage		Vcc		V

Relay parameter

RELAY PARAMETER	MIN	TYP	MAX	UNIT
Max switching voltage AC			250	VAC
Max switching voltage DC			24	VDC
Max carrying current			6	A
Mechanical life	$10 * 10^6$			operations
Electrical life	$50 * 10^3$			operations @ 6A,250VAC/24VDC
Sense input voltage	AC supply voltage			

Environment parameter

ENVIRONMENT PARAMETER		Min.	Typ.	Max.	UNIT
TAMB	Operating temperature	-20	-	85	°C
TSTORE	Storage temperature	-40	-	85	°C
RAH	Relative air humidity (non condensing)	0	-	85	%

4 Handling

This electronic component is sensitive to electrostatic discharge (ESD).

5 Mechanical Dimensions

The mechanical dimensions and mounting holes of this product are dimensioned in Figure 1.
Every mounting hole has a copper restrict area to support mounting via enclosure domes and screws. Screws and domes shouldn't exceed a 7.8 mm diameter.

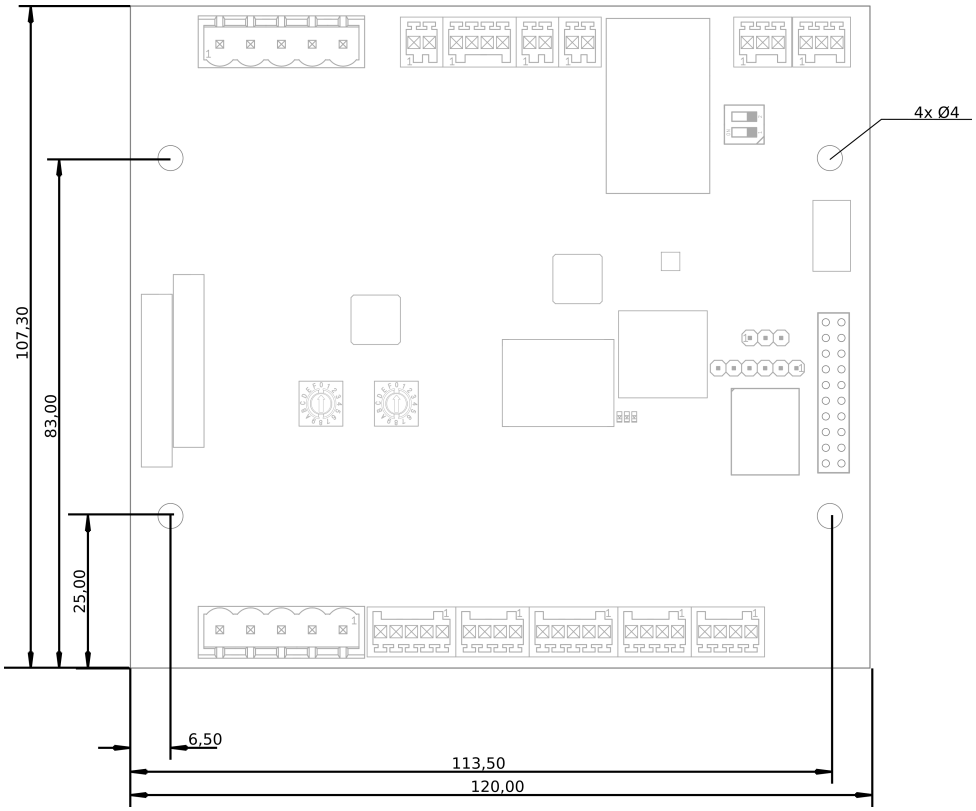
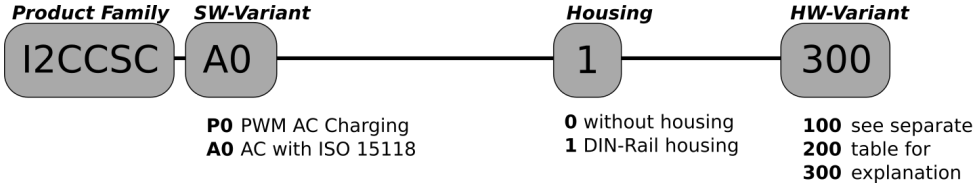


Figure 1: Mechanical drawing of Charge Control C

6 Product Variants

Interface	Charge Control C		
	100	200	300
i.MX6ULL Controller, eMMC, DDR3	1	1	1
Ethernet	-	1	1
PLC over mains	-	-	1
PLC to PEV	-	1	1
PWM to PEV	1	1	1
Relay outputs (250 VAC / 6 A) with sense feedback	1	2	2
RS485 (not galvanically isolated, with failsafe biasing)	-	-	1
RS485 (galvanically isolated, without failsafe biasing)	1	1	1
USB	1	1	1
Digital input	4	4	6
Digital output	4	4	6
1-Wire Temperature Interface	-	1	1
Locking Motor Interface	-	2	2
Rotary coding switch	1	1	1
Fan output	-	-	1
Option Connector	1	1	1
Mounting holes	4	4	4
CAN*	-	-	-

7 Order Code



permissible order codes	SW Variant	Included OCPP License	Housing	HW Variant
I2CCSC-P00-100	PWM AC Charging	no	without housing	100
I2CCSC-P00-200	PWM AC Charging	no	without housing	200
I2CCSC-P00-300	PWM AC Charging	no	without housing	300
I2CCSC-A00-200	AC with ISO15118	no	without housing	200
I2CCSC-A00-300	AC with ISO15118	no	without housing	300
I2CCSC-P01-100	PWM AC Charging	no	DIN-Rail housing	100
I2CCSC-P01-200	PWM AC Charging	no	DIN-Rail housing	200
I2CCSC-P01-300	PWM AC Charging	no	DIN-Rail housing	300
I2CCSC-A01-200	AC with ISO15118	no	DIN-Rail housing	200
I2CCSC-A01-300	AC with ISO15118	no	DIN-Rail housing	300