

## Wide Input CC/CV Synchronous Buck Converter

### General Description

AT8802Z is a wide input voltage, high efficiency step-down DC/DC converter that operates in either CV (Constant Output Voltage) mode or CC (Constant Output Current) mode. AT8802Z provides up to 4A output current at 110kHz switching frequency, and the CC level can be adjusted by changing external sensing resistor.

The AT8802Z provides full protection functions, thermal shutdown is to prevent over temperature operating from damage; cycle by cycle current limit is against over current operating of the switch; under voltage protection (UVP); flexible over voltage protection threshold setting by OVP pin.

The device is available in QFN5X4-24L package and require very few external devices for operation.

### Features

- Wide Input Voltage with 8V ~ 40V Operation
- Up to 4A Output Current
- Fixed Frequency 110 kHz with Easy EMI Control
- Constant voltage and constant voltage control
- Precision Feedback Voltage 1.2V+-1%
- Precision CC Limit with +-5% Accuracy
- Cable Compensation Output Voltage around 3% at 100% CC Limit Level
- Integrated 20mohm High Side MOS, 10mohm Low Side MOS
- Internal MOS 10A Current Peak Protected with Cycle by Cycle Current Limit
- QFN5X4-24L Package

### Applications

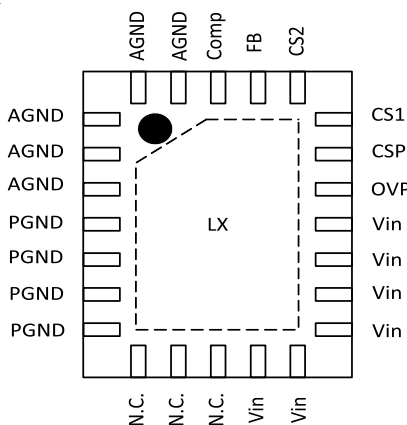
- Car Charger/Adaptor
- General-Purposed DC/DC Converters with Constant Current Limit
- Rechargeable Portable Devices

### Ordering and Marking Information

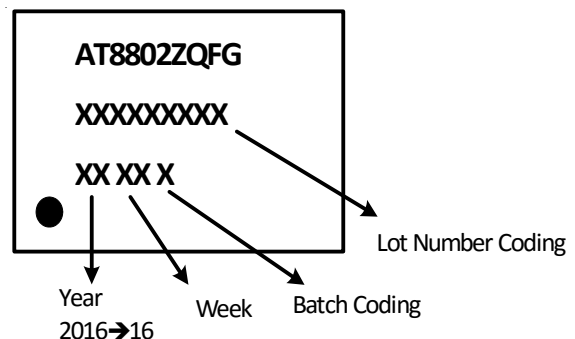
Order Number	Package
AT8802ZQFG	QFN5X4-24L

Note: Aplustek products are compatible with the current IPC/JEDEC J-STD-020 requirement. They are halogen-free, RoHS compliant and 100% matte tin (Sn) plating that are suitable for use in SnPb or Pb-free soldering processes.

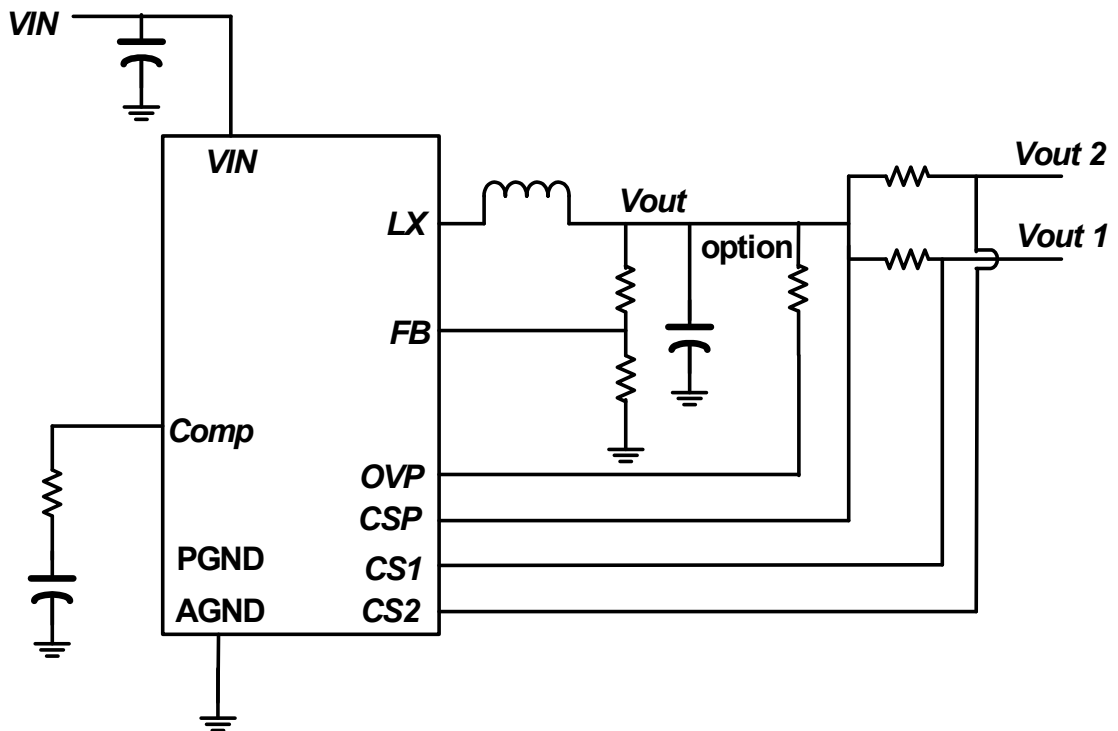
### Pin Configuration



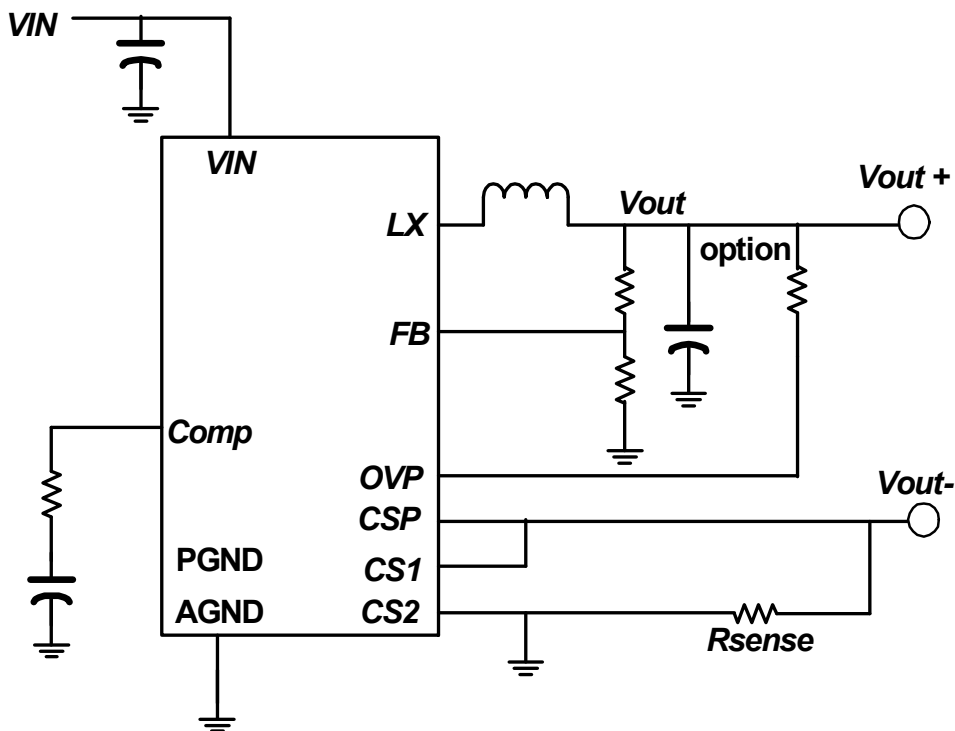
### Top Marking



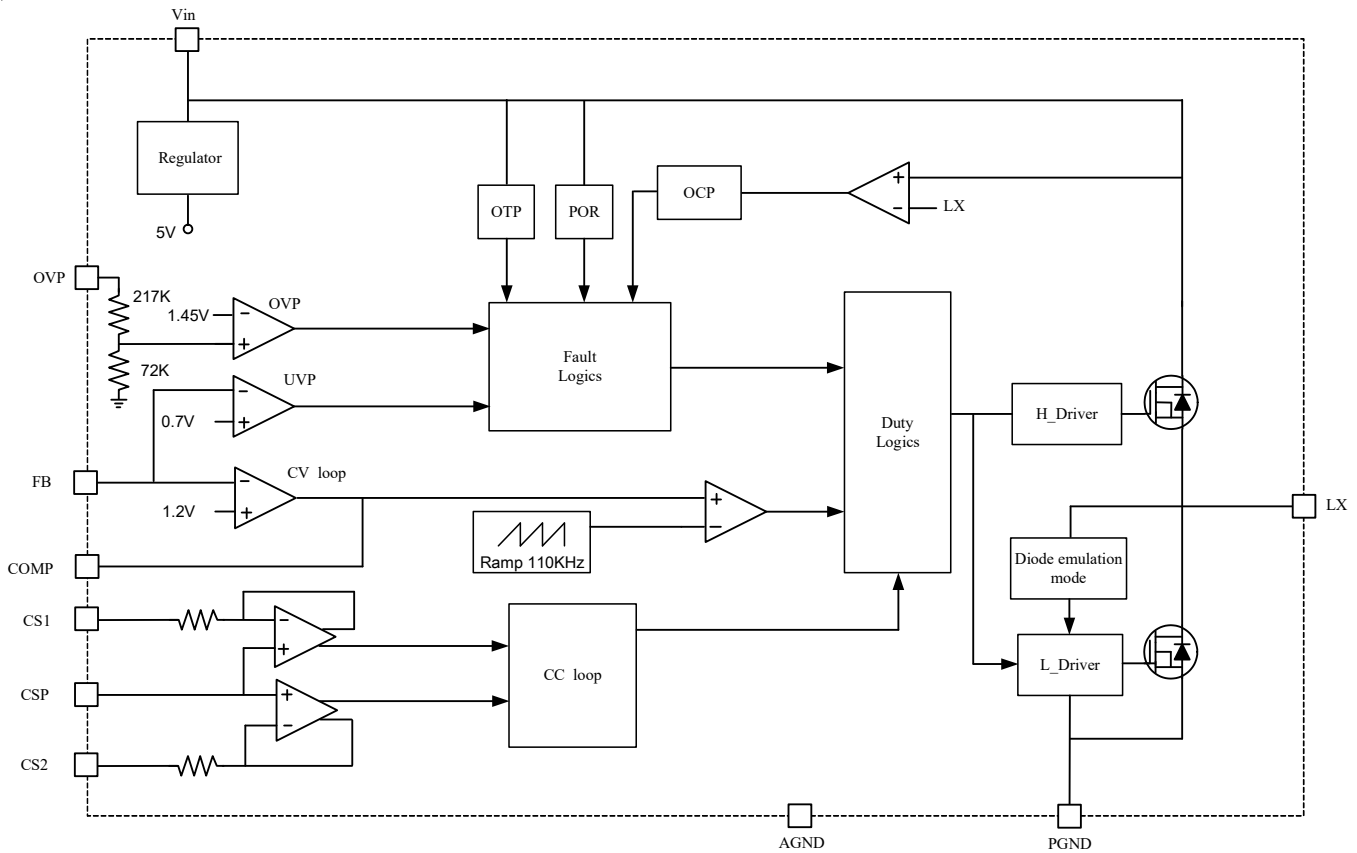
Multi Output Typical Application Circuit



Quick Charging Typical Application Circuit



## Function Blocks



## Function Pin Description

No.	Pin Name	Pin Function
4~7	PGND	<b>Power Ground for Internal MOS.</b>
8~10	N.C.	<b>No Connection.</b>
11~16	Vin	<b>Power Supply Input.</b> Bypass this pin with a 0.1uF ceramic capacitor to GND, placed as close to the IC as possible.
17	OVP	<b>OVP threshold setting input Pin.</b> Connect a resistor to output capacitor.
18	CSP	<b>Current sense positive input pin.</b> Connect to output capacitor.
19	CS1	<b>Channel 1 Current sense negative input pin.</b>
20	CS2	<b>Channel 2 Current sense negative input pin.</b>
21	FB	<b>Feedback Input.</b> The voltage at this pin is regulated to 1.2V. Connect to resistor divider between output and GND to set the output voltage.
22	COMP	<b>Error Amplifier output Pin.</b> The pin is used to compensate the converter.
1~3, 23~24	AGND	<b>Power Ground for internal control circuit.</b>
E.pad	LX	<b>Power Switching Output to external Inductor.</b>



## Absolute Maximum Ratings

(Note1)

Supply Input Voltage, $V_{in}$	-----	-0.3V to +44V
LX to PGND,AGND DC	-----	-0.3V to +44V
FB,COMP to AGND DC	-----	-0.3V to +7V
OVP,CSP,CS1,CS2 to AGND DC	-----	-0.3V to +16V
Storage Temperature Range	-----	-65°C to +150°C
Junction Temperature	-----	-40°C to +150°C
Lead Temperature Range(Soldering 10sec)	-----	260°C
ESD Rating (Note2)		
HBM(Human Body Mode)	-----	-2KV
MM(Mechine Mode)	-----	-200V

## Thermal Characteristics

Package Thermal Resistance (Note3)

QFN5X4-24L $\theta_{JA}$	-----	33°C/W
QFN5x4-24L $\theta_{JC}$	-----	8°C/W
Power Dissipation, PD @ TA=25°C	-----	3W
PD @ TA=50°C	-----	2.27W
PD @ TA=63°C	-----	1.87W

## Electrical Characteristics

( $V_{CC} = 12V, T_A = +25^\circ C$  unless otherwise specified.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
<b>Supply Input Section</b>						
VCC operation range	$V_{CC,R}$		8	--	40	V
VCC UVLO threshold	$V_{CC,R}$	VCC Rising	--	7.5	--	V
	$V_{CC,F}$	VCC Falling	--	6.3	--	V
VCC operation current	$I_{CC}$	VCC=9V to 40V, COMP short to FB	--	1	1.5	mA
<b>Oscillation Section</b>						
PWM Frequency	$F_{SW}$		--	110	--	kHz
			-15%	--	+15	%
Max Duty	$D_{MAX}$		--	92	--	%
<b>PWM loop Section</b>						
Feedback reference voltage	$V_{REF}$		--	1.2	--	V
Feedback reference accuracy			-1%	--	+1%	%
COMP source current		FB<1.2V	--	85	--	uA
COMP sink current		FB>1.2V	--	85	--	uA
COMP High voltae		FB<1.2V	--	5	--	V
<b>Fault protection Section</b>						
OVP threshold	$V_{OVP}$	OVP pin connect to VOut	--	5.9	--	V
FB under voltage level	$V_{UVP}$		--	0.7	--	V
FB short Impedance level	$V_{SHORT}$		--	0.2	--	V



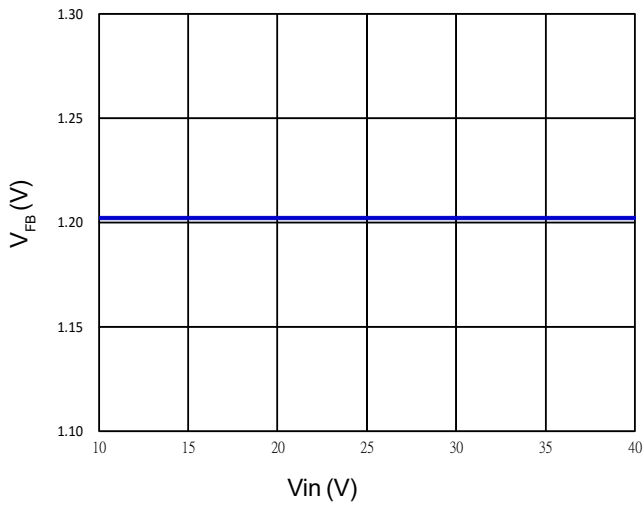
Over Temperature level	$T_{OTP}$		--	150	--	°C
	$T_{HYS}$		--	40	--	°C
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
<b>Fault protection Section</b>						
Internal Soft Start time	$T_{SS}$		--	4.5	--	mS
Fault recycle waiting time	$T_{recycle}$		--	0.5	--	S
<b>CC Section</b>						
CS1/2 OP setting voltage		CSP-CS1/2		82		mV
CC1/CC2 setting accuracy			-5		+5	%
Cable compensation		CSP-CS1/2 =82mV		3		%
<b>High/Low side MOS Section</b>						
High side MOS ON resistance	$R_{DSON\_H}$		--	0.02	--	ohm
Low side MOS ON resistance	$R_{DSON\_L}$		--	0.01	--	ohm

**Note 1.** Exceeding these limits may impair the life of the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.

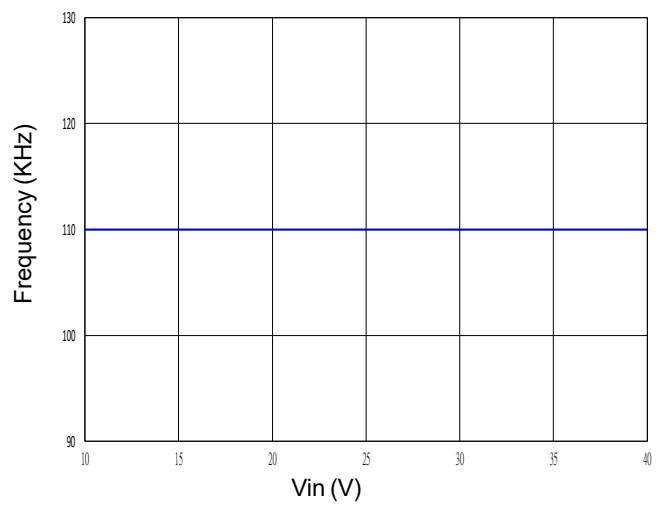
**Note 2.**  $\theta_{JA}$  is measured with the component mounted on a high effective thermal conductivity test board in free air. The exposed pad of the package is soldered directly on the PCB.

## Typical Operation Characteristics

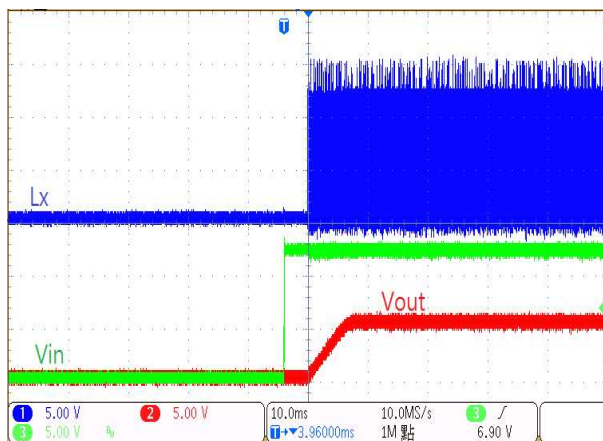
$V_{FB}$  vs.  $V_{in}$



Frequency vs.  $V_{in}$

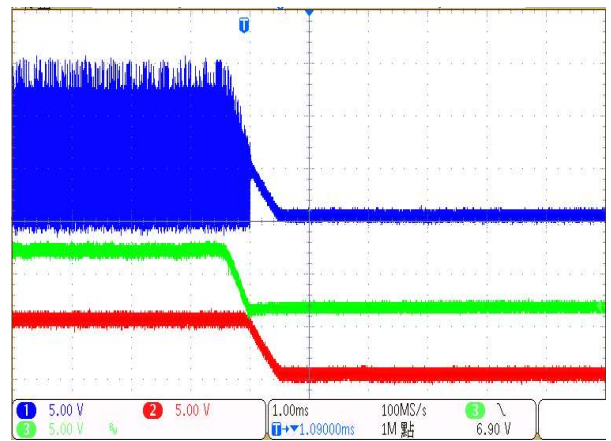


Power On from  $V_{in}$



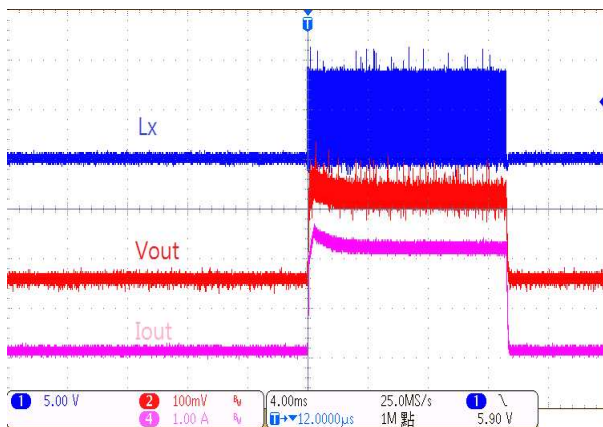
10ms/Div

Power Off from  $V_{in}$



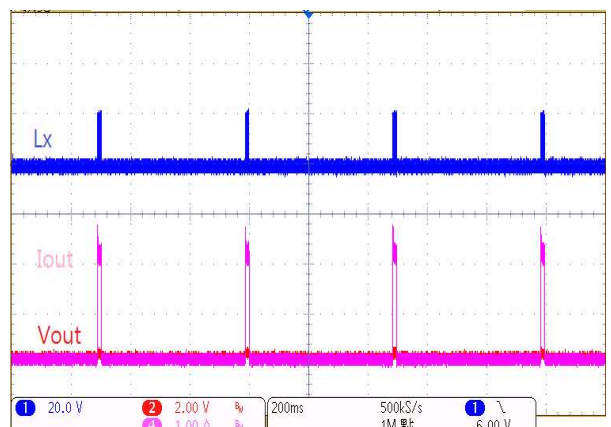
10ms/Div

CC setting=2.3A , Short Circuit Enter



4ms/Div

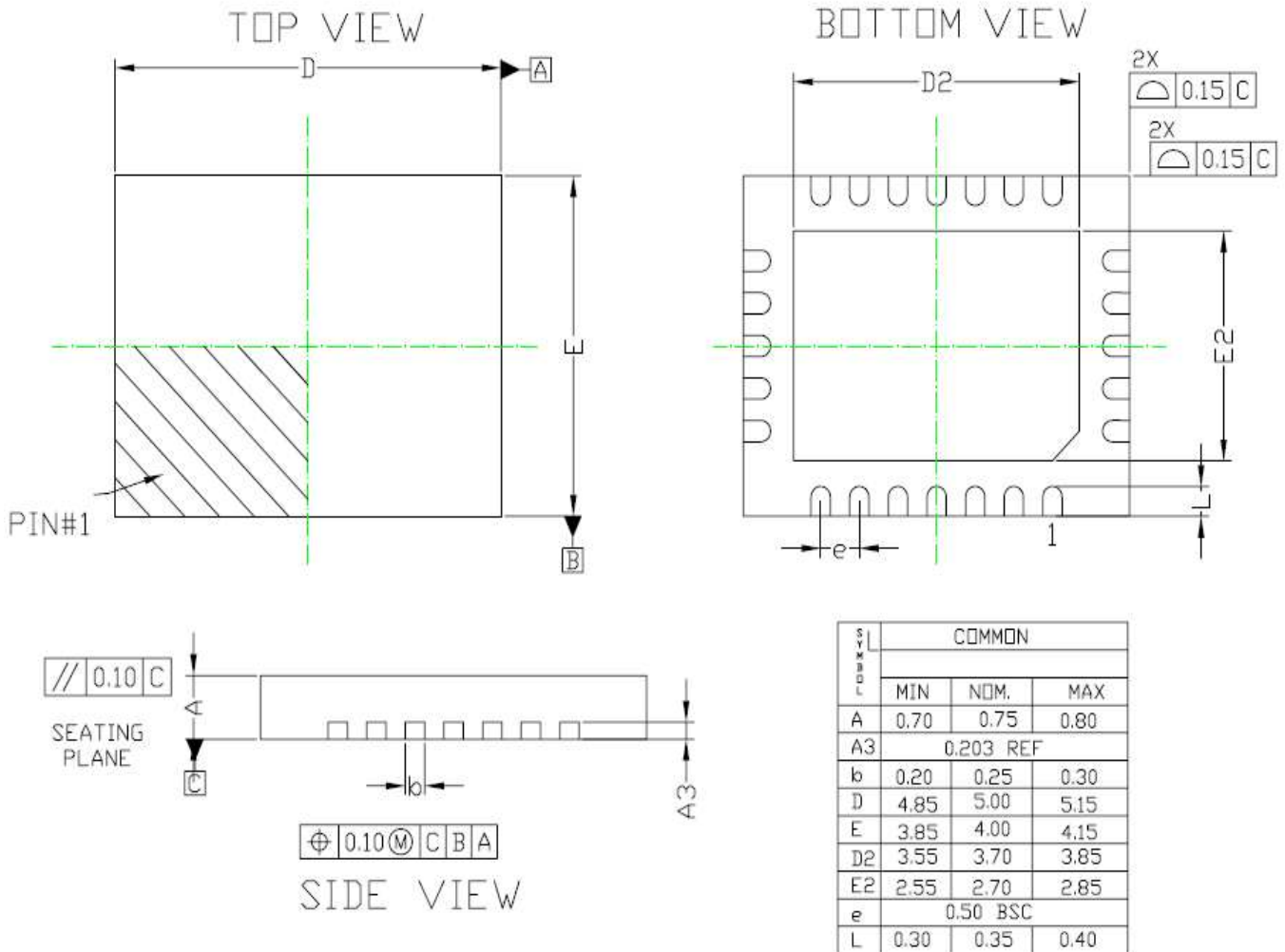
CC setting=2.3A , Short Circuit Recovery



200ms/Div

## Package Information

QFN5X4-24L



### Note

#### 1. Package Outline Unit Description:

BSC: Basic. Represents theoretical exact dimension .

MAX: Maximum dimension specified.

MIN: Minimum dimension specified.

REF: Represents dimension for reference use only. The value is not the device specification.

TYP: Represents as a typical value. The value is not the device specification.

#### 2. All linear dimensions are in Millimeters.

