

Constant current type 1-CH H-bridge driver IC

Features

- Low voltage operation (VDD min=2.5V)
- Low saturation voltage (sum of upside transistor and bottom side transistor is 0.3V at 200mA)
- Two operation mode FS/CC.
- Low input current.
- Low current consumption (sleep mode with zero current drain when EN is low.)
- Build-in thermal shutdown (TSD, 150°C).
- Small package: TDFN2X2-10

Applications

- Shutter or Iris controller for DSC
- Shutter or Iris controller for Mobile phone.

General Description

G2015 is a constant current type 1-CH H-bridge driver IC with small package (TDFN2X2-10). It is one channel CC/FS with H-bridge motor driver IC. It is suitable for camera module application for DSC and Mobile phone.

Ordering Information

ORDER NUMBER	MARKING	TEMP. RANGE	PACKAGE (Green)
G2015K21U	2015	-40°C to +85°C	TDFN2X2-10

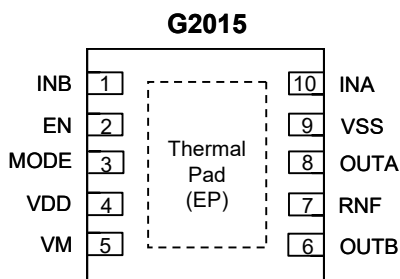
Note: K2:TDFN2X2-10

1: Bonding Code

U: Tape & Reel

Green : Lead Free / Halogen Free

Pin Configurations



Note: Recommend connecting the Thermal Pad to the GND or let it keep floating.

Absolute Maximum Ratings

Supply Voltage VDD (VDD). -0.5V to +5.5V
 Supply Voltage VM (VM). -0.5V to +5.5V
 Control Input Voltage (VIN). -0.5V to VDD+0.3V
 Output Current (I_{od})*¹. 0 to 450mA
 Thermal Resistance Junction to Ambient, (θ_{JA})*
 TDFN2X2-10 112.38°C/W
 Continuous Power Dissipation (T_A = +25°C)*
 TDFN2X2-10 1.139W

Thermal Resistance Junction to Case, (θ_{JC})
 TDFN2X2-10. 76.92°C/W
 Operating Temperature Range -40°C to 85°C
 Junction Temperature 150°C
 Storage Temperature Range -55°C to 150°C
 Instantaneous Output Current. 800mA/CH
 Reflow Temperature (soldering, 10sec) 260°C
 ESD (HBM)*². 4KV
 ESD (CDM). 1KV

* Please refer to EV Board PCB Layout Section.

1. Output current rating may be limited by ambient temperature and heat sinking. Under any set of conditions, do not exceed the specified.
2. Device are ESD sensitive. Handling precaution recommended. The Human Body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

* System Application Suggestions.

3. EN signal pull High after VDD/VM Power Ready.
4. If the application will connect VDD and EN PIN in series, the Tr of VDD is recommend to be under 1.2mS.

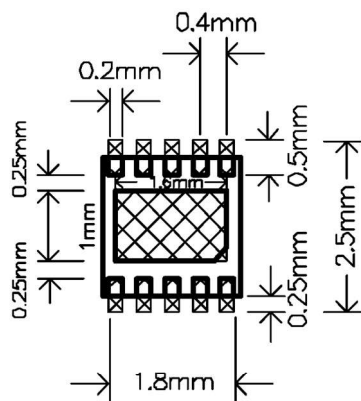
Electrical Characteristics

(T_A=25°C, VDD = 3V, VM=3V.)

The device is not guaranteed to function outside its operating conditions. Parameters with MIN and/or MAX limits are 100% tested at +25°C, unless otherwise specified.

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Power Supply Voltage						
Supply Voltage for CC mode	VDD, VM		2.5	3	5.5	V
Supply Voltage for FS mode	VDD, VM		1.8	3	5.5	V
Power Supply Current						
Stand by Current for CC mode	IDD0	If EN=L, IDD0=I _{VDD} +I _{VM}	---	1.0	2.0	μA
Operate Circuit Current for CC mode	IDD1	If EN=H, V _{INVA} , V _{INVB} ≠L, IDD1=I _{VDD} +I _{VM}	---	0.2	0.45	mA
Stand by Current for FS mode	IDD3	If V _{INVA} =0 and V _{INVB} =0, IDD3=I _{VDD} +I _{VM}	---	0.1	2.0	μA
Operate Circuit Current for FS mode	IDD4	If V _{INVA} , V _{INVB} ≠0, IDD4=I _{VDD} +I _{VM}	---	0.6	2.0	mA
Input PIN: INA, INB, EN						
H Level Input Voltage	VIH		0.5*VDD	---	VDD+0.3	V
L Level Input Voltage	VIL		-0.3	---	0.2*VDD	V
Input Voltage Hysteresis	VHsy		---	0.42	---	V
Input Current "H"	I _{IH}	V _{INVx} =VDD	---	---	3	μA
Input Current "L"	I _{IL}	V _{INVx} =0V	---	---	3	μA
CH1, CH2						
Output Voltage (Upper + lower)	VOUT1	I _{OUT} =200mA,	---	0.3	0.4	V
TSD						
Thermal Shut Down Temperature	TTSD		---	150	---	°C
Note: Temperature Hysteresis 25°C						

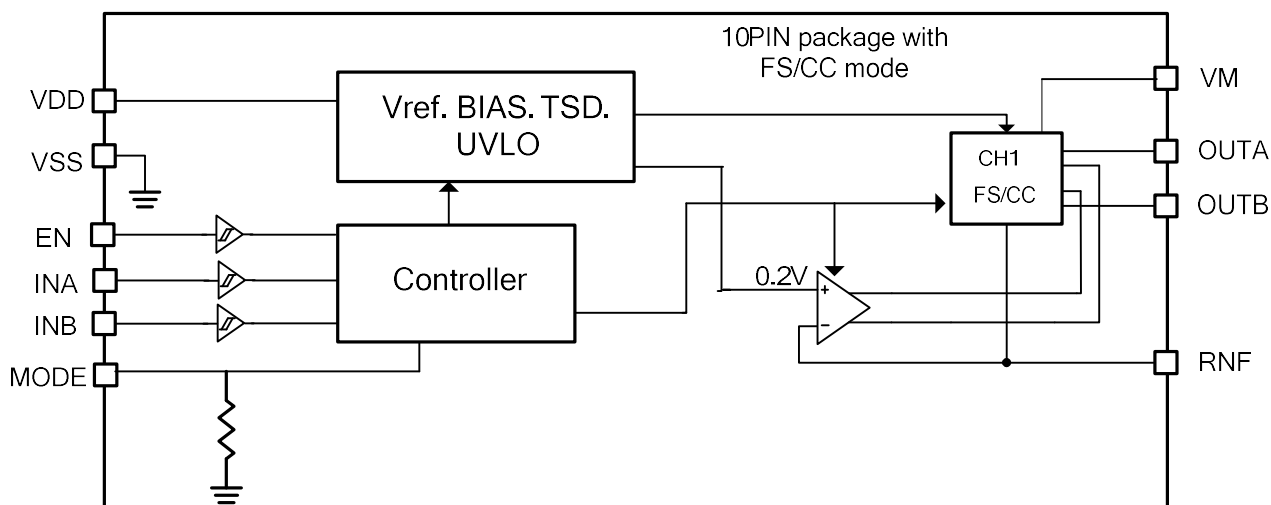
Minimum Footprint PCB Layout Section

TDFN2X2-10


Pin Description

PIN NO	NAME	I/O	DESCRIPTION
1	INB	I	Input pin that determines operation mode.
2	EN	I	Chip enable pin, if EN=L is turn off this IC.
3	MODE	I	FS/CC mode select pin MODE=H is CC, MODE=L is FS
4	VDD	Power	Power supply pin.
5	VM	Power	Power supply pin for power MOS
6	OUTB	O	Channel H-bridge output terminal B of CC/FS
7	RNF	I/O	Current detect terminal for CC, must connect the 1 ohm resistance to GND. If using for FS mode, this pin must connect to GND
8	OUTA	O	Channel H-bridge output terminal A of CC/FS
9	VSS	GND	Ground pin.
10	INA	I	Input pin that determines operation mode.
EP	PGND	GND	The EP pad must be connected to the power and analog ground plane.

Block Diagram



Truth Table
Mode =L is FS mode

Input terminal			Output terminal		MODE
EN	INA	INB	OUTA	OUTB	
X	L	L	Z	Z	Standby
X	H	L	H	L	Forward
X	L	H	L	H	Reverse
X	H	H	---	---	Keep the previous mode(Forward/Reverse)

Mode =H is CC mode

Input terminal			Output terminal		MODE
EN	INA	INB	OUTA	OUTB	
L	X	X	Z	Z	OFF1, EN=L turn off all block.
H	L	L	Z	Z	OFF2, EN=H, INA and INB=L turn off the output channel
H	H	L	H	L	Forward
H	L	H	L	H	Reverse
H	H	H	L	L	Brake

Function Description
Device operation:

G2015 is a constant current/full scale type 1-CH H-bridge driver IC with small package TDFN 2X2 -10. The constant current is 200mA for constant current mode with RNF connects 1ohm resistance. It is suitable for camera module application for DSC and Mobile phone. MOSFET output stages substantially reduce the voltage drop and the power dissipation of the outputs of the G2015 compared to other drivers with BJT.

G2015 protection includes thermal shutdown with hysteresis. The G2015 is suitable for portable applications with a power off (EN=L) current of 1μA typical, and an operation voltage of 2.5 to 5.5V. The G2015 logic inputs are 3 to 5V logic compatible.

In conditions where the logic supply voltage drops below 2.5V, both the sink and the source voltage drop will increase beyond the specified values. In extreme cases, no power will be delivered to the motors. However the device will not be damaged.

Power off Mode:

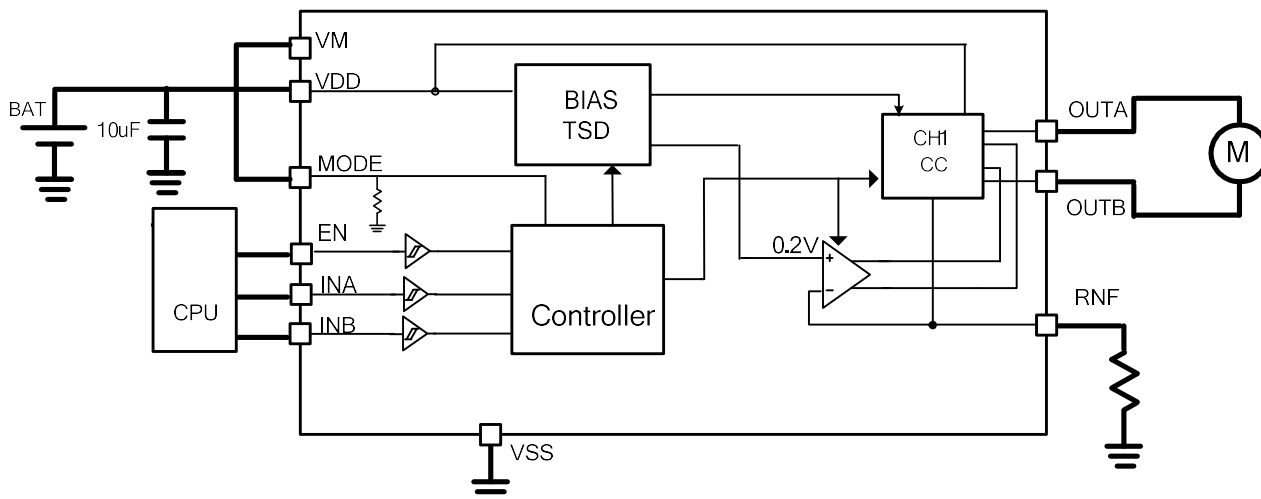
Pulling EN to 0.4V or less, sends the G2015 to power off mode, during which it draws 1μA typical.

Thermal Shutdown:

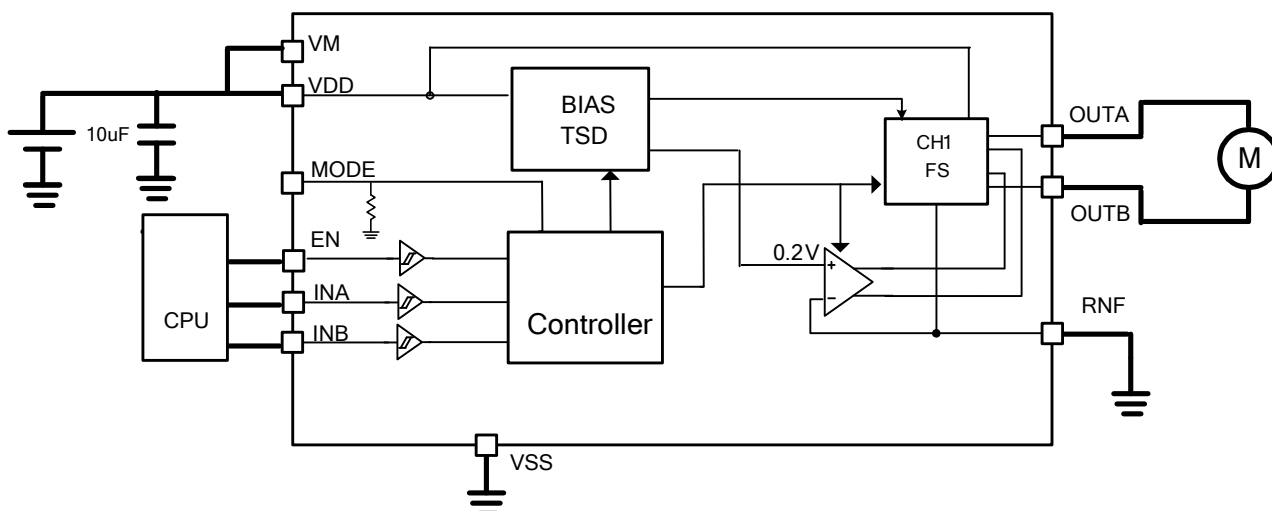
The G2015 will disable the outputs if the junction temperature reaches 150°C. When thermal shutdown is entered after the junction temperature drops 25°C, the outputs will be re-enabled

Application Notes

- Using for constant current (CC) MODE connect to BAT and RNF connect 1 ohm resistance for 200mA.

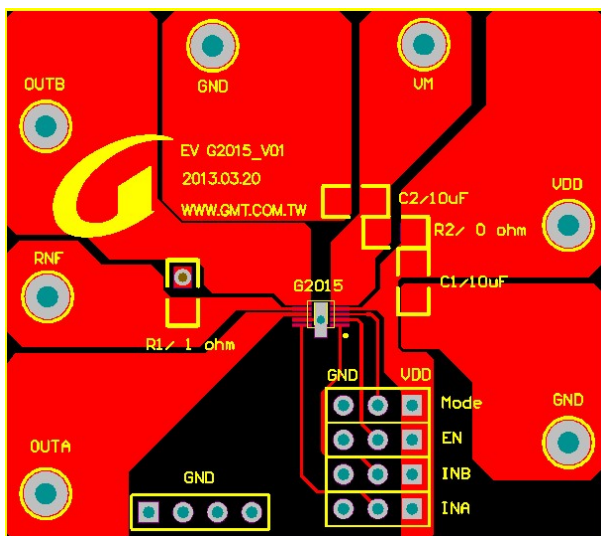


- Using for Full scale (FS) MODE floating and RNF connect to GND.

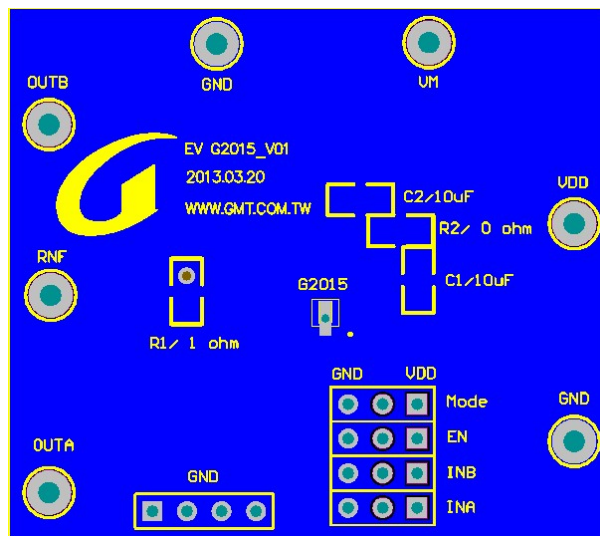


EV Board PCB Layout Section

Top Layer

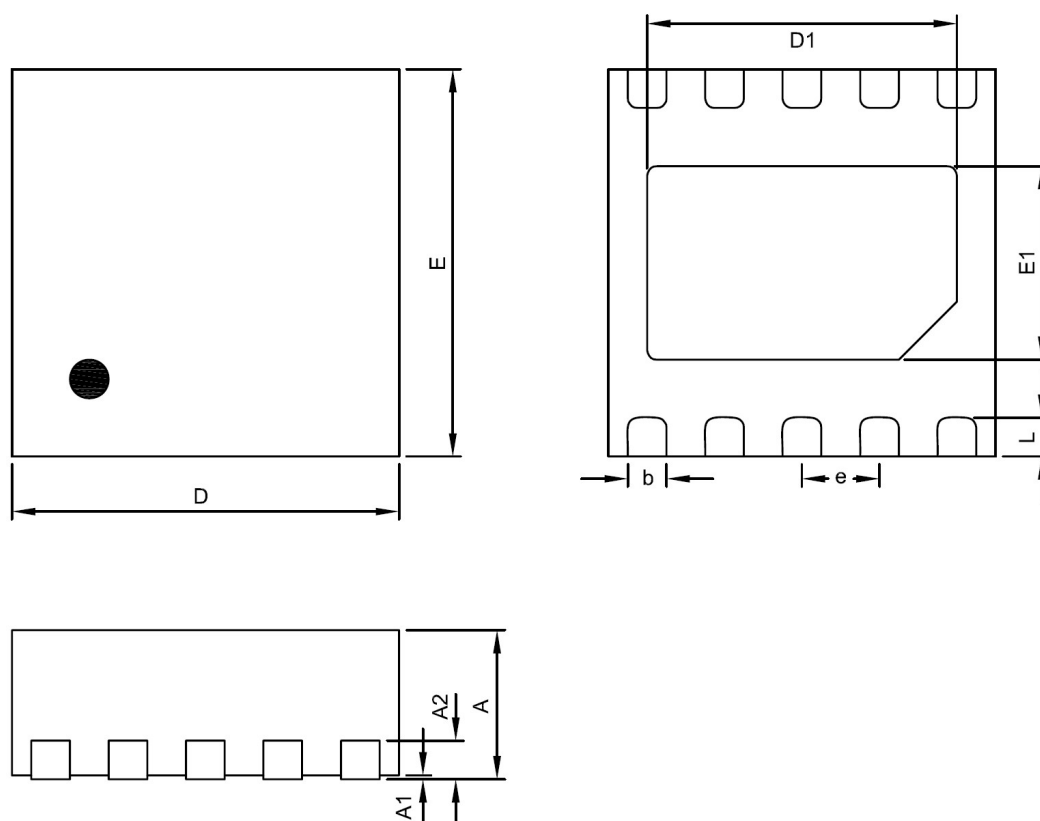


Bottom Layer



EV2015 PCB	Information
Board Material	FR4
Size	44.30mm*39.12 mm
Board Thickness	1.6mm
Layers	2
Copper Thickness	2 oz.

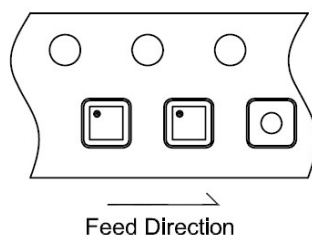
Package Information



TDFN2X2-10 Package

Symble	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	0.0276	0.0295	0.0315
A1	0.00	---	0.05	0.0000	---	0.0020
A2	0.19	0.20	0.21	0.0075	0.0079	0.0083
D	1.95	2.00	2.05	0.0768	0.0787	0.0807
E	1.95	2.00	2.05	0.0768	0.0787	0.0807
D1	1.55	1.60	1.65	0.0610	0.0630	0.0650
E1	0.95	1.00	1.05	0.0374	0.0394	0.0413
b	0.15	0.20	0.25	0.0059	0.0079	0.0098
e	0.40 BSC			0.0157 BSC		
L	0.20	0.25	0.30	0.0079	0.0098	0.0118

Taping Specification



PACKAGE	Q'TY/REEL
TDFN2X2-10	3,000 ea