

20W High-Integration, High-Efficiency Power Solution for Wireless Power Transmitter

Description

The FS4030Q is a high efficient synchronous buck power stage module consisting of H-bridge MOSFETs and an integrated driver. The MOSFETs are individually optimized for the operation in the synchronous buck configuration. The high side and low side MOSFETs have ultralow $R_{DS(ON)}$ to minimize conduction losses. The bootstrap diode is integrated in the driver.

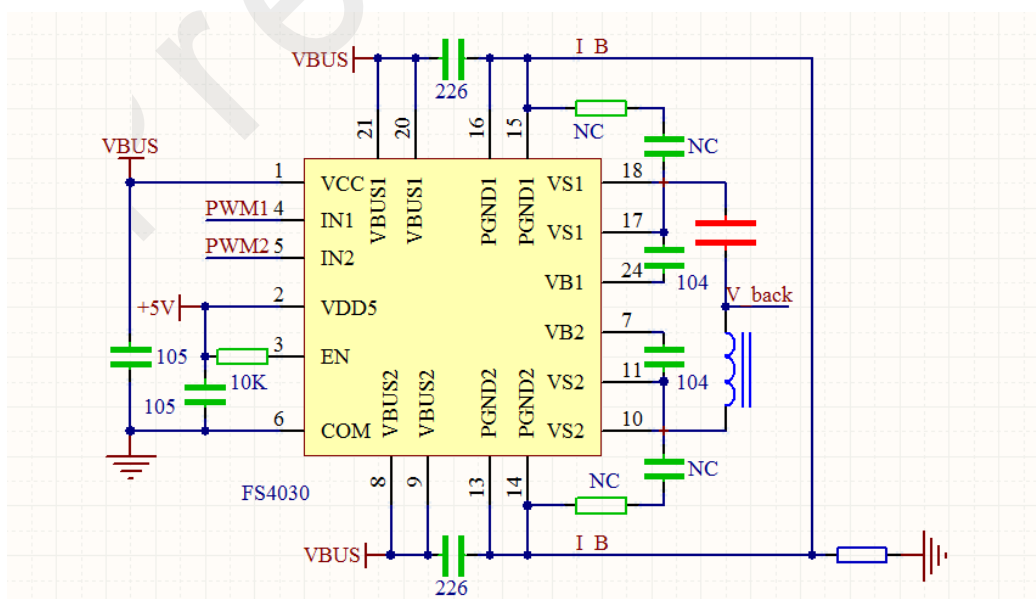
Features

- 4V to 16V supply voltage
- Up to 20W Power Transfer
- Integrated high efficiency H-Bridge power stage
- Integrated four low $R_{DS(ON)}$ power FETs
- Build in 5V-100mA LDO
- 3.3V/5V logic input compatible
- Under-voltage lockout for all channels
- Disable function
- Thermal shutdown
- QFN24-4mm × 4mm package
- ROHS compliant and halogen free

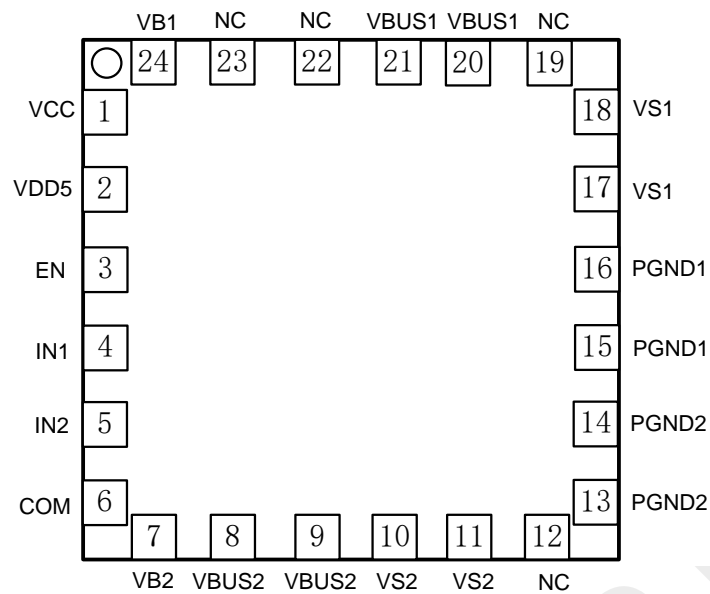
Applications

- WPC Compliant Wireless Chargers of 5W to 15W Systems for mobiles, Tablets and Wearable devices
- General Wireless Power Transmitters for Consumer, Industrial and Medical Equipment
- Proprietary Wireless Chargers and Transmitters
- H-Bridge DC-DC Switching Regulator

Typical Application Circuit



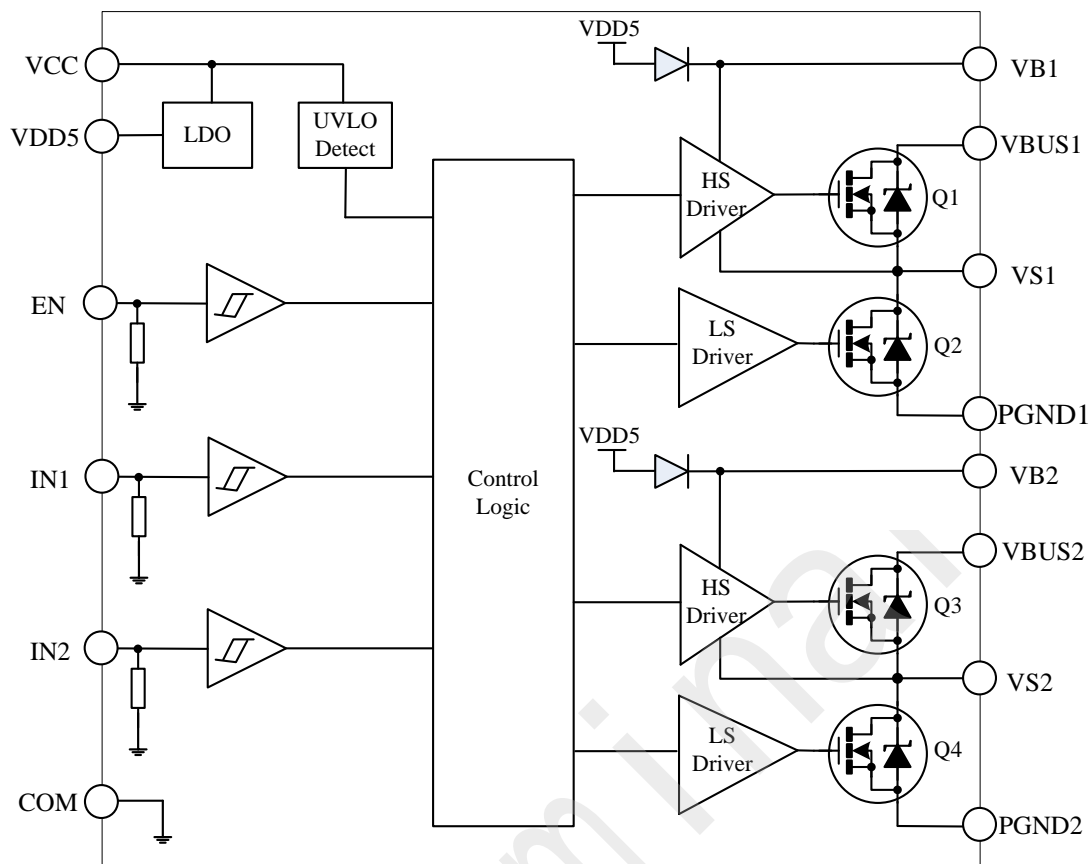
Pin Configuration



Pin Description

Pin	Name	Description
1	VCC	Low side and logic fixed supply
2	VDD5	5V LDO output. Connect a 0.1uF or greater capacitor to COM.
3	EN	Logic input for driver enable/disable. Drive EN high to turn on the FS4030Q, drive EN low to turn off the FS4030Q.
4	IN1	Logic input to the FET Q1 and Q2 as shown in the block diagram. Drive IN1 high to turn on the high-side FET Q1, and turns off the low-side FET Q2. Drive IN1 low to turn on the low-side FET Q2, and turns off the high-side FET Q1.
5	IN2	Logic input to the FET Q3 and Q4 as shown in the block diagram. Drive IN2 high to turn on the high-side FET Q3, and turns off the low-side FET Q4. Drive IN2 low to turn on the low-side FET Q4, and turns off the high-side FET Q3.
6	COM	Low side gate drive return
7	VB2	High side floating supply. Connect a 0.1uF or greater capacitor between VB2 and VS2.
8,9	VBUS2	DC bus
10,11	VS2	Phase output
13,14	PGND2	Low side source connection
15,16	PGND1	Low side source connection
17,18	VS1	Phase output
20,21	VBUS1	DC Bus
24	VB1	High side floating supply. Connect a 0.1uF or greater capacitor between VB1 and VS1.
12,19,22,23	NC	Not connected

Functional Block Diagram



Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage to the device.

Symbol	Description	Min	Max	Unit
$V_{BUS1,2}$	DC bus voltage	-0.3	20	V
$V_{S1,2}$	High side floating supply offset voltage	---	$V_{BUS1,2}$	V
$V_{BS1,2}$	$V_{B1,2}$ to $V_{S1,2}$ voltage	-0.3	6.5	V
VCC	Low side fixed supply voltage	-0.3	24	V
V_{IN}	Logic input voltage	-0.3	6.5	V
T_J	Maximum operating junction temperature	---	150	°C
T_L	Lead temperature (soldering 30 seconds)	---	260	°C
T_S	Storage temperature range	-55	150	°C
P_D	Power dissipation @ $T_A \leq 25^\circ\text{C}$	---	3.0	W
$R_{th(J-A)}$	Thermal resistance, junction to ambient	---	42	°C/W

Note1: In any case, power dissipation should not exceed P_D .

Note2: Voltages above the absolute maximum ratings may damage the chip.

Recommended Operating Conditions

The device is not guaranteed to operate beyond the Maximum Recommended Operating Conditions.

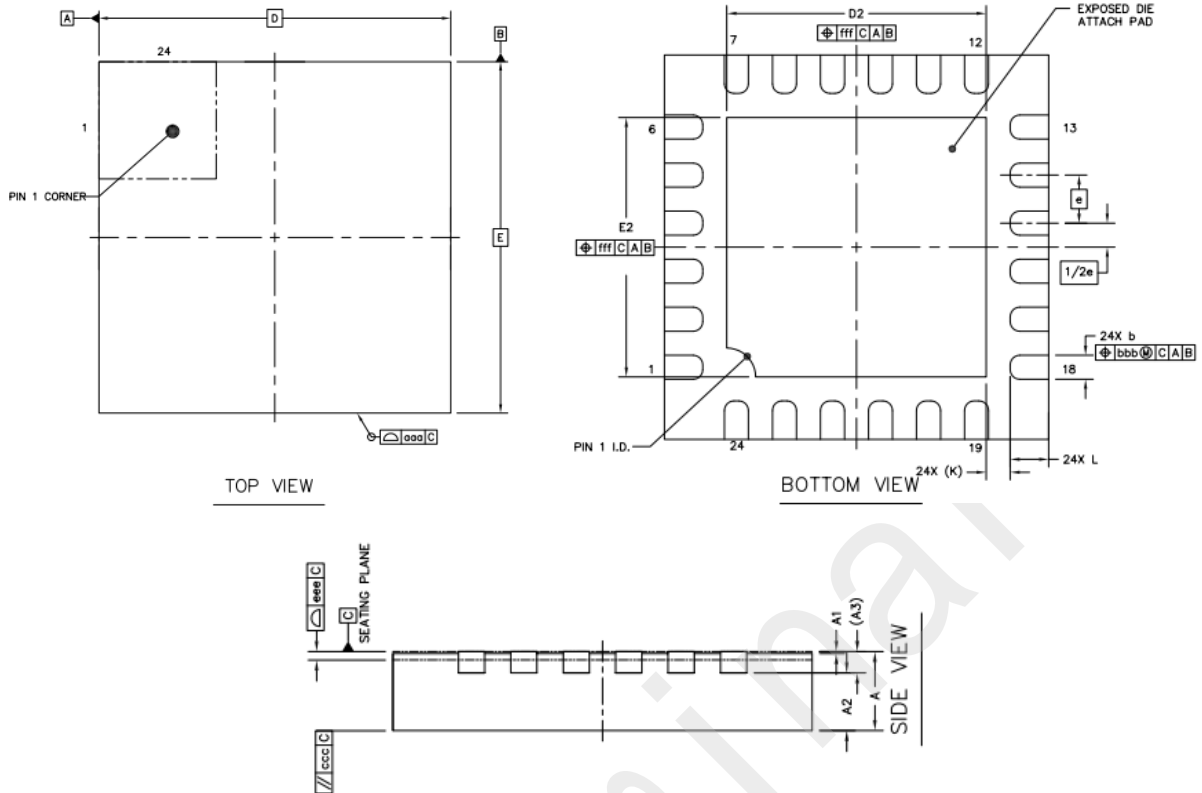
Symbol	Description	Min	Typ	Max	Units
V _{BUS1,2}	DC bus voltage	---	12	16	V
V _{S1,2}	High side floating supply offset voltage	---	---	16	V
V _{CC}	Low side and logic supply voltage	4	---	16	V
V _{IN}	Logic input voltage	0	---	5.5	V
f _{SW}	Switching frequency	---	---	500	kHz
T _A	Operating temperature	-40	---	85	°C

Static Electrical Characteristics

V_{CC}=12V, T_A=25°C, unless otherwise specified.

Symbol	Description	Min	Typ	Max	Units	Conditions
V _{IH}	Logic “1” input voltage for IN/EN	2.7	---	---	V	
V _{IL}	Logic “0” input voltage for IN/EN	---	---	0.8	V	
V _{CCUV+}	V _{CC} undervoltage protection trip voltage	3.2	3.6	4.0	V	
V _{CCUV-}	V _{CC} undervoltage protection reset voltage	3.0	3.4	3.8	V	
V _{CCUVH}	V _{CC} undervoltage protection hysteresis voltage	---	0.2	---	V	
V _F	Bootstrap diode	---	0.8	---	V	I _F =10mA
I _{QCC}	VCC quiescent current	---	500	900	µA	V _{EN} =5V, V _{IN} =0/5V
	VCC standby current	---	50	90	µA	V _{EN} =0V
I _{LK_VBUS}	Leakage current for VBUS1/VBUS2	---	1	5	µA	V _{EN} =0V, V _{VBUS} =20V
I _{IN+}	Input bias current for IN/EN	---	120	210	µA	V _{IN} =5V
I _{IN-}	Input bias current for IN/EN	---	---	2	µA	V _{IN} =0V
V _{5P0}	Output voltage	4.8	5	5.2	V	
I _{5P0}	Output current capability	100	---	---	mA	
T _{SD}	Thermal shutdown	---	165	---	°C	
T _{SDH}	Thermal shutdown hysteresis	---	30	---	°C	

Note: All voltages are specified with respect to the corresponding COM/PGND pin.

Package size (QFN24-4*4)


		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.7	0.75	0.8
STAND OFF		A1	0	0.02	0.05
MOLD THICKNESS		A2	---	0.55	---
L/F THICKNESS		A3	0.203 REF		
LEAD WIDTH		b	0.2	0.25	0.3
BODY SIZE	X	D	4 BSC		
	Y	E	4 BSC		
LEAD PITCH		e	0.5 BSC		
EP SIZE	X	D2	2.6	2.7	2.8
	Y	E2	2.6	2.7	2.8
LEAD LENGTH		L	0.3	0.4	0.5
LEAD TIP TO EXPOSED PAD EDGE		K	0.2 min		
PACKAGE EDGE TOLERANCE		aaa	0.1		
MOLD FLATNESS		ccc	0.1		
COPLANARITY		eee	0.08		
LEAD OFFSET		bbb	0.1		
EXPOSED PAD OFFSET		fff	0.1		

Part Number	Package Type	Marking ID	Package Method	Quantity
FS4030Q	QFN24-4*4	FS4030Q	Tape & Reel	3000

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