

FS230BD Half-Bridge IPM

Description

The FS230BD is a high efficiency synchronous buck power stage module consisting of two asymmetrical MOSFETs and an integrated driver. The MOSFETs are individually optimized for operation in the synchronous buck configuration. The high side and low side MOSFETs has ultra low $R_{DS(ON)}$ to minimize conduction losses.

A number of features are provided making the FS230BD a highly versatile power module. The bootstrap diode is integrated in the driver.

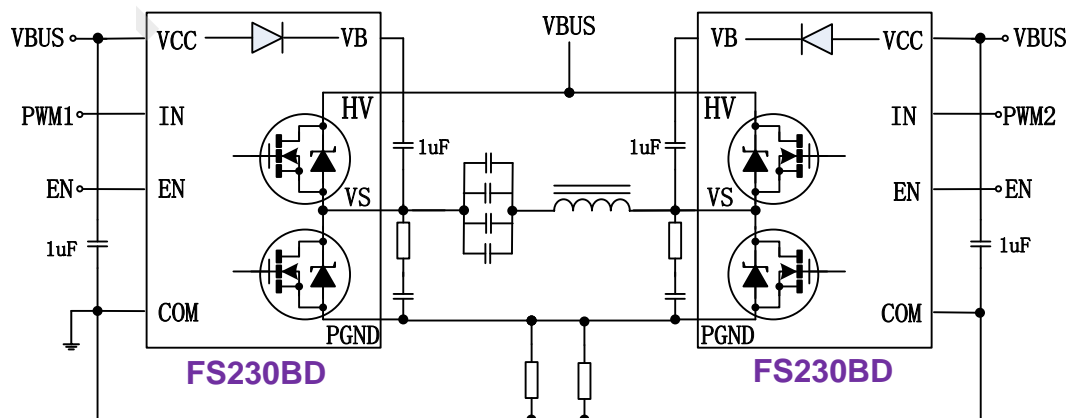
Features

- Integrated Power 18mΩ Switches
- Integrated bootstrap diode
- Up to 25V DC bus voltage
- 4V to 20V supply voltage
- Up to 25A output current
- Up to 500kHz Switching Frequency
- 3.3V/5V logic input compatible
- Under-voltage lockout for all channels
- Disable function
- ROHS compliant and halogen free

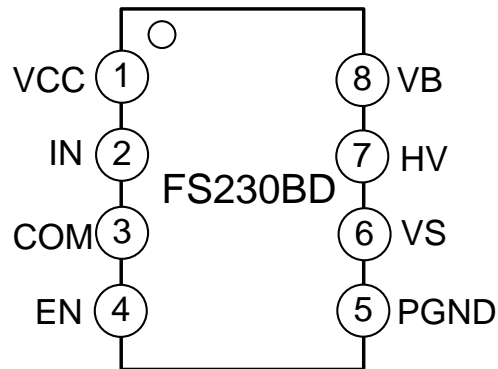
Applications

- General Wireless Power Transmitter for Consumer, Industrial and Medical Applications
- Full or Half Bridge DC-DC Switching Regulator
- Motor Driver

Typical Application Circuit



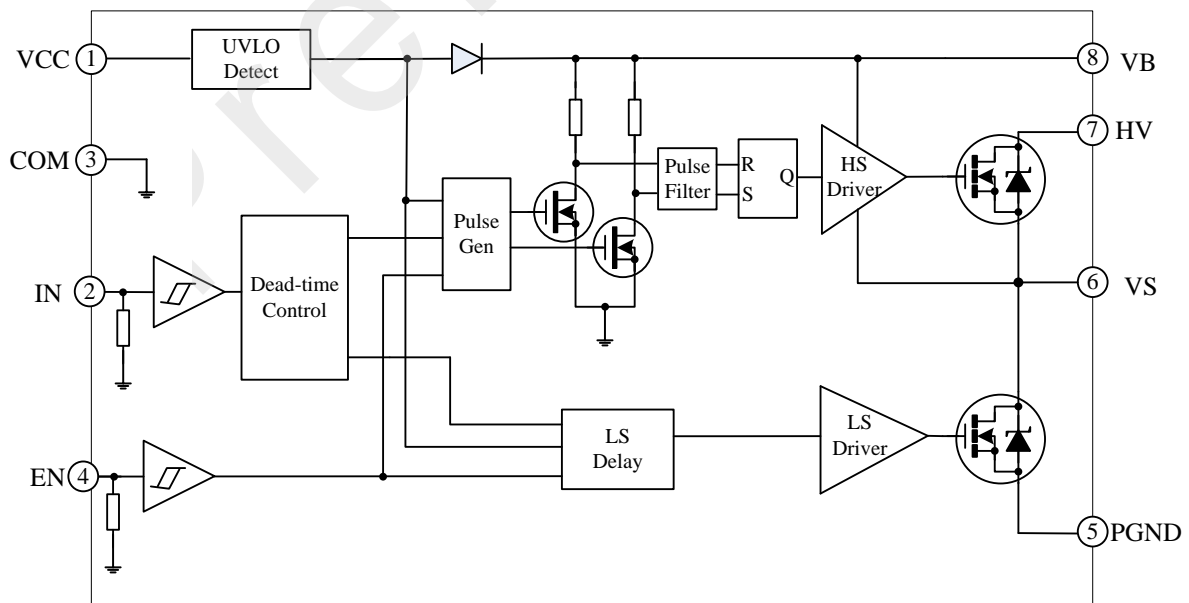
Pin Configuration



Pin Description

Pin	Name	Description
1	VCC	Low side and logic fixed supply
2	IN	Logic Input. Drive IN high to turn on the high-side switch; drive IN low to turn the low-side switch.
3	COM	Low Side Gate Drive Return
4	EN	Logic input for driver enable/disable. Drive EN high to turn on the FS230BD, drive EN low to turn off the FS230BD.
5	PGND	Low Side Source Connection
6	VS	Phase Output
7	HV	DC Bus
8	VB	High Side Floating Supply. Connect a 0.1uF or greater capacitor between VB and VS.

Functional Block Diagram



Absolute Maximum Ratings

Exceeding the Absolute Maximum ratings may damage to the device.

Symbol	Description	Min	Typ	Max	Unit
V_{HV}	DC Bus Voltage	-0.3	---	25	V
V_S	High side floating supply offset voltage	-3	---	V_{HV}	V
V_{BS}	V_B to V_S voltage	-0.3	---	25	V
VCC	Low Side fixed supply voltage	-0.3	---	25	V
V_{IN}	Logic input voltage IN, EN	-0.3	---	7	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
$R_{th(J-C)}$	Thermal resistance, junction to case	---	10	---	°C/W
$R_{th(J-A)}$	Thermal resistance, junction to ambient	---	50	---	°C/W

Recommended Operating Conditions

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

Symbol	Description	Min	Typ	Max	Units
V_{HV}	Positive DC Bus Input Voltage	---	12	20	V
V_S	High Side Floating Supply Offset Voltage	---	---	20	V
V_{CC}	Low Side and Logic Supply Voltage	4	---	20	V
V_{IN}	Logic Input Voltage	0	---	6	V
f_{SW}	Swithing Frequency	---	---	500	kHz
T_A	Operating Temperature	-40	---	85	°C

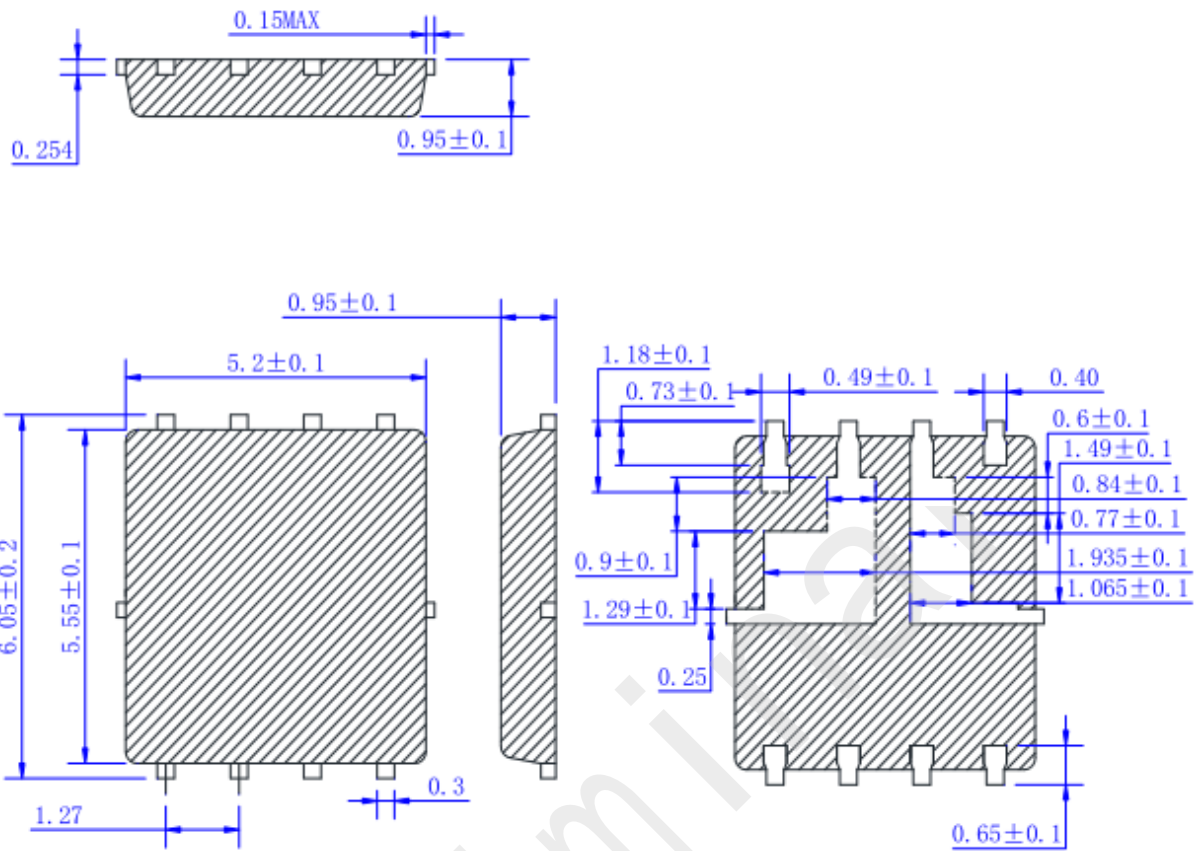
Static Electrical Characteristics (Note1)

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

Symbol	Description	Min	Typ	Max	Units	Conditions
$V_{IN/EN}$	Logic "1" input voltage for IN/EN	2.7	---	---	V	
$V_{IN/EN}$	Logic "0" input voltage for IN/EN	---	---	0.8	V	
V_{CCUV+}	VCC Supply Under-Voltage, Positive Going Threshold	3.1	3.5	3.9	V	
V_{CCUV-}	VCC supply Under-Voltage, Negative Going Threshold	2.8	3.2	3.6	V	
V_{CCUVH}	VCC Supply Under-Voltage Lock- Out Hysteresis	---	0.2	---	V	
V_{F1}	Bootstrap diode VF	---	0.75	---	V	$I_S=10mA$
V_{F2}		---	0.9	---	V	$I_S=50mA$
I_{QCC}	Quiescent VCC Supply Current	---	450	800	μA	$V_{EN}=0V$
I_{IN+}	Input Bias Current	---	120	200	μA	$V_{IN}=5V$
I_{IN-}	Input Bias Current	---	---	1	μA	$V_{IN}=0V$
I_{EN+}	Input Bias Current	---	120	200	μA	$V_{EN}=5V$
I_{EN-}	Input Bias Current	---	---	1	μA	$V_{EN}=0V$
T_{ON}	Input to Output Propagation Turn-On Delay Time	---	150	---	ns	
T_{OFF}	Input to Output Propagation Turn-Off Delay Time	---	100	---	ns	
MOSFET Avalanche Characteristics						
BV_{DSS}	Drain-to-Source Breakdown Voltage	30	---	---	V	$I_{LK}=1mA$
I_{LKH}	Leakage Current of FET's in Parallel	---	1	---	μA	$V_{DS}=30V$
$R_{DS(ON)}$	Drain to Source ON Resistance	---	13	18	$m\Omega$	$V_{CC}=10V, I_d=15A$
		---	22	27	$m\Omega$	$V_{CC}=5V, I_d=10A$
V_{SD}	Diode Forward Voltage	---	0.9	1.2	V	$I_{SD}=15A$

Note1: All voltages are specified with respect to the corresponding COM pin.

Package Information



Part Number	Package Type	Marking ID	Package Method	Quantity
FS230BD	DFN8	FS230BD	Tray	5000

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