M81700FP

PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

HIGH VOLTAGE HALF BRIDGE DRIVER

DESCRIPTION

M81700FP is high voltage Power MOSFET and IGBT module driver for half bridge applications.

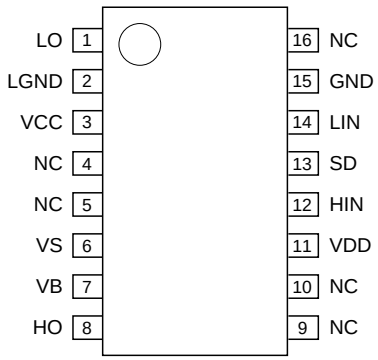
FEATURES

- FLOATING SUPPLY VOLTAGE 600V
- OUTPUT CURRENT ..... ±2A
- HALF BRIDGE DRIVER
- SOP-16

APPLICATIONS

PDP. HID lamp.
MOSFET and IGBT module inverter driver for refrigerator, air-conditioner, washing machine, servomotor and general purpose.

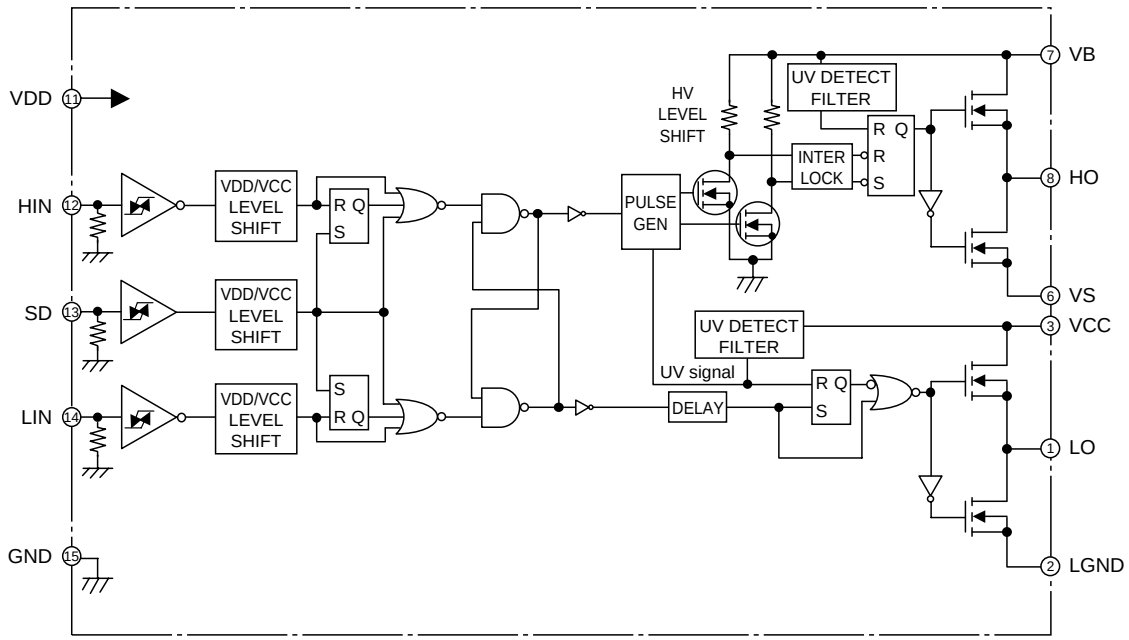
PIN CONFIGURATION (TOP VIEW)



NC:NO CONNECTION

PACKAGE TYPE 16P2N

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

ABSOLUTE MAXIMUM RATINGS

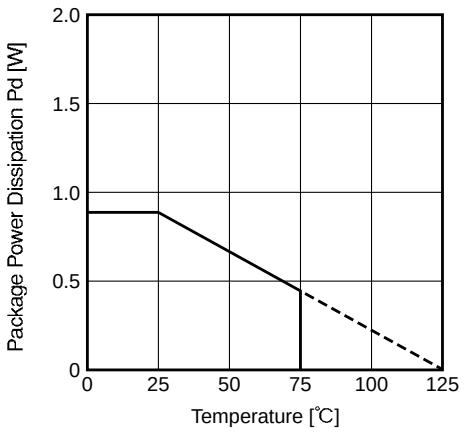
Symbol	Parameter	Conditions	Ratings	Unit
VB	High Side Floating Supply Absolute Voltage		–0.5 ~ 624	V
VS	High Side Floating Supply Offset Voltage		–0.5 ~ 600	V
VBS	High Side Floating Supply Voltage	VBS = VB-VS	–0.5 ~ 24	V
–VS	Allowable Offset Supply Voltage minus serge	PW < 1μs	–5	V
VHO	High Side Output Voltage		VS–0.5 ~ VB+0.5	V
VCC	Low Side Fixed Supply Voltage		–0.5 ~ 24	V
VLO	Low Side Output Voltage		–0.5 ~ VCC+0.5	V
VDD	Logic Supply Voltage		–0.5 ~ 24	V
VIN	Logic Input Voltage	HIN, LIN	–0.5 ~ VDD+0.5	V
SD	Shut Down Input Voltage		–0.5 ~ VDD+0.5	V
LGND	Low Side Return Offset Voltage	VCC-LGND < 24V	–5 ~ VCC+0.5	V
dVS/dt	Allowable Offset Supply Voltage Transient		±50	V/ns
Pd	Package Power Dissipation	Ta = 25°C, On Board	0.88	W
Kθ	Linear Derating Factor	Ta > 25°C, On Board	–8.8	mW/°C
Rth(j-c)	Junction-Case Thermal Resistance		50	°C/W
Tj	Junction Temperature		–20 ~ 125	°C
Topr	Operation Temperature		–20 ~ 75	°C
Tstg	Storage Temperature		–40 ~ 125	°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
VB	High Side Floating Supply Absolute Voltage		VS+10	—	VS+20	V
VS	High Side Floating Supply Offset Voltage		0	—	500	V
VBS	High Side Floating Supply Voltage	VBS = VB-VS	10	—	20	V
VCC	Low Side Fixed Supply Voltage		10	—	20	V
VDD	Logic Supply Voltage		5	—	20	V
VIN	Logic Input Voltage	HIN, LIN	0	—	VDD	V
SD	Shut Down Input Voltage		0	—	VDD	V
LGND	Low Side Return Offset Voltage		–5	—	5	V

PERFORMANCE CURVES

Thermal Derating Factor Characteristics



PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

ELECTRICAL CHARACTERISTICS (Ta=25°C, VCC=VBS (=VB–VS)=VDD=15V, LGND=0V unless otherwise specified)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
IFS	Floating Supply Leakage Current	VB=VS=600V	—	—	1	μA
IBS	VBS standby Current		—	0.4	0.7	mA
ICC	VCC standby Current		—	0.75	1.5	mA
IDD	VDD standby Current		—	—	10	μA
VOH	High Level Output Voltage	IO=0A, LO, HO	13.8	14.4	—	V
VOL	Low Level Output Voltage	IO=0A, LO, HO	—	—	0.1	V
VIH15	High Level Input Threshold Voltage	HIN, LIN	—	8.4	9.5	V
VIL15	Low Level Input Threshold Voltage	HIN, LIN	6.0	6.8	—	V
VIH5	High Level Input Threshold Voltage	HIN, LIN (VDD=5V)	—	3.1	4.1	V
VIL5	Low Level Input Threshold Voltage	HIN, LIN (VDD=5V)	1.4	2.4	—	V
VISDH15	Shutdown High Level Input Threshold Voltage	SD	—	8.4	9.5	V
VISDL15	Shutdown Low Level Input Threshold Voltage	SD	6.0	6.8	—	V
VISDH5	Shutdown High Level Input Threshold Voltage	SD (VDD=5V)	—	3.1	4.1	V
VISDL5	Shutdown Low Level Input Threshold Voltage	SD (VDD=5V)	1.4	2.4	—	V
IIH	High Level Input Bias Current	VIN=15V	—	75	150	μA
IIL	Low Level Input Bias Current	VIN=0V	—	—	1.0	μA
VBSuvr	VBS Supply UV Reset Voltage		7.5	8.6	9.7	V
VBSuvh	VBS Supply UV Hysteresis Voltage		0.1	0.4	0.7	V
tVBSuv	VBS Supply UV Filter Time		—	10	—	μs
VCCuvr	VCC Supply UV Reset Voltage		7.5	8.6	9.7	V
VCCuvh	VCC Supply UV Hysteresis Voltage		0.1	0.4	0.7	V
tVCCuv	VCC Supply UV Filter Time		—	10	—	μs
IOH	Output High Level Short Circuit Pulsed Current	VO=0V, VIN=15V, PW<10μs	—	–2.5	—	A
IOL	Output Low Level Short Circuit Pulsed Current	VO=15V, VIN=0V, PW<10μs	—	2.5	—	A
ROH	Output High Level On resistance	IO=–200mA, ROH=(VOH-VO)/IO	—	10	13	Ω
ROL	Output Low Level On resistance	IO=200mA, ROL=VO/IO	—	2.5	3	Ω
tdLH(HO)	High Side Turn-On Propagation Delay	CL=1000pF between HO – VS	—	—	350	ns
tdHL(HO)	High Side Turn-Off Propagation Delay	CL=1000pF between HO – VS	—	—	330	ns
trH	High Side Turn-On Rise Time	CL=1000pF between HO – VS	—	—	60	ns
tfH	High Side Turn-Off Fall Time	CL=1000pF between HO – VS	—	—	30	ns
tdLH(LO)	Low Side Turn-On Propagation Delay	CL=1000pF between LO – GND	—	—	350	ns
tdHL(LO)	Low Side Turn-Off Propagation Delay	CL=1000pF between LO – GND	—	—	330	ns
trL	Low Side Turn-On Rise Time	CL=1000pF between LO – GND	—	—	60	ns
tfL	Low Side Turn-Off Fall Time	CL=1000pF between LO – GND	—	—	30	ns
ΔtdLH	Delay Matching, High Side and Low Side Turn-On	|tdLH(HO)-tdLH(LO)|	—	—	30	ns
ΔtdHL	Delay Matching, High Side and Low Side Turn-Off	|tdHL(HO)-tdHL(LO)|	—	—	30	ns
tSD	Shutdown Propagation Delay	CL=1000pF between HO – VS CL=1000pF between LO – GND	—	—	350	ns

PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

FUNCTION TABLE (X: H or L)

HIN	LIN	VBS UV	VCC UV	HO	LO	SD	Behavioral state
L	L	H	H	L	L	L	LO = OFF, HO = OFF
L	H	H	H	L	H	L	LO = ON, HO = OFF
H	L	H	H	H	L	L	LO = OFF, HO = ON
H	H	H	H	*	*	L	
X	L	L	H	L	L	L	LO = OFF, HO = OFF, VBS UV tripped
X	H	L	H	L	H	L	LO = ON, HO = OFF, VBS UV tripped
L	X	H	L	L	L	L	LO = OFF, HO = OFF, VCC UV tripped
H	X	H	L	L	L	L	LO = OFF, HO = OFF, VCC UV tripped
X	X	H	H	L	L	H	LO = OFF, HO = OFF, SD = ON

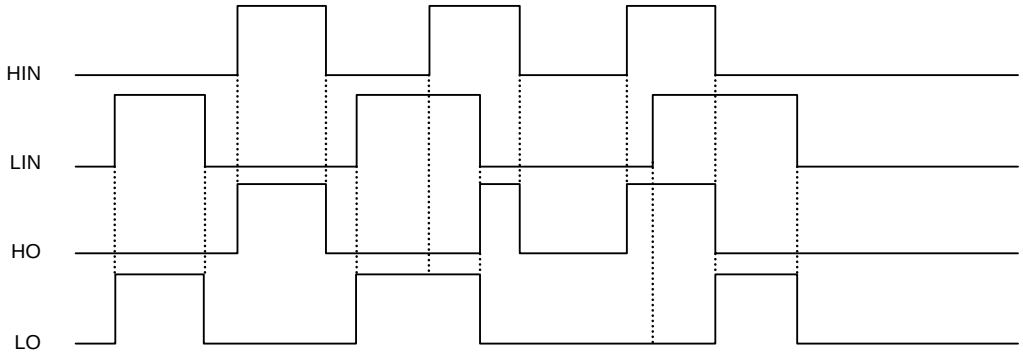
Note : “L” state of VBS UV and VCC UV means that UV trip voltage.

* If both input signals are “H”, refer to TIMING DIAGRAM.

TIMING DIAGRAM

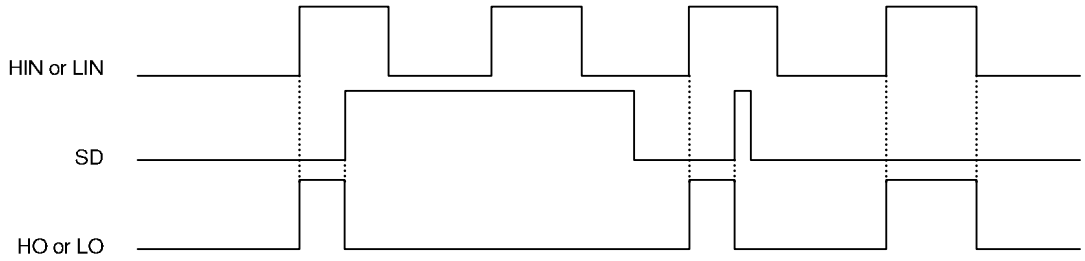
1.Input/Output Timing Diagram

When input signal (HIN or LIN) is “H”, then output signal (HO or LO) is “H”.
In the case of both input signals (HIN and LIN) are “H”, first coming input signal (HIN or LIN) “H” is only accepted.
Corresponding this signal, output signal (HO or LO) becomes “H”.
Corresponding the other signal (LIN or HIN), output signal (LO or HO) keeps “L”.



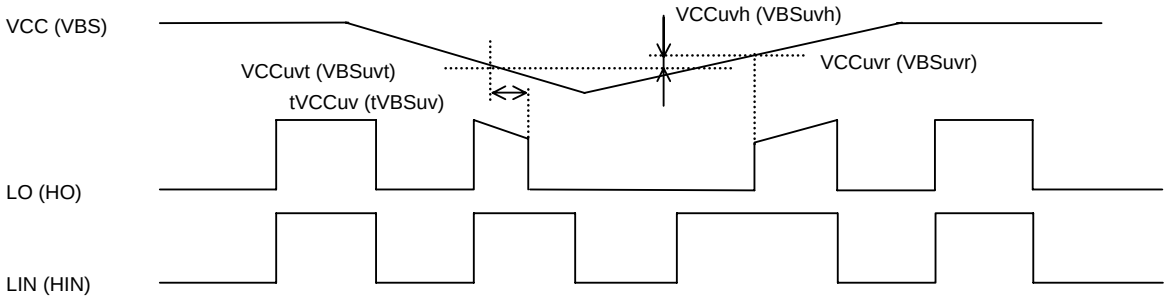
2.Shutdown Input Timing Diagram

When shutdown input signal (SD) is “H”, then output signals (HO and LO) are “L”.
Output signals (HO and LO) keep “L” by shutdown input signal (SD) is “L” until next input signal (HIN or LIN) is “H”.



PRELIMINARY
Notice: This is not a final specification.
Some parametric limits are subject to change.

3.VCC (VBS) Supply Under Voltage Lockout Timing Diagram



4.Allowable supply voltage transient

Allowable high side floating supply voltage (VBS) transient or low side fixed supply voltage (VCC) transient are below 50V/μs. In case VBS or VCC are started more than 50V/μs, output signal (HO or LO) may be “H”.

PACKAGE OUTLINE