MITSUBISHI ELECTRIC

<HVIC>

M81737FP

Dual High Side Driver

DESCRIPTION

M81737FP is high voltage Power MOSFET and IGBT Module driver for dual high side application.

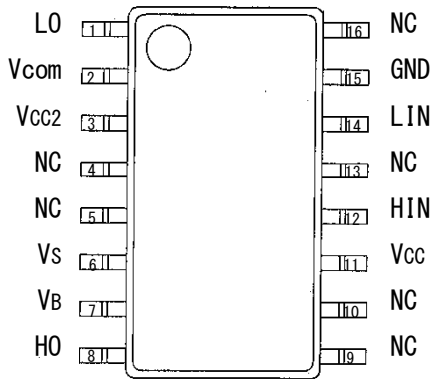
FEATURES

- ●FLOATIONG SUPPLY VOLTAGE・・・・・・・・・600V
- ●OUTPUT CURRENT・・・・・+270mA/−225mA(typ)
- ●UNDER VOLTAGE LOCKOUT
- ●SOP-16 PACKAGE

APPLICATIONS

MOSFET and IGBT module driver

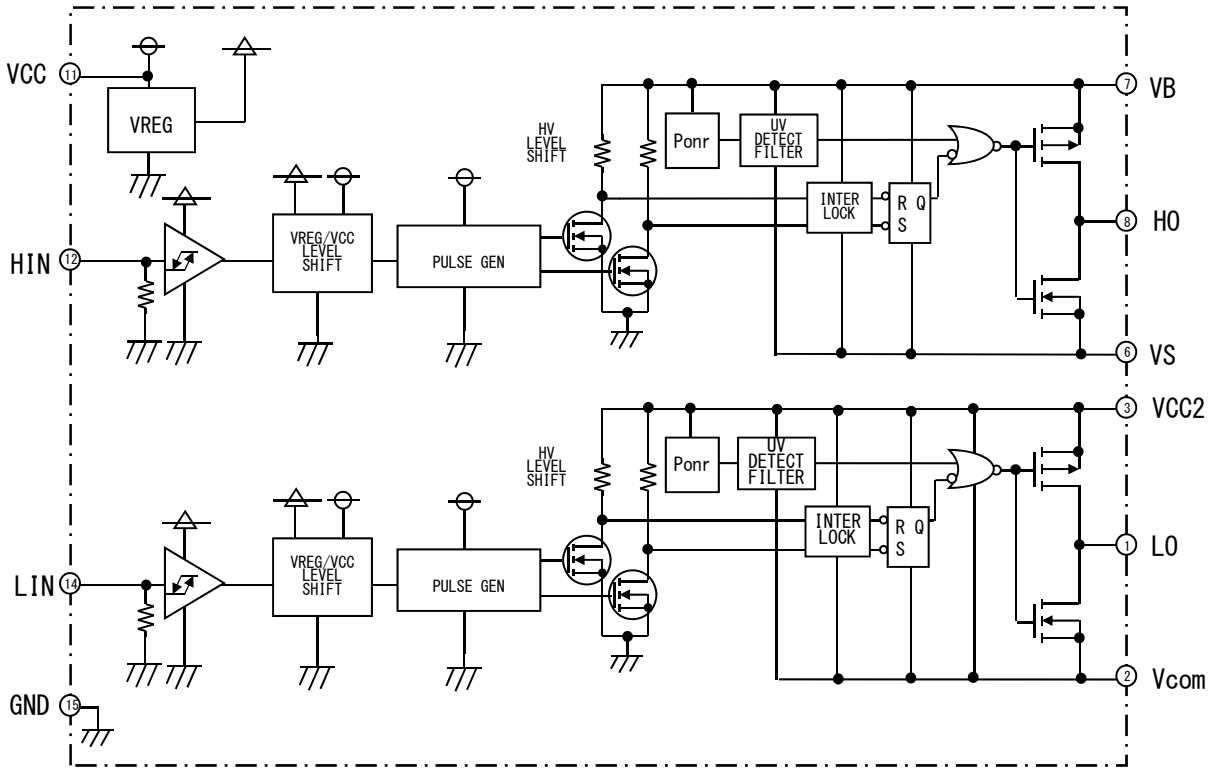
PIN CONFIGURATION (TOP VIEW)



Outline : 16P2N

NC:No Connection

BLOCK DIAGRAM



Absolute Maximum Ratings (Ta = 25℃,Unless otherwise noted)

Symbol	Parameter	Test conditions	Ratings	Unit
V_B	High Side Floating Supply Absolute Voltage		-0.5 ~ 624	V
V_S	High Side Floating Supply Offset Voltage		V_B-24 ~ V_B+0.5	V
V_{BS}	High Side Floating Supply Voltage	$V_{BS}=V_B-V_S$	-0.5 ~ 24	V
V_{HO}	High Side Output Voltage		V_S-0.5 ~ V_B+0.5	V
V_{CC2}	Low Side Floating Supply Absolute Voltage		-0.5 ~ 624	V
V_{com}	Output Standard Voltage		V_{CC2}-24 ~ V_{CC2}+0.5	V
V_{CC2com}	Low Side Floating Supply Voltage	$V_{CC2com}=V_{CC2}-V_{com}$	-0.5 ~ 24	V
V_{LO}	Low Side Output Voltage		V_{com}-0.5 ~ V_{com}+0.5	V
V_{CC}	Low Side Fixed Supply Voltage		-0.5 ~ 24	V
V_{IN}	Logic Input Voltage	HIN, LIN	-0.5 ~ V_{CC}+0.5	V
dVs/dt	Allowable Offset Voltage Transient		±50	V/ns
Pd	Package Power Dissipation	Ta=25℃,On Board	1.11	W
Kθ	Linear Derating Factor	Ta>25℃,On Board	-8.9	mW/℃
Rth(j-c)	Junction - Case Thermal Resistance		45	℃/W
Tj	Junction Temperature		-40 ~ 150*	℃
Topr	Operating Temperature		-40 ~ 100	℃
Tstg	Storage Temperature		-55 ~ 150	℃
TL	Soldering Temperature(Reflow)	Pb-free applied	255:10s,max260	℃

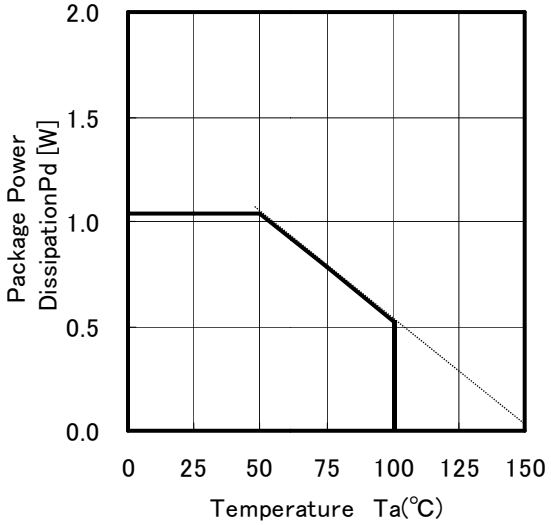
* Vs voltage has to be less than 500V if Tj is more than 125℃.

Recommended Operating Conditions

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ*.	Max.	
V_B	High Side Floating Supply Absolute Voltage		V_S+10	-	V_S+20	V
V_S	High Side Floating Supply Offset Voltage	V_B>10V	-5	-	500	V
V_{BS}	High Side Floating Supply Voltage	$V_{BS}=V_B-V_S$	10	-	20	V
V_{HO}	High Side Output Voltage		V_S	-	V_B	V
V_{CC2}	Low Side Floating Supply Absolute Voltage		V_{com}+10	-	V_{com}+20	V
V_{com}	Low Side Floating Supply Offset Voltage	V_{CC2}>10V	-5	-	500	V
V_{CC2com}	Low Side Floating Supply Voltage	$V_{CC2com}=V_{CC2}-V_{com}$	10	-	20	V
V_{LO}	Low Side Output Voltage		V_{com}	-	V_{CC2}	V
V_{CC}	Low Side Fixed Supply Voltage		10	-	20	V
V_{IN}	Logic Input Voltage	HIN,LIN	0	-	V_{CC}	V

* For proper operation, the device should be used within the recommended conditions.

Thermal Derating Factor Characteristics (Absolute Maximum Ratings)



Electrical Characteristics (Ta=25℃,V_{CC}=V_{BS}(=VB-VS)=15V,VS=0V Unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.*	Max.	
IFS	Floating Supply Leakage Current	VB=VS=600V	-	-	1.0	μA
IFcom	Vcom Floating Supply Leakage Current	VCC2=Vcom=600V	-	-	1.0	μA
IBS	VBS standby Current	HIN=LIN=0V	-	0.20	0.45	mA
ICC	VCC Standby Current	HIN=LIN=0V	-	0.28	0.6	mA
ICC2	VCC2 Standby Current	HIN=LIN=0V	-	0.20	0.45	mA
IBSH	VBS standby Current H	HIN=5V	-	0.22	0.5	mA
ICCH	VCC Standby Current H	HIN=5V	-	0.35	0.75	mA
ICC2H	VCC2 Standby Current H	HIN=5V	-	0.20	0.45	mA
IBSL	VBS standby Current L	LIN=5V	-	0.20	0.45	mA
ICCL	VCC Standby Current L	LIN=5V	-	0.35	0.75	mA
ICC2L	VCC2 Standby Current L	LIN=5V	-	0.22	0.5	mA
VOH	High Level Output Voltage	IO=0A,LO,HO	14.9	-	-	V
VOL	Low Level Output Voltage	IO=0A,LO,HO	-	-	0.1	V
VIH	High Level Input Threshold Voltage	HIN,LIN	2.0	3.0	4.0	V
VIL	Low Level Input Threshold Voltage	HIN,LIN	1.0	1.5	2.5	V
VINh	Input Hysteresis Voltage	VINh=VIH-VIL	1.0	1.5	2.0	V
IIH5	High Level Input Bias Current 5	VIN=5V	-	25	75	μA
IIH15	High Level Input Bias Current 15	VIN=15V	-	75	150	μA
IIL	Low Level Input Bias Current	VIN=0V	-	-	1.0	μA
VBSuvr	VBS Supply UV Reset Voltage		7.2	8.4	9.7	V
VBSuvh	VBS Supply UV Hysteresis Voltage		0.1	0.4	0.7	V
tVBSuv	VBS Supply UV Filter Time		-	7.5	-	μs
VCCuvr	Vcc Supply UV Reset Voltage		7.2	8.4	9.7	V
VCCuvh	Vcc Supply UV Hysteresis Voltage		0.1	0.4	0.7	V
tVCCuv	Vcc Supply UV Filter Time		-	7.5	-	μs
VPonr	Power-on Reset Voltage		-	-	6.0	V
tPonr(FIL)	Power-on Reset Filter Time		300	-	-	ns
IOH	Output High Level Short Circuit Pulsed Current	VO=0V,VIN=5V,PW<10μs	-160	-270	-380	mA
IOL	Output Low Level Short Circuit Pulsed Current	VO=15V,VIN=0V,PW<10μs	135	225	315	mA
ROH	Output High Level On-Resistance	IO=-20mA,ROH=(VOH-VO)/ IO	-	28	55	Ω
ROL	Output Low Level On-Resistance	IO=20mA,ROL= VO / IO	-	23	45	Ω
tdLH(HO)	High Side Turn-On Propagation Delay	CL=200pF between HO-VS	75	95	115	ns
tdHL(HO)	High Side Turn-Off Propagation Delay	CL=200pF between HO-VS	90	115	140	ns
trH	High Side Turn-On Rise Time	CL=200pF between HO-VS	9	18	40	ns
tfH	High Side Turn-Off Fall Time	CL=200pF between HO-VS	7	15	30	ns
tdLH(LO)	Low Side Turn-On Propagation Delay	CL=200pF between LO-Vcom	75	95	115	ns
tdHL(LO)	Low Side Turn-Off Propagation Delay	CL=200pF between LO-Vcom	90	115	140	ns
trL	Low Side Turn-On Rise Time	CL=200pF between LO-Vcom	9	18	40	ns
tfL	Low Side Turn-Off Fall Time	CL=200pF between LO-Vcom	7	15	30	ns
⊿tdLH	Delay Matching, High Side and Low Side Turn-On	|tdLH(HO)-tdLH(LO)|	-	-	15	ns
⊿tdHL	Delay Matching, High Side and Low Side Turn-Off	|tdHL(HO)-tdHL(LO)|	-	-	15	ns
VOPW	Output Pulse Width	VIN:PW=200ns	200	220	240	ns

* : Typ. is not specified

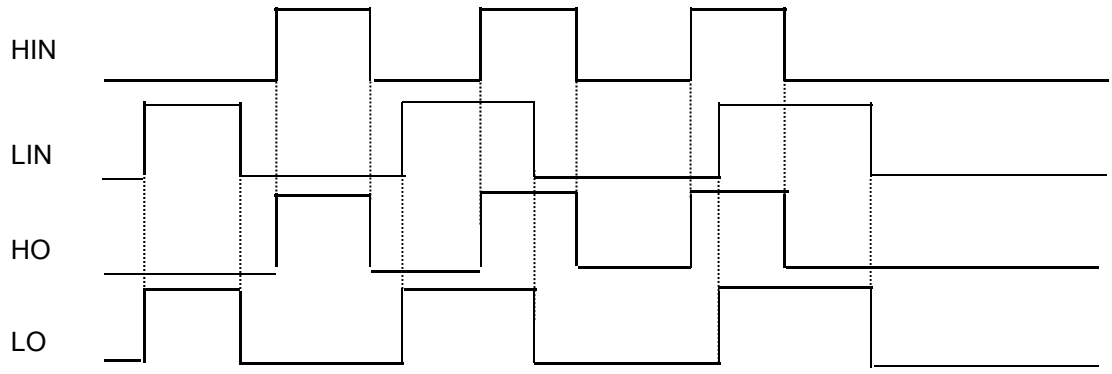
Function Table (X : HorL)

HIN	LIN	V_{BS} UV	V_{CC2com} UV	HO	LO	Behavioral State
L	L	H	H	L	L	LO = HO = Low
L	H	H	H	L	H	LO = High
H	L	H	H	H	L	HO = High
H	H	H	H	H	H	LO = HO = Low
X	L	L	H	L	L	HO = Low, V_{BS} UV tripped
X	H	L	H	L	H	LO = High, V_{BS} UV tripped
L	X	H	L	L	L	LO = Low, Vcc2com UV tripped
H	X	H	L	H	L	HO = LO = Low, Vcc2com UV tripped

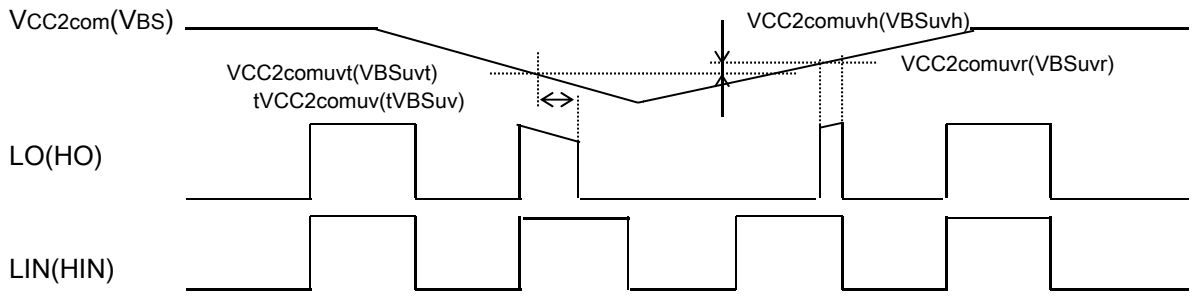
Note: "L" state of VBS UV, Vcc2com UV means that UV trip voltage.

M81737FP Timing Chart

1) . Input/Output Timing Diagram
HIGH ACTIVE(When input signal(HIN or LIN) is "H" ,then output signal (HO or LO)is "H".)



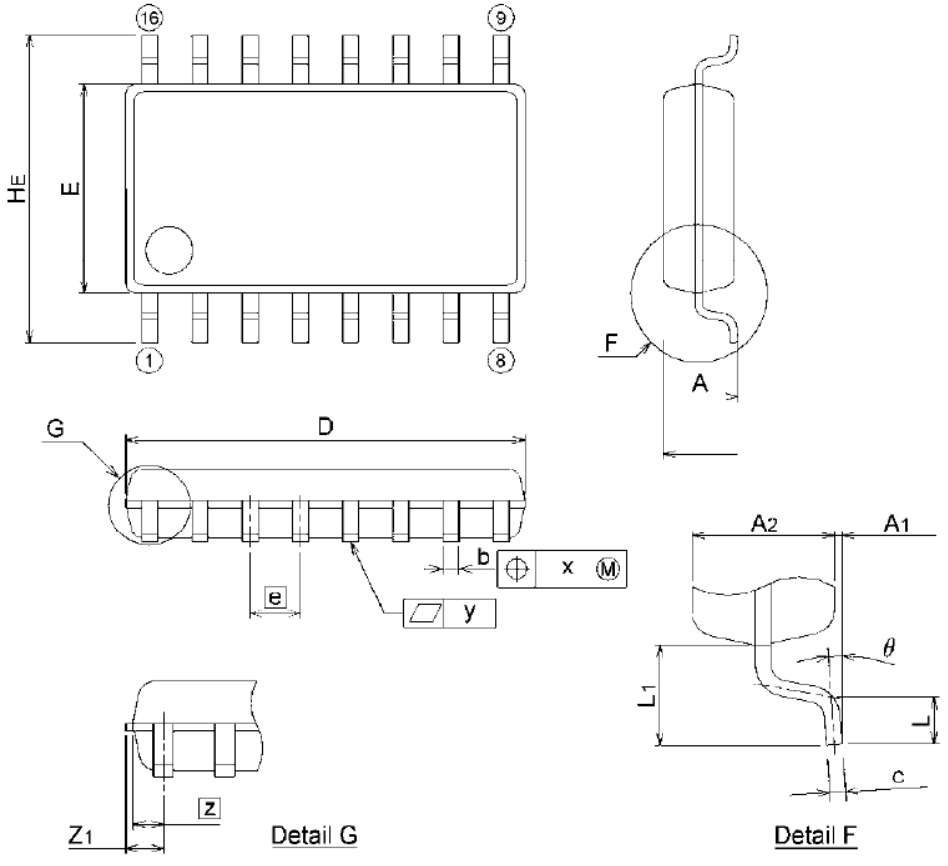
2) . Vcc2com(V_{BS}) Supply Under Voltage Lockout Timing Diagram
When Supply Voltage keeps lower than UV Trip Voltage(***uvt=***uvr-***uvh) for Supply UV Filter Time, output signal becomes “L”. And then, when V_{CC} Supply Voltage is higher than UV Reset Voltage, output becomes normal.

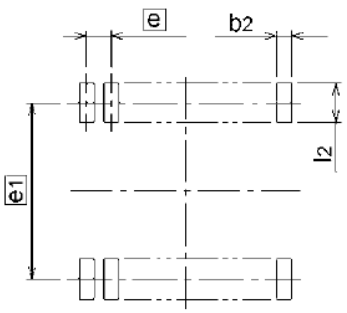


3) . Allowable Supply Votage Transient
It is recommended to supply Vcc firstly , supply Vcc2com secondly and supply VBS thirdly. In the case of shutting off supply voltage, please shut off VBS firstly ,shut off Vcc2com secondly and shut off Vcc thirdly. When applying Vcc2com and VBS, power supply should be applied slowly. If it rises rapidly, output signal (HO or LO) may be malfunction.

16P2N-A (MMP) Plastic 16pin 300mil SOP

EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SOP16-P-300-1.27	P	0.2	Cu Alloy





Recommended Mount Pad

Symbol	Dimension in Millimeters		
	Min	Nom	Max
A			2.1
A_1	0	0.1	0.2
A_2	P	1.8	P
b	0.35	0.4	0.5
c	0.18	0.2	0.25
D	10.0	10.1	10.2
E	5.2	5.3	5.4
e	P	1.27	P
H_E	7.5	7.8	8.1
L	0.4	0.6	0.8
L_1	P	1.25	P
z	P	0.605	P
Z_1	P	P	0.755
x	P	P	0.25
y	P	P	0.1
θ	0°	P	8°
b_2	P	0.76	P
e1	P	7.62	P
l_2	1.27	P	P

Main Revision for this Edition

No.	Date	Revision	
		Pages	Points
A	7, Jul. 2015	-	New making

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