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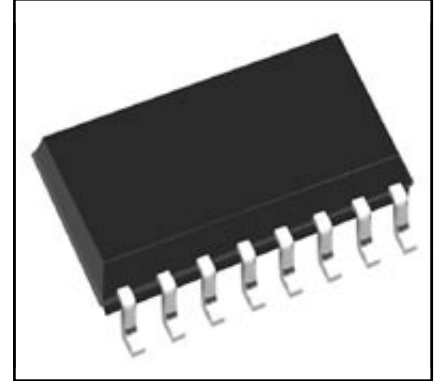
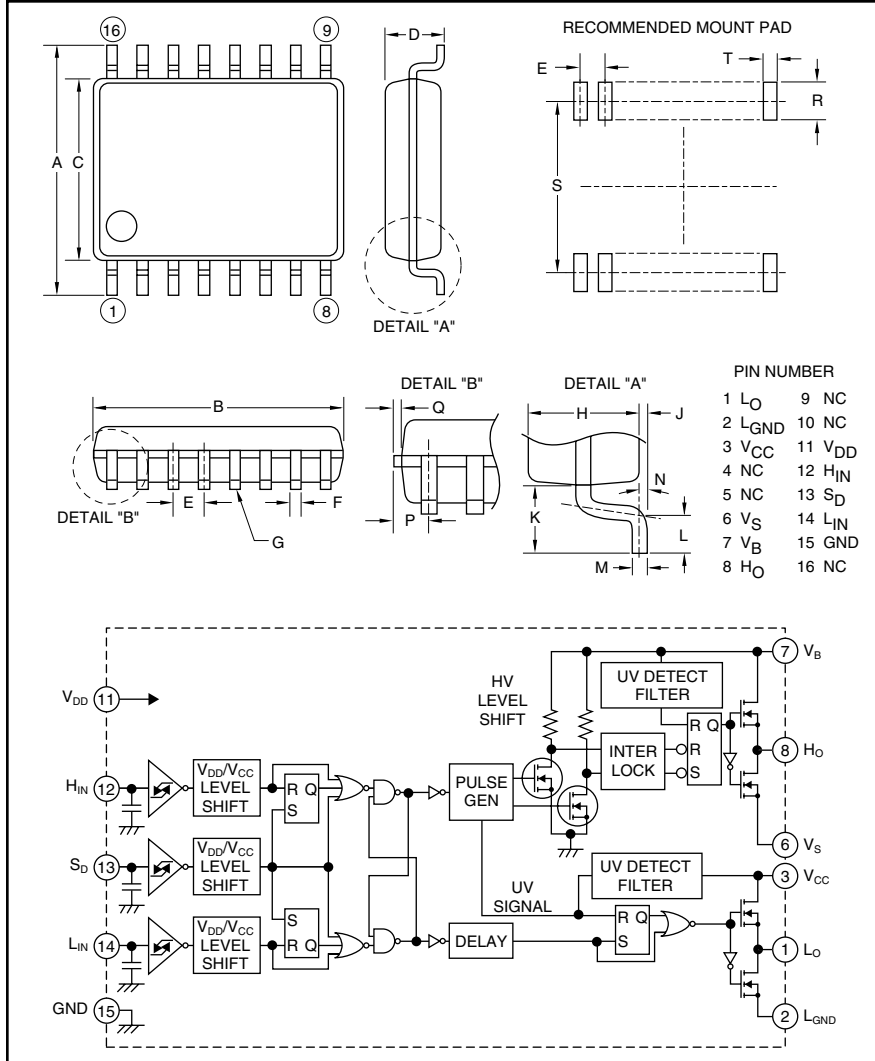
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HVIC

High Voltage Integrated Circuit
600 Volts/±2 Amperes



Description:

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

Features:

- Floating Supply Voltage
- Output Current
- Half-Bridge Driver
- SOP-16

Applications:

- HID
- PDP
- MOSFET Driver
- IGBT Driver
- Inverter Module Control

Ordering Information:

M81700FP is a ±2 Ampere, 600 Volt HVIC, High Voltage Integrated Circuit

Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	0.31±0.01	7.8±0.3
B	0.41±0.004	10.1±0.1
C	0.21±0.004	5.3±0.1
D	0.12	2.10
E	0.05	1.27
F	0.02±0.002	0.4±0.05
G	0.004	0.1
H	0.07	1.8
J	0.01±0.004	0.1±0.1

Dimensions	Inches	Millimeters
K	0.05	1.25
L	0.024±0.008	0.6±0.2
M	0.1±0.002	0.2±0.05
N	4°±4°	4°±4°
P	0.03 Max.	0.755 Max.
Q	0.006	0.15
R	0.05 Min.	Min. 1.27
S	0.30	7.62
T	0.029	0.76



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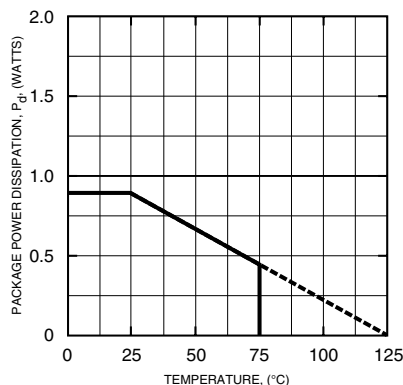
Absolute Maximum Ratings, $T_a = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	M81701FP	Units
High Side Floating Supply Absolute Voltage	V_B	-0.5 ~ 624	Volts
High Side Floating Supply Offset Voltage	V_S	-0.5 ~ 600	Volts
High Side Floating Supply Voltage ($V_{BS} = V_B - V_S$)	V_{BS}	-0.5 ~ 24	Volts
Allowable Offset Supply Voltage Minus Surge ($P_W < 1\mu\text{s}$)	$-V_S$	-5	Volts
High Side Output Voltage	V_{HO}	$V_S - 0.5 \sim V_B + 0.5$	Volts
Low Side Fixed Supply Voltage	V_{CC}	-0.5 ~ 24	Volts
Low Side Output Voltage	V_{LO}	-0.5 ~ $V_{CC} + 0.5$	Volts
Logic Supply Voltage	V_{DD}	-0.5 ~ 24	Volts
Logic Input Voltage (H_{IN}, L_{IN})	V_{IN}	-0.5 ~ $V_{DD} + 0.5$	Volts
Shutdown Input Voltage	S_D	-0.5 ~ $V_{DD} + 0.5$	Volts
Low Side Return Offset Voltage ($V_{CC} - L_{GND} < 24\text{V}$)	L_{GND}	-5 ~ $V_{CC} + 0.5$	Volts
Allowable Offset Supply Voltage Transient	dV_S/dt	±50	V/ns
Package Power Dissipation ($T_a = 25^\circ\text{C}$, On Board)	P_d	0.88	Watts
Linear Derating Factor ($T_a > 25^\circ\text{C}$, On Board)	K_θ	-8.8	mW/°C
Junction to Case Thermal Resistance	$R_{th(j-c)}$	50	°C/W
Junction Temperature	T_j	-20 ~ 125	°C
Operation Temperature	T_{opr}	-20 ~ 75	°C
Storage Temperature	T_{stg}	-40 ~ 125	°C

Recommended Operating Conditions

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
High Side Floating Supply Absolute Voltage	V_B		$V_S + 10$	—	$V_S + 20$	Volts
High Side Floating Supply Offset Voltage	V_S		0	—	500	Volts
High Side Floating Supply Voltage	V_{BS}	$V_{BS} = V_B - V_S$	10	—	20	Volts
Low Side Fixed Supply Voltage	V_{CC}		10	—	20	Volts
Logic Supply Voltage	V_{DD}		5	—	20	Volts
Logic Input Voltage	V_{IN}	H_{IN}, L_{IN}	0	—	V_{DD}	Volts
Shutdown Input Voltage	S_D		0	—	V_{DD}	Volts
Low Side Return Offset Voltage	L_{GND}		-5	—	5	Volts

THERMAL DERATING FACTOR CHARACTERISTICS



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Electrical Characteristics

T_a = 25°C, V_{CC} = V_{BS} (= V_B - V_S) = V_{DD} = 15V, L_{GND} = 0V unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Floating Supply Leakage Current	I _{FS}	V _B = V _S = 600V	—	—	1	μA
V _{BS} Standby Current	I _{BS}		—	0.4	0.7	mA
V _{CC} Standby Current	I _{CC}		—	0.75	1.5	mA
V _{DD} Standby Current	I _{DD}		—	—	10	μA
High Level Output Voltage	V _{OH}	I _O = 0A, L _O , H _O	13.8	14.4	—	Volts
Low Level Output Voltage	V _{OL}	I _O = 0A, L _O , H _O	—	—	0.1	Volts
High Level Input Threshold Voltage	V _{IH15}	H _{IN} , L _{IN}	—	8.4	9.5	Volts
Low Level Input Threshold Voltage	V _{IL15}	H _{IN} , L _{IN}	6.0	6.8	—	Volts
High Level Input Threshold Voltage	V _{IH5}	H _{IN} , L _{IN} (V _{DD} = 5V)	—	3.1	4.1	volts
Low Level Input Threshold Voltage	V _{IL5}	H _{IN} , L _{IN} (V _{DD} = 5V)	1.4	2.4	—	Volts
Shutdown High Level Input Threshold Voltage	V _{ISDH15}	S _D	—	8.4	9.5	Volts
Shutdown Low Level Input Threshold Voltage	V _{ISDL15}	S _D	6.0	6.8	—	Volts
Shutdown High Level Input Threshold Voltage	V _{ISDH5}	S _D (V _{DD} = 5V)	—	3.1	4.1	Volts
Shutdown Low Level Input Threshold Voltage	V _{ISDL5}	S _D (V _{DD} = 5V)	1.4	2.4	—	Volts
High Level Input Bias Current	I _{IH}	V _{IN} = 15V	—	75	150	μA
Low Level Input Bias Current	I _{IL}	V _{IN} = 0V	—	—	1.0	μA
V _{BS} Supply UV Reset Voltage	V _{BSuvr}		7.5	8.6	9.7	Volts
V _{BS} Supply UV Hysteresis Voltage	V _{BSuvh}		0.1	0.4	0.7	Volts
V _{BS} Supply UV Filter Time	t _{VBSuv}		—	10	—	μs
V _{CC} Supply UV Reset Voltage	V _{CCuvr}		7.5	8.6	9.7	Volts
V _{CC} Supply UV Hysteresis Voltage	V _{CCuvh}		0.1	0.4	0.7	Volts
V _{CC} Supply UV Filter Time	t _{VCCuv}		—	10	—	μs
Output High Level Short Circuit Pulsed Current	I _{OH}	V _O = 0V, V _{IN} = 15V, P _W < 10μs	—	-2.5	—	Amperes
Output Low Level Short Circuit Pulsed Current	I _{OL}	V _O = 15V, V _{IN} = 0V, P _W < 10μs	—	2.5	—	Amperes
Output High Level ON Resistance	R _{OH}	I _O = -200mA, R _{OH} = (V _{OH} - V _O)/I _O	—	10	13	Ω
Output Low Level ON Resistance	R _{OL}	I _O = 200mA, R _{OL} = V _O /I _O	—	2.5	3	Ω
High Side Turn-On Propagation Delay	t _{dLH(HO)}	C _L = 1000pF between H _O - V _S	—	—	350	ns
High Side Turn-Off Propagation Delay	t _{dHL(HO)}	C _L = 1000pF between H _O - V _S	—	—	330	ns
High Side Turn-On Rise Time	t _{rH}	C _L = 1000pF between H _O - V _S	—	—	60	ns
High Side Turn-Off Fall Time	t _{fH}	C _L = 1000pF between H _O - V _S	—	—	30	ns
Low Side Turn-On Propagation Delay	t _{dLH(LO)}	C _L = 1000pf between L _O - GND	—	—	350	ns
Low Side Turn-Off Propagation Delay	t _{dHL(LO)}	C _L = 1000pf between L _O - GND	—	—	330	ns
Low Side Turn-On Rise Time	t _{rL}	C _L = 1000pf between L _O - GND	—	—	60	ns
Low Side Turn-Off Rise Time	t _{fL}	C _L = 1000pf between L _O - GND	—	—	30	ns
Delay Matching, High Side and Low Side Turn-On	Δt _{dLH}	t _{dLH(HO)} - t _{dLH(LO)}	—	—	30	ns
Delay Matching, High Side and Low Side Turn-Off	Δt _{dHL}	t _{dHL(HO)} - t _{dHL(LO)}	—	—	30	ns
Shutdown Propagation Delay	t _{SD}	C _L = 1000pF between H _O -V _S , C _L = 1000pF between L _O -GND	—	—	350	ns

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FUNCTION TABLE (X: H or L)

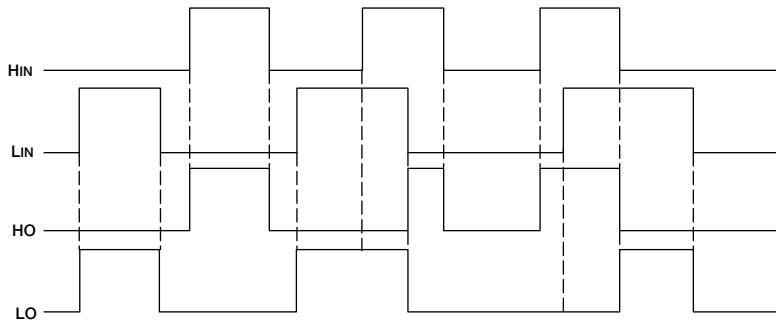
HIN	LIN	VBS UV	VCC UV	HO	LO	Sd	Behavioral State
L	L	H	H	L	L	L	LO = OFF, HO = OFF
L	H	H	H	L	H	L	LO = ON, HO = OFF
H	L	H	H	H	L	L	LO = OFF, HO = ON
H	H	H	H	*	*	L	
X	L	L	H	L	L	L	LO = OFF, HO = OFF, Vbs UV tripped
X	H	L	H	L	H	L	LO = ON, HO = OFF, Vbs UV tripped
L	X	H	L	L	L	L	LO = OFF, HO = OFF, Vcc UV tripped
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

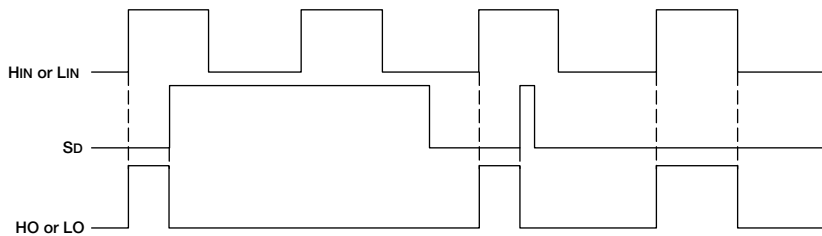
1. Input/Output Timing Diagram

When input signal (H_{IN} or L_{IN}) is "H", then output signal (HO or LO) is "H". In the case of both input signals (H_{IN} and L_{IN}) are "H", first coming input signal (H_{IN} or L_{IN}) "H" is only accepted. Corresponding this signal, output signal (HO or LO) becomes "H". Corresponding the other signal (L_{IN} or H_{IN}), output signal (LO or HO) keeps "L".

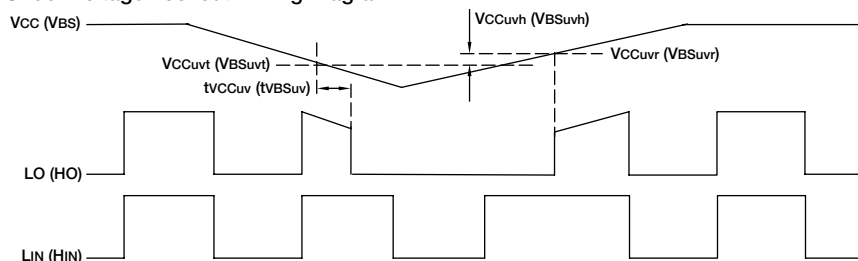


2. Shutdown Input Timing Diagram

When shutdown input signal (S_D) is "H", then output signals (HO and LO) are "L". Output signals (HO and LO) keep "L" by shutdown input signal (S_D) is "L" until next input signal (H_{IN} or L_{IN}) is "H".



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



4. Allowable Supply Voltage Transient

Allowable high side floating supply voltage (V_{BS}) transient or low side fixed supply voltage (V_{CC}) transient are below 50V/μs. In case V_{BS} or V_{CC} are started more than 50V/μs, output signal (HO or LO) may be "H".