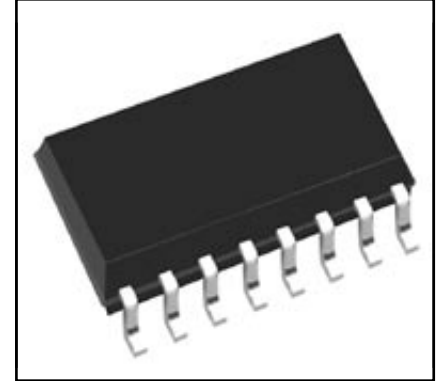
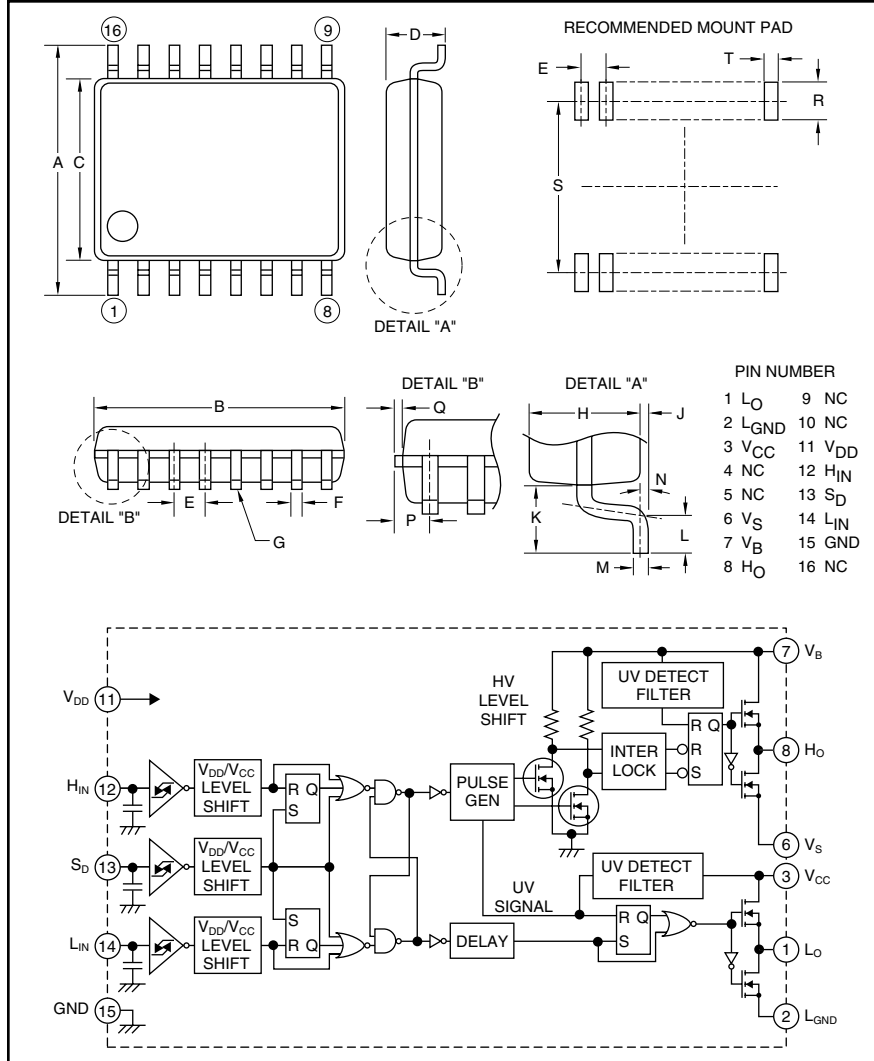


HVIC

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

M81700FP

HVIC, High Voltage Integrated Circuit

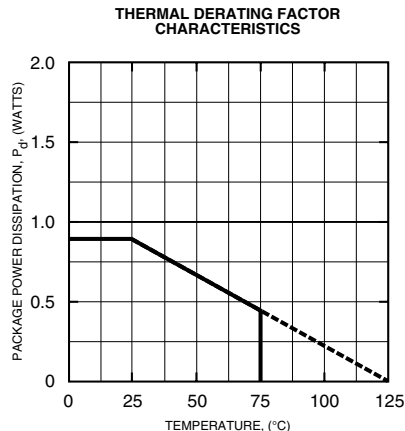
600 Volts/ ± 2 Amperes

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/ $^\circ\text{C}$
Junction to Case Thermal Resistance	$R_{th(j-c)}$	50	$^\circ\text{C}/\text{W}$
Junction Temperature	T_j	-20 ~ 125	$^\circ\text{C}$
Operation Temperature	T_{opr}	-20 ~ 75	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ 125	$^\circ\text{C}$

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



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HVIC, High Voltage Integrated Circuit

600 Volts/±2 Amperes

Electrical Characteristics

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Floating Supply Leakage Current	I_{FS}	$V_B = V_S = 600\text{V}$	—	—	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}	$I_O = 0\text{A}$, L_O , H_O	13.8	14.4	—	Volts
Low Level Output Voltage	V_{OL}	$I_O = 0\text{A}$, 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} ($V_{DD} = 5\text{V}$)	—	3.1	4.1	volts
Low Level Input Threshold Voltage	V_{IL5}	H_{IN} , L_{IN} ($V_{DD} = 5\text{V}$)	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 ($V_{DD} = 5\text{V}$)	—	3.1	4.1	Volts
Shutdown Low Level Input Threshold Voltage	V_{ISDL5}	S_D ($V_{DD} = 5\text{V}$)	1.4	2.4	—	Volts
High Level Input Bias Current	I_{IH}	$V_{IN} = 15\text{V}$	—	75	150	μA
Low Level Input Bias Current	I_{IL}	$V_{IN} = 0\text{V}$	—	—	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}	$V_O = 0\text{V}$, $V_{IN} = 15\text{V}$, $P_W < 10\mu\text{s}$	—	-2.5	—	Amperes
Output Low Level Short Circuit Pulsed Current	I_{OL}	$V_O = 15\text{V}$, $V_{IN} = 0\text{V}$, $P_W < 10\mu\text{s}$	—	2.5	—	Amperes
Output High Level ON Resistance	R_{OH}	$I_O = -200\text{mA}$, $R_{OH} = (V_{OH} - V_O)/I_O$	—	10	13	Ω
Output Low Level ON Resistance	R_{OL}	$I_O = 200\text{mA}$, $R_{OL} = V_O/I_O$	—	2.5	3	Ω
High Side Turn-On Propagation Delay	$t_{dLH(HO)}$	$C_L = 1000\text{pF}$ between $H_O - V_S$	—	—	350	ns
High Side Turn-Off Propagation Delay	$t_{dHL(HO)}$	$C_L = 1000\text{pF}$ between $H_O - V_S$	—	—	330	ns
High Side Turn-On Rise Time	t_{rH}	$C_L = 1000\text{pF}$ between $H_O - V_S$	—	—	60	ns
High Side Turn-Off Fall Time	t_{fH}	$C_L = 1000\text{pF}$ between $H_O - V_S$	—	—	30	ns
Low Side Turn-On Propagation Delay	$t_{dLH(LO)}$	$C_L = 1000\text{pf}$ between $L_O - \text{GND}$	—	—	350	ns
Low Side Turn-Off Propagation Delay	$t_{dHL(LO)}$	$C_L = 1000\text{pf}$ between $L_O - \text{GND}$	—	—	330	ns
Low Side Turn-On Rise Time	t_{rL}	$C_L = 1000\text{pf}$ between $L_O - \text{GND}$	—	—	60	ns
Low Side Turn-Off Rise Time	t_{fL}	$C_L = 1000\text{pf}$ between $L_O - \text{GND}$	—	—	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}	$C_L = 1000\text{pF}$ between $H_O - V_S$, $C_L = 1000\text{pF}$ between $L_O - \text{GND}$	—	—	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

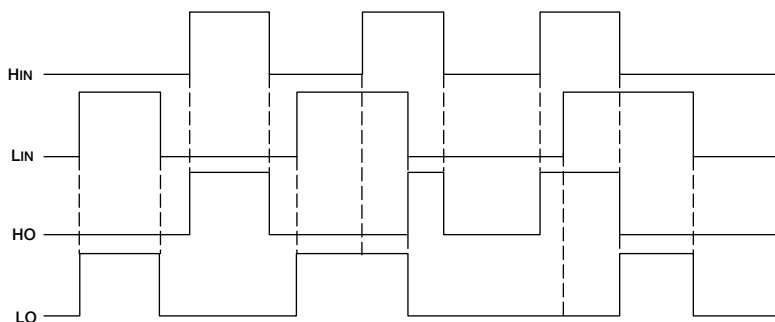
Note : "L" state of Vbs UV and Vcc UV means that UV trip voltage.

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

TIMING DIAGRAM

1. Input/Output Timing Diagram

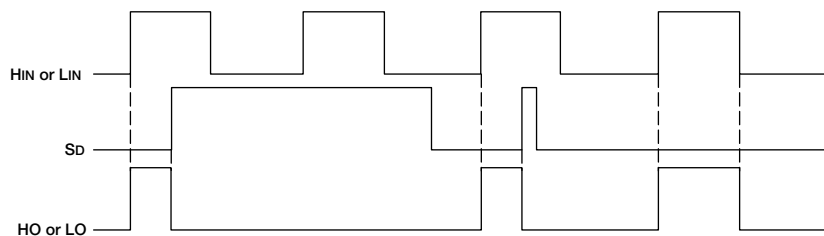
When input signal (H_{IN} or L_{IN}) is "H", then output signal (HO or LO) is "H". In the case of both input signals (H_{IN} and L_{IN}) are "H", first coming input signal (H_{IN} or L_{IN}) "H" is only accepted. Corresponding this signal, output signal (HO or LO) becomes "H". Corresponding the other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



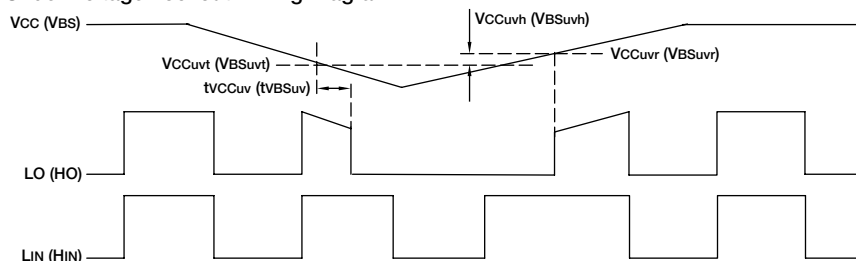
2. Shutdown Input Timing Diagram

When shutdown input signal (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 (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 (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".