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[Powerex Inc.](#)
[M81703FP](#)

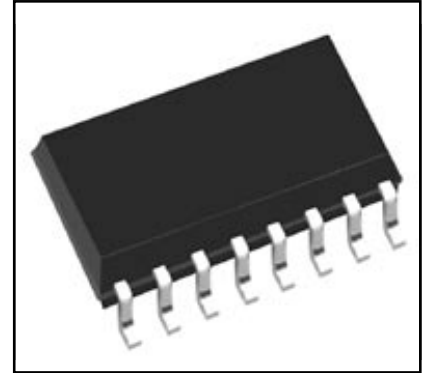
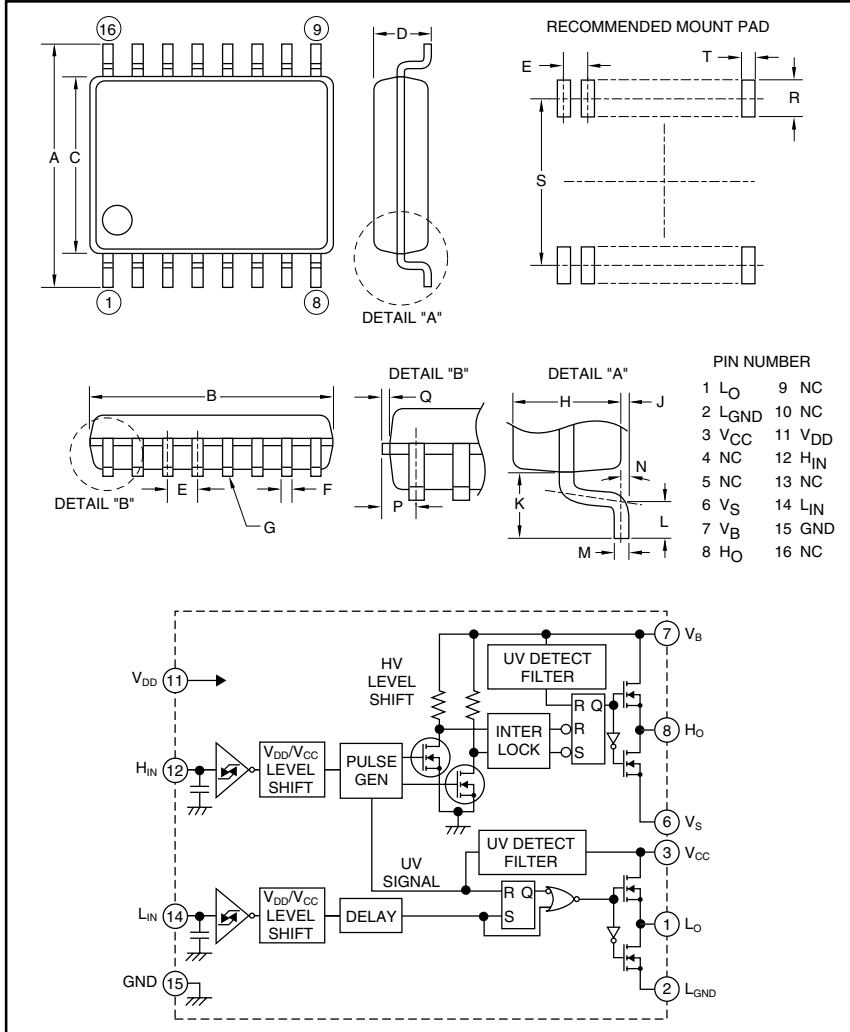
For any questions, you can email us directly:
sales@integrated-circuit.com



Powerex, Inc., 200 E. Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

M81703FP

HVIC
High Voltage Integrated Circuit
600 Volts/±2 Amperes



Description:
 M81703FP 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:
 M81703FP 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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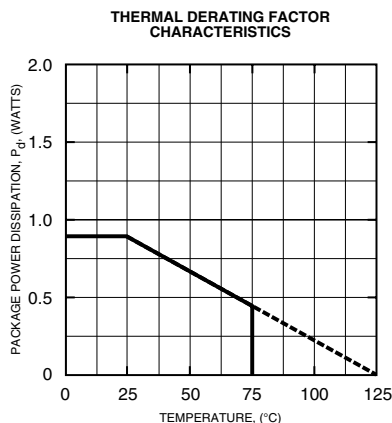
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Absolute Maximum Ratings, $T_a = 25^\circ\text{C}$ unless otherwise specified

Characteristics	Symbol	M81703FP	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
SLow 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
Low Side Return Offset Voltage	L_{GND}		-5	—	5	Volts





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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
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)

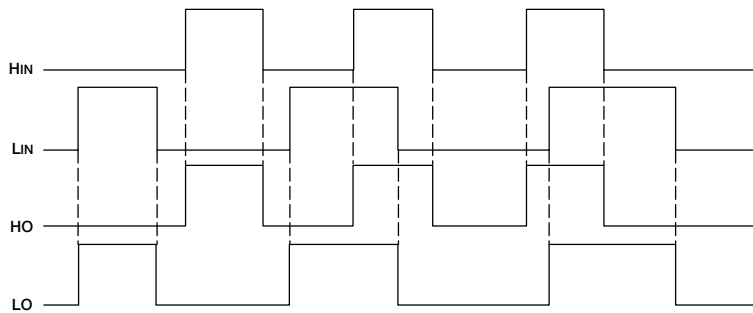
H _{IN}	L _{IN}	V _{BS} UV	V _{CC} UV	HO	LO	Behavioral State
L	L	H	H	L	L	LO = OFF, HO = OFF
L	H	H	H	L	H	LO = ON, HO = OFF
H	L	H	H	H	L	LO = OFF, HO = ON
H	H	H	H	H	H	LO = ON, HO = ON
X	L	L	H	L	L	LO = OFF, HO = OFF, V _{BS} UV tripped
X	H	L	H	L	H	LO = ON, HO = OFF, V _{BS} UV tripped
L	X	H	L	L	L	LO = OFF, HO = OFF, V _{CC} UV tripped
H	X	H	L	L	L	LO = OFF, HO = OFF, V _{CC} UV tripped

Note : "L" state of V_{BS} UV and V_{CC} UV means that UV trip voltage.

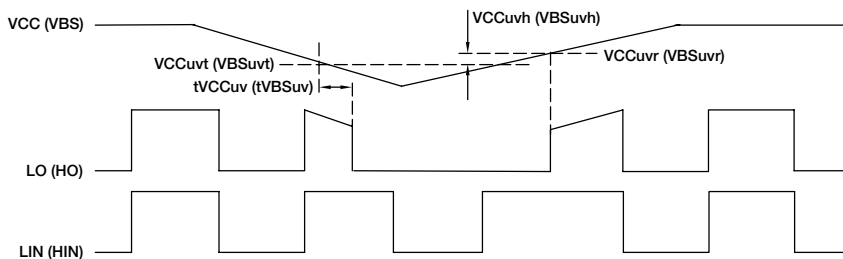
TIMING DIAGRAM

1. Input/Output Timing Diagram

When input signal (H_{IN} or L_{IN}) is "H", then output signal (HO or LO) is "H".
 Both input signals (H_{IN} and L_{IN}) are "H", then output signal (HO or LO) becomes "H".



2. V_{CC} (V_{BS}) Supply Under Voltage Lockout Timing Diagram



3. 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".