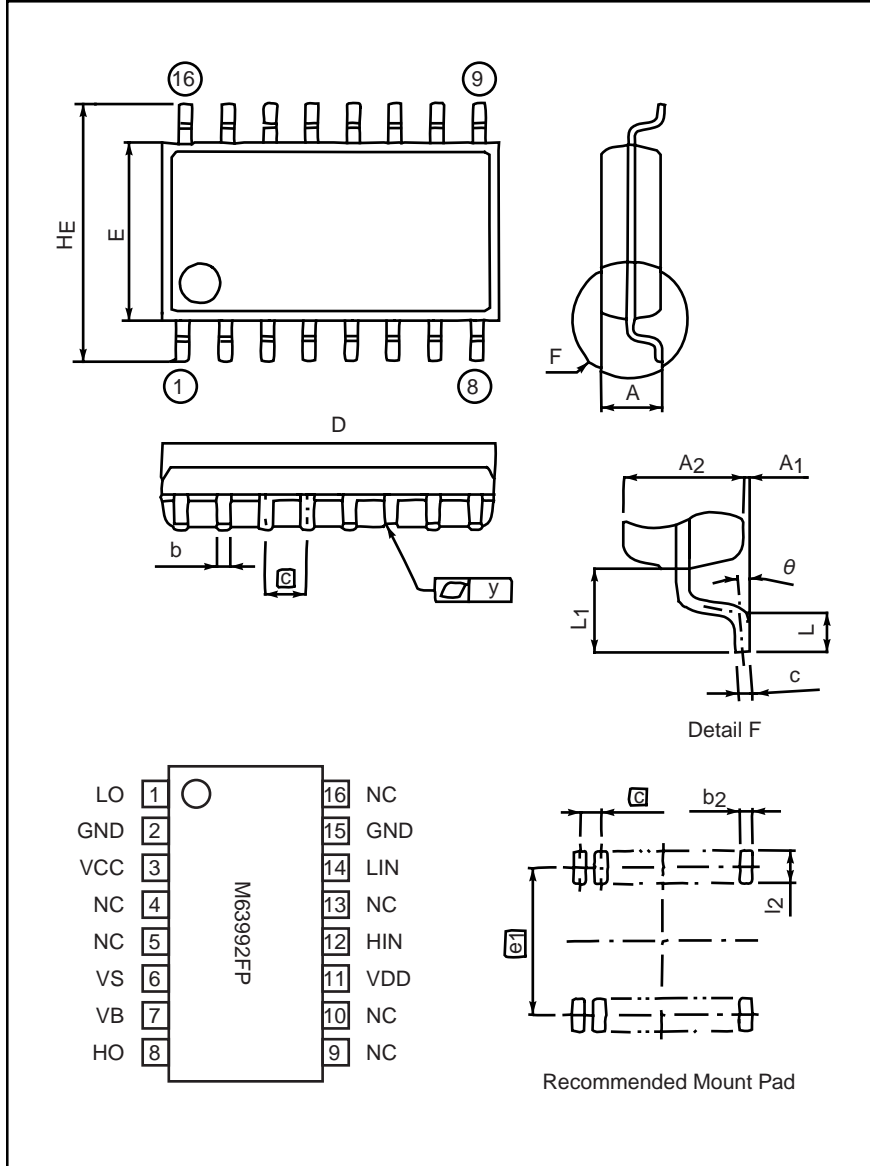


### HVIC Half-Bridge Driver



**Description:**

M63991FP is a high voltage, Power MOSFET/IGBT module driver for half-bridge applications.

**Features:**

- 600V Floating Supply Voltage
- ±500mA Output Current
- Half-Bridge Driver
- SOP-16 Package

**Application:**

- Appliances
- Air Conditioners
- AC Servo Motors
- General Purpose Power Supplies

**Outline Drawing and Pin Diagram**

Dimensions	Inches	Millimeters
A	0.08 Max.	2.1 Max.
A <sub>1</sub>	0.004±0.004/0	0.1±0.1/0
A <sub>2</sub>	0.07	1.8
b	0.02+0.004/-0.002	0.4+0.1/-0.05
c	0.01+0.002/-0.008	0.2+0.05/-0.02
$\square$ C	0.05	1.27
D	0.4±0.004	10.1±0.1
E	0.21±0.004	5.3±0.1

Dimensions	Inches	Millimeters
H <sub>E</sub>	0.31±0.01	7.8±0.3
L	0.02±0.01	0.6±0.2
L <sub>1</sub>	0.05	1.25
$\square$ e1	0.31	7.62
y	0.004 Max.	0.1 Max.
$\theta$	0° – 8°	0° – 8°
b <sub>2</sub>	0.03	0.76
l <sub>2</sub>	0.05 Min.	1.27 Min.



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

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

Ratings	Symbol	Test Conditions	M63991FP	Units
High Side Floating Supply Voltage	$V_B$		-0.5 ~ 624	Volts
High Side Floating Supply Offset Voltage	$V_S$		$V_B - 24 + 0.5$	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 ~ 7	Volts
Logic Input Voltage	$V_{IN}$	$H_{IN}, L_{IN}$	-0.5 ~ $V_{DD} + 0.5$	Volts
Allowable Offset Supply Voltage Transient	$dV_S/dt$		$\pm 50$	V/ns
Package Power Dissipation	$P_t$	$T_a = 25^\circ\text{C}$ , On Board	1.1	W
Linear Derating Factor	$K_\theta$	$T_a > 25^\circ\text{C}$ , On Board	-11	mW/ $^\circ\text{C}$
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**

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
High Side Floating Supply Voltage	$V_B$		$V_S + 13.5$	—	$V_S + 20$	Volts
High Side Floating Supply Offset Voltage	$V_S$		-5	—	500	Volts
Low Side Fixed Supply Voltage	$V_{CC}$		13.5	—	20	Volts
Logic Supply Voltage	$V_{DD}$		4.5	—	5.5	Volts
Logic Input Voltage	$V_{IN}$	$H_{IN}, L_{IN}$	0	—	$V_{DD}$	Volts

**Function Table**

$H_{IN}$	$L_{IN}$	$V_{BS} U_V$	$V_{CC} U_V$	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	L	L	LO = OFF, HO = OFF, $L_{IN} = H_{IN} = H$ Simultaneously
X	L	L	H	L	L	LO = OFF, HO = OFF, $V_{BS} U_V$ Tripped
X	H	L	H	L	H	LO = ON, HO = OFF, $V_{BS} U_V$ Tripped
L	X	H	L	L*	L	LO = OFF, HO = OFF, $V_{CC} U_V$ Tripped
H	X	H	L	H*	L	LO = OFF, HO = ON, $V_{CC} U_V$ Tripped

\* Note: "L" state of  $V_{BS} U_V$  and  $V_{CC} U_V$  means that supply is below trip level.  
 If  $V_{CC}$  becomes less than  $U_V$  trip, HO state will not change.  
 If  $V_{CC}$  becomes less than  $U_V$ ,  $H_{IN}$  state will not transfer to HO.

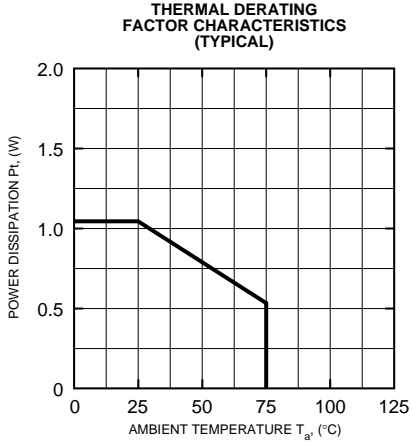
**M63991FP**  
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**Electrical Characteristics,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = V_{BS} = 15\text{V}$ ,  $V_{DD} = 5\text{V}$  unless otherwise specified**

Parameter	Symbol	Test Conditions	Min.	Typ.*	Max.	Units
Floating Supply Leakage Current	$I_{FS}$	$V_B = V_S = 600\text{V}$	—	—	10	$\mu\text{A}$
$V_{BS}$ Standby Current	$I_{BS}$		0.2	0.5	1.0	$\text{mA}$
$V_{CC}$ Standby Current	$I_{CC}$		0.2	0.5	1.0	$\text{mA}$
$V_{DD}$ Standby Current	$I_{DD}$		—	—	100	$\mu\text{A}$
High Level Output Voltage	$V_{OH}$	$I_O = 0\text{A}$ , LO, HO	13.8	14.4	—	Volts
Low Level Output Voltage	$V_{OL}$	$I_O = 0\text{A}$ , LO, HO	—	—	0.1	Volts
High Level Input Threshold Voltage	$V_{IH}$	$H_{IN}$ , $L_{IN}$	2.1	3.0	4.0	Volts
Low Level Input Threshold Voltage	$V_{IL}$	$H_{IN}$ , $L_{IN}$	0.6	1.5	1.9	Volts
High Level Input Bias Current	$I_{IH}$	$V_{IN} = 5\text{V}$	—	25	75	$\mu\text{A}$
Low Level Input Bias Current	$I_{IL}$	$V_{IN} = 0\text{V}$	—	—	1.0	$\mu\text{A}$
$V_{BS}$ Supply UV Trip Voltage	$V_{BSUVT}$		9.5	10.5	11.5	Volts
$V_{BS}$ Supply UV Reset Voltage	$V_{BSUVR}$		10.0	11.0	12.0	Volts
$V_{BS}$ Supply Filter Time	$t_{VBSUV}$		—	7.5	—	$\mu\text{s}$
$V_{CC}$ Supply UV Trip Voltage	$V_{CCUVT}$		9.5	10.5	11.5	Volts
$V_{CC}$ Supply UVReset Voltage	$V_{CCUVR}$		10.0	11.0	12.0	Volts
$V_{CC}$ Supply Filter Time	$t_{VCCUV}$		—	7.5	—	$\mu\text{s}$
Output High Level Short Circuit Pulsed Current	$I_{OH}$	$V_O = 0\text{V}$ , $V_{IN} = 5\text{V}$ , $PW < 10 \mu\text{s}$	—	-0.5	—	A
Output Low Level Short Circuit Pulsed Current	$I_{OL}$	$V_O = 15\text{V}$ , $V_{IN} = 0\text{V}$ , $PW < 10 \mu\text{s}$	—	0.5	—	A
Output High Level On Resistance	$R_{OH}$	$I_O = -200\text{mA}$ , $R_{OH} = (V_{OH} - V_O) / I_O$	—	40	—	$\Omega$
Output Low Level On Resistance	$R_{OL}$	$I_O = 200\text{mA}$ , $R_{OL} = V_O / I_O$	—	20	—	$\Omega$
High Side Turn-On Propagation Delay	$t_{dLH}(\text{HO})$		250	300	350	ns
High Side Turn-Off Propagation Delay	$t_{dHL}(\text{HO})$	$CL = 1000\text{pF}$ between HO to $V_S$	230	280	330	ns
High Side Turn-On Rise Time	$t_r(\text{HO})$		—	80	—	ns
High Side Turn-Off Fall Time	$t_f(\text{HO})$		—	60	—	ns
Low Side Turn-On Propagation Delay	$t_{dLH}(\text{LO})$		250	300	350	ns
Low Side Turn-Off Propagation Delay	$t_{dHL}(\text{LO})$	$CL = 1000\text{pF}$ between LO to GND	230	280	330	ns
Low Side Turn-On Rise Time	$t_r(\text{LO})$		—	80	—	ns
Low Side Turn-Off Fall Time	$t_f(\text{LO})$		—	60	—	ns
Delay Matching, High Side and Low Side Turn-On	$t_{dMon}$	$ t_{dLH}(\text{HO}) - t_{dLH}(\text{LO}) $	—	—	30	ns
Delay Matching, High Side and Low Side Turn-Off	$t_{dMoff}$	$ t_{dHL}(\text{HO}) - t_{dHL}(\text{LO}) $	—	—	30	ns

\* The typical values are those measured under ambient temperature ( $T_a$ ) of  $25^\circ\text{C}$ .  
 There is no guarantee that these values are obtained under any conditions.

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**BLOCK DIAGRAM**

