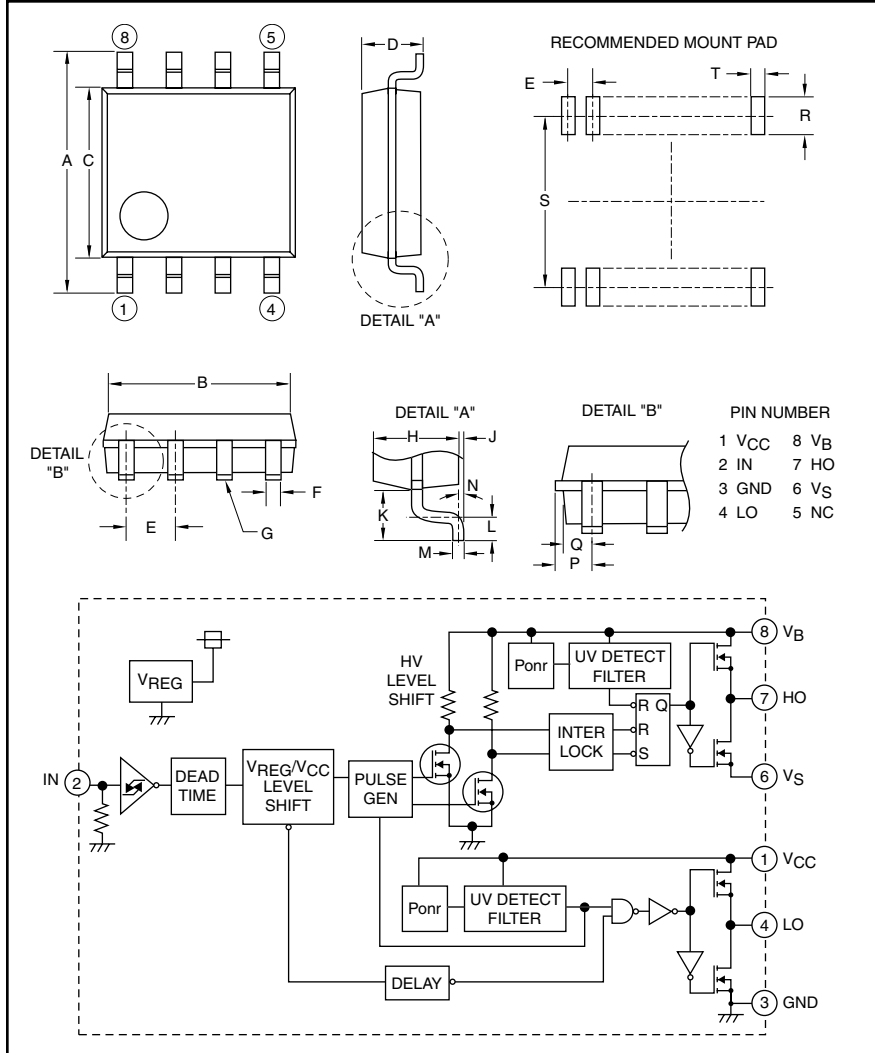


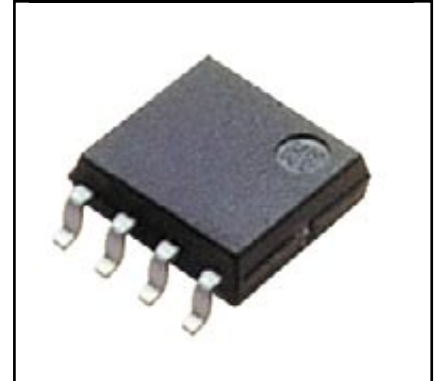
### HVIC High Voltage Half-Bridge Driver 600 Volts/±500mA



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	0.24±0.01	6.2±0.3
B	0.2±0.008	5.0±0.2
C	0.17±0.008	4.4±0.2
D	0.08 Max.	1.9 Max.
E	0.05	1.27
F	0.015±0.002	0.4±0.05
G	0.004	0.1
H	0.06	1.5
J	0.002 Min.	0.05 Min.

Dimensions	Inches	Millimeters
K	0.04	0.9
L	0.015±0.008	0.4±0.2
M	0.006±0.002	0.15±0.05
N	10° Max.	10° Max.
P	0.03	0.745
Q	0.023	0.595
R	0.05 Min.	1.27 Min.
S	0.23	5.72
T	0.76	0.76



**Description:**  
M81713FP is a high voltage Power MOSFET and IGBT driver for half-bridge applications.

- Features:**
- Shoot Through Interlock
  - Output Current ±500mA
  - Half-Bridge Driver
  - SOP-8 Package
  - Internal Dead Time - Fixed

- Applications:**
- HID Ballast
  - PDP
  - MOSFET Driver
  - IGBT Driver
  - Inverter Module Control

**Ordering Information:**  
M81713FP is a ±500mA, 600 Volt HVIC, High Voltage Half-Bridge Driver



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

**M81713FP**

**HVIC, High Voltage Half-Bridge Driver**

600 Volts/±500mA

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

Characteristics	Symbol	M81713FP	Units
High Side Floating Supply Absolute Voltage	$V_B$	-0.5 ~ 624	Volts
High Side Floating Supply Offset Voltage	$V_S$	$V_B - 24 \sim V_B + 0.5$	Volts
High Side Floating Supply Voltage ( $V_{BS} = V_B - V_S$ )	$V_{BS}$	-0.5 ~ 24	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 Input Voltage	$V_{IN}$	-0.5 ~ $V_{CC} + 0.5$	Volts
Allowable Offset Voltage Transient	dVs/dt	±50	V/ns
Package Power Dissipation ( $T_a = 25^\circ\text{C}$ , On Board)	$P_d$	0.6	Watts
Linear Derating Factor ( $T_a > 25^\circ\text{C}$ , On Board)	$K_\theta$	6.0	mW/°C
Junction to Case Thermal Resistance	$R_{th(j-c)}$	50	°C/W
Junction Temperature	$T_j$	-20 ~ 150	°C
Operation Temperature	$T_{opr}$	-20 ~ 125	°C
Storage Temperature	$T_{stg}$	-40 ~ 150	°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	$V_S$	$V_B > 10V$	-5	—	500	Volts
High Side Floating Supply Voltage	$V_{BS}$	$V_B = V_B - V_S$	10	—	20	Volts
High Side Output Voltage	$V_{HO}$		$V_S$	—	$V_B$	Volts
Low Side Fixed Supply Voltage	$V_{CC}$		10	—	20	Volts
Logic Supply Voltage	$V_{LO}$		0	—	$V_{CC}$	Volts
Logic Input Voltage	$V_{IN}$		0	—	$V_{CC}$	Volts

**Electrical Characteristics,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = V_{BS} (= V_B - V_S) = 15V$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Floating Supply Leakage Current	$I_{FS}$	$V_B = V_S = 600V$	—	—	1.0	µA
$V_{BS}$ Standby Current	$I_{BS}$	$I_N = 0V$	—	0.2	0.5	mA
$V_{CC}$ Standby Current	$I_{CC}$	$I_N = 0V$	0.2	0.5	0.75	mA
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	$V_{IH}$	$H_{IN}, L_{IN}$	2.1	3.0	4.0	Volts
Low Level Input Threshold Voltage	$V_{IL}$	$H_{IN}, L_{IN}$	0.6	1.5	2.0	Volts
High Level Input Bias Current	$I_{IH}$	$V_{IN} = 5V$	—	25	75	µA
Low Level Input Bias Current	$I_{IL}$	$V_{IN} = 0V$	—	—	1.0	µA
$V_{BS}$ Supply UV Reset Voltage	$V_{BSuvr}$		8.0	8.9	9.8	Volts
$V_{BS}$ Supply UV Hysteresis Voltage	$V_{BSuvh}$		0.5	0.7	—	Volts
$V_{BS}$ Supply UV Filter Time	$tV_{BSuv}$		—	7.5	—	µs
$V_{CC}$ Supply UV Reset Voltage	$V_{CCuvr}$		8.0	8.9	9.8	Volts
$V_{CC}$ Supply UV Hysteresis Voltage	$V_{CCuvh}$		0.5	0.7	—	Volts

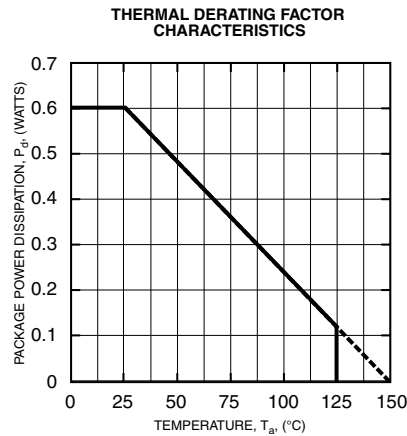
**M81713FP**

**HVIC, High Voltage Half-Bridge Driver**

600 Volts/±500mA

**Electrical Characteristics,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = V_{BS} (= V_B - V_S) = 15\text{V}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
$V_{CC}$ Supply UV Filter Time	$t_{V_{CC}uv}$		—	7.5	—	$\mu\text{s}$
Output High Level Short Circuit Pulsed Current	$I_{OH}$	$V_O = 0\text{V}$ , $P_W < 10\mu\text{s}$	—	-500	—	mA
Output Low Level Short Circuit Pulsed Current	$I_{OL}$	$V_O = 15\text{V}$ , $P_W < 10\mu\text{s}$	—	500	—	mA
Output High Level ON Resistance	$R_{OH}$	$I_O = -200\text{mA}$ , $R_{OH} = (V_{OH} - V_O)/I_O$	—	30	—	$\Omega$
Output Low Level ON Resistance	$R_{OL}$	$I_O = 200\text{mA}$ , $R_{OL} = V_O / I_O$	—	12	—	$\Omega$
Dead Time LO Turn-Off to HO Turn-ON and HO Turn-Off to LO Turn-On	$t_{DEAD}$	$C_L = 1000\text{pF}$ between HO – $V_S$ , LO-GND	0.5	—	1.0	$\mu\text{s}$
Power On Reset Voltage	$V_{Ponr}$		—	—	6	Volts
Power On Reset Filter Time	$t_{Ponr(FIL)}$		300	—	—	ns
Turn-On Propagation Delay	$t_{dLH}$	$C_L = 1000\text{pF}$ between HO – $V_S$ , LO – GND	0.6	0.9	1.2	$\mu\text{s}$
Turn-Off Propagation Delay	$t_{dHL}$	$C_L = 1000\text{pF}$ between HO – $V_S$ , LO – GND	0.1	0.15	0.2	$\mu\text{s}$
High Side Turn-On Rise Time	$t_{rH}$	$C_L = 1000\text{pF}$ between LO – GND	—	75	180	ns
High Side Turn-Off Fall Time	$t_{fH}$	$C_L = 1000\text{pF}$ between LO – GND	—	75	180	ns
Low Side Turn-On Rise Time	$t_{rL}$	$C_L = 1000\text{pF}$ between LO – GND	—	75	180	ns
Low Side Turn-Off Fall Time	$t_{fL}$	$C_L = 1000\text{pF}$ between LO – GND	—	75	180	ns



1. Input/Output Logic

HO has positive logic with reference to IN. LO has negative logic with reference to IN.

2. Logic During UV ( $V_{CC}$ ,  $V_{BS}$ ) Error

Error Signal	HO	LO
UV Error ( $V_{CC}$ )*	HO outputs “L” level as long as UV error for $V_{CC}$ is detected. HO responds to IN if $V_{CC}$ exceeds $V_{CC}$ UV reset level.	LO is locked at “L” as long as UV error for $V_{CC}$ is detected. After $V_{CC}$ exceeds $V_{CC}$ UV reset level, the lock for LO is removed and responds to IN signal.
UV Error ( $V_{BS}$ )	HO is locked at “L” as long as UV error for $V_{BS}$ is detected. After $V_{BS}$ exceeds $V_{BS}$ UV reset level, the lock for HO is removed following an “L” state of the IN signal, and then HO responds to the input.	LO is independent of $V_{BS}$ to respond to IN.

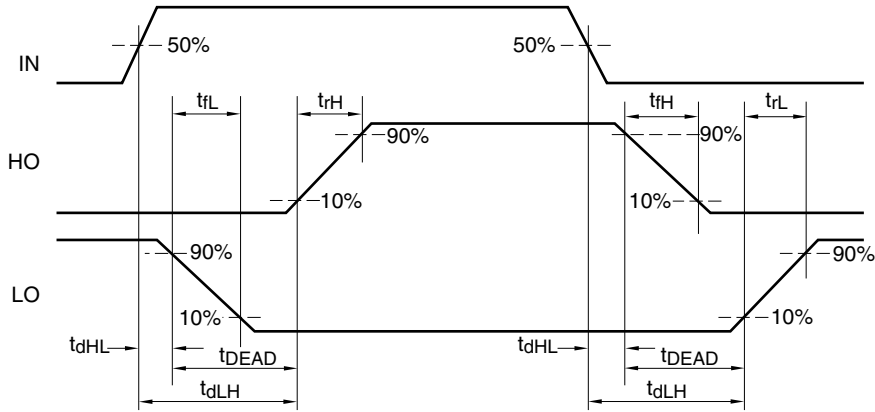
\*If UV error for  $V_{CC}$  is detected when HO is in “H” level and the falling speed for  $V_{CC}$  exceeds  $0.03\text{V}/\mu\text{s}$ , the OFF signal for HO might not be transmitted from low side to high side and then HO stays “H”.

3. Allowable Supply Voltage Transient

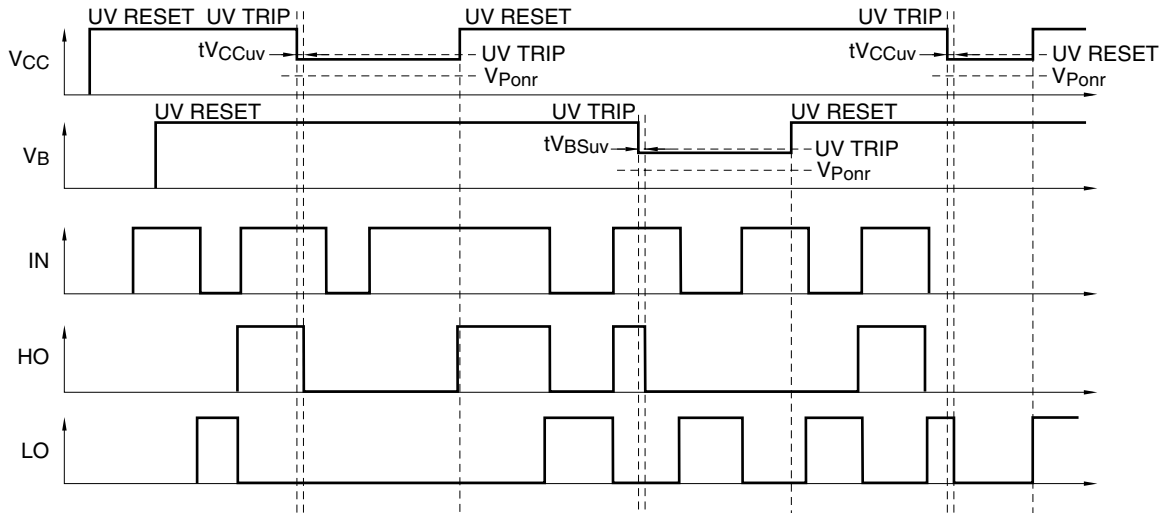
It is recommended supplying  $V_{CC}$  first and  $V_{BS}$  second. In the case of shutting off supply voltage, it is recommended to shut off  $V_{BS}$  first and  $V_{CC}$  second. At the time of starting,  $V_{CC}$  and  $V_{BS}$ , the power supply should be increased slowly (below  $50\text{V}/\mu\text{s}$ ). If it is increased rapidly, output signal (HO or LO) may be “H”.

**M81713FP**  
**HVIC, High Voltage Half-Bridge Driver**  
 600 Volts/±500mA

### INPUT/OUTPUT TIMING DIAGRAM



### UV SEQUENCE



### Ponr (Power-On-Reset) SEQUENCE

