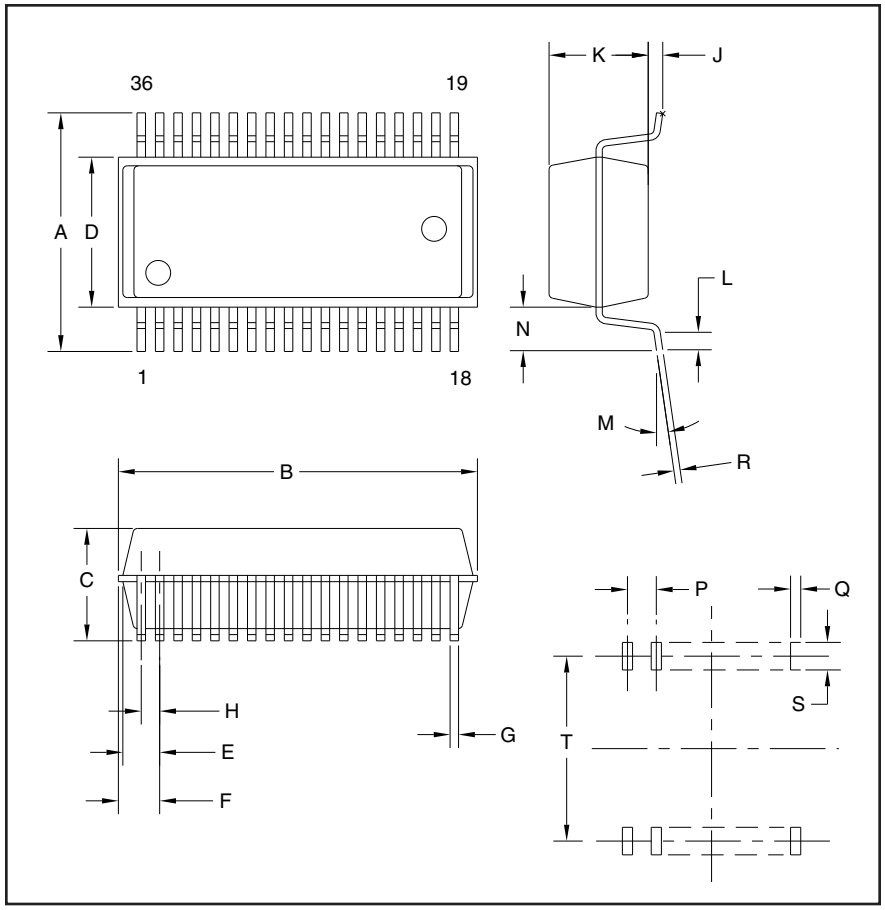
Powerex, Inc., 173 Pavilion Lane, Youngwood, Pennsylvania 15697 (724) 925-7272

HVIC
3-Phase Bridge Driver



Outline Drawing and Pin Diagram

Dimensions	Inches	Millimeters
A	0.47	11.93±0.3
B	0.59	15.0±0.2
C	0.09 Max.	2.35 Max.
D	0.33	8.4±0.2
E	0.03	0.7
F	0.03 Max.	0.85 Max.
G	0.01	0.35+0.1/-0.05
H	0.03	0.8
J	0.004	0.1±0.1

Dimensions	Inches	Millimeters
K	0.08	2.05
L	0.02	0.5±0.2
M	8° Max.	8° Max.
N	0.07	1.765
P	0.03	0.8
Q	0.02	0.5
R	0.01	0.2+0.05/-0.02
S	0.05 Min.	1.27 Min.
T	0.45 Min.	11.43 Min.

Description:
M63993FP is a high voltage, Power MOSFET/IGBT module driver for 3-Phase bridge applications.

Features:
- ☐ 600V Floating Supply Voltage
- ☐ ±300mA Output Current
- ☐ 3-Phase Bridge Driver
- ☐ SSOP-36 Package

Applications:
- ☐ Appliances
- ☐ Air Conditioners
- ☐ AC Servo Motors
- ☐ General Purpose Power Supplies

Absolute Maximum Ratings, T_a = 25°C unless otherwise specified

Ratings	Symbol	Test Conditions	M63993FP	Units
High Side Floating Supply Voltage	U,V,W_{FB}		-0.5 ~ 624	Volts
High Side Floating Supply Offset Voltage	U,V,W_{FS}		V_B-24/+0.5	Volts
High Side Output Voltage	V_U,V,W_{PO}		V_S-0.5 ~ V_B+0.5	Volts
Low Side Fixed Supply Voltage	V_{CC}		-0.5 ~ 24	Volts
Low Side Output Voltage	V_U,V,W_{NO}		-0.5 ~ V_{CC}+0.5	Volts
Logic Supply Voltage	V_{DD}		-0.5 ~ 7	Volts
Logic Input Voltage	V_{IN}	U,V,WP_{IN}, U,V,WN_{IN}	-0.5 ~ V_{DD}+0.5	Volts
Allowable Offset Supply Voltage Transient	d_{VS}/dt		±50	V/ns
Package Power Dissipation	P_t	T_a = 25°C, On Board	1.2	W
Linear Derating Factor	Kθ	T_a > 25°C, On Board	12.0	mW/°C
Junction Case Thermal Resistance	$R_{th(j-c)}$		30	°C/W
Junction Temperature	T_j		-30 ~ 125	°C
Operation Temperature	T_{opr}		-30 ~ 100	°C
Storage Temperature	T_{stg}		-40 ~ 125	°C

Recommended Operating Conditions

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Units
High Side Floating Supply Voltage	U,V,W_{FB}		V_S+10	—	V_S+20	Volts
High Side Floating Supply Offset Voltage	U,V,W_{FS}		-5	—	500	Volts
Low Side Fixed Supply Voltage	V_{CC}		10	—	20	Volts
Logic Supply Voltage	V_{DD}		4.5	—	5.5	Volts
Logic Input Voltage	V_{IN}	U,V,WP_{IN}, U,V,WN_{IN}	0	—	V_{DD}	Volts
Output Ground Voltage	VP_{GND}		-5	—	5	Volts

Function Table 1 (Input, Output and U_V)

U,V,W_{PIN}	U,V,W_{NIN}	U_V	U,V,W_{PO}	U,V,W_{NO}	Behavioral State
H	H	H	L	L	Normal OFF
H	L	H	L	H	*NO ON
L	H	H	H	L	*PO ON
L	L	X	L	L	*PO = OFF, *NO = OFF, $*P_{IN}$ = $*N_{IN}$ = L Simultaneously
X	H	L	L	L	*PO OFF, $*V_B$ U_V Tripped
H	L	L	L	H	*NO ON, $*V_B$ U_V Tripped

* Note: "L" state of $*V_B$ U_V means that UV trip voltage.

Function Table 2 (Comparator)

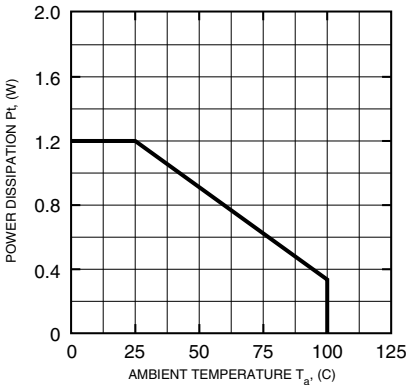
C_{IN1}	C_{IN2}	C_{OUT}	Behavioral State
L	H	H	C_{OUT} is Normal HIGH
H	X	L	
X	L	L	

Electrical Characteristics, T_a = 25°C, V_{CC} = V_{BS} = 15V, V_{DD} = 5V unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.*	Max.	Units
Floating Supply Leakage Current	I_{FS}	V_B = V_S = 600V per 1-Phase	—	—	1	µA
V_{BS} Standby Current	I_{BS}		—	0.48	—	mA
V_{CC} Standby Current	I_{CC}		—	—	0.1	mA
V_{DD} Standby Current	I_{DD}		—	0.5	—	µA
High Level Output Voltage	V_{OH}	I_O = 0A, *NO, *PO	14.9	—	—	Volts
Low Level Output Voltage	V_{OL}	I_O = 0A, *NO, *PO	—	—	0.1	Volts
High Level Input Threshold Voltage	V_{IH}	*P_{IN}, *N_{IN}	2.1	3.0	4.0	Volts
Low Level Input Threshold Voltage	V_{IL}	*P_{IN}, *N_{IN}	0.6	1.5	1.9	Volts
High Level Input Bias Current	I_{IH}	*P_{IN}, *N_{IN} = 5V	—	—	1.0	µA
Low Level Input Bias Current	I_{IL}	*P_{IN}, *N_{IN} = 0V	—	100	300	µA
V_{BS} Supply U_V Trip Voltage	V_{UVT}		7.0	8.0	9.0	Volts
V_{BS} Supply U_V Reset Voltage	V_{UVR}		7.5	8.5	9.5	Volts
V_{BS} Supply Filter Time	t_{UV}		—	7.5	—	µs
Output High Level Short Circuit Pulsed Current	I_{OH}	*P_O, *N_O = 0V, *P_{IN}, *N_{IN} = 5V, P_W < 10µs	—	-300	—	mA
Output Low Level Short Circuit Pulsed Current	I_{OL}	*P_O, *N_O = 15V, *P_{IN}, *N_{IN} = 0V, P_W < 10µs	—	300	—	mA
High SideTurn-On Propagation Delay	t_{dLH} (HO)	CL = 1000pF between HO – V_S	250	300	350	ns
High Side Turn-Off Propagation Delay	t_{dHL}(HO)		230	280	330	ns
High Side Turn-On Rise Time	t_r (HO)		—	130	—	ns
High Side Turn-Off Fall Time	t_f (HO)		—	100	—	ns
Low SideTurn-On Propagation Delay	t_{dLH} (LO)	CL = 1000pF between LO – GND	250	300	350	ns
Low Side Turn-Off Propagation Delay	t_{dHL}(LO)		230	280	330	ns
Low Side Turn-On Rise Time	t_r (LO)		—	130	—	ns
Low Side Turn-Off Fall Time	t_f (LO)		—	100	—	ns
Comparator 1 Threshold Voltage	V_{CIN1th}	V_{DD} = 5V	0.47	0.5	0.53	Volts
Comparator 1 Filter Time	t_{VCIN1}		—	1.5	—	µs
Comparator 2 Threshold Voltage	V_{CIN2th}	V_{DD} = 5V	2.4	2.5	2.6	Volts
Comparator 2 Filter Time	t_{VCIN2}		—	7.5	—	µs
Comparator H Level Output Voltage	V_{COH}	I_{CO} = 500 µA	4.5	—	—	Volts
Comparator L Level Output Voltage	V_{COL}	I_{CO} = 500 µA	—	—	0.5	Volts

* The typical values are those measured under ambient temperature (T_a) of 25°C.
There is no guarantee that these values are obtained under any conditions.

THERMAL DERATING FACTOR CHARACTERISTICS (TYPICAL)



BLOCK DIAGRAM