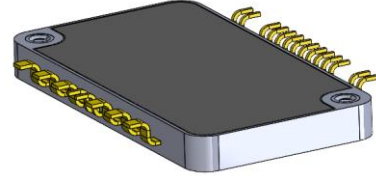


TECHNICAL DATA
DATASHEET 6199, REV B

MOSFET Full Bridge with Integrated Gate Drive

FEATURES:

- 600VDC max voltage
- 30A max current
- Aluminum nitride isolated thermal interface
- Independent PWM control

**DESCRIPTION:**

This SiC FET Full Bridge power module can be used in various applications including, but not limited to, power converters and motor drives. The integrated gate drive simplifies the system design and optimizes the dynamic performance of the bridge.

The small size of this complete module makes it ideal for high reliability industrial, aerospace, and military applications.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT
DC Bus Supply Voltage			600	V
Logic supply voltage, V_{IS} to V_{IS_RTN}	V_{IS}	-0.3	20	V
Driver bias supply	VDD, VSS, VDD1, VSS1, VDD2, VSS2	-0.3	20	V
Input signal voltage	HI, LI, DIS	-0.3	$V_{IS}+0.3$	V
PWM Switching Frequency	F_{SW}		500	kHz
Continuous Drain Current, each Leg, $T_c = 25^\circ\text{C}$	I_D		30	A
Pulsed Drain Current, each Leg, $T_c = 25^\circ\text{C}$	$I_{D(PULSE)}$		153	A
Power Dissipation per MOSFET, $T_c = 25^\circ\text{C}$	PD		170	W
Junction Temperature	T_{jmax}	-55	150	$^\circ\text{C}$
Storage Temperature	$T_{s\ max}$	-55	150	$^\circ\text{C}$

TECHNICAL DATA
DATASHEET 6199, REV B

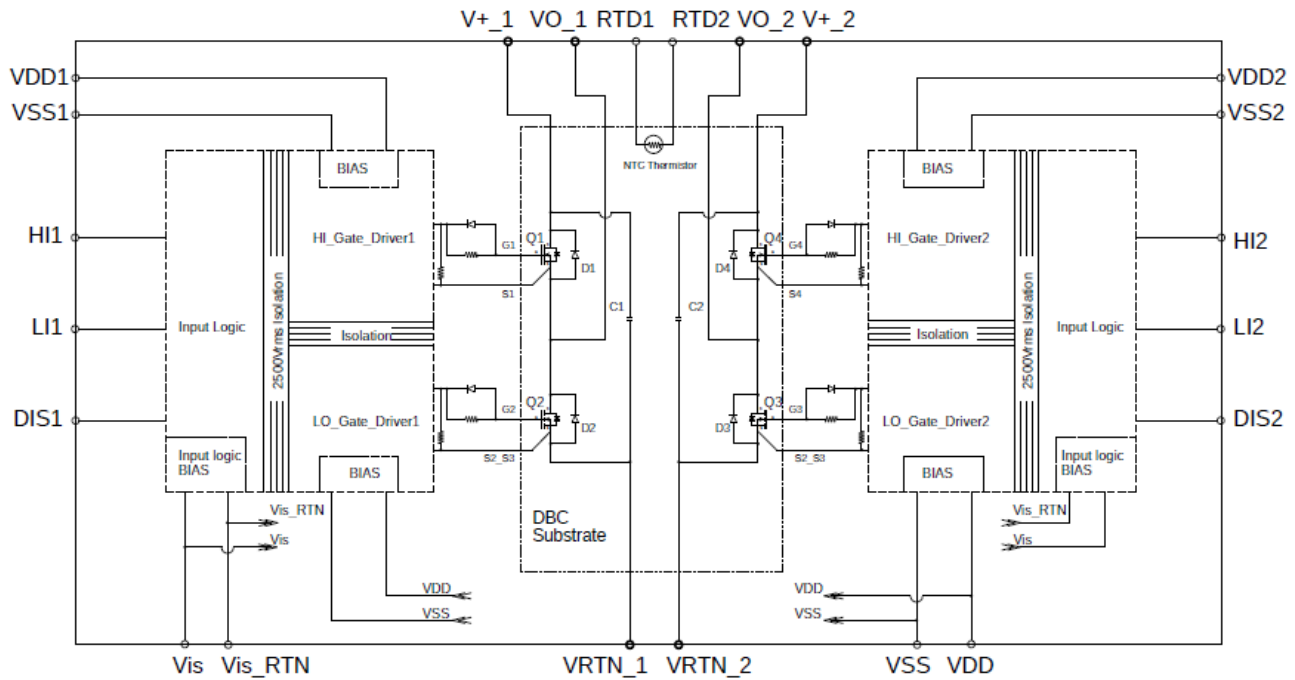


Figure 1 – Block Diagram

Connections for Full Bridge Application

V+_1, V+_2:	Both pins must connect to DC Bus power supply's Positive; there is no internal connection between these two pins.
VRTN_1, VRTN_2:	Both pins must connect to DC Bus power supply's Negative; there is no internal connection between these two pins.
VO_1, VO_2:	Output connections
HI1, LI1, HI2, LI2:	Gate control inputs
DIS1, DIS2:	Disable driver inputs
Vis /V _{is} , V _{is_RTN} :	Power supply input to logic circuitry
VDD /VDD, VSS:	Power supply input to LO_Gate_Driver1 and LO_Gate_Driver2 circuitry
VDD1 /VDD1, VSS1:	Power supply input HI_Gate_Driver1 circuitry
VDD2 /VDD2, VSS2:	Power supply input for HI_Gate_Driver2 circuitry
RTD1, RTD2	Connection to internal thermistor

TECHNICAL DATA
DATASHEET 6199, REV B**ELECTRICAL CHARACTERISTICS** $T_J=25^{\circ}\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain to source breakdown voltage, $I_D=1\text{mA}$	600			
$V_{GS(th)}$	Gate threshold voltage, $I_D=0.9\text{mA}$	3.5	4.0	4.5	V
I_{DSS}	Zero gate voltage drain current, $V_{DS}=600\text{V}$			1	μA
$R_{DS(on)}$	Drain to source on-resistance, $V_{GS}=10\text{V}$, $I_D=18.0\text{A}$		0.052	0.061	Ω
$R_{DS(on)}$	Drain to source on-resistance, $V_{GS}=10\text{V}$, $I_D=18.0\text{A}$, $T_J=150^{\circ}\text{C}$		0.125		Ω
C_{ISS}	Input capacitance, $V_{DS}=400\text{V}$, $f=250\text{kHz}$		3194		pF
C_{OSS}	Output capacitance, $V_{DS}=400\text{V}$, $f=250\text{kHz}$		62		pF
C_{RSS}	Reverse transfer capacitance, $V_{DS}=400\text{V}$, $f=250\text{kHz}$		45		pF
Q_{GS}	Gate to source charge, $V_{DS}=400\text{V}$, $I_D=12.4\text{A}$, V_{GS} 0-10V		18		nC
Q_{GD}	Gate to drain charge, $V_{DS}=400\text{V}$, $I_D=12.4\text{A}$, V_{GS} 0-10V		27		nC
Q_G	Gate total charge, $V_{DS}=400\text{V}$, $I_D=12.4\text{A}$, V_{GS} 0-10V		79		nC
V_{SD}	Diode forward voltage, $I_F=18.0\text{A}$		1.0		V
t_{rr}	Reverse recovery time, $V_R=400\text{V}$, $I_F=12.4\text{A}$, $di_F/dt=100\text{A}/\mu\text{s}$		128		nS
Q_{rr}	Reverse recovery charge, $V_R=400\text{V}$, $I_F=12.4\text{A}$, $di_F/dt=100\text{A}/\mu\text{s}$		0.77		μC
I_{mm}	Peak reverse recovery current, $V_R=400\text{V}$, $I_F=12.4\text{A}$, $di_F/dt=100\text{A}/\mu\text{s}$		10		A
V_{is_ON}	UVLO rising threshold, logic supply	2.5	2.7	2.9	V
V_{is_OFF}	UVLO falling threshold, logic supply	2.3	2.5	2.7	V
V_{is_HYS}	UVLO threshold hysteresis, logic supply		0.2		V
V_{DD_ON}	UVLO rising threshold, driver supply	5.7	6.0	6.3	V
V_{DD_OFF}	UVLO falling threshold, driver supply	5.4	5.7	6.0	V
V_{DD_HYS}	UVLO threshold hysteresis, driver supply		0.3		V
HI_H , LI_H , DIS_H	Input high voltage	1.6	1.8	2.0	V
HI_L , LI_L , DIS_L	Input low voltage	0.8	1.0	1.2	V
HI_HYS , LI_HYS , DIS_HYS	Input hysteresis		0.8		V

TECHNICAL DATA
DATASHEET 6199, REV B

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
R_0	RTD Resistance @ $T_C = 0^\circ\text{C}$		1		k Ω
R_{TOL}	RTD Resistance Tolerance			± 0.12	%
	RTD Measuring Current	0.1		0.3	mA
TCR	$TCR = \frac{R_{100} - R_0}{R_0 * 100^\circ\text{C}}$ R_{100} is resistance at 100°C , R_0 is resistance at 0°C		3850		ppm/K
	Temperature Range	-70		500	$^\circ\text{C}$
Resistance vs Temperature	$t \geq 0^\circ\text{C}$ $R(t) = R_0 * (1 + A * t + B * t^2)$ $t < 0^\circ\text{C}$ $R(t) = R_0 * (1 + A * t + B * t^2 + C * (t - 100^\circ\text{C}) * t^3);$	$A = 3.9083 * 10^{-3} \quad ^\circ\text{C}^{-1}$ $B = -5.775 * 10^{-7} \quad ^\circ\text{C}^{-2}$ $C = -4.183 * 10^{-12} \quad ^\circ\text{C}^{-4}$			

TECHNICAL DATA
DATASHEET 6199, REV B

THERMAL AND MECHANICAL CHARACTERISTICS

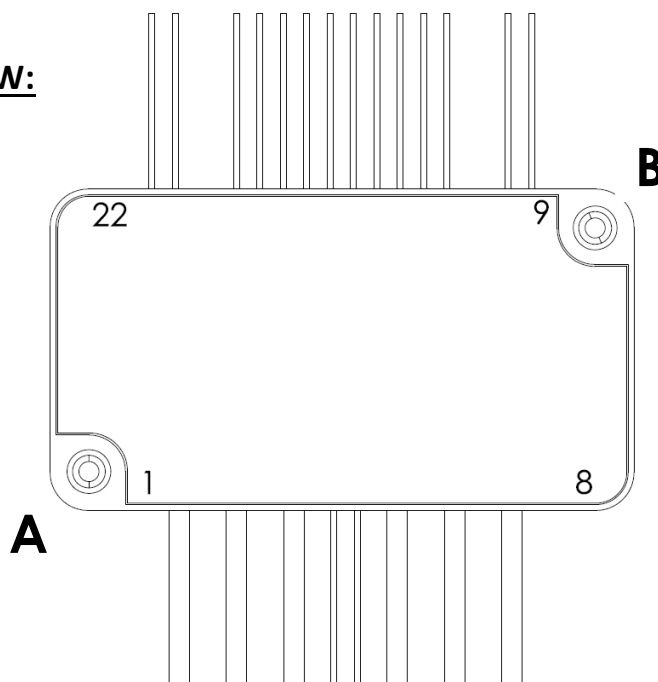
SYMBOL/ CHARACTERISTIC	PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC_M}$	MOSFET Junction-to-Case Thermal Resistance Per Leg			.72	°C/W
Isolations	All pins to Base Plate/Screw mounting pads			2500	VDC
	Logic signals to driver signals $ V_{is}-VDD $ $ V_{is}-VDD1 $ $ V_{is}-VDD2 $			2500	V _{RMS}
Mounting Torque	#4 Size Screw	3	-	4	in-lbs.
Weight			17		g
Termination Finish	Gold over Electrodeposited Nickel				
	Gold (Top Layer):	2		10	μin
	Nickel (Base Layer):	50		125	μin

INSTALLATION INSTRUCTIONS:

Recommended thermal interface material = Laird Tgon 805 (5 mil thick graphite pad)

1. Pins are to be locally soldered. This product is not suitable for furnace reflow applications.

TOP VIEW:

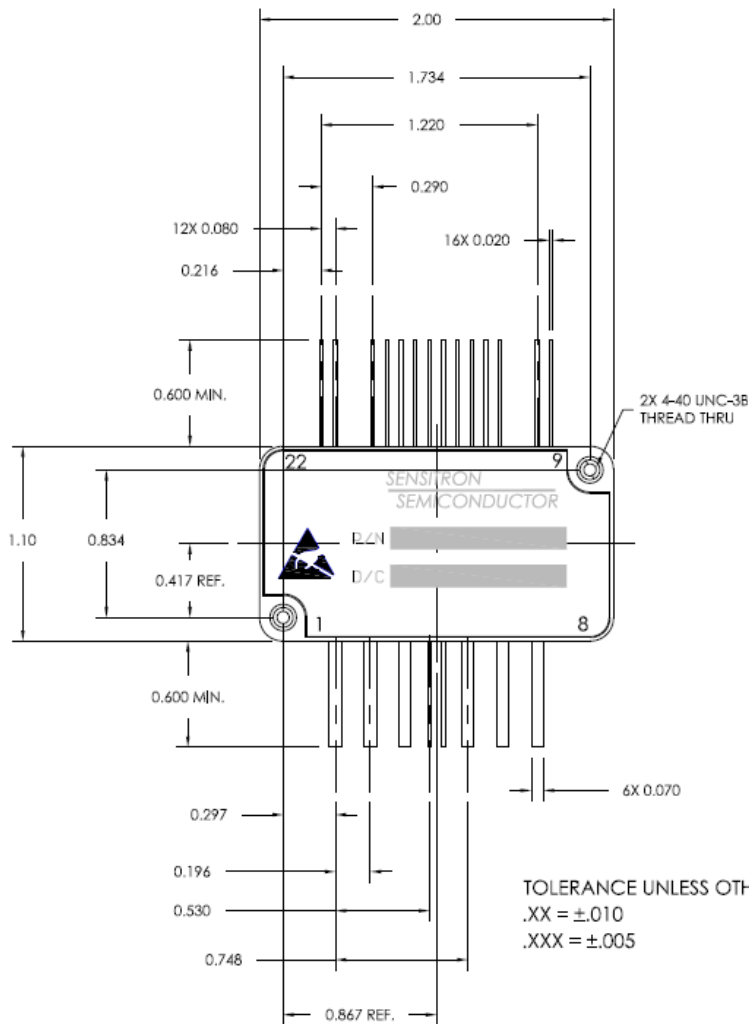
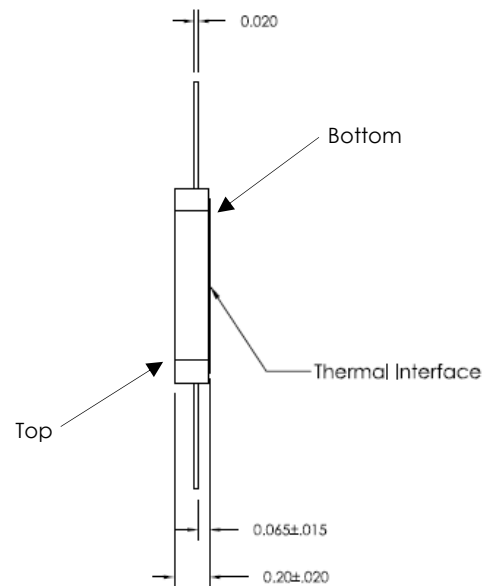


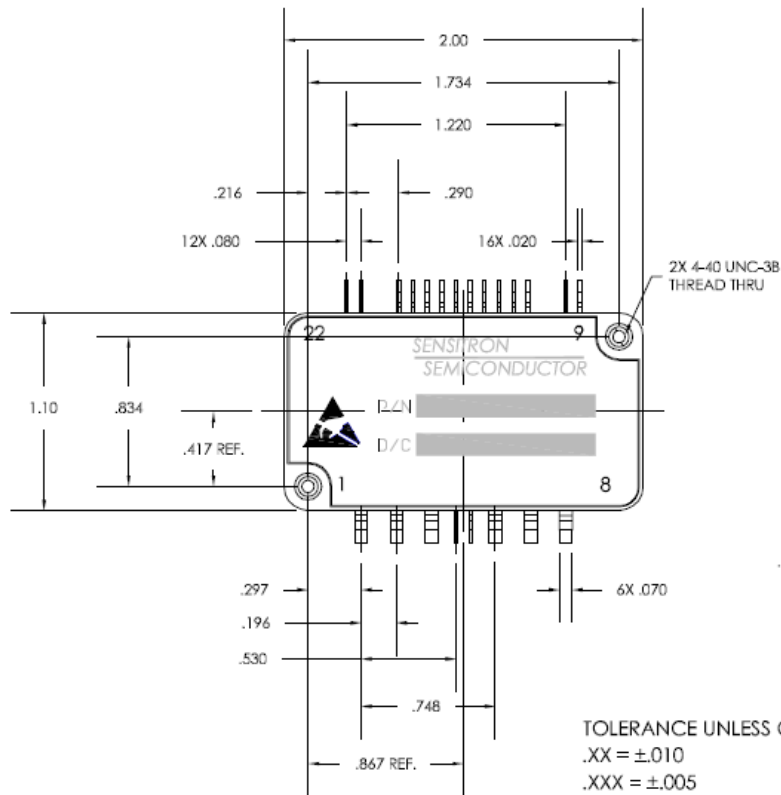
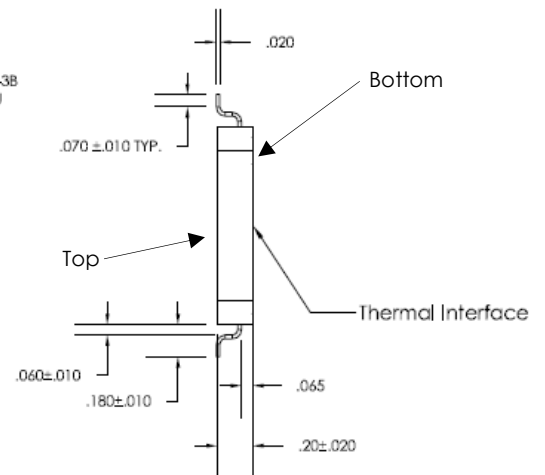
TECHNICAL DATA
DATASHEET 6199, REV B**PART NUMBER DESCRIPTION:**

- “SPF030M060P2” – Straight Leads
- “SPF030M060P2A” – Surface Mount Lead Formation

MECHANICAL OUTLINES (inches) THIRD ANGLE PROJECTION

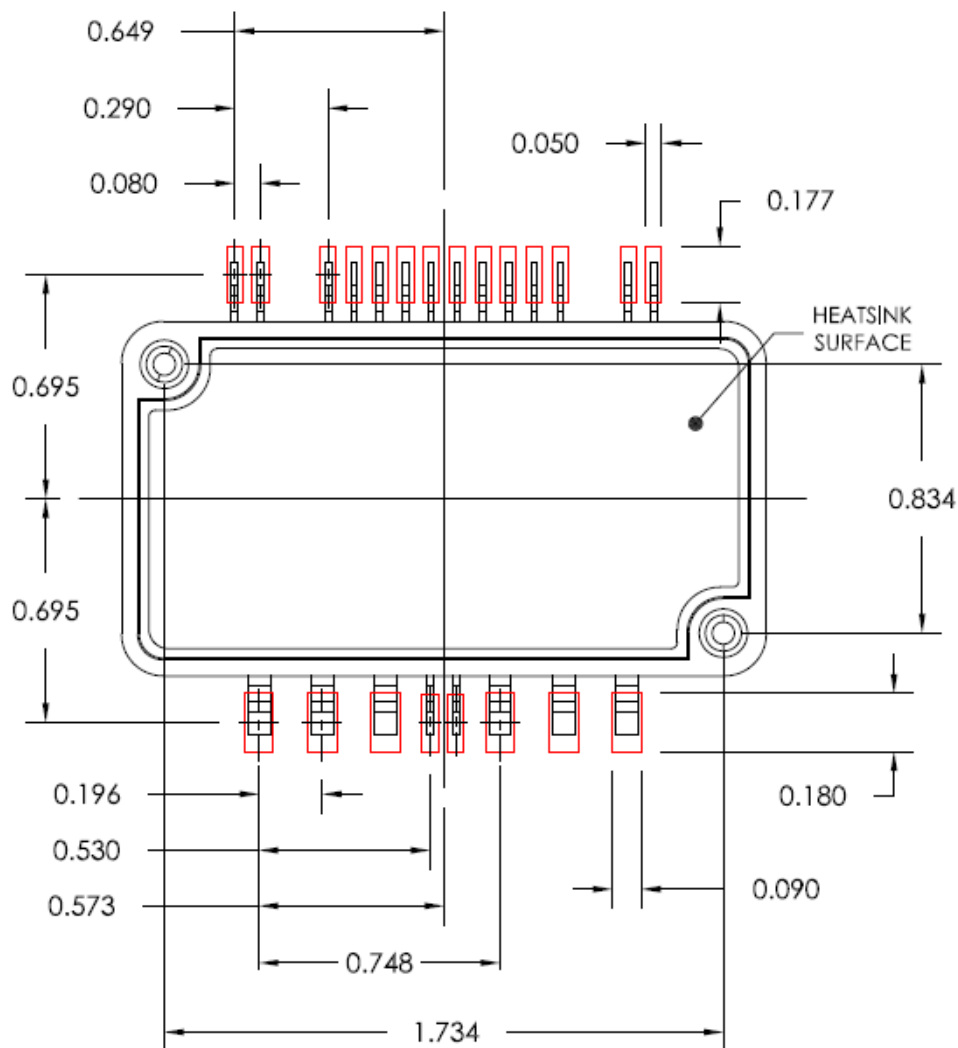
Top and Bottom orientation labels are for reference only. Product is to be installed in the appropriate orientation per customer application

SPF030M060P2**TOP VIEW:****SIDE VIEW:**

TECHNICAL DATA
DATASHEET 6199, REV B**SPF030M060P2A****TOP VIEW:****SIDE VIEW:****PINOUTS**

Pin 1: V+_1	Pin 9: VSS2
Pin 2: VO_1	Pin 10: VDD2
Pin 3: VRTN_1	Pin 11: DIS2
Pin 4: VDD	Pin 12: LI2
Pin 5: VSS	Pin 13: HI2
Pin 6: VRTN_2	Pin 14: Vis
Pin 7: VO_2	Pin 15: RTD1
Pin 8: V+_2	Pin 16: RTD2
	Pin 17: Vis_RTN
	Pin 18: LI1
	Pin 19: HI1
	Pin 20: DIS1
	Pin 21: VSS1
	Pin 22: VDD1

SPF030M060P2A RECOMMENDED FOOTPRINT



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