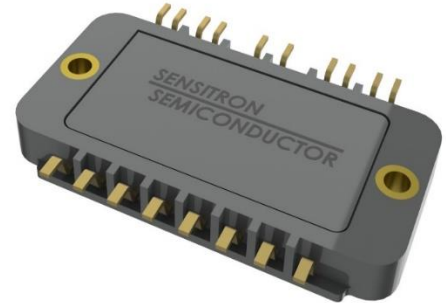


## 1200 VOLT, 30 AMP MOSFET FULL-BRIDGE MODULE

### Features:

- Electrically isolated, base-less construction
- Light weight low profile standard package
- Aluminum Nitride substrate
- High temperature engineering plastic shell construction



### ELECTRICAL CHARACTERISTICS PER MOSFET LEG

(T<sub>J</sub>=25°C UNLESS OTHERWISE SPECIFIED)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
<b>MOSFET SPECIFICATIONS</b>					
B <sub>V</sub> DSS	Drain to Source Breakdown Voltage I <sub>D</sub> = 100 μA, V <sub>GS</sub> = 0V	1200	-	-	V
I <sub>D</sub>	Continuous Drain Current T <sub>C</sub> = 25°C T <sub>C</sub> = 100°C	-	-	30 20	A
I <sub>D(pulse)</sub>	Pulsed Drain Current, pulse width t <sub>p</sub> limited by t <sub>ijmax</sub>	-	-	80	A
V <sub>GS</sub>	Gate to Source Voltage static dynamic	-	-	-4/+15 -8/+19	V
I <sub>GSS</sub>	Gate-Source Leakage Current V <sub>GS</sub> = +15V / -4V, V <sub>DS</sub> = 0V	-	10	250	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage, I <sub>D</sub> = 5mA, V <sub>DS</sub> = V <sub>GS</sub>	1.8	2.6 2.2	4.0	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current V <sub>DS</sub> = 1200 V, V <sub>GS</sub> = 0V	-	1	50	μA
R <sub>DS(on)</sub>	Drain-Source On-State Resistance I <sub>D</sub> = 18A, V <sub>GS</sub> = 15V	-	75 130	99	mΩ
C <sub>iss</sub>	Input Capacitance	-	1480	-	pF
C <sub>oss</sub>	Output Capacitance	-	95	-	
C <sub>rss</sub>	Reverse Transfer Capacitance V <sub>DS</sub> = 200 V, V <sub>GS</sub> = 0 V, f = 1 MHz, V <sub>AC</sub> = 25 mV	-	3.2	-	
t <sub>D(on)</sub>	Turn On Delay Time	-	8	-	ns
t <sub>r</sub>	Rise Time	-	22	-	
t <sub>D(off)</sub>	Turn Off Delay Time	-	29	-	
t <sub>f</sub>	Fall Time	-	11	-	
t <sub>F</sub>	V <sub>DS</sub> = 800 V, I <sub>D</sub> = 20A, V <sub>GS</sub> = -4/+15V, R <sub>G</sub> = 2.5Ω Timing relative to V <sub>DS</sub> , inductive load	-	-	-	
E <sub>ON</sub>	Turn on Energy Loss	-	180	-	μJ
E <sub>OFF</sub>	Turn off Energy Loss V <sub>DS</sub> = 600 V, I <sub>D</sub> = 20A, V <sub>GS</sub> = -4/+15V, R <sub>G</sub> = 2.5Ω, L = 135μH	-	48	-	
R <sub>G(int)</sub>	Internal Gate Resistance f = 1MHz, V <sub>AC</sub> = 25mV	-	9	-	Ω
Q <sub>GS</sub>	Gate to Source Charge	-	17	-	nC
Q <sub>GD</sub>	Gate to Drain Charge	-	18	-	
Q <sub>G</sub>	Total Gate Charge V <sub>DS</sub> = 800 V, I <sub>D</sub> = 18A, V <sub>GS</sub> = -4/+15V	-	55	-	

**TECHNICAL DATA**

DATASHEET 6179, Preliminary

**REVERSE DIODE CHARACTERISTICS**

(T<sub>J</sub>=25 °C UNLESS OTHERWISE SPECIFIED)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
<b>DIODE SPECIFICATIONS</b>					
V <sub>SD</sub>	Diode Forward Voltage V <sub>GS</sub> = -4V, I <sub>SD</sub> = 9A		T <sub>J</sub> = 25°C 4.5 T <sub>J</sub> = 150°C 4.0	-	V
I <sub>S</sub>	Continuous Forward Current, V <sub>GS</sub> = -4V	-	-	27	A
t <sub>rr</sub>	Reverse Recovery Time V <sub>GS</sub> = -4V, I <sub>SD</sub> = 20A, V <sub>R</sub> = 800V, di/dt = 1925A/μs	-	20	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge V <sub>GS</sub> = -4V, I <sub>SD</sub> = 20A, V <sub>R</sub> = 800V, di/dt = 1925A/μs	-	376	-	nC
I <sub>rrm</sub>	Peak Reverse Recovery Current V <sub>GS</sub> = -4V, I <sub>SD</sub> = 20A, V <sub>R</sub> = 800V, di/dt = 1925A/μs	-	25	-	A

**ZVS SiC DIODE CHARACTERISTICS**

(T<sub>J</sub>=25 °C UNLESS OTHERWISE SPECIFIED)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
<b>DIODE SPECIFICATIONS</b>					
V <sub>RRM</sub>	Repetitive Peak Reverse Voltage	1200	-	-	V
V <sub>RSM</sub>	Surge Peak Reverse Voltage	1300	-	-	V
V <sub>R</sub>	DC Peak Blocking Voltage	1200	-	-	V
I <sub>F</sub>	Continuous Forward Current, T <sub>J</sub> = 150°C	-	-	2	A
I <sub>FRM</sub>	Repetitive Peak Forward Surge Current t <sub>p</sub> = 10ms, Half Sine Pulse T <sub>C</sub> = 25°C T <sub>C</sub> = 110°C	-	-	13 8.4	A
I <sub>FSM</sub>	Non-Repetitive Forward Surge Current t <sub>p</sub> = 10ms, Half Sine Pulse T <sub>C</sub> = 25°C T <sub>C</sub> = 110°C	-	-	19 16.5	A
V <sub>F</sub>	Forward Voltage I <sub>F</sub> = 2A T <sub>J</sub> = 25°C T <sub>J</sub> = 150°C	-	1.4 1.9	1.8 3.0	V
I <sub>R</sub>	Reverse Current V <sub>R</sub> = 1200V T <sub>J</sub> = 25°C T <sub>J</sub> = 150°C	-	10 40	50 150	μA
Q <sub>C</sub>	Total Capacitive Charge V <sub>R</sub> = 800V, I <sub>F</sub> = 2A, di/dt = 200A/μs, T <sub>J</sub> = 25 °C	-	11	-	nC
C	Total Capacitance V <sub>R</sub> = 0V, T <sub>J</sub> = 25 °C, f = 1MHz V <sub>R</sub> = 400V, T <sub>J</sub> = 25 °C, f = 1MHz V <sub>R</sub> = 800V, T <sub>J</sub> = 25 °C, f = 1MHz	-	167 11 8	-	pF

Note: Production units are only tested at room temperature. Low/High temperature operation is guaranteed by design.

**TECHNICAL DATA**  
**DATASHEET 6179, Preliminary**

**NTC-THERMISTOR CHARACTERISTICS**

(T<sub>J</sub>=25°C UNLESS OTHERWISE SPECIFIED)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
<b>NTC SPECIFICATIONS</b>					
R <sub>25</sub>	Resistance T <sub>C</sub> = 25°C	-	4.7	-	K Ohm
R <sub>TOL</sub>	Resistance Tolerance	-	-	1	%
P	Maximum Power Dissipation	-	-	50	mW
B <sub>25/85</sub>	NTC Thermistor Beta Value $R = R_{25} e^{B_{25/85} (\frac{1}{T} - \frac{1}{298.15})}$		3435		K

**THERMAL AND MECHANICAL CHARACTERISTICS**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
R <sub>θJB_M</sub>	MOSFET Junction-to-Base Plate Thermal Resistance Per Leg	-	0.87	1.00	°C/W
R <sub>θJB_D</sub>	Diode Junction-to-Base Plate Thermal Resistance Per Leg	-	2.90	3.20	°C/W
V <sub>iso1</sub>	Isolation to Base Plate	-	-	2500	VDC
V <sub>iso2</sub>	NTC1(Pin14&15) to all other pins	-	-	2000	Vrms
T <sub>J</sub>	Operating Junction Temperature	-55	-	150	°C
T <sub>STG</sub>	Storage Temperature	-55	-	150	°C
	Mounting Torque for Module Mounting	3	-	4	in-lbs.
	Weight	-	10	-	g

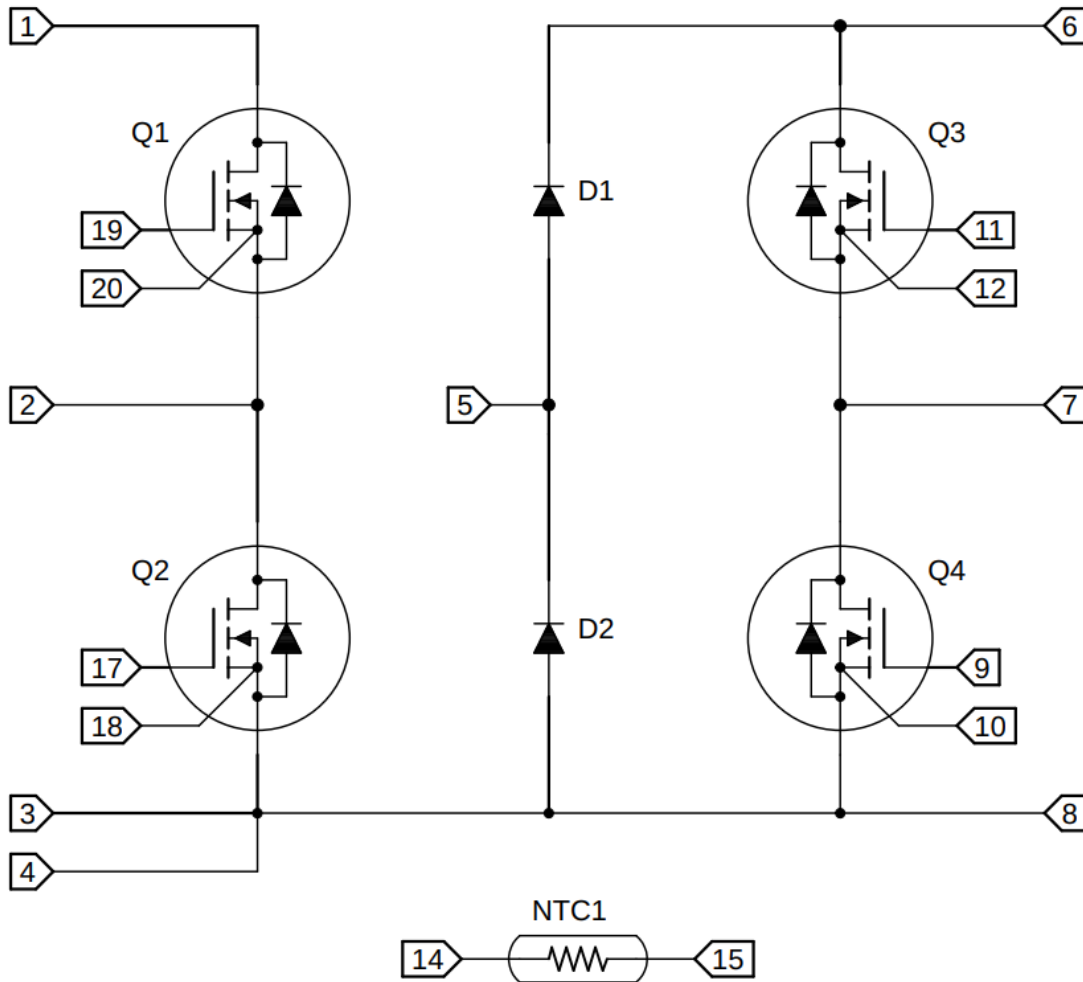
**INSTALLATION INSTRUCTIONS:**

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

1. Fasten screws to 1 to 2 in-lb. of torque.
2. Fasten screws to final torque.

TECHNICAL DATA  
DATASHEET 6179, Preliminary

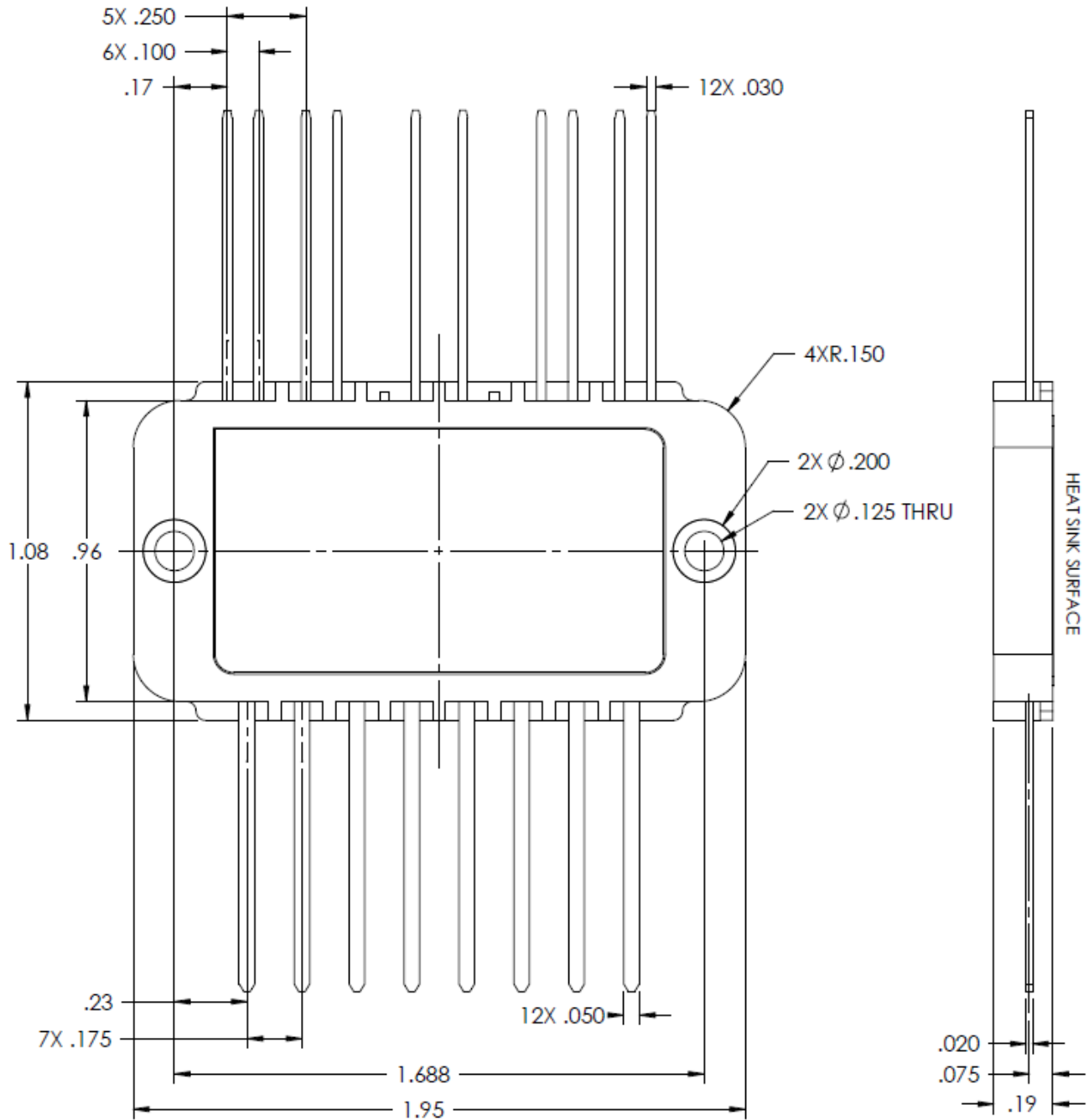
**SCHEMATIC DIAGRAM AND PINOUT:**



**TECHNICAL DATA**  
**DATASHEET 6179, Preliminary**

**MECHANICAL OUTLINE (inches):**

**Part Number SPM1019A3-1**  
**Straight Leads**



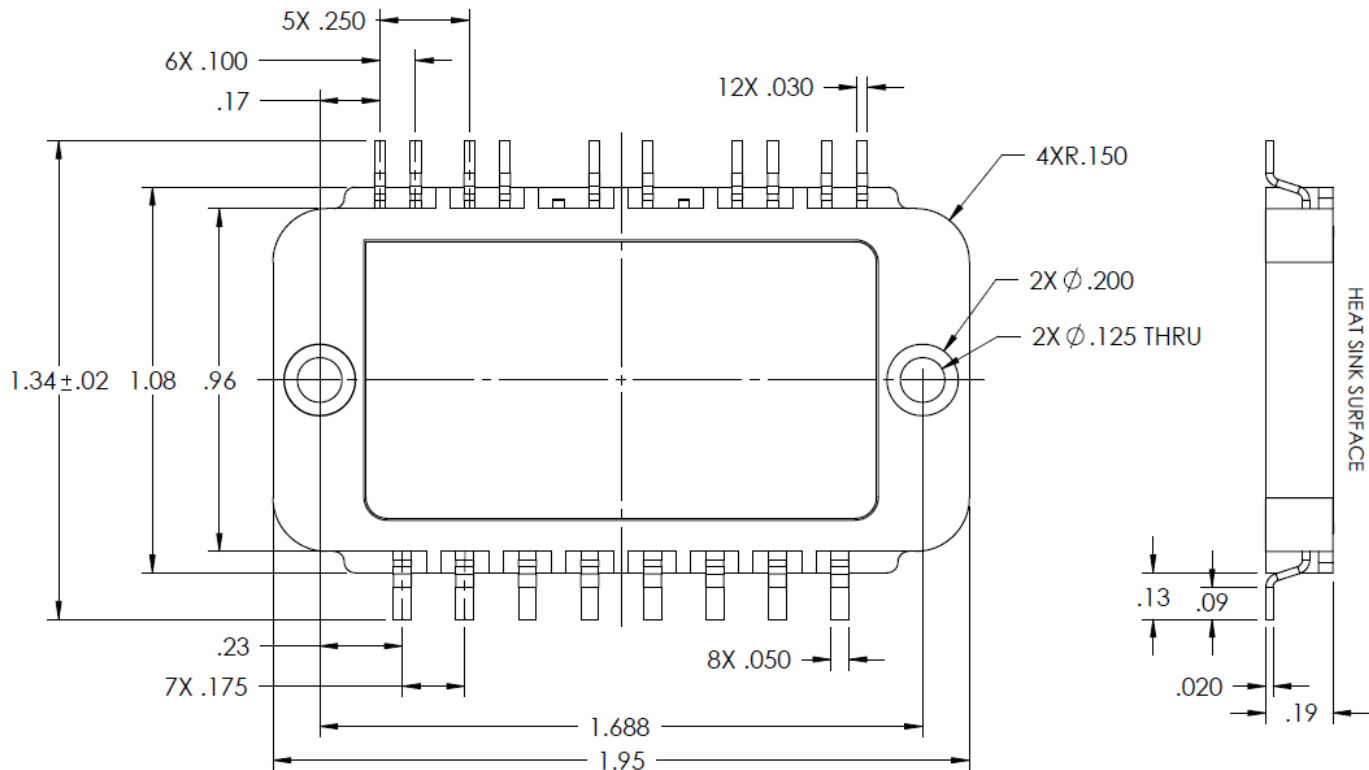
TOLERANCE UNLESS OTHERWISE NOTED:  
.XX =  $\pm$ .01  
.XXX =  $\pm$ .005

PINS 13 AND 16 REMOVED

**TECHNICAL DATA**

DATASHEET 6179, Preliminary

**Part Number SPM1019A3-2**  
**SMT leads, reverse mounting**



TOLERANCE UNLESS OTHERWISE NOTED:

.XX = ±.01  
.XXX = ±.005

PINS 13 AND 16 REMOVED

**DISCLAIMER:**

1- The information given herein, including the specifications and dimensions, is subject to change without prior notice to improve product characteristics. Before ordering, purchasers are advised to contact the Sensitron Semiconductor sales department for the latest version of the datasheet(s).

2- In cases where extremely high reliability is required (such as use in nuclear power control, aerospace and aviation, traffic equipment, medical equipment, and safety equipment), safety should be ensured by using semiconductor devices that feature assured safety or by means of users' fail-safe precautions or other arrangement.

3- In no event shall Sensitron Semiconductor be liable for any damages that may result from an accident or any other cause during operation of the user's units according to the datasheet(s). Sensitron Semiconductor assumes no responsibility for any intellectual property claims or any other problems that may result from applications of information, products or circuits described in the datasheets.

4- In no event shall Sensitron Semiconductor be liable for any failure in a semiconductor device or any secondary damage resulting from use at a value exceeding the absolute maximum rating.

5- No license is granted by the datasheet(s) under any patents or other rights of any third party or Sensitron Semiconductor.

6- The datasheet(s) may not be reproduced or duplicated, in any form, in whole or part, without the expressed written permission of Sensitron Semiconductor.

7- The products (technologies) described in the datasheet(s) are not to be provided to any party whose purpose in their application will hinder maintenance of international peace and safety nor are they to be applied to that purpose by their direct purchasers or any third party. When exporting these products (technologies), the necessary procedures are to be taken in accordance with related laws and regulations.