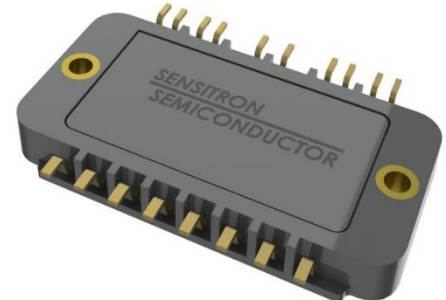


## 1200 VOLT, 40 AMP MOSFET FULL-BRIDGE MODULE

### Features:

- Electrically isolated, base-less construction
- Light weight low profile standard package
- Aluminum Nitride substrate
- High temperature engineering plastic shell construction
- S100 Screening per Sensitron Document 2044



### 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>VDS</sub>	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	-	-	60 40	A
I <sub>D(pulse)</sub>	Pulsed Drain Current, pulse width t <sub>p</sub> limited by T <sub>Jmax</sub>	-	-	160	A
V <sub>GS</sub>	Gate to Source Voltage	-	-	-10/+25	V
I <sub>GSS</sub>	Gate-Source Leakage Current, V <sub>GS</sub> = +20V / -5V	-	-	250	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage, I <sub>D</sub> = 10mA, V <sub>DS</sub> = V <sub>GS</sub>	2.0 1.4	3.1 2.3	4.0 3.0	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current V <sub>DS</sub> = 1200 V, V <sub>GS</sub> = 0V	-	1	100	μA
R <sub>DS(on)</sub>	Drain-Source On-State Resistance I <sub>D</sub> = 40A, V <sub>GS</sub> = 20V	- -	47 98	56 118	mΩ
C <sub>iss</sub>	Input Capacitance	-	1894	-	pF
C <sub>oss</sub>	Output Capacitance	-	150	-	
C <sub>rss</sub>	Reverse Transfer Cap. V <sub>DS</sub> = 1000 V, V <sub>GS</sub> = 0 V, f = 1 MHz, V <sub>AC</sub> = 25 mV	-	10	-	
t <sub>D(on)</sub>	Turn On Delay Time	-	15	-	ns
t <sub>R</sub>	Rise Time	-	52	-	
t <sub>D(off)</sub>	Turn Off Delay Time	-	26	-	
t <sub>F</sub>	Fall Time V <sub>DS</sub> = 800 V, I <sub>D</sub> = 40A, V <sub>GS</sub> = -5/+20V, R <sub>G</sub> = 2.5Ω, R <sub>L</sub> = 20Ω	-	34	-	
E <sub>AS</sub>	Avalanche Energy, Single Pulse I <sub>D</sub> = 40A, V <sub>DS</sub> = 50V	-	2	-	J
E <sub>ON</sub>	Turn on Energy Loss	-	1000	-	μJ
E <sub>OFF</sub>	Turn off Energy Loss V <sub>DS</sub> = 800 V, I <sub>D</sub> = 40A, V <sub>GS</sub> = -5/+20V, R <sub>G</sub> = 2.5Ω, L = 80μH	-	400	-	
R <sub>G(int)</sub>	Internal Gate Resistance f = 1MHz, V <sub>AC</sub> = 25mV	-	1.8	-	Ω

**TECHNICAL DATA**  
**DATASHEET 6180, REV -**

Q <sub>GS</sub>	Gate to Source Charge	-	28	-	nC
Q <sub>GD</sub>	Gate to Drain Charge	-	37	-	
Q <sub>G</sub>	Total Gate Charge V <sub>DS</sub> = 800 V, I <sub>D</sub> = 40A, V <sub>GS</sub> = -5/+20V	-	115	-	

**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> = -5V, I <sub>SD</sub> = 20A		T <sub>J</sub> = 25°C 4.2 T <sub>J</sub> = 150°C 3.7	4.5 4.0	V
I <sub>S</sub>	Continuous Forward Current, T <sub>J</sub> = 25°C	-	-	60	A
t <sub>rr</sub>	Reverse Recovery Time V <sub>GS</sub> = -5V, I <sub>SD</sub> = 40A, V <sub>R</sub> = 800V, di/dt = 1000A/μs	-	54	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge V <sub>GS</sub> = -5V, I <sub>SD</sub> = 40A, V <sub>R</sub> = 800V, di/dt = 1000A/μs	-	283	-	nC
I <sub>rrm</sub>	Peak Reverse Recovery Current V <sub>GS</sub> = -5V, I <sub>SD</sub> = 40A, V <sub>R</sub> = 800V, di/dt = 1000A/μs	-	15	-	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	-	-	5	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	-	-	26 18	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	-	-	46 36	A
V <sub>F</sub>	Forward Voltage I <sub>F</sub> = 5A		T <sub>J</sub> = 25°C 1.4 T <sub>J</sub> = 150°C 1.9	1.8 3.0	V
I <sub>R</sub>	Reverse Current V <sub>R</sub> = 1200V		T <sub>J</sub> = 25°C 20 T <sub>J</sub> = 150°C 40	150 300	μA
Q <sub>C</sub>	Total Capacitive Charge V <sub>R</sub> = 800V, I <sub>F</sub> = 5A, di/dt = 200A/μs, T <sub>J</sub> = 25 °C	-	27	-	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	-	390 27 20	-	pF

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

**TECHNICAL DATA**  
**DATASHEET 6180, REV -**

**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	-	0.30	0.36	°C/W
R <sub>θJB_D</sub>	Diode Junction-to-Base Plate Thermal Resistance Per Leg	-	1.60	1.76	°C/W
V <sub>iso1</sub>	All pins to Isolation to Base Plate/Screw mounting pads	-	-	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

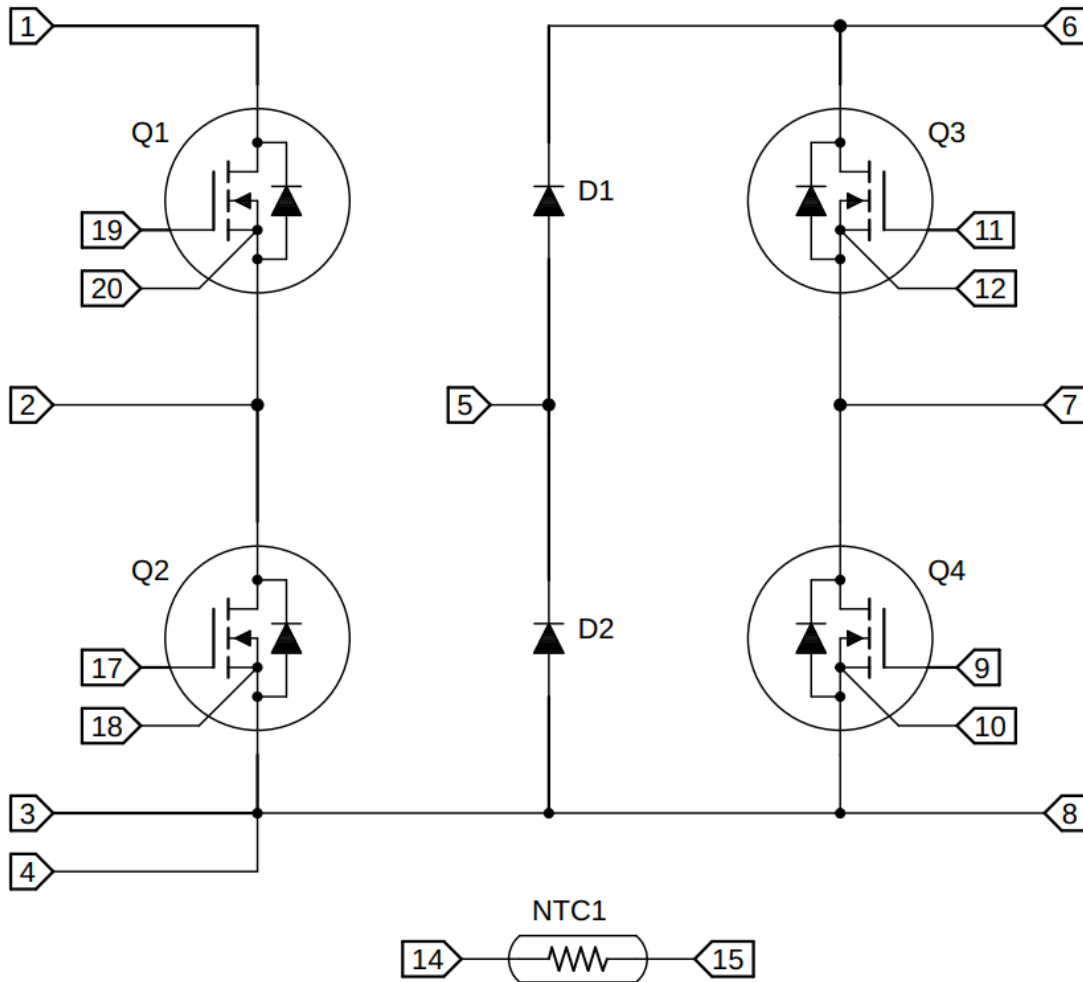
**INSTALLATION INSTRUCTIONS:**

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 6180, REV -

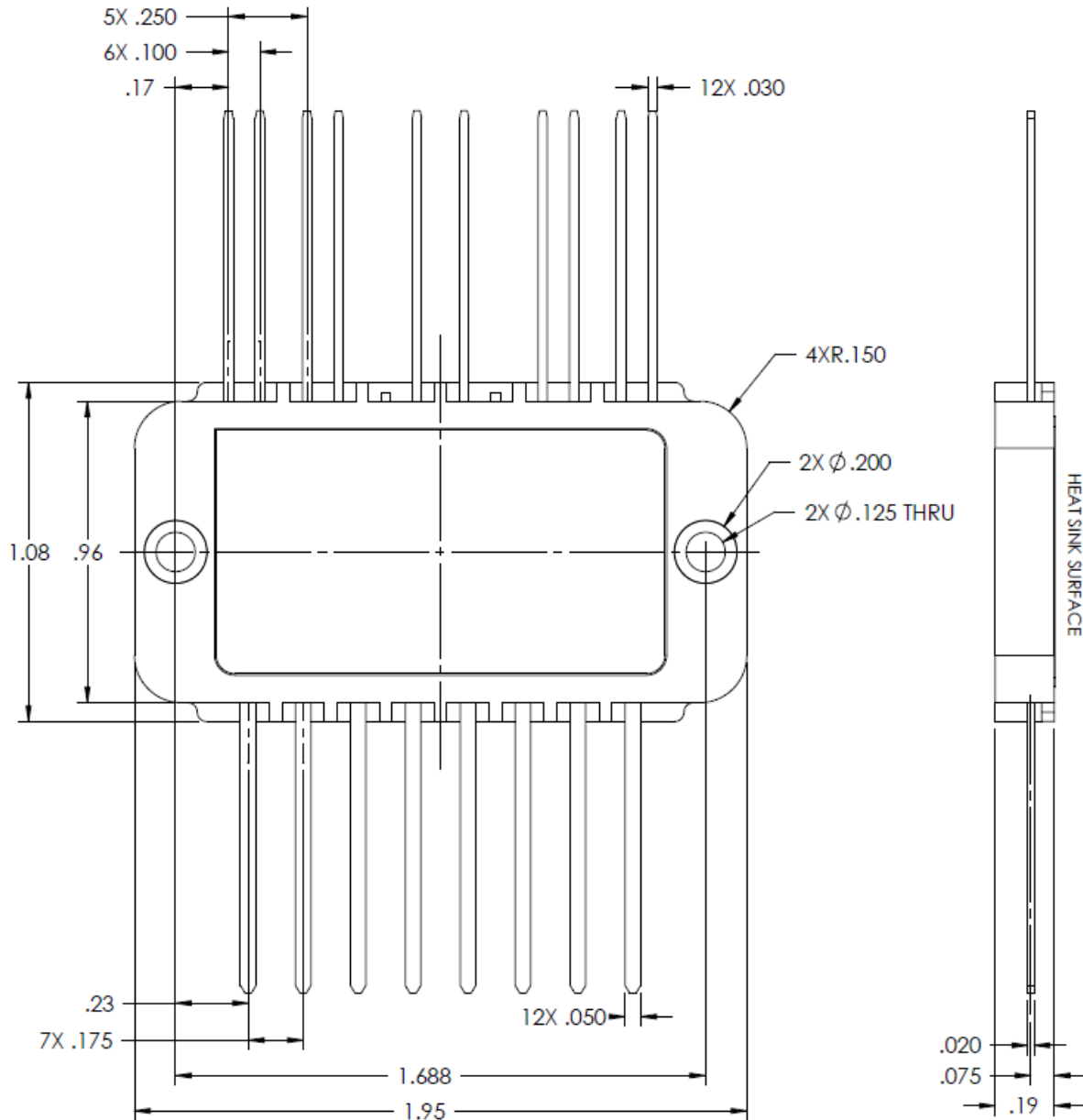
**SCHEMATIC DIAGRAM AND PINOUT:**



TECHNICAL DATA  
DATASHEET 6180, REV -

MECHANICAL OUTLINE (inches):

Part Number SPM1019C2-1  
Straight Leads

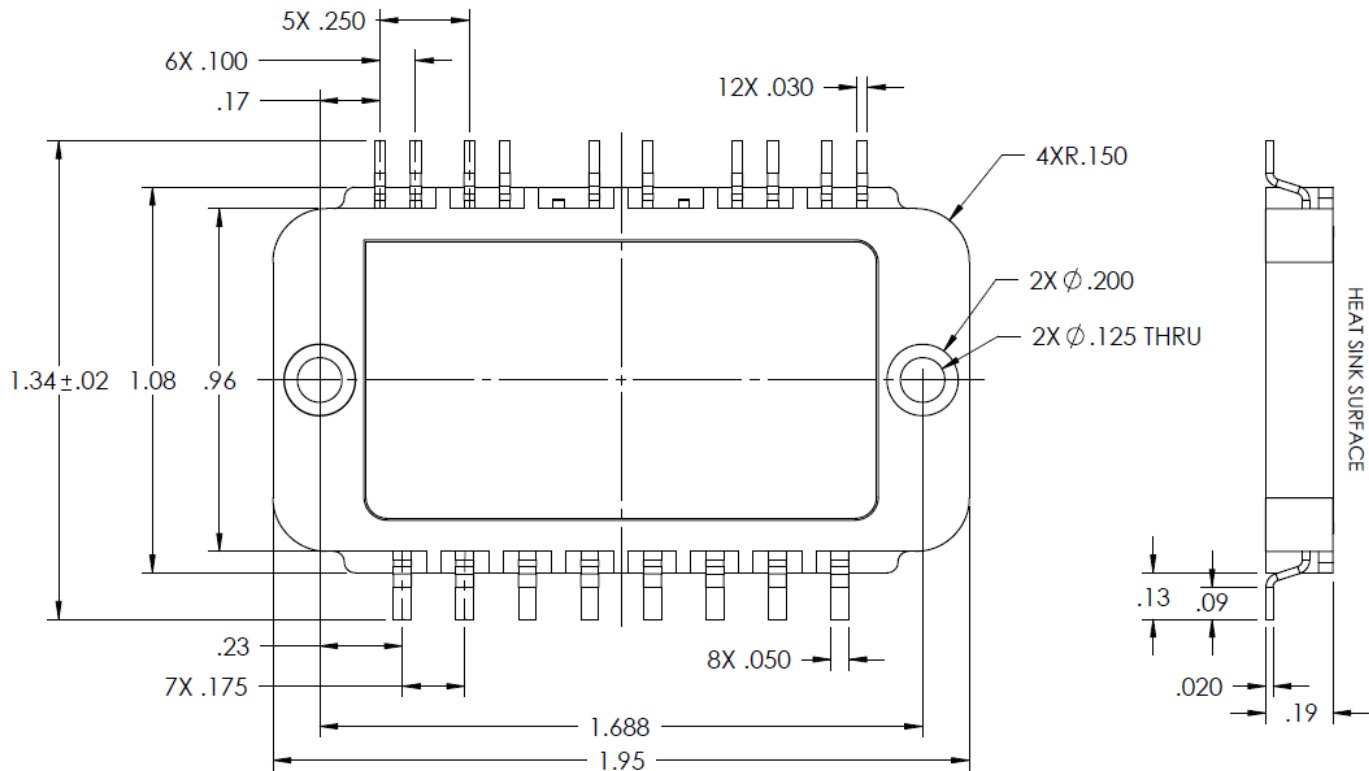


TOLERANCE UNLESS OTHERWISE NOTED:  
.XX = ±.01  
.XXX = ±.005

PINS 13 AND 16 REMOVED

**TECHNICAL DATA**  
**DATASHEET 6180, REV -**

**Part Number SPM1019C2-2**  
**SMT leads, reverse mounting**



TOLERANCE UNLESS OTHERWISE NOTED:  
.XX = ±.01  
.XXX = ±.005

PINS 13 AND 16 REMOVED

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