Three-Phase IGBT BRIDGE with BRAKE IGBT
Three-Phase Input BRIDGE with INRUSH SCR

DESCRIPTION:

- 1200 VOLT, 150 AMP, THREE PHASE IGBT BRIDGE
- UPPER & LOWER REGENERATIVE BRAKE IGBT SWITCHES
- USE OF LATEST 4TH GENERATION IGBT AND DIODE TO MINIMIZE TOTAL LOSSES
- 1200 VOLT, 25 AMP BRAKE IGBT
- 1200 VOLT, 133 AMP INRUSH THYRISTOR (SCR)
- 1200 VOLT, 63A THREE PHASE DIODE BRIDGE
- RTD TO MONITOR MODULE TEMPERATURE
- NEAR HERMETIC CONSTRUCTION
- AlSiC BASE PLATE FOR HIGH TEMPERATURE CYCLING CAPABILITY
- AlN SUBSTRATE FOR HIGH POWER CAPABILITY
- LOW PROFILE LIGHT WEIGHT PACKAGE WITH BUS BAR ATTACHMENT
- STANDARD FLYING LEAD I/O WITH OPTIONAL D-SUB CONNECTORS TO WIRE TO CONTROL BOARD W/O INTERFERENCE TO BUS BARS
- PARTS ARE SERIALIZED
- HTRB @ 125^{o}C, 48 hrs.
- TEST DATA RECORDED

THREE PHASE IGBT SECTION

ELECTRICAL CHARACTERISTICS PER IGBT DEVICE (Tj=25^{0}C UNLESS OTHERWISE SPECIFIED)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
INVERTER IGBT SPECIFICATIONS					
Collector to Emitter Breakdown Voltage I_C = 4mA, V_{GE} = 0V	BV_{CES}	1200	-	-	V
Gate Threshold Voltage I_C = 5.3mA, V_{CE} = V_{GE}	V_{GETH}	5.2	5.8	6.4	V
Continuous Collector Current T_C = 25 ^{O}C T_C = 80 ^{O}C	I_C	-	-	150 95	A
Zero Gate Voltage Collector Current V_{CE} = 1200V, V_{GE} = 0V T_i = 25^{o}C V_{CE} = 800V, V_{GE} = 0V T_i = 125^{o}C	I_{CES}	-	-	 1 25	 mA mA
Collector to Emitter Saturation Voltage, T_j = 25 ^{O}C I_C = 150A, V_{GE} = 15V T_j = 125 ^{O}C	$V_{CE(SAT)}$	-	1.9 2.2	2.4	V
Gate to Emitter Leakage Current (not measurable due to built-in G-E resistor) V_{CE} = 0V, V_{GE} = 20V	I_{GES}			100	nA
IGBT Internal Gate Resistance		-	5	-	Ohm
IGBT turn-on switching loss V_{CE} = 600V, I_C = 150A, T_j = 25^{o}C		-	5	-	mJ
IGBT turn-off switching loss V_{CE} = 600V, I_C = 150A, T_j = 25^{o}C		-	10	-	mJ
Short Circuit Withstand Time, Conditions 600V DC link, V_{GE}=15V, I_{SC} = 600A, T_{start} < 175 ^{O}C		-	10	-	µs
Junction To Case Thermal Resistance	$R_{\theta JC}$	-	-	0.24	^{o}C/W
INVERTER DIODE SPECIFICATIONS					
Diode Peak Inverse Voltage	PIV	1200	-	-	V
Continuous Forward Current, T_C = 80 ^{O}C	I_F	-	-	95	A
Diode Forward Voltage I_F = 150A, T_j = 25 ^{O}C	V_F	-	1.8	2.2	V
Diode Peak Reverse Recovery Current I_F=150A, V_{RR}=600V, di/dt = 6000 A/µs, T_j = 25 ^{O}C	t_{rr}	-	220	-	A
Diode switching loss I_F=150A, V_{RR}=600V, di/dt = 6000 A/µs, T_j = 25 ^{O}C		-	7	-	mJ
Junction To Case Thermal Resistance	$R_{\theta JC}$	-	-	0.42	^{o}C/W

BRAKE IGBT SPECIFICATIONS

Collector to Emitter Breakdown Voltage I_C = 1.5mA, V_{GE} = 0V	BV_{CES}	1200	-	-	V
Continuous Collector Current T_C = 25 °C T_C = 80 °C	I_C	-	-	45 25	A
Zero Gate Voltage Collector Current V_{CE} = 1200 V, V_{GE}=0V T_j=25°C	I_{CES}	-	-	5.0	mA
Collector to Emitter Saturation Voltage, T_j = 25 °C I_C = 25A, V_{GE} = 15V T_j = 125 °C	$V_{CE(SAT)}$	-	1.7 2.0	2.2	V
Pulsed Collector Current, 0.5ms	I_{CM}	-	-	70	A
Junction To Case Thermal Resistance	$R_{\theta JC}$	-	-	0.9	°C/W

BRAKE FREE WHEEL DIODE SPECIFICATIONS

Diode Peak Inverse Voltage	PIV	1200	-	-	V
Continuous Forward Current, T_C = 80 °C	I_F	-	-	25	A
Diode Forward Voltage, I_F = 12 A, T_j = 25 °C	V_F	-	-	1.3	V
Diode Leakage Current @ 1200V T_j = 25 °C T_j = 125 °C	I_{RM}	-	-	0.05 0.5	mA
Junction To Case Thermal Resistance	$R_{\theta JC}$	-	-	2.0	°C/W

INRUSH THYRISTOR (SCR) SPECIFICATIONS

Peak Inverse Voltage	PIV	1200	-	-	V
Continuous Forward Current (I_{RMS}) T_C = 80 °C	I_T	-	-	133	A
Inrush Current, T_j = 25 °C, V_R = 0, t = 8.3msec	I_{FSM}	-	-	2400	A
Forward Voltage, T_j = 25 °C, I_{GT} = 150mA, I_T = 300A pulse	V_{AK}	-	-	1.8	V
Latching Current, T_C = 25 °C	I_L	-	-	450	mA
Holding Current, T_C = 25 °C	I_H	-	-	200	mA
Gate Trigger Current, V_D = 6V T_C = 25 °C T_C = - 55 °C	I_{GT}	-	-	150 240	mA
Junction To Case Thermal Resistance	$R_{\theta JC}$	-	-	0.27	°C/W

INPUT RECTIFIER SPECIFICATIONS

Diode Peak Inverse Voltage	PIV	1200	-	-	V
Continuous Forward Current, T_C = 80 ^{O}C	I_F	-	-	63	A
Diode Forward Voltage, I_F = 100A, T_j = 25 ^{O}C	V_F	-	-	1.3	V
Diode Leakage Current @ 1200V T_j = 25 ^{O}C T_j = 125 ^{O}C	I_{RM}	-	-	0.05 2	mA
Junction To Case Thermal Resistance	$R_{\theta JC}$	-	-	0.63	^{o}C/W

RTD SPECIFICATIONS (R = 1kΩ at 00C)

Temperature coefficient (0^0C – 100^0C)	K_T		3850		ppm/K
Resistance at -55^0C (temperature tolerance ±0.58^0C)	R_{-55}		783.19		Ω
Resistance at 125^0C (temperature tolerance ±0.93^0C)			1479.51		Ω

MODULE STORAGE AND OPERATING CONDITIONS

Operating Junction Temperature	T_j	-55	-	150	^{o}C
Storage Ambient Temperature	T_s	-55	-	150	^{o}C
Operating Case Temperature	T_c	-55	-	100	^{o}C
Operating Ambient Temperature	T_A	-55	-	100	^{o}C
Operating Altitude		-	-	50000	Ft

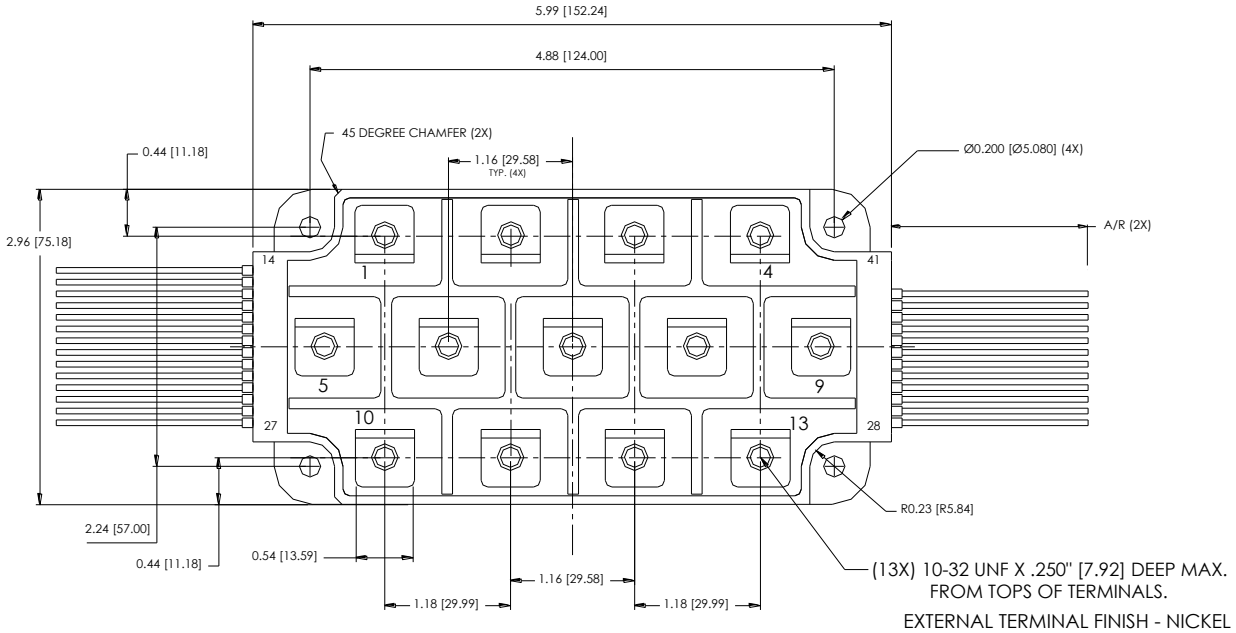
MODULE ISOLATION

All pins to baseplate (sea level)	-	2500	-	-	VDC
All other pins to RTD (sea level)	-	1500	-	-	VDC
All pins to baseplate (sea level), 60Hz	-	1500	-	-	VAC

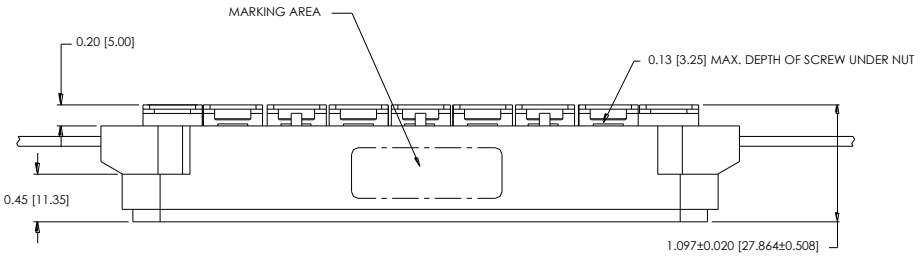
MODULE TOTAL WEIGHT

Total Weight		-	-	600	grams

MECHANICAL OUTLINE:



ENGLISH [METRIC]



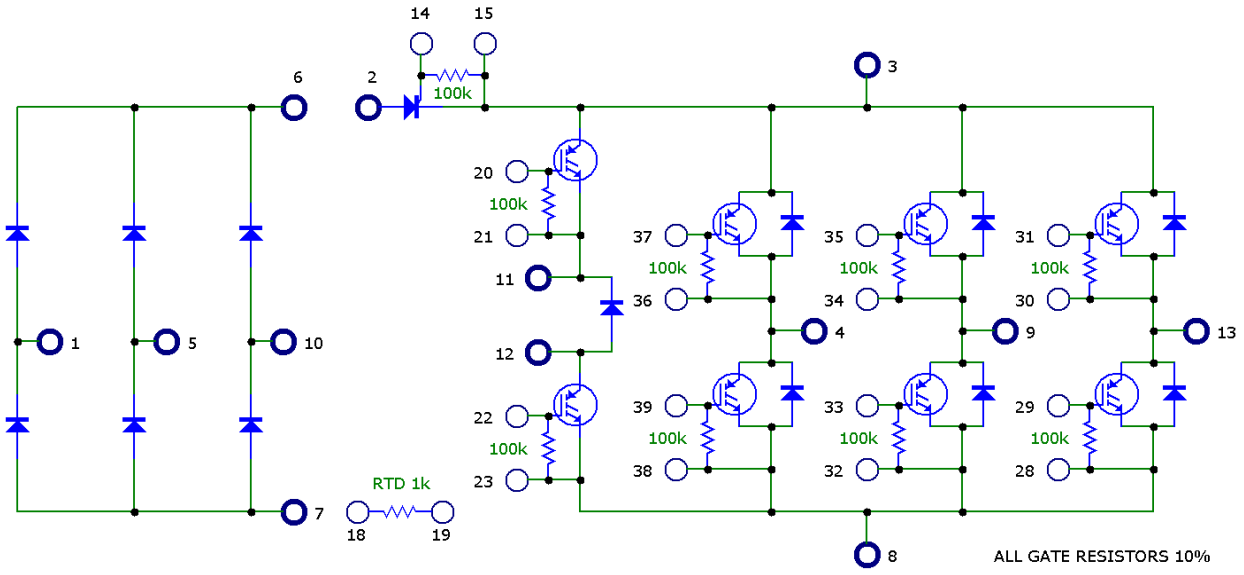
TOLERANCES UNLESS OTHERWISE NOTED

.XX= +/- .020 [.50]
.XXX= +/- .010 [.254]

RECOMMEND TORQUE VALUE : 25 IN-LBS.

Recommended Thermal Pad Material is Laird Technologies Tgon 805 (to be ordered separately) .

SCHEMATIC:



Wire Details (all AWG #24, 200^{0}C, 1000V insulated):

Circuit Ref	Function	Wire Color	Circuit Ref	Function	Wire Color
14	Inrush SCR Gate	Violet	28	Phase C Bottom Emitter	Black
15	Inrush SCR Cathode	Brown	29	Phase C Bottom Gate	Brown
16	N/C		30	Phase C Top Emitter	Red
17	N/C		31	Phase C Top Gate	Orange
18	RTD	Red	32	Phase B Bottom Emitter	Black
19	RTD	Orange	33	Phase B Bottom Gate	Yellow
20	Top Brake IGBT Gate	Red	34	Phase B Top Emitter	Green
21	Top Brake IGBT Cathode	Orange	35	Phase B Top Gate	Blue
22	Bottom Brake IGBT Gate	Yellow	36	Phase A Top Emitter	Violet
23	Bottom Brake IGBT Cathode	Green	37	Phase A Top Gate	Gray
24	N/C		38	Phase A Bottom Emitter	Black
25	N/C		39	Phase A Bottom Gate	White
26	N/C		40	N/C	
27	N/C		41	N/C	

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