



M.S.KENNEDY CORP.

1200V/150A THREE PHASE BRIDGE PEM WITH BRAKE

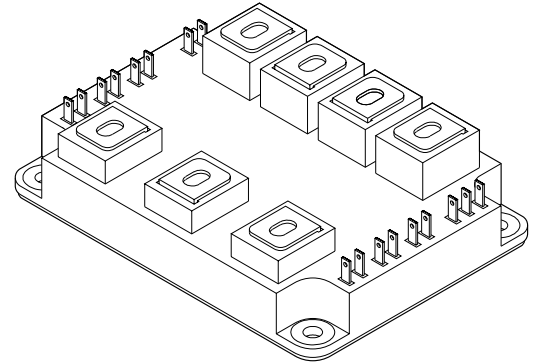
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FEATURES:

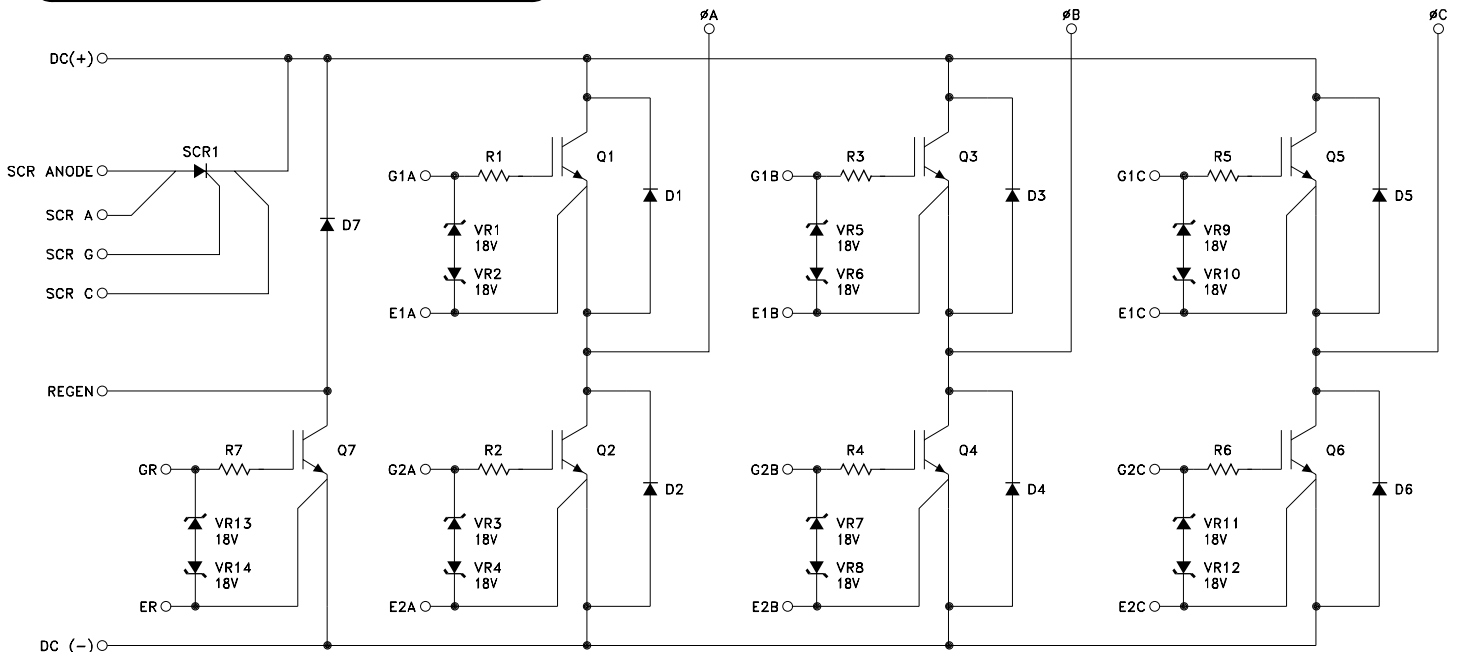
- Full Three Phase Bridge Configuration with SCR/IGBT Brake
- 1200V Rated Voltage
- 150A Continuous Output Current
- Internal Zener Clamps on Gates
- Proprietary Encapsulation Provides Near Hermetic Performance
- MIL-PRF-38534 Screening Available (Modified)
- Light Weight Domed ALSiC Baseplate
- Robust Mechanical Design for Hi-Rel Applications
- Ultra-Low Inductance Internal Layout
- Withstands 96 Hours HAST and Thermal Cycling (-55 °C to + 125 °C)



DESCRIPTION:

The MSK 4852 is one of a family of plastic encapsulated modules (PEM) developed specifically for use in military, aerospace and other severe environment applications. The Three Phase Bridge configuration along with the SCR/IGBT brake circuit and 1200 volt/150 amp rating make it ideal for use in high current motor drive and inverter applications. The Aluminum Silicon Carbide (AlSiC) baseplate offers superior flatness and light weight; far better than the copper or copper alloys found in most high power plastic modules. The high thermal conductivity materials used to construct the MSK 4852 allow high power outputs at elevated baseplate temperatures. Our proprietary coating, SEES™ - Severe Environment Encapsulation System - protects the internal circuitry of MSK PEM's from moisture and contamination, allowing them to pass the rugged environmental screening requirements of military and aerospace applications. MSK PEM's are also available with industry standard silicone gel coatings for a lower cost option.

EQUIVALENT SCHEMATIC



TYPICAL APPLICATIONS

- Motor Drives
- Inverters

ABSOLUTE MAXIMUM RATING ^⑧

V _{CE}	Collector to Emitter Voltage	1200V
V _{GE}	Gate to Emitter Voltage	± 20V
I _{OUT}	Current (Continuous)	150A
I _{OUTP}	Current Pulsed (1mS)	300A
V _{CASE}	Case Isolation Voltage	2500V

T _{ST}	Storage Temperature Range	-55°C to +125°C
T _J	Junction Temperature	150°C
T _C	Case Operating Temperature Range	
	MSK 4852H/E	-55°C to +125°C
	MSK 4852	-40°C to +85°C

ELECTRICAL SPECIFICATIONS

Parameter ^⑥	Test Conditions	Group A Subgroup	MSK 4852 H/E			MSK 4852			Units
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Collector-Emitter Saturation Voltage	I _C = 150A, V _{GE} = 15V	1	-	1.7	TBD	-	1.7	TBD	V
		2	-	1.7	TBD	-	1.7	TBD	V
		3	-	1.9	TBD	-	1.9	TBD	V
Collector-Emitter Leakage Current	V _{CE} = 1200V, V _{GE} = 0V	1	-	0.05	TBD	-	0.05	TBD	mA
		2	-	0.05	TBD	-	0.05	TBD	mA
		① 3	-	0.05	TBD	-	0.05	TBD	mA
Gate Threshold Voltage	I _C = 6mA, V _{CE} = V _{GE}	1	4.0	5.8	TBD	4.0	5.8	TBD	V
		2	4.0	5.8	TBD	4.0	5.8	TBD	V
		3	4.0	6.2	TBD	4.0	6.2	TBD	V
Gate Leakage Current	V _{CE} = 0V, V _{GE} = ± 15V	1	-10	0.10	10	-12	0.10	12	µA
		2	-10	0.15	10	-12	0.15	12	µA
		3	-10	0.10	10	-12	0.10	12	µA
Diode Forward Voltage	I _C = 150A	1	-	1.6	TBD	-	1.6	TBD	V
		2	-	1.6	TBD	-	1.6	TBD	V
		3	-	1.7	TBD	-	1.7	TBD	V
SCR Reverse Leakage	V _{RRM} = 1200V	1	-	0.01	TBD	-	0.01	TBD	mA
		2	-	0.01	TBD	-	0.01	TBD	mA
		3	-	0.01	TBD	-	0.01	TBD	mA
SCR On Voltage	I _F = 100A	1	-	1.0	1.35	-	1.0	1.4	V
		2	-	1.0	1.35	-	1.0	1.4	V
		3	-	1.0	1.5	-	1.0	1.6	V
SCR Holding Current		1	-	100	300	-	100	325	mA
		2	-	90	300	-	90	325	mA
		3	-	110	300	-	110	325	mA
Regen Diode Forward Voltage	I _F = 50A	1	-	1.3	TBD	-	1.3	TBD	V
Total Gate Charge ^①	V = 600V, I _C = 150A	4	-	1000	TBD	-	1000	TBD	nC
Turn-On Delay ^①	V = 600V, I _C = 150A, R _G = 20Ω	4	-	300	TBD	-	300	TBD	nS
Rise Time ^①	V = 600V, I _C = 150A, R _G = 20Ω	4	-	95	TBD	-	95	TBD	nS
Turn-Off Delay ^①	V = 600V, I _C = 150A, R _G = 10Ω	4	-	650	TBD	-	650	TBD	µS
Fall Time ^①	V = 600V, I _C = 150A, R _G = 10Ω	4	-	180	TBD	-	180	TBD	nS
Diode Reverse Recovery Time ^①	I _E = 150A, di/dt = 1650A/µS	4	-	TBD	TBD	-	TBD	TBD	nS
Diode Reverse Recovery Charge ^①	I _E = 150A, di/dt = 1650A/µS	4	-	TBD	TBD	-	TBD	TBD	µC
Thermal Resistance ^①	IGBT @ T _J = 125°C	4	-	0.16	TBD	-	0.16	TBD	°C/W
	BRIDGE DIODE @ T _J = 125°C	4	-	0.17	TBD	-	0.17	TBD	°C/W
	REGEN SCR	4	-	0.25	TBD	-	0.25	TBD	°C/W
	REGEN DIODE	4	-	0.22	TBD	-	0.22	TBD	°C/W

NOTES:

- ① Guaranteed by design but not tested. Typical parameters are representative of actual device performance but are for reference only.
- ② Industrial grade and "E" suffix devices shall be tested to subgroup 1 unless otherwise specified.
- ③ Military grade devices ("H" suffix) shall be 100% tested to subgroups 1, 2 and sample tested to subgroup 3.
- ④ Subgroups 4, 5 and 6 testing available upon request.
- ⑤ Subgroup 1, 4 T_A = +25°C
2, 5 T_A = +125°C
3, 6 T_A = -55°C
- ⑥ All specifications apply to both the upper and lower sections of the half bridge.
- ⑦ V_{GE} = 15V unless otherwise specified.
- ⑧ Continuous operation at or above absolute maximum ratings may adversely effect the device performance and/or life cycle.

TYPICAL PERFORMANCE CURVES

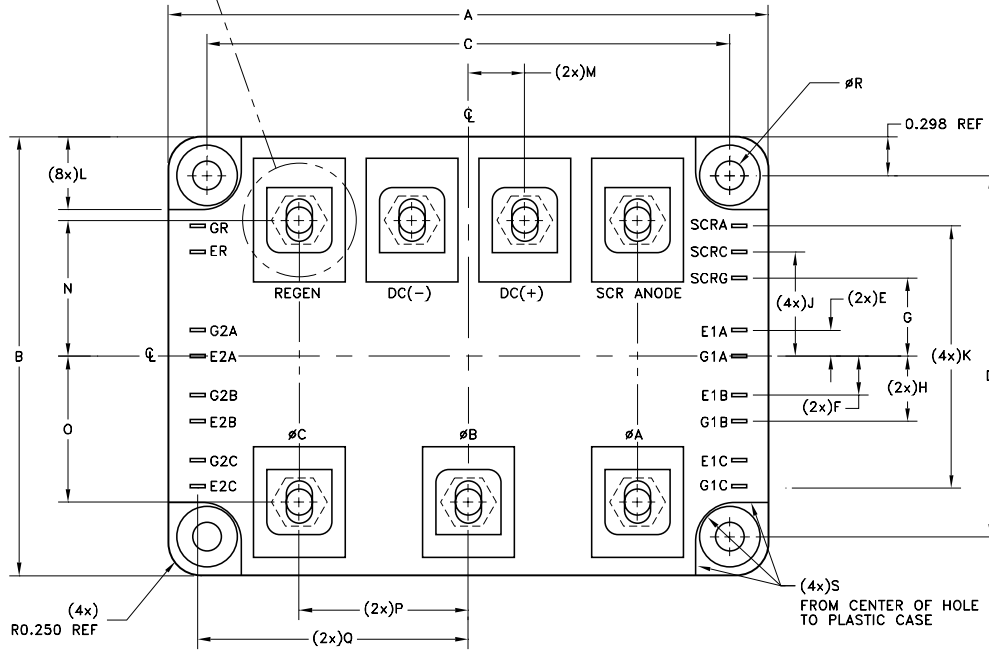
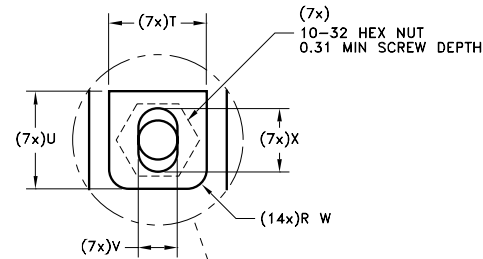
TBD

SCREENING CHART

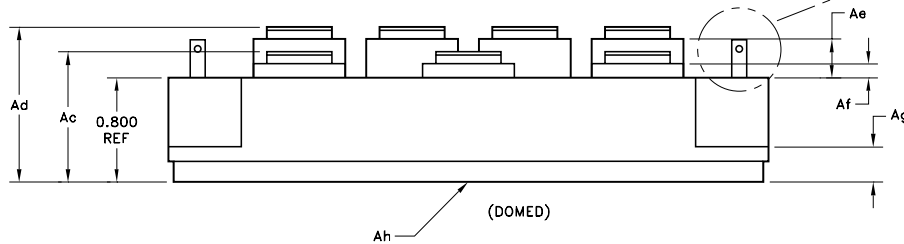
OPERATION IN ACCORDANCE WITH MIL-PRF-38534	INDUSTRIAL	CLASS E	CLASS H
QUALIFICATION (MODIFIED)	NO	NO	YES
ELEMENT EVALUATION	NO	YES	YES
CLEAN ROOM PROCESSING	YES	YES	YES
NON DESTRUCT BOND PULL SAMPLE	YES	YES	YES
CERTIFIED OPERATORS	NO	YES	YES
MIL LINE PROCESSING	YES	YES	YES
MAX REWORK SPECIFIED	NO	YES	YES
ENCAPSULANT	GEL COAT	SEES™	SEES™
PRE-CAP VISUAL	YES - INDUSTRIAL	YES - CLASS H	YES - CLASS H
TEMP CYCLE (-55°C TO +125°C)	NO	YES	YES
BURN-IN	NO	YES - 96 HOURS	YES - 160 HOURS
ELECTRICAL TESTING	YES - 25°C	YES - 25°C	YES - FULL TEMP
EXTERNAL VISUAL	YES - SAMPLE	YES - SAMPLE	YES
XRAY	NO	NO	NO
PIN FINISH	NI	NI	NI

NOTE: ADDITIONAL SCREENING IS AVAILABLE SUCH AS XRAY, CSAM, MECHANICAL SHOCK, ETC. CONTACT FACTORY FOR QUAL STATUS.

MECHANICAL SPECIFICATIONS



REF	MIN	MAX
A	4.580	4.640
B	3.340	3.390
C	4.006	4.031
D	2.765	2.785
E	0.190	0.210
F	0.290	0.310
G	0.590	0.610
H	0.490	0.510
J	0.790	0.810
K	0.990	1.010
L	0.520	
M	0.428	0.438
N	1.039	1.049
O	1.117	1.127
P	1.294	1.304
Q	2.070	2.090
R	0.208	0.225
S	0.240	
T	0.500	0.550
U	0.500	0.700
V	0.195	0.205
W	0.100	
X	0.310	0.340
Y	0.048	0.068
Z	0.105	0.125
Aa	0.060	0.080
Ab	0.040	0.060
Ac	0.985	1.015
Ad	1.175	1.205
Ae	0.280	0.300
Af	0.090	0.110
Ag	0.255	0.285
Ah	0.000	0.008



WEIGHT = 442 GRAMS MAX.

ORDERING INFORMATION

MSK4852 H

SCREENING

BLANK = INDUSTRIAL; E = EXTENDED RELIABILITY;

H = MIL-PRF-38534 CLASS H (MODIFIED)

GENERAL PART NUMBER

THE ABOVE EXAMPLE IS A MILITARY SCREENED MODULE.

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Contact MSK for MIL-PRF-38534 qualification status.