

Advance Information

Hybrid Power Module

Integrated Power Stage for 230 VAC Motor Drives

These VersaPower™ modules integrate a 3-phase inverter and 3-phase rectifier in a single convenient package. They are designed for 0.5, 1.0, and 1.5 hp motor drive applications at frequencies up to 15 kHz. The inverter incorporates advanced E-Series insulated gate bipolar transistors (IGBT) matched with ultrafast soft (UFS) free-wheeling diodes to give optimum performance. The input bridge uses rugged, efficient diodes with high surge capability. The top connector pins are designed for easy interfacing to the user's control board.

- Short Circuit Rated 10 μ s @ 125°C, 400 V
- Pin-to-Baseplate Isolation Exceeds 2500 Vac (rms)
- Compact Package Outline
- Access to Positive and Negative DC Bus
- Gate-Emitter Clamp Diodes for ESD Protection
- UL  Recognized
- Visit our website at <http://www.mot-sps.com/tsg/>

ORDERING INFORMATION

Device	Voltage Rating	Current Rating	Equivalent Horsepower
XHPM6B7E60D3	600	7.0	0.5
XHPM6B10E60D3	600	10	1.0
XHPM6B15E60D3	600	15	1.5

MAXIMUM DEVICE RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Repetitive Peak Input Rectifier Reverse Voltage (T _J = 25°C to 150°C)	V _{RRM}	900	V
IGBT Reverse Voltage	V _{CES}	600	V
Gate-Emitter Voltage	V _{GES}	±20	V
Continuous IGBT Collector Current (T _C = 25°C)	I _{Cmax}	7.0 10 15	A
Continuous IGBT Collector Current (T _C = 80°C)	I _{C80}	7.0 10 13	A
Repetitive Peak IGBT Collector Current (1)	I _{C(pk)}	14 20 30	A
Continuous Free-Wheeling Diode Current (T _C = 25°C)	I _{Fmax}	7.0 10 15	A
Continuous Free-Wheeling Diode Current (T _C = 80°C)	I _{F80}	5.2 6.8 10	A
Repetitive Peak Free-Wheeling Diode Current (1)	I _{F(pk)}	14 20 30	A

(1) 1.0 ms = 1.0% duty cycle

This document contains information on a new product. Specifications and information herein are subject to change without notice.

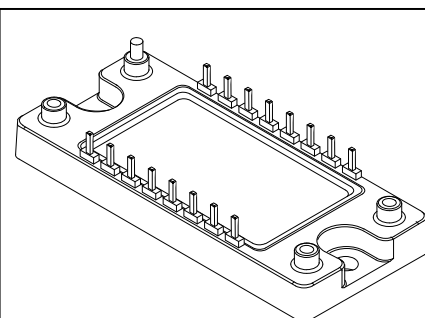
Preferred devices are Motorola recommended choices for future use and best overall value.

VersaPower is a trademark of Motorola, Inc.

MHPM6B15E60D3
MHPM6B10E60D3
MHPM6B7E60D3

Motorola Preferred Devices

**7.0, 10, 15 AMP, 600 VOLT
HYBRID POWER MODULES**



**CASE 464-03
ISSUE B**

MHPM6B15E60D3 MHPM6B10E60D3 MHPM6B7E60D3

MAXIMUM DEVICE RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Average Converter Output Current (Peak-to-Average ratio of 10, T _C = 95°C)	I _{Omax}	20	A
Continuous Input Rectifier Current (T _C = 25°C)	I _{DC}	20	A
Non-Repetitive Peak Input Rectifier Forward Surge Current ⁽²⁾ (T _J = 95°C prior to start of surge)	I _{FSM}	475	A
IGBT Power Dissipation per die (T _C = 95°C)	P _D	14 17 23	W
Free-Wheeling Diode Power Dissipation per die (T _C = 95°C)	P _D	7.4 9.0 13	W
Input Rectifier Power Dissipation per die (T _C = 95°C)	P _D	13	W
Junction Temperature Range	T _J	–40 to +150	°C
Short Circuit Duration (V _{CE} = 400 V, T _J = 125°C)	t _{sc}	10	μs
Isolation Voltage, pin to baseplate	V _{ISO}	2500	Vac
Operating Case Temperature Range	T _C	–40 to +95	°C
Storage Temperature Range	T _{stg}	–40 to +125	°C
Mounting Torque — Heat Sink Mounting Holes	—	12	lb-in

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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DC AND SMALL SIGNAL CHARACTERISTICS

Input Rectifier Forward Voltage (I = 15 A) T _J = 125°C	V _F	— —	0.97 0.88	1.2 —	V
Instantaneous Reverse Current (V = 900 V) T _J = 150°C	I _R	— —	50 3000	— —	μA
Gate-Emitter Leakage Current (V _{CE} = 0 V, V _{GE} = ±20 V)	I _{GES}	—	—	±50	μA
Collector-Emitter Leakage Current (V _{CE} = 600 V, V _{GE} = 0 V)	I _{CES}	—	5.0	100	μA
Gate-Emitter Threshold Voltage (V _{CE} = V _{GE} , I _C = 1.0 mA)	V _{GE(th)}	4.0	6.0	8.0	V
Collector-Emitter Breakdown Voltage (I _C = 10 mA, V _{GE} = 0 V)	V _{(BR)CES}	600	—	—	V
Collector-Emitter Saturation Voltage (I _C = I _{Cmax} , V _{GE} = 15 V) T _J = 125°C	V _{CE(SAT)}	— —	2.0 1.8	2.4 —	V
Free-Wheeling Diode Forward Voltage (I _F = I _{Fmax} , V _{GE} = 0 V) T _J = 125°C	V _F	1.7 —	2.0 1.8	2.3 —	V
Input Capacitance (V _{GE} = 0 V, V _{CE} = 10 V, f = 1.0 MHz)	C _{ies}	— — —	780 1020 1605	— — —	pF

THERMAL CHARACTERISTICS (EACH DIE)

Thermal Resistance — IGBT	R _{θJC}	— — —	3.1 2.6 1.9	3.8 3.2 2.4	°C/W
Thermal Resistance — Free-Wheeling Diode	R _{θJC}	— — —	6.0 4.8 3.4	7.5 6.0 4.2	°C/W
Thermal Resistance — Input Rectifier	R _{θJC}	—	3.4	4.2	°C/W

(2) 1.0 ms = 10% pulse width (t_w 10%)

MHPM6B15E60D3 MHPM6B10E60D3 MHPM6B7E60D3

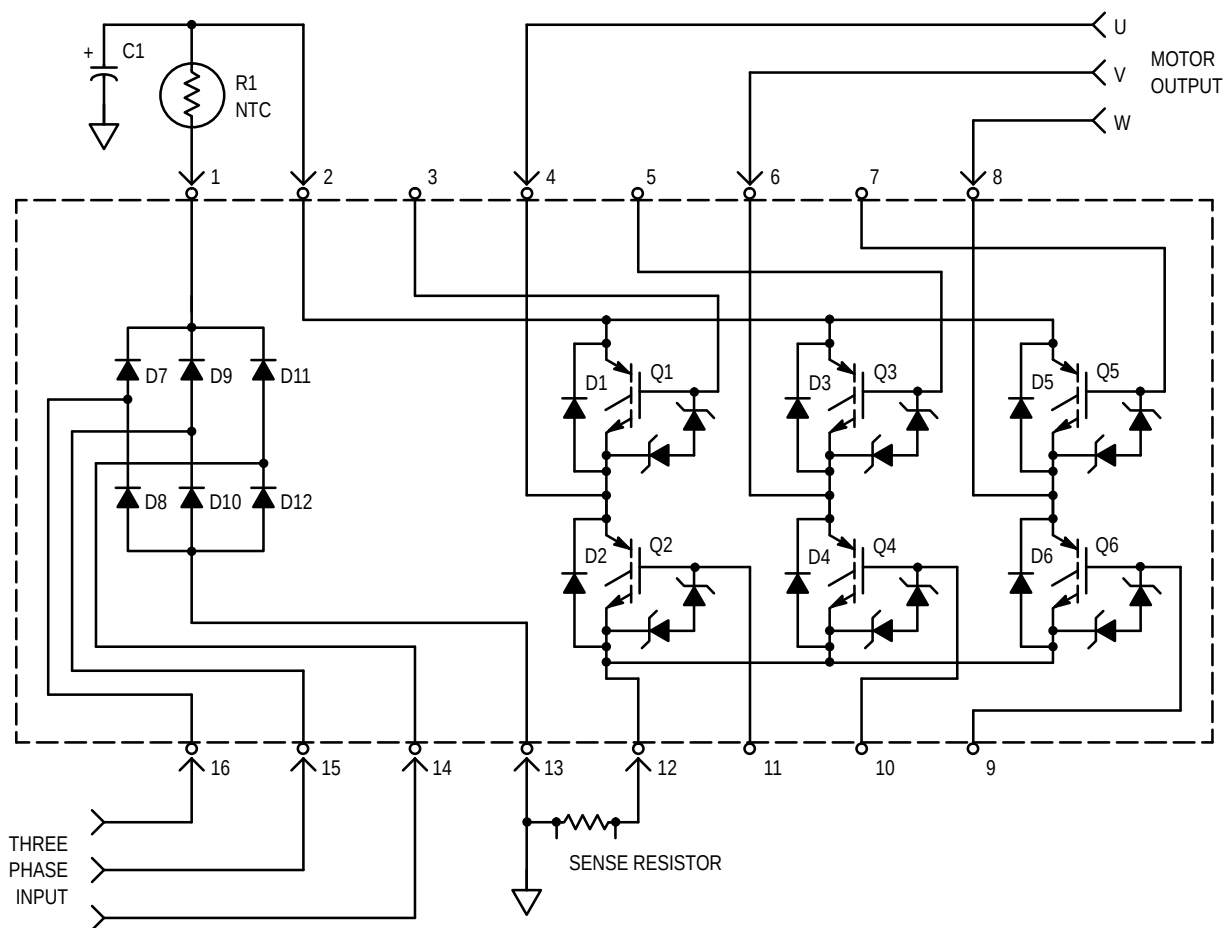


Figure 1. Schematic of Module, Showing Pin-Out and External Connections

MHPM6B15E60D3 MHPM6B10E60D3 MHPM6B7E60D3

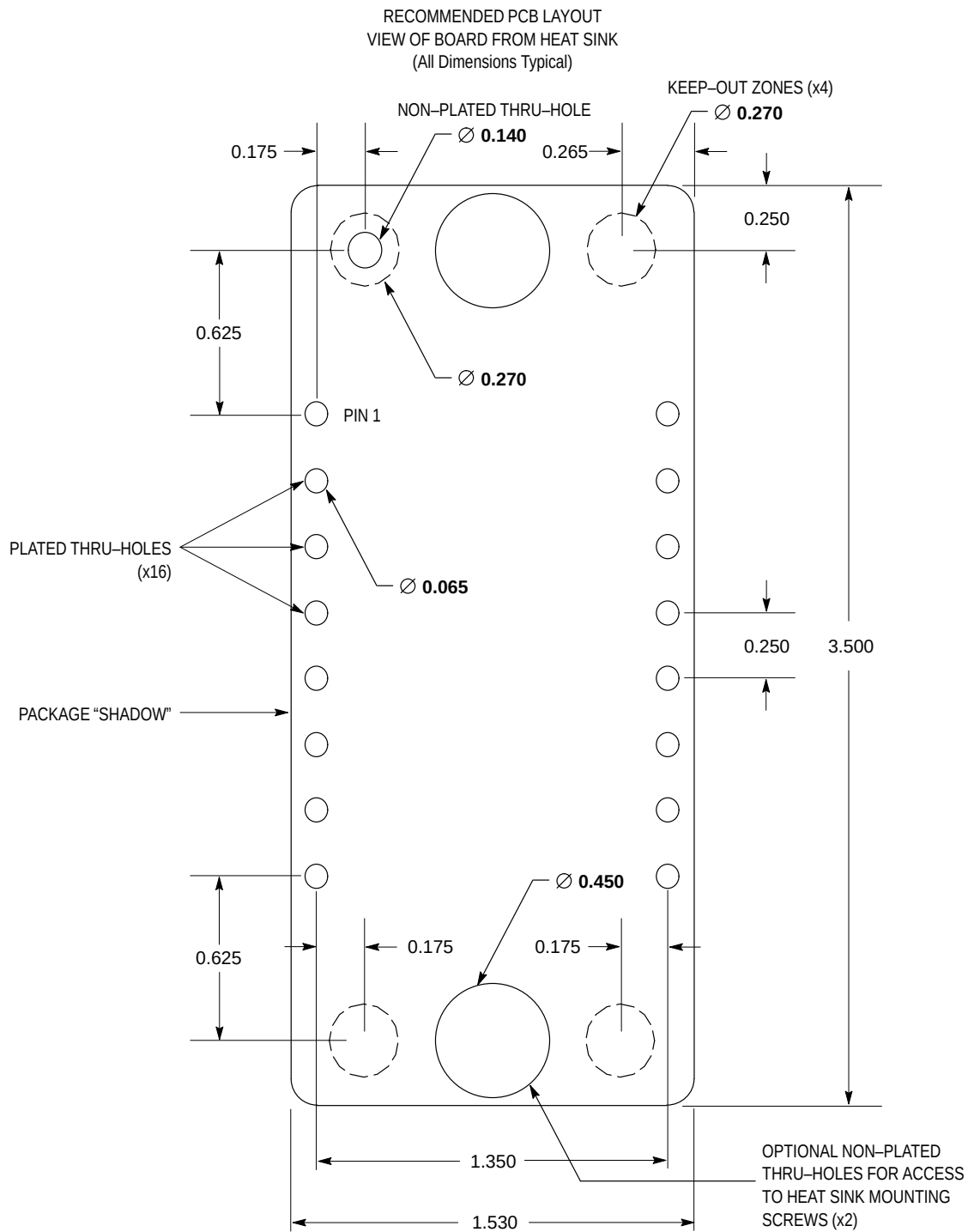


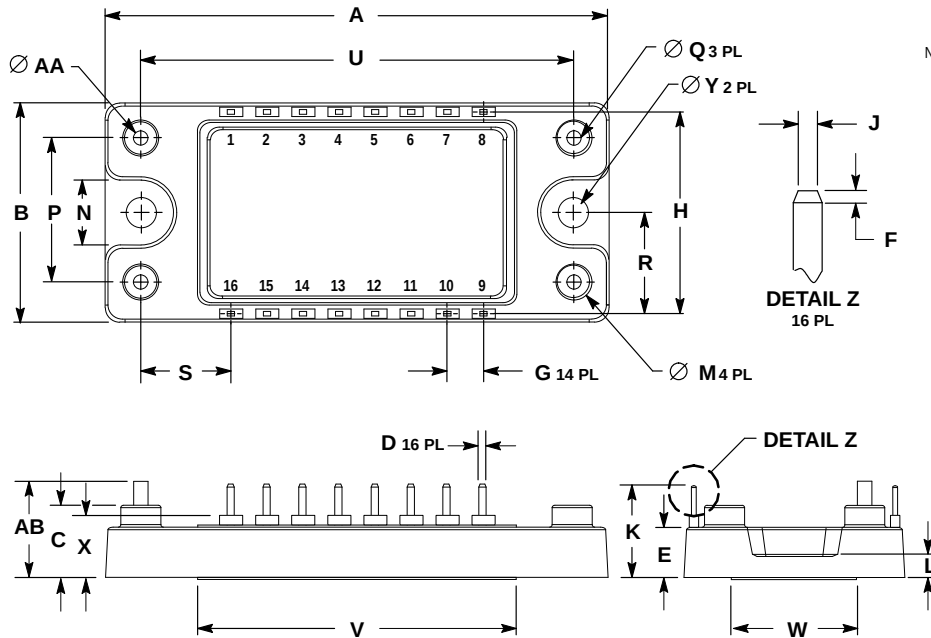
Figure 2. Package Footprint

NOTE:

1. Package is symmetrical, except for a polarizing plastic post near pin 1, indicated by a non-plated thru-hole in the footprint.
2. Dimension of plated thru-holes indicates net size after plating.
3. Access holes for mounting screws may or may not be necessary depending on assembly plan for finished product.

MHPM6B15E60D3 MHPM6B10E60D3 MHPM6B7E60D3

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. LEAD LOCATION DIMENSIONS (ie: G, S, R, H, ...) ARE TO THE CENTER OF THE LEAD.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	88.39	89.41	3.480	3.520
B	38.35	39.37	1.510	1.550
C	12.32	13.59	0.485	0.535
D	0.89	1.65	0.035	0.065
E	8.64	9.65	0.340	0.380
F	0.13	0.64	0.005	0.025
G	5.97	6.73	0.235	0.265
H	33.91	34.67	1.335	1.365
J	0.41	1.22	0.016	0.048
K	16.26	17.27	0.640	0.680
L	3.71	4.72	0.146	0.186
M	5.46	6.48	0.215	0.255
N	10.92	11.94	0.430	0.470
P	24.89	25.91	0.980	1.020
Q	2.01	2.62	0.079	0.103
R	16.76	17.53	0.660	0.690
S	15.49	16.26	0.610	0.640
U	75.69	76.71	2.980	3.020
V	55.88	57.15	2.200	2.250
W	29.97	30.99	1.180	1.220
Y	5.26	5.77	0.207	0.227
X	11.30	12.07	0.445	0.475
AA	2.29	2.79	0.090	0.110
AB	16.26	17.27	0.640	0.680

CASE 464-03
ISSUE B

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