

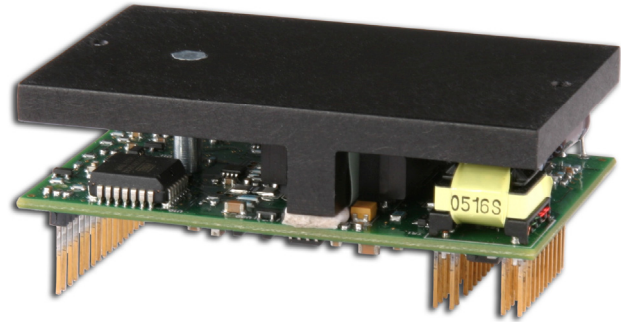
**Description**

The AZBDC20A20 PWM servo drive is designed to drive brushless DC motors at a high switching frequency. To increase system reliability and to reduce cabling costs, the drive is designed for direct integration into your PCB. The AZBDC20A20 is fully protected against over-voltage, under-voltage, over-current, over-heating and short-circuits. A single digital output indicates operating status. The drive interfaces with digital controllers that have digital PWM output. The PWM IN duty cycle determines the output current and DIR input determines the direction of rotation. This servo drive requires only a single unregulated isolated DC power supply, and is fully RoHS (Reduction of Hazardous Substances) compliant.

See Part Numbering Information on last page of datasheet for additional ordering options.

**Power Range**

Peak Current	20 A
Continuous Current	10 A
Supply Voltage	40 - 175 VDC


**Features**

- ▲ High Power Density
- ▲ Compact Size
- ▲ Direct Board-to-Board Integration
- ▲ Lightweight
- ▲ High Switching Frequency
- ▲ Four Quadrant Regenerative Operation
- ▲ Wide Temperature Range
- ▲ High Performance Thermal Dissipation
- ▲ Differential Input Command
- ▲ Current Monitor Output
- ▲ Digital Fault Output Monitor
- ▲ Wide Supply Voltage Range

**HARDWARE PROTECTION**

- Over-Voltage
- Under-Voltage
- Over-Current
- Over-Temperature
- Short-circuit (phase-phase)
- Short-circuit (phase-ground)

**INPUTS/OUTPUTS**

- Digital Fault Output
- Digital Inhibit Input
- Analog Current Monitor
- Analog Command Input
- Analog Current Reference

**FEEDBACK SUPPORTED**

- Hall Sensors

**MODES OF OPERATION**

- Current

**COMMUTATION**

- Trapezoidal

**MOTORS SUPPORTED**

- Three Phase (Brushless)
- Single Phase (Brushed, Voice Coil, Inductive Load)

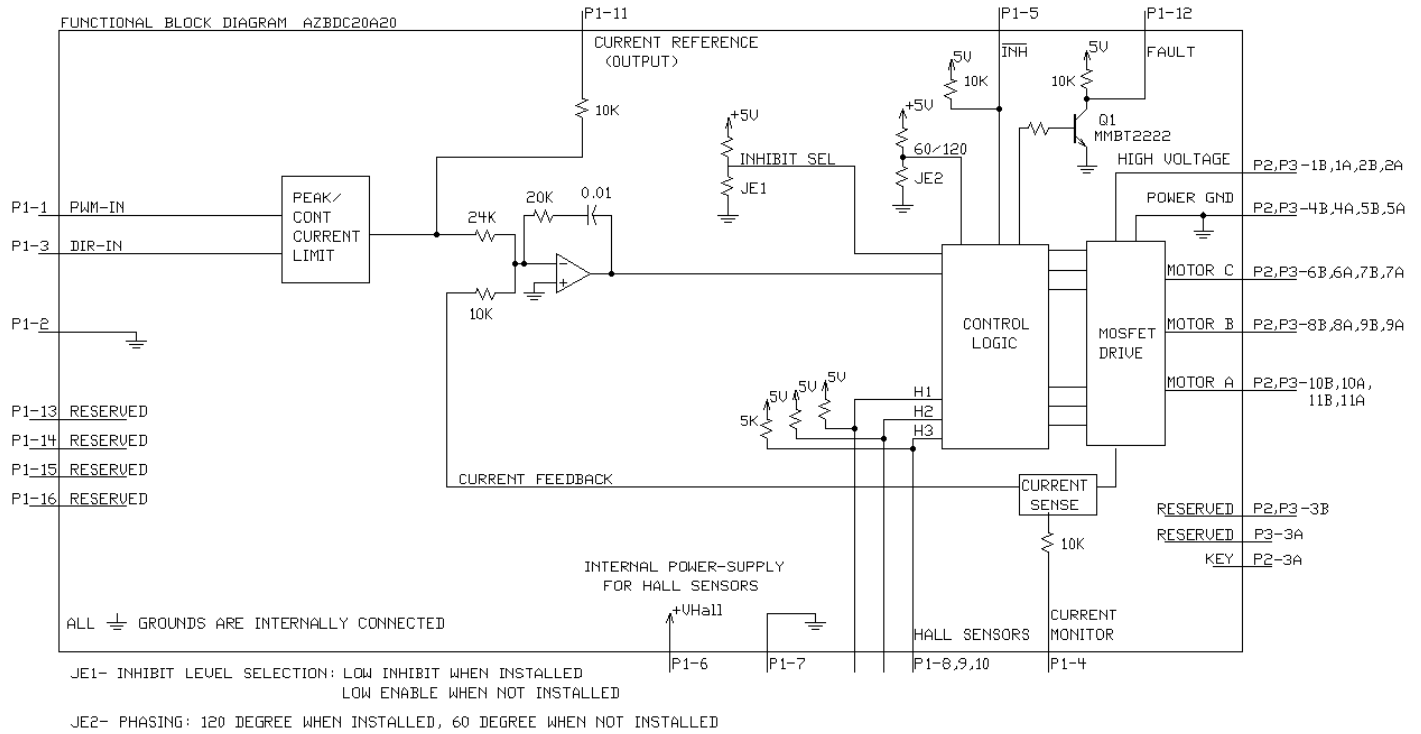
**COMMAND SOURCE**

- PWM

**COMPLIANCES & AGENCY APPROVALS**

- RoHS

**BLOCK DIAGRAM**



**Information on Approvals and Compliances**



RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.

**SPECIFICATIONS**

Power Specifications		
Description	Units	Value
DC Supply Voltage Range	VDC	40 – 175
DC Bus Under Voltage Limit	VDC	36
DC Bus Over Voltage Limit	VDC	193
Maximum Peak Output Current <sup>1</sup>	A	20
Maximum Continuous Output Current	A	10
Maximum Continuous Output Power	W	1663
Maximum Power Dissipation at Continuous Current	W	88
Minimum Load Inductance (Line-To-Line) <sup>2</sup>	μH	250
Internal Bus Capacitance <sup>3</sup>	μF	20
Low Voltage Supply Outputs	-	+6 VDC (30 mA)
Switching Frequency	KHz	20.7
Control Specifications		
Description	Units	Value
Command Sources	-	PWM
PWM Input Frequency Range	kHz	10 - 25
Feedback Supported	-	Halls
Commutation Methods	-	Trapezoidal
Modes of Operation	-	Current
Motors Supported	-	Three Phase (Brushless), Single Phase (Brushed, Voice Coil, Inductive Load)
Hardware Protection	-	Invalid Commutation Feedback, Over Current, Over Temperature, Over Voltage, Under Voltage, Short Circuit (Phase-Phase & Phase-Ground)
Mechanical Specifications		
Description	Units	Value
Agency Approvals	-	RoHS
Size (H x W x D)	mm (in)	76.2 x 50.8 x 22.9 (3 x 2 x 0.9)
Weight	g (oz)	119.7 (4.2)
Heatsink (Base) Temperature Range <sup>4</sup>	°C (°F)	0 - 75 (32 - 167)
Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)
P1 Connector	-	16-pin, 2.54 mm spaced header
P2 Connector	-	22-pin, 2.54 mm spaced, dual-row header
P3 Connector	-	22-pin, 2.54 mm spaced, dual-row header

**Notes**

1. Maximum duration of peak current is ~2 seconds.
2. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
3. Requires a 100μF/200V electrolytic capacitor near the P2 Power Connector between High Voltage and Power Ground pins.
4. Additional cooling and/or heatsink may be required to achieve rated performance.

## PIN FUNCTIONS

P1 - Signal Connector			
Pin	Name	Description / Notes	I/O
1	PWM / IN	10 – 25 kHz pulse width modulated digital input command (+5V). Input duty cycle commands the output current.	I
2	SIGNAL GND	Signal Ground	GND
3	DIRECTION	Direction Input (+5 V)	I
4	CURRENT MONITOR	Current Monitor. Analog output signal proportional to the actual current output. Scaling is 6.6 A/V. Measure relative to signal ground.	O
5	INHIBIT IN	TTL level (+5 V) inhibit/enable input. Leave open to enable drive. Pull to ground to inhibit drive. Inhibit turns off all power devices.	I
6	+V HALL OUT	Low Power Supply For Hall Sensors (+6 V @ 30 mA). Referenced to signal ground. Short circuit protected.	O
7	SIGNAL GND	Signal Ground	GND
8	HALL 1	Single-ended Hall/Commutation Sensor Inputs (+5 V logic level)	I
9	HALL 2		I
10	HALL 3		I
11	CURRENT REFERENCE	Measures the command signal to the internal current-loop. This pin has a maximum output of $\pm 7.3$ V when the drive outputs maximum peak current. Measure relative to signal ground.	O
12	FAULT OUT	TTL level (+5 V) output becomes high when power devices are disabled due to at least one of the following conditions: inhibit, invalid Hall state, output short circuit, over voltage, over temperature, power-up reset.	O
13	RESERVED	Reserved	-
14	RESERVED		-
15	RESERVED		-
16	RESERVED		-

P2 and P3 - Power Connector			
Pin	Name	Description / Notes	I/O
1b	1a	HIGH VOLTAGE	I
2b	2a		I
3b		NC	-
	3a	NC (KEY)	-
4b	4b	PWR GND	GND
5b	5a		GND
6b	6a	MOTOR C	O
7b	7a		O
8b	8a	MOTOR B	O
9b	9a		O
10b	10a	MOTOR A	O
11b	11a		O

## HARDWARE SETTINGS

### Jumper Settings

Jumpers are SMT, 0 ohm resistors located on the underside of the drive PCB. By default, the drive is configured with the jumpers installed. Typical drive operation will not require the jumpers to be removed. Please contact the factory before jumper removal.

Jumper	Description	Configuration		
		SMT Jumper (0Ω Resistor)	Not Installed	Installed
JE1	Inhibit logic. Sets the logic level of inhibit pins. Labeled JE1 on the PCB of the drive.		Low Enable	Low Inhibit
JE2	Hall sensor phasing. Selects 120 or 60 degree commutation phasing. Labeled JE2 on the PCB of the drive.		60 degree	120 degree

**MECHANICAL INFORMATION**

**P1 - Signal Connector**

Connector Information		16-pin, 2.54 mm spaced header
Mating Connector	Details	Samtec: BCS-116-L-S-PE
	Included with Drive	No

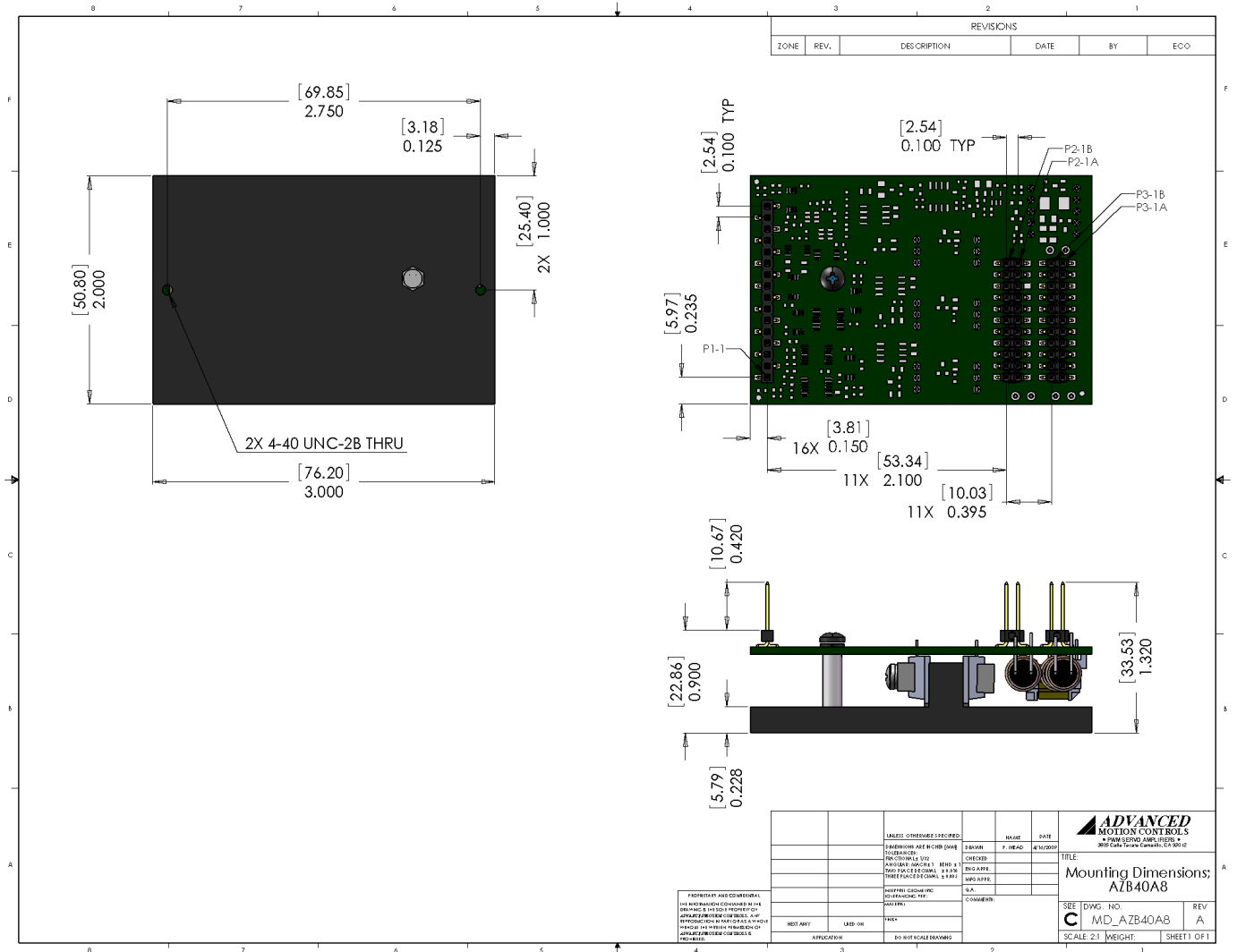
**P2 - Power Connector**

Connector Information		22-pin, 2.54 mm spaced, dual-row header
Mating Connector	Details	Samtec: SSM-111-L-DV
	Included with Drive	No

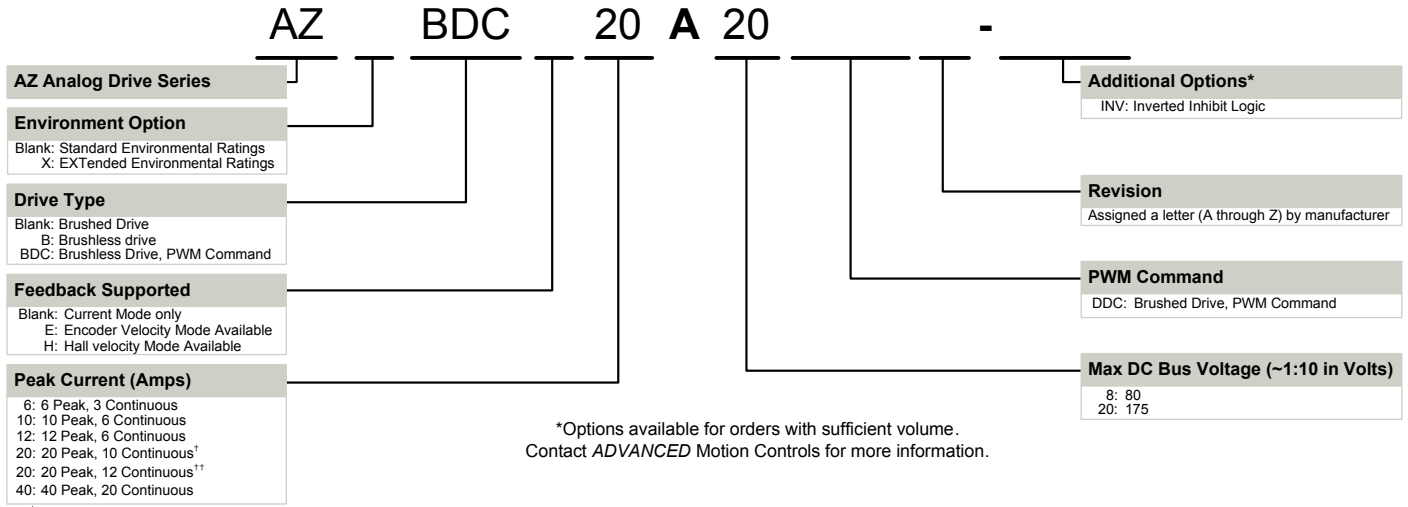
**P3 - Power Connector**

Connector Information		22-pin, 2.54 mm spaced, dual-row header
Mating Connector	Details	Samtec: SSM-111-L-DV
	Included with Drive	No

**MOUNTING DIMENSIONS**



**PART NUMBERING INFORMATION**



ADVANCED Motion Controls AZ series of servo drives are available in many configurations. All models listed in the selection tables of the website are readily available, standard product offerings.

ADVANCED Motion Controls also has the capability to promptly develop and deliver specified products for OEMs with volume requests. Our Applications and Engineering Departments will work closely with your design team through all stages of development in order to provide the best servo drive solution for your system. Equipped with on-site manufacturing for quick-turn customs capabilities, ADVANCED Motion Controls utilizes our years of engineering and manufacturing expertise to decrease your costs and time-to-market while increasing system quality and reliability.

**Examples of Modifications and Customized Products**

- ▲ Integration of Drive into Motor Housing
- ▲ Mount OEM PCB onto Drive Without Cables
- ▲ Multi-axis Configuration for Compact System
- ▲ Custom PCB and Baseplate for Optimized Footprint
- ▲ RTV/Epoxy Components for High Vibration
- ▲ OEM Specified Connectors for Instant Compatibility
- ▲ OEM Specified Silkscreen for Custom Appearance
- ▲ Increased Thermal Limits for High Temp. Operation
- ▲ Integrate OEM Circuitry onto Drive PCB
- ▲ Custom Control Loop Tuned to Motor Characteristics
- ▲ Custom I/O Interface for System Compatibility
- ▲ Preset Switches and Pots to Reduce User Setup
- ▲ Optimized Switching Frequency
- ▲ Ramped Velocity Command for Smooth Acceleration
- ▲ Remove Unused Features to Reduce OEM Cost
- ▲ Application Specific Current and Voltage Limits

Feel free to contact Applications Engineering for further information and details.

**Available Accessories**

ADVANCED Motion Controls offers a variety of accessories designed to facilitate drive integration into a servo system. Visit [www.a-m-c.com](http://www.a-m-c.com) to see which accessories will assist with your application design and implementation.

