

Description

The 12A8 PWM servo drive is designed to drive brush type DC motors at a high switching frequency. A single red/green LED indicates operating status. The drive is fully protected against over-voltage, under voltage, over-current, over-heating and short-circuits across motor, ground and power leads. Furthermore, the drive can interface with digital controllers or be used stand-alone and requires only a single unregulated DC power supply. Loop gain, current limit, input gain and offset can be adjusted using 14-turn potentiometers. The offset adjusting potentiometer can also be used as an on-board input signal for testing purposes.

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

Power Range

Peak Current	12 A
Continuous Current	6 A
Supply Voltage	20 - 80 VDC



Features

- ▲ Four Quadrant Regenerative Operation
- ▲ DIP Switch Selectable Modes
- ▲ Adjustable Current Limits
- ▲ High Switching Frequency
- ▲ Differential Input Command
- ▲ Digital Fault Output Monitor
- ▲ On-Board Test Potentiometer
- ▲ Offset Adjustment Potentiometer
- ▲ Adjustable Input Gain
- ▲ Drive Status LED
- ▲ Current Monitor Output
- ▲ Directional Inhibit Inputs for Limit Switches

MODES OF OPERATION

- Current
- Voltage
- IR Compensation
- Velocity

COMMAND SOURCE

- ±10 V Analog

FEEDBACK SUPPORTED

- Tachometer (±60 VDC)
- ±10 VDC Position

COMPLIANCES & AGENCY APPROVALS

- UL
- cUL
- CE Class A (LVD)
- CE Class A (EMC)
- RoHS

SPECIFICATIONS

Power Specifications		
Description	Units	Value
DC Supply Voltage Range	VDC	20 - 80
DC Bus Over Voltage Limit	VDC	86
Maximum Peak Output Current ¹	A	12
Maximum Continuous Output Current	A	6
Maximum Continuous Output Power	W	456
Maximum Power Dissipation at Continuous Current	W	24
Minimum Load Inductance (Line-To-Line) ²	µH	200
Low Voltage Supply Outputs	-	±5 VDC (3 mA)
Switching Frequency	kHz	36
Control Specifications		
Description	Units	Value
Command Sources	-	±10 V Analog
Feedback Supported	-	±10 VDC Position, Tachometer (±60 VDC)
Commutation Methods	-	Brush Type
Modes of Operation	-	Current, IR Compensation, Velocity, Voltage
Motors Supported	-	Single Phase (Brushed, Voice Coil, Inductive Load)
Hardware Protection	-	Over Current, Over Temperature, Over Voltage, Short Circuit (Phase-Phase & Phase-Ground)
Primary I/O Logic Level	-	5V TTL
Mechanical Specifications		
Description	Units	Value
Agency Approvals	-	CE Class A (EMC), CE Class A (LVD), cUL, RoHS, UL
Size (H x W x D)	mm (in)	129.3 x 75.8 x 25.1 (5.1 x 3 x 1)
Weight	g (oz)	280 (9.9)
Heatsink (Base) Temperature Range ³	°C (°F)	0 - 65 (32 - 149)
Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)
Form Factor	-	Panel Mount
P1 Connector	-	16-pin, 2.54 mm spaced, friction lock header
P2 Connector	-	5-port, 5.08 mm spaced, screw terminal

Notes

1. Maximum duration of peak current is ~2 seconds. Peak RMS value must not exceed continuous current rating of the drive.
2. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
3. Additional cooling and/or heatsink may be required to achieve rated performance.

PIN FUNCTIONS

P1 - Signal Connector			
Pin	Name	Description / Notes	I/O
1	+5V 3mA OUT	±5 V @ 3 mA low power supply for customer use. Short circuit protected. Reference ground common with signal ground.	O
2	SIGNAL GND		GND
3	-5V 3mA OUT		O
4	+REF IN	Differential Reference Input (±10 V Operating Range, ±15 V Maximum Input)	I
5	-REF IN		I
6	-TACH IN	Negative Tachometer Input (Maximum ±60 V). Use signal ground for positive input.	I
7	+TACH / GND	Positive Tachometer Input and Signal Ground	GND
8	CURRENT MONITOR	Current Monitor. Analog output signal proportional to the actual current output. Scaling is 2.2 A/V. Measure relative to signal ground.	O
9	CURR REF OUT	Measures the command signal to the internal current-loop. This pin has a maximum output of ±7.25 V when the drive outputs maximum peak current. Measure relative to signal ground.	O
10	CONT CURRENT LIMIT	Can be used to reduce the factory-preset maximum continuous current limit without affecting the peak current limit by attaching an external current limiting resistor between this pin and signal ground. See pin details for resistor values.	I
11	<u>INHIBIT IN</u>	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
12	<u>+INHIBIT IN</u>	Positive Direction Inhibit (Does Not Cause A Fault Condition)	I
13	<u>-INHIBIT IN</u>	Negative Direction Inhibit (Does Not Cause A Fault Condition)	I
14	FAULT OUT	TTL level (+5 V) output becomes high when power devices are disabled due to at least one of the following conditions: inhibit, output short circuit, over voltage, over temperature, power-up reset.	O
15	NC	Not Connected (Reserved)	-
16	NC	Not Connected (Reserved)	-

P2 - Power Connector			
Pin	Name	Description / Notes	I/O
1	-MOT	Negative Motor Output	O
2	+MOT	Positive Motor Output	O
3	POWER GND	Power Ground (Common With Signal Ground)	PGND
4	POWER GND		PGND
5	HIGH VOLTAGE	DC Power Input	I

Pin Details

CONT CURRENT LIMIT (P1-10)

This pin can be used to reduce the continuous current limit without affecting the peak current limit by connecting an external current limiting resistor between this pin and signal ground. See table below.

Current Limit Resistor	15 kΩ	6.6 kΩ	3.4 kΩ	2.1 kΩ	1.2 kΩ	810Ω	500 Ω	250 Ω	0 kΩ
Continuous Current Limit	90%	80%	70%	60%	50%	40%	30%	20%	10%

Note: These values are secondary to the continuous/peak ratio set by the DIP switches.

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HARDWARE SETTINGS

Switch Functions

Switch	Description	Setting	
		On	Off
1	Voltage feedback. Mode dependent (see mode selection table below).	On	Off
2	Current loop integral gain. Activates or deactivates integration. OFF by default.	Inactive	Active
3	Outer loop integration. Activates or deactivates integration. ON, by default, for current mode and OFF for other modes.	Inactive	Active
4	Test/Offset. Switches the function of the Test/Offset pot between an on-board command input for testing or a command offset adjustment. OFF by default.	Test	Offset

Mode Selection Table

	SW1	SW3
CURRENT	OFF	ON
VOLTAGE	ON	OFF
IR COMPENSATION	ON	OFF
TACHOMETER VELOCITY	OFF	OFF

Potentiometer Functions

Potentiometer	Description	Turning CW
1	Loop gain adjustment for voltage/velocity modes. Turn this pot fully CCW in current mode.	Increases gain
2	Current limit. It adjusts both continuous and peak current limit while maintaining their ratio.	Increases limit
3	Reference gain. Adjusts the ratio between input signal and output variables (voltage, current, or velocity).	Increases gain
4	Offset / Test. Used to adjust any imbalance in the input signal or in the amplifier. Can also be used as an on-board signal source for testing purposes.	Adjusts offset in negative direction

Note: Potentiometers are approximately linear and have 12 active turns with 1 inactive turn on each end.

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COMMAND SOURCE

- ±10 V Analog

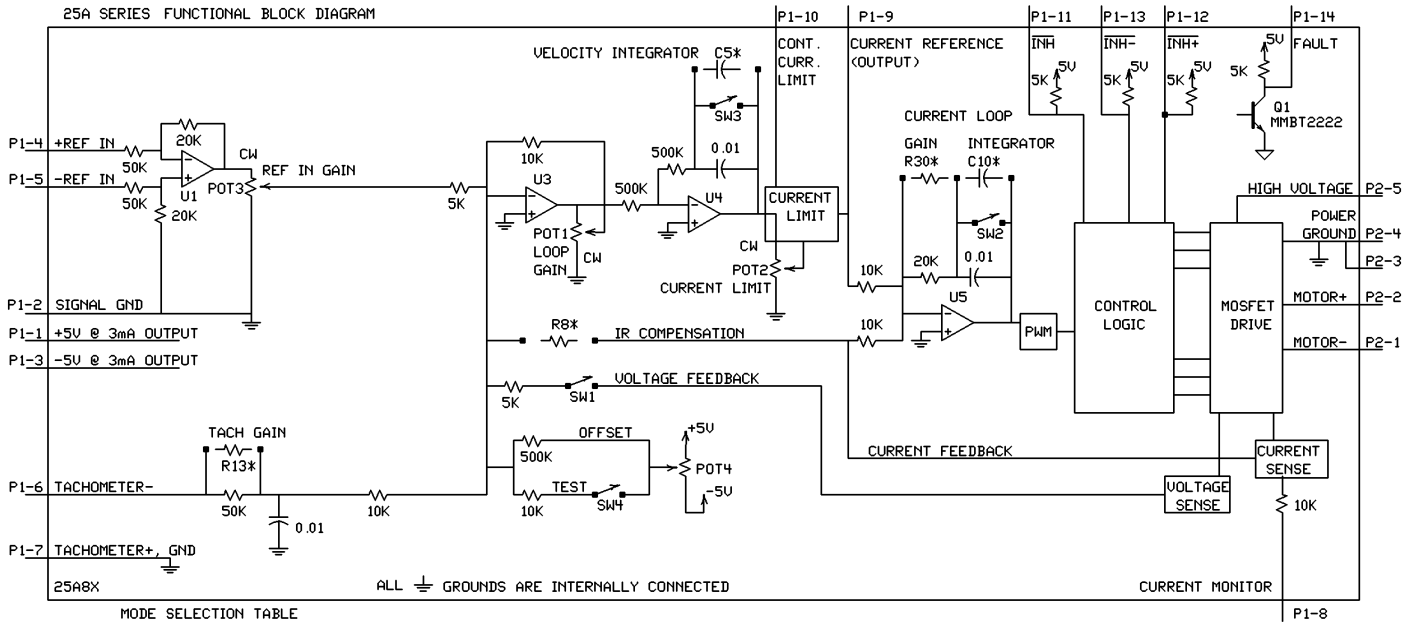
FEEDBACK SUPPORTED

- Tachometer (±60 VDC)
- ±10 VDC Position

COMPLIANCES & AGENCY APPROVALS

- UL
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BLOCK DIAGRAM



MODE SELECTION TABLE

	SW1	SW2	SW3
CURRENT MODE	OFF	OFF	ON
VOLTAGE MODE	ON	OFF	OFF
IR COMPENSATION	ON	OFF	OFF
TACHOMETER MODE	OFF	OFF	OFF

SW2 SHOULD BE OFF FOR MOST APPLICATIONS

LED GREEN - NORMAL OPERATION, LED RED - FAULT
 RECOMMENDED SETTING FOR CURRENT MODE - POT1 FULLY CCW, POT3 FULLY CW
 AMPLIFIERS ARE SHIPPED IN CURRENT MODE WITH MAXIMUM CURRENT SETTINGS
 FOR OTHER SWITCH FUNCTIONS SEE SWITCH DESCRIPTION
 * OPTIONAL USER INSTALLED THROUGH HOLE COMPONENT

Information on Approvals and Compliances

	<p>US and Canadian safety compliance with UL 508c, the industrial standard for power conversion electronics. UL registered under file number E140173. Note that machine components compliant with UL are considered UL registered as opposed to UL listed as would be the case for commercial products.</p>
	<p>Compliant with European CE for both the Class A EMC Directive 2004/108/EC on Electromagnetic Compatibility (specifically EN 61000-6-4:2007 and EN 61000-6-2:2005) and LVD requirements of directive 2006/95/EC (specifically EN 60204-1:2006), a low voltage directive to protect users from electrical shock.</p>
	<p>RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.</p>

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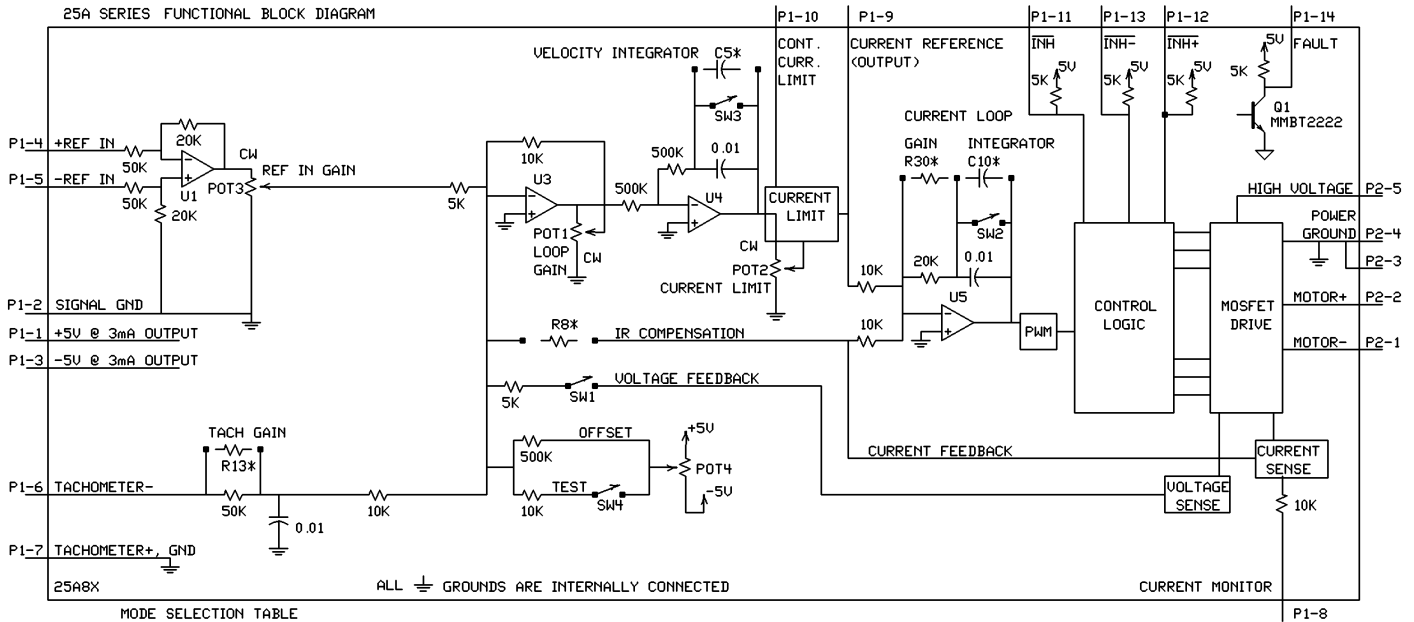
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