ECS48V20A
High-Performance Sensorless Drive for Brushless DC (EC) Motors



- Rotor position detection via back-EMF measurement
- Low-cost design (Hall sensor system completely eliminated)
- Compact dimensions: 108 mm × 55 mm × 20 mm
- Supply voltage: 20 VDC to 50 VDC, alternatively 18 VDC to 34 VDC
- Continuous current per phase: 20 A
- Maximum peak current: 50 A
- Suitable for brushless three-phase motors in delta or star (wye) configuration
- Analog speed reference input: 0–5 V (10 V) or external potentiometer
- Direction input
- Enable input
- Commutation mode selectable: overlapping commutation or 120° commutation
- Speed output signal: 3 pulses per revolution
- PWM monitor output

ECS48V20A is a sensorless three-phase motor driver for brushless DC motors (EC motors).

Rotor position is determined by evaluating the back electromotive force (back-EMF), and the corresponding phase signals for the power driver are generated accordingly.

The control electronics and power driver are integrated on a single 108 × 55 mm printed circuit board.

The compact heat sink flange allows the unit to be easily mounted to virtually any chassis while providing excellent thermal coupling. This enables efficient dissipation of power losses.

Alternatively, the ECS48V20A can be fitted with a commercially available heat sink.

The power driver is based on discrete power MOSFET technology.

Thanks to the low RDS(on) of the power MOSFETs, efficiency ranges from 85% to 97%, depending on the motor type and supply voltage. The power stage operates at a switching frequency of 16.4 kHz.

The maximum continuous current is 20 A, while the maximum peak current is 50 A per motor phase for short periods. This allows reliable startup of very low-resistance EC motors, even under load.

The supply voltage range is 20 VDC to 50 VDC, or alternatively 18 VDC to 34 VDC.

Motor speed can be adjusted either via an analog control voltage of 0 to 10 V or by means of an externally connected potentiometer.

Various control inputs, including direction, enable, and commutation mode selection, provide extensive configuration options.

In addition, a speed output signal with 3 pulses per revolution and a PWM monitor output are available.

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ECS48V20A – Technical Specifications

Operating Modes:	Sensorless commutation
Supply Voltage (single supply voltage):	20VDC bis 48VDC alternativ 18VDC bis 34VDC
Maximum Continuous Current (Current Limited):	20 A
Maximum Power:	480 W
Power Stage Switching Frequency:	16,4 kHz
Control Inputs: • Speed reference: • Direction (CW/CCW): • Enable: • Commutation mode:	 Analog input (0–5 V / 10 V) or external potentiometer High (5 V) or open = CW, Low (GND) = CCW High (5 V) or open = disabled, Low (GND) = enabled High (5 V) or open = 120° commutation, Low (GND) = overlapping commutation (depending on phase advance)
Outputs: • Speed Signal (FG): • PWM Monitor:	 3 pulses/rev, 5 V PWM output proportional to the speed reference input
Connections: • Supply Voltage and Motor Connection: • Inputs / Outputs: • Potentiometer Connection:	 6.3 mm blade terminals 9-pin screw terminal block, 2.54 mm pitch 3-pin HE-14 connector
Dimensions with heat sink flange: Optional: Dimensions with heat sink:	108 x 55 x 25 mm 108 x 77 x 33 mm
Operating Temperature Range:	0 ... +50 °C
Storage Temperature Range:	-40 ... +85 °C