Melexis
INSPIRED ENGINEERING

The hummingbird's beating wings flap at extremely high frequencies, typically around 50 times per second. This allows it to fly at speeds exceeding 15 m/s, to fly backwards or to seemingly be suspended in the air in perfect balance. What better animal to reflect the motor/control driver and actuator capacities?

MLX81346

SMART LIN PRE-DRIVER FOR DC AND BLDC MOTORS (<2000 W)

LIN MOTOR DRIVER FOR EXTERNAL NFETS <200NC CUTS COSTS IN AUTOMOTIVE MECHATRONIC APPLICATIONS

MLX81346

The MLX81346 complement the gen-3 LIN pre-driver for 12 V, 24 V and 48 V motors targeting automotive mechatronic applications up to 1000 W (12 V) or up to 2000 W (48 V). This all-in-one LIN pre-driver enables small-footprint applications to control DC and BLDC motors, and support sensored or sensorless field-oriented control (FOC) algorithms.

KEY FEATURES MLX81346

Motor driver
- 3x PreDriver for DC or BLDC motor
- Up to 200nC NFETs (12-48V supply)
  - 0.7 A_{pk} typ. charge current
  - 1.5 A_{pk} typ. discharge current
- Charge-pump for top-NFETs
- V_{DS} protection for all NFETs

Microcontroller
- MLX16-FX, application CPU
- MLX4, communication CPU
- Programmable digital watch-dog
- Interrupt controller
- Common purpose timer

Memories split per CPU
- MLX16-FX memories:
  - MLX81346: 64 KB Flash with ECC
  - 20 KB ROM
  - 4 KB RAM
  - 576 B EEPROM
- MLX4 memories:
  - 6 KB ROM
  - 512 KB RAM

Fast end-of-line programming via LIN pin (64 KB Flash in < 4sec)

Pin-compatible family in QFN32
- MLX81340: 58KB Flash+ROM
- MLX81344: 90KB Flash+ROM
- MLX81346: 90KB Flash+ROM

Periphery
- Configurable RC-clock 12..32MHz
- 12x general purpose IO's, digital, analog, 3x high-voltage IO's, 2x UART,SPI, I²C-slave
- 2x high-side supply <50mA
- 5x 16-bit motor PWM timers
- 2x 16-bit timers
- 12-bit ADC with < 1.2µs conversion time with 64 channels
- Differential current sense amplifier with 8-bit programmable overcurrent
- Temperature sensor, over-temperature detection
- Over-current detection, over-voltage and under-voltage protection

Voltage regulators
- IC operating motor voltage VSM = 5.5V to 60V
- Operating voltage VS = 5.5V to 32V*
- Internal voltage regulators, directly powered from VS supply
- Operation down to 3.5V with reduced analog characteristics, down to 3.0V without losing register content, down to 1.6V with intact RAM memory
- Low standby current consumption of typ 25µA in sleep mode
- Wake-up possible via LIN, external pins or internal wake-up timer

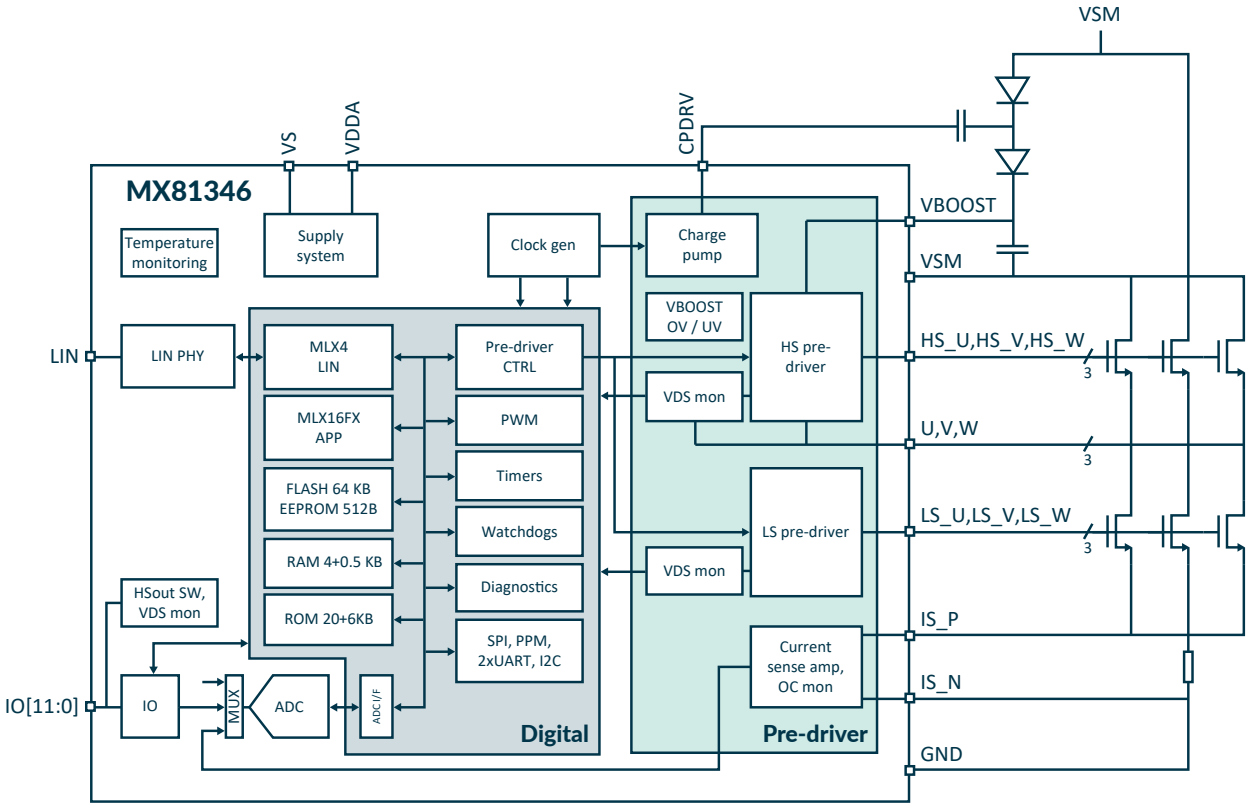
Bus interface
- LIN 2.x/SAE J2602 and ISO17987-4 compliant LIN slave

Automotive AEC-Q100 qualified

Designed for safety applications according to ASIL-B (ISO 26262)

Maximum IC temperature (with validated mission profile) Tj = 175°C

BLOCK DIAGRAM



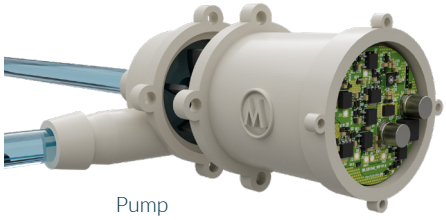
MLX81346 IC Block diagram with external power bridge (BLDC)

APPLICATION WITH DC AND BLDC MOTORS (<2000 W)

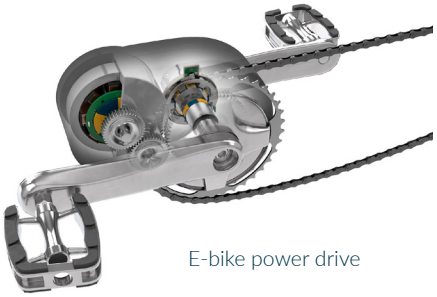
The MLX81346 pre-driver is well suited for

- 12V-48V DC/BLDC Engine Cooling Fans, Pumps, Compressors
- 12V-48V DC/BLDC Positioning Actuators, including Robotics
- 36V-48V BLDC e-bikes, e-scooters

Engine cooling fan



Pump



E-bike power drive