Melexis
INSPIRED ENGINEERING

MLX81160

SMART LIN PRE-DRIVER FOR DC MOTORS WITH RELAY (200 W)
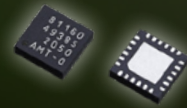
SMALLEST ALL-IN-ONE LIN PRE-DRIVER PROPELS AUTOMOTIVE RELAY WINDOW LIFTERS

MLX81160

The MLX81160 is a LIN pre-driver IC for relay DC motors offering a combination of high power, compactness and attractive pricing. It complements the gen-3 family of compatible embedded motor drivers. With its 48 KB of memory (16 KB ROM for the included LIN protocol and 32 KB Flash for the application software) in a compact QFN24 package (4 mm x 4 mm) it is suitable for applications like window regulators.

KEY FEATURES MLX81160

✓ **Motor driver**
  - 6x Driver for external relays, or 6x Pre-Driver for external PN-FET half-bridges up to 30nC with 6x PWM

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

✓ **Memories split per CPU**
  - MLX16-FX memories:
    - 32 KB Flash with ECC
    - 10 KB ROM
    - 2 KB RAM
    - 512 B EEPROM
  - MLX4 memories:
    - 6 KB ROM
    - 512 KB RAM

✓ **Fast end-of-line programming via LIN pin** (32 KB Flash in < 2.5sec)

✓ **Pin-compatible family in QFN32**
  - MLX81160: 48 KB PN-FET driver
  - MLX81344: 90 KB NN-FET driver

✓ **Periphery**
  - Configurable RC-clock 12..32MHz
  - 12x general purpose IO's, up to 9x high-voltage analog inputs, 2x UART, SPI, I²C-slave
  - 6x 16-bit motor PWM timers
  - 2x 16-bit timers
  - 12-bit ADC with < 1.2µs conversion time with 32 channels
  - 2x 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**
  - Internal voltage regulators, directly powered from 12V battery supply
  - IC operating motor voltage VSM = 5.5V to 32V
  - Operating voltage VS = 5.5V to 32V*
  - 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**
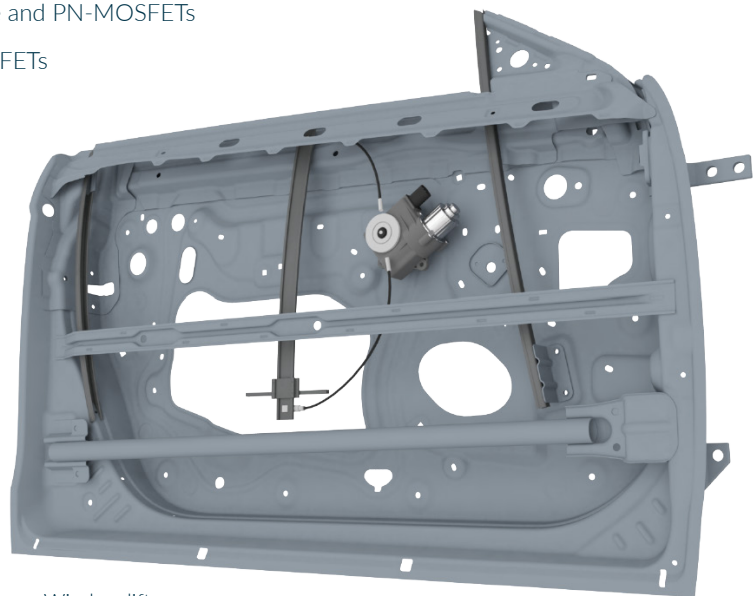
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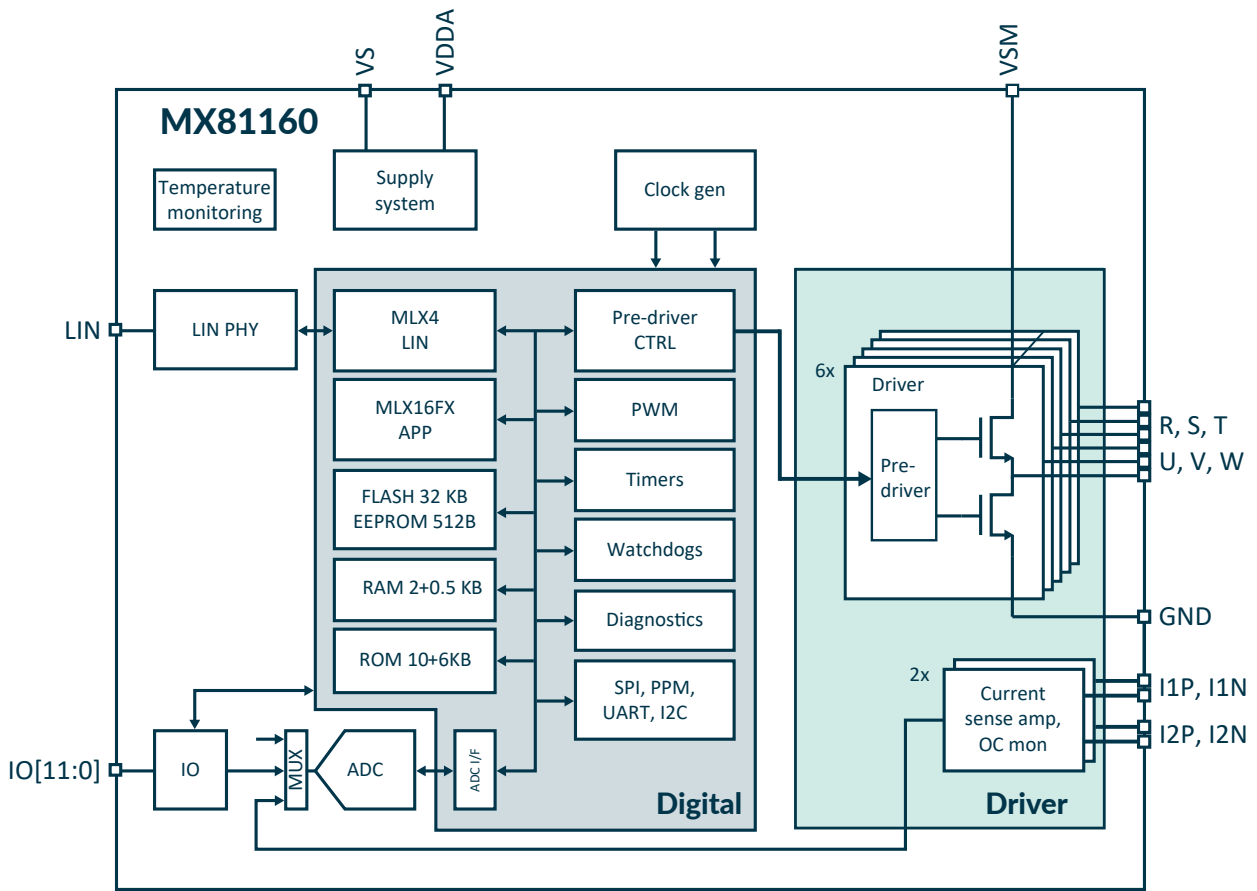
BLOCK DIAGRAM

MLX81160 IC Block diagram

APPLICATION WITH RELAY DC MOTORS (<200 W)

The MLX81160 pre-driver is well suited for

- ⊘ DC Window Lift, Sunroof with Relays or PN-MOSFETs
- ⊘ DC/BLDC pump or fan with PWM-drive and PN-MOSFETs
- ⊘ Multiple small DC motors with PN-MOSFETs

DC motor

Window lift