TI Motor Drivers

Smarter, safer, smaller brushed-DC and stepper motor driver solutions
Motor drive solutions to keep the world spinning

Design intelligent and efficient motor systems with accurate, small-size motor drivers
Motor Drive Applications

<table>
<thead>
<tr>
<th>Auto Body Motors</th>
<th>Smart Locks</th>
<th>IP Network Camera</th>
<th>Printers</th>
<th>Textiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMs</td>
<td>EPOS Printers</td>
<td>Powertrain</td>
<td>Headlight</td>
<td>Smart Sanitation</td>
</tr>
<tr>
<td>Hospital Beds</td>
<td>Appliances</td>
<td>Window Blinds</td>
<td>Coffee Machines</td>
<td>Smart Meters</td>
</tr>
<tr>
<td>Power Seats</td>
<td>Vacuum Robot</td>
<td>On-board Charger</td>
<td>Toys</td>
<td>Head Up Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Solenoid and relay motor drivers

MAX OPERATING VOLTAGE

<12V

<20V

<35V

<40V

CURRENT RATING (Peak Current)

<1.0A

<1.5A

<2.5A

3.0A

4.0A-6.0A

>8.0A

Gate Drivers

DRV8843

DRV8837

DRV8837C

DRV8426P

DRV8428P

DRV8424P

DRV842873

DRV8874

DRV8881P

DRV8256

DRV8873

DRV8701

DRV870x2/3

SINGLE CHANNEL

DUAL CHANNEL

INTEGRATED CURRENT SENSING

SMART GATE DRIVER

PC

Texas Instruments
Stepper motor drivers

MAX OPERATING VOLTAGE

CURRENT RATING (FS)

<1A

1.5 A

2.0 A

2.5 A

3.5 A

>4.0 A

SMART GATE DRIVER

PWM MODE

INTEGRATED CURRENT SENSING

SMART TUNE

TORQUE DAC

STALL DETECT

DRV8428

DRV8436

DRV8426

DRV8821/3

DRV8846

DRV8847

DRV8834

DRV8432

DRV8844

 DRV8711/04

Texas Instruments
Solenoid and relay motor drivers

MAX OPERATING VOLTAGE

- 60V
- >40V
- <35V
- <20V
- <12V

CURRENT RATING (PEAK)

- <1A
- 1.5 A
- 2.0 A
- 2.5 A
- 3.5 A
- >4.0 A

SMART GATE DRIVER

- DRV8803 04
- DRV8955
- DRV8874
- DRV8711 04
- DRV8432 12

INTEGRATED CURRENT SENSING

- 2-CHANNEL
- 4-CHANNEL
- 8-CHANNEL
- 16-CHANNEL

Low side output

High side output
Stepper Motor Drivers – DRV84xx
Industry’s smallest P2P Family of stepper motor drivers with best in class motion control

Integrated Current sensing
Eliminates all current sense resistors while providing accurate current regulation (Maximum integration)

Benefits
✓ BOM reduction: Removed sense resistors and reduced board size
✓ Power management: No power loss over the sense resistor
✓ Easy design: Hassle-free layout with no sense routing

Smart Tune
Tune Stepper motors effortlessly & automatically (TI Patented)

Benefits
✓ Seamless, quiet tuning: Motor runs quietly without losing regulation
✓ Power management: Motor runs more efficiently than fixed decay modes
✓ Shorter design cycle: No need to spend months tweaking decay modes of motors
✓ Reliability: auto adjustment to motor parameters over lifetime
✓ Thermal management: makes system 5-12 degrees cooler than traditional decay modes
✓ Ripple control: automatically adjusts and controls the ripple current level resulting in higher average torque at each step

High Microstepping & more
1/256 Microstepping (Industry highest) with (Industry best) accuracy of current sense, wide input voltage, low Rdson and protection features

Benefits
✓ Fine microstepping: 1/256 microstepping for more accurate and controlled motion
✓ Current Sense Accuracy to ± <5%
✓ 5 level protection: UVLO, CPUV, OCP, OL, OTSD
✓ P2P scalability in QFN reducing size:
  ✓ Smallest 16 Pin TSOT 3x3mm Package (1.5Ω)
  ✓ P2P 4x4mm QFN package with range of Rdson options (0.33Ω – 0.9Ω)
✓ Flexibility:
  ▪ Wide operating voltage range (4.2V - 48V)
  ▪ Simple STEP/DIR, PH/EN and PWM interface

More info

1206 or smaller
0402 or smaller
400Ω or smaller

3.0x3.0mm, 16-pin QFN package
## Mid voltage stepper integrated MOSFET drivers

### Selection guide

<table>
<thead>
<tr>
<th>Device Feature</th>
<th>NEW FAMILY</th>
<th>PREVIOUS GEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DRV8428</td>
<td>DRV8437</td>
</tr>
<tr>
<td>Supply Voltage (V) (abs. max)</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>Output FS Current (A)</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>RDSon (HS+LS) Ω</td>
<td>1.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Microstepping</td>
<td>1/256</td>
<td>1/256</td>
</tr>
<tr>
<td>Interface Control</td>
<td>STEP/DIR</td>
<td>STEP/DIR</td>
</tr>
<tr>
<td>Stall</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Integrated current sensing</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Smart Tune</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Package options</td>
<td>HTSSOP (16pin)</td>
<td>HTSSOP (16pin)</td>
</tr>
<tr>
<td>Package sizes</td>
<td>HTSSOP (5x4.4mm)</td>
<td>HTSSOP (7.7x4.4mm)</td>
</tr>
</tbody>
</table>

**Texas Instruments**
DRV84xx (Stepper family with advanced features)

**Features**

- Dual H bridge stepper motor driver
  - Supply voltage: DRV842x: 4.5 to 33 V (abs max 35 V)  
    DRV843x: 4.5 to 48 V (abs max 50 V)
  - Current: RMS: 0.7-2.45A, FS: 1.0-3.5A, Peak: 1.7-7A
  - RDS(ON): 175 mΩ - 1200 mΩ HS + LS (at 24 V, 25°C)
- Integrated current sensing eliminates 2 current sense resistors!
- ±5% Full-scale Current Accuracy, ±5% ch-to-ch current matching
- Smart tune Adaptive decay technology
  - Interface Options: STEP/DIR Indexer up to 1/256 microstepping or Parallel interface (PH/EN, PWM)
- Fully Protected: Supply and charge pump undervoltage, overcurrent protection with latched or retry response, open-load detection, thermal shutdown

**Benefits**

- Wide supply range supports industry standard supplies and high output current delivers maximum performance
- Integrated current sense reduces system cost, improves efficiency and makes PCB layout easy
- Small package and simple pinout also results in simple PCB layout
- Accurate and smooth operation without support from the system controller: smoother, quieter micro-stepping motion profiles; flexible configuration options
- Advanced on-chip protection reduces design complexity and enables higher system reliability 4.5 to 35 / 50 V

**Applications**

- Multi-Function Printers
- Laser-Beam Printers
- Scanners
- Stage Lighting
- ATMs & Currency Counters
- EPOS Printers
- Textile Machines
- Air Purifiers & Humidifiers
- IP Network Camera

**Specifications**

- 7.8 x 6.4mm, 24-pin HTSSOP package
- 4.0x4.0mm, 24-pin QFN package

---

**Texas Instruments**
DRV8434A/35A: Stepper driver with integrated current sense, 1/256 microstepping, smart tune and stall detection

### Features

- **Stepper driver**
  - Supply voltage: 4.5 to 48 V (abs max 50 V)
  - Current: DRV8434A: RMS: 1.8A, FS: 2.5A, Peak: 4A
    - DRV8435A RMS: 1.4A, FS: 2A, Peak: 3.2A
  - RDS(ON): DRV8434A: 330m Ω HS + LS (at 24 V, 25°C)
    - DRV8435A: 550m Ω HS + LS (at 24 V, 25°C)

- **Integrated current sensing** eliminates 2 current sense resistors!
- ±5% Full-scale Current Accuracy, ±2.5% ch-to-ch current matching
- **Smart tune Adaptive decay technology**
- **STEP/DIR** interface up to 1/256 microstepping
- SPI Interface (S version) for added adjustability
- **Integrated sensor-less stall detection**
- **Fully Protected**: Supply undervoltage, charge pump undervoltage, overcurrent protection, thermal shutdown, Open load detection, nFAULT pin

### Benefits

- Integrated current sense reduces system cost, improves efficiency and makes PCB layout easy
- Simple pinout results in small PCB layout
- Smart tune Decay, up to 1/256 microstepping – smooth and quiet motion profile
- Flexible configuration options
- **Sensor-less stall detection** detects overload or end of travel without requiring position sensors
- Advanced on-chip protection reduces design complexity and enables higher system reliability

### Applications

- Multi-Function Printers
- 3D Printers
- Textile machines
- ATMs
- Electronic Expansion Valve

### Diagram

9.7 x 4.4mm, 28-pin, HTSSOP package

**Texas Instruments**
**Features**

- H bridge motor driver
  - Supply voltage: **4.5 to 38 V (abs max 40 V)**
  - Peak Current: **10 A**
  - RDS(ON): **150 mΩ HS + LS** (at 13.5 V, 25°C)
- Current mirror for output current sensing (no sense resistor required)
- **Devices in the Family:**
  - DRV8873H: Hardware Interface
  - DRV8873S: SPI Interface
- Output slew rate control for EMI tuning
- PH/EN, PWM, or independent PWM control modes available
- **Fully Protected:** over-current, thermal, shoot-through, UVLO protection, charge pump faults, open load detection, and overvoltage protection

**Benefits**

- Wide supply range supports industry standard supplies and high output current delivers maximum performance
- Simplified board design and reduced system cost
- Current mirror allows the host micro-controller to monitor the load current. This mirror approximates the current through the high-side FETs, and does not require a sense resistor
- Advanced on-chip protection reduces design complexity and enables higher system reliability

**Applications**

- ePOS & Currency Counting
- ATM Machine
- Multi-Function Printers
- Factory Automation and Robotics
- Major & Small Home Appliance

---

**DRV8873** (40V Brushed-dc driver with integrated current sense)

**Controller**

- PWM
- H/W or SPI
- Fault
- Current Sense

**brushed-DC Motor Driver**

- Supply voltage: **4.5 to 38 V**
- Package: 7.8 x 6.4mm, 24-pin HTSSOP

**Texas Instruments**
DRV8873 (40V Brushed-dc driver with integrated current sense)

- **DRV8873H**
  - Hardware Interface

- **DRV8873S**
  - SPI Interface
**DRV887x** (40V Brushed-DC driver with integrated current sense)  

**Features**

- **H bridge motor driver**
  - Supply voltage: **5 to 37 V (abs max 40 V)**
  - Peak Current: **3-6 A**
  - RDS(ON): **200-1000 mΩ HS + LS** (at 24 V, 25°C)
- **Integrated Current Sensing** for current regulation
- Current mirror for output current sensing (no sense resistor required)
- **Devices in the Family:**
  - DRV8874: 200 mΩ HS+LS, 6.0 A peak (HTSSOP)
  - DRV8876: 700 mΩ HS+LS, 3.5 A peak (HTSSOP&QFN)
- PH/EN, PWM, or independent PWM control modes available
- **Fully Protected:** over-current, thermal, shoot-through, UVLO protection, charge pump faults, and overvoltage protection

**Benefits**

- Wide supply range supports industry standard supplies and high output current delivers maximum performance
- Simplified board design and reduced system cost
- Current mirror allows the host micro-controller to monitor the load current. This mirror approximates the current through the high-side FETs, and does not require a sense resistor
- Advanced on-chip protection reduces design complexity and enables higher system reliability

**Applications**

- Mixers, Blenders, & Processors
- Coffee Machines
- Vacuum Robot
- Home Service Robot
- Multifunction Printers
- Laser Beam Printers
- ATM & Currency Counter
- Smart Meter
- Motorized Window Blinds

---

**Texas Instruments**

---
DRV887x (40V Brushed-DC driver with integrated current sense)

**DRV8874**
- 200mΩ HS+LS, 6.0 A peak
- HTSSOP Package

**DRV8876**
- 700mΩ HS+LS, 3.5 A peak
- HTSSOP & QFN Package
New Product Updates for Industrial Applications

Join our webinar series, as we explore different industry trends and technologies across our diverse product portfolio.

Welcome to our New Product Update webinar series! Join in every Thursday as we explore different industry trends and technologies across our diverse product portfolio. Our experts cover the latest analog and embedded processing topics for industrial applications.

Thursdays, 9:00 AM Central US Time

Click to join Webex meeting

How to join:

- Meeting number: 356 235 123
- When joining the Webex, please click Audio- Call Using Computer- Connect Audio.
- NOTE: Webex Audio is used for this webinar series
## Upcoming New Product Updates

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/11/2020</td>
<td>Boost Converters &amp; Controllers</td>
</tr>
<tr>
<td>6/18/2020</td>
<td>High Power Drivers</td>
</tr>
<tr>
<td>6/25/2020</td>
<td>Clock &amp; Timing Solutions</td>
</tr>
<tr>
<td>7/2/2020</td>
<td>Power Interface- USB</td>
</tr>
<tr>
<td>7/9/2020</td>
<td>Switching Regulators- Wide Vin &lt;100V</td>
</tr>
</tbody>
</table>