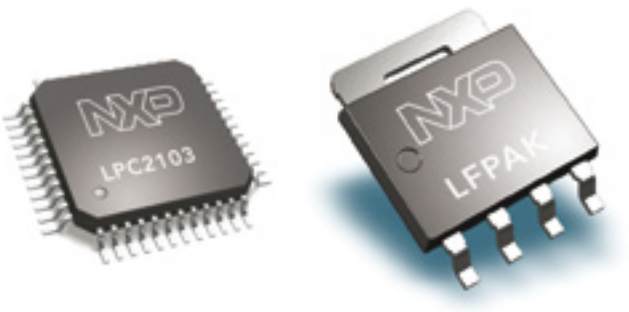



# LFPAK power MOSFETs and LPC microcontrollers

# Combined power and control

With LFPAK you have a high efficiency and high reliability power package in an SO8 footprint that delivers thermal and electrical performance comparable with a DPAK. Combined with our LPC microcontroller portfolio, they form the ideal system solution for all your motor control applications.

### Key LFPAK features

- Only enhanced SO8 package that meets AEC Q101 requirements
- Exceeds IPC thermal fatigue requirements
- RoHS compliant
- Low $R_{DS(on)}$ and low inductance

### Key LFPAK benefits

- Improves power density or reduces PCB space needed in low power motor controllers
- Reduced package inductance simplifies driver circuit design in high power motor control circuits
- Very low $R_{DS(on)}$ reduces unnecessary power losses and heat dissipation
- Can replace $D^2PAK$ devices when suitable bottom side cooling is available

### Key LPC features

- Integrated Flash memory
- Clock rate up to 60 MHz
- On board A/D converters, PWM controllers and serial interface

### Key LPC benefits

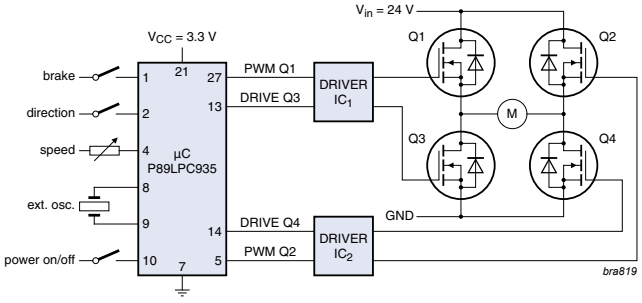
- Integrated Flash memory allows in-line programming and simplifies software changes or upgrades
- On-chip PWM controller reduces software requirements for switching MOSFETs

When designing motor control systems for many of today's applications you need to find the right combination of power and control. With an expanding range of MOSFETs in the highly power- and space-efficient LFPAK and a complete portfolio of Low Pin Count (LPC) microcontrollers with enhanced functionality, NXP helps simplify your choice.

The LFPAK's small footprint allows you to create smaller motor control modules with very high current densities. This in turn lets you increase the current handling capability of small modules in applications, such as servo controllers or reduce the footprint size of large power modules. In heavy industrial applications such as forklift trucks for example, LFPAK solutions can replace much larger D2PAK or TO220 MOSFETs, significantly reducing PCB space. By placing devices closer together you can reduce track lengths between devices, minimizing problems due to track inductances.

NXP founded by Philips

Completing our motor control system solution, LPC microcontrollers offer an abundance of integrated functionality and features. Within our extensive portfolio you will find the 8-bit LPC900 family with clock speeds up to 18 MHz and the 16/32-bit LPC2000 family of ARM controllers with clock speeds as high as 60 MHz.
That means you can quickly and easily find devices suitable for any system, from the simplest to the most complex motor control application.




## LFPAK overview

| Packages | $V_{DS}$ | $R_{DS(on)}$max (mΩ) @ | | $t_{rr}$ | $Q_{rr}$ | $Q_{GD}$ | $Q_{g\ (tot)}$ |
|---|---|---|---|---|---|---|---|
| LFPAK | (V) | $V_{GS}$=10V | $V_{GS}$=4.5V | (ns) | (nC) | (nC) | (nC) |
| *PH6325L* | 25 | 6.3 | 9.5 | 33 | 13 | 3.3 | 13.3 |
| *PH4830L* | 30 | 4.8 | 6.9 | | | 4.1 | 20.3 |
| PH5330E | 30 | 5.7 | 8.5 | 53 | 15 | 6 | 21 |
| PH4530L | 30 | 5.7 | 7.2 | 38 | - | 6.5 | 21 |
| *PH8030L* | 30 | 5.9 | 9.7 | 32 | 8.5 | 3.1 | 11 |
| PH7030L | 30 | 7.9 | 11 | 11 | - | 3.2 | 12 |
| PH8230E | 30 | 8.2 | 13.2 | 38 | - | 5 | 14 |
| *PH9930L* | 30 | 9.9 | 14.4 | | | 2.4 | 9.6 |
| PH16030L | 30 | 16.9 | 23.5 | 34 | 12 | 2.9 | 6.7 |
| PH4840S | 40 | 4.1 | 4.8 | 46 | | 16 | 67 |
| PH955L | 55 | 8.3 | 9.9 | 62 | 48 | 16.4 | 42 |
| PH1955L | 55 | 17.3 | 21 | 52 | 38 | 8 | 18 |
| PH3855L | 55 | 36 | 45 | 45 | 25 | 5.5 | 11.7 |
| PH1875L | 75 | 16.5 | 20 | 107 | 124 | 15.3 | 33.4 |
| PH3075L | 75 | 28 | 34 | 100 | 115 | 9 | 19 |
| PH20100S | 100 | 23 | - | 110 | - | 8.9 | 39 |

Note: New products are highlighted in red
Products in development are highlighted in Italic, red underlined

## LPC213x Family of ARM 16/32-bit μController

| Type | On Chip Memory | | | PWM | I/O | Serial Interfaces | | | A/D | Fmax | Package | Special features |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flash | RAM (kB) | EE | b/ch | Pins | UARTS | I²C | SPI | ch/bit | (MHz) | | |
| LPC2131 | 32K | 8 | - | 6 | 47 | 2 | 2 | 2 | 8/10bit | 60 | LQFP64 | |
| LPC2132 | 64K | 16 | - | 6 | 47 | 2 | 2 | 2 | 8/10bit | 60 | LQFP64 | DAC 1ch, 10bit |
| LPC2134 | 128K | 16 | - | 6 | 47 | 2 | 2 | 2 | 2*8/10bit | 60 | LQFP64 | DAC 1ch, 10bit |
| LPC2136 | 256K | 32 | - | 6 | 47 | 2 | 2 | 2 | 2*8/10bit | 60 | LQFP64 | DAC 1ch, 10bit |
| LPC2138 | 512K | 32 | - | 6 | 47 | 2 | 2 | 2 | 2*8/10bit | 60 | LQFP64 | DAC 1ch, 10bit |
| LPC2119/29 | 128K/256K | 16 | - | 6 | 46 | 2 | 1 | 2 | 8/10bit | 60 | LQFP64 | 2 CAN |
| LPC2290/92 | 128K/256K | 16 | - | 6 | 112 | 2 | 1 | 2 | 8/10bit | 60 | LQFP144 | 2 CAN, External Bus Interface |
| LPC2294 | 128K/256K | 16 | - | 6 | 112 | 2 | 1 | 2 | 8/10bit | 60 | LQFP144 | 4 CAN, External Bus Interface |
| LPC2101/2/3 | 8/16/32K | 2/4/8K | - | 6 timers | 32 | 2 | 2 | 2 | 8/10bit | 70 | LQFP48 | PWM features through output match of all timers |

## LPC9xx Family of Low Pin Count μControllers (Vdd: 2.4V-3.6V)

| Type | On Chip Memory | | | PWM | I/O | Serial Interfaces | | | A/D | Fmax | Package | Special features |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Flash | RAM (kB) | EE | b/ch | Pins | UARTS | I²C | SPI | ch/bit | (MHz) | | |
| P89LPC938 | 8K | 768B | 512B | 4 | 26 | Y | Y | Y | 8/10bit | 18 | TSSOP28, HVQFN28, PLCC28 | |
| P89LPC936 | 16K | 768B | 512B | 4 | 26 | Y | Y | Y | 2*4/8bit | 18 | TSSOP28, HVQFN28, PLCC28 | DAC 2ch, 8bit |
| P98LPC935 | 8K | 768B | 512B | 4 | 26 | Y | Y | Y | 2*4/8bit | 18 | TSSOP28, HVQFN28, PLCC28 | DAC 2ch, 8bit |
| P89LPC932A1 | 8K | 768B | 512B | 4 | 26 | Y | Y | Y | - | 18 | TSSOP28, HVQFN28, PLCC28 | |
| P89LPC9408 | 8K | 768B | 512B | 4 | 23 | Y | Y | Y | 8/10bit | 18 | LQFP64 | 32 segment LCD Driver |

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PHILIPS



Date of release: November 2006
Document order number: 9397 750 15818
Printed in the Netherlands