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analog solutions

PT2000 Programmable Gate Driver ICs

NXP's bank programmable gate driver ICs for precision solenoid control applications consist of high- and low-side pre-drivers for external MOSFETs. The flexible MOSFETs gate drive solution has versatile control and optimized latency time allowing for customizable peak and hold-current profiles.

TARGET APPLICATIONS

- ▶ Gasoline and diesel direct injection
- ▶ Transmissions valve driver
- ▶ Industrial and medical
- ▶ Solenoid and valve actuation

OVERVIEW

NXP's programmable gate driver for solenoid control integrates microcores, external MOSFET high-side pre-drivers, and external MOSFET low-side pre-drivers. One/two low-side drivers can be used as DC/DC converters.

Gate drive parameters, diagnosis and protection are managed through independent microcores with shared banks of code RAM and data RAM banks.

PT2000 and MC33816 also include diagnostics, automatic DC/DC control, current measurement and end of injection detection (only PT2000).

FEATURES AND BENEFITS

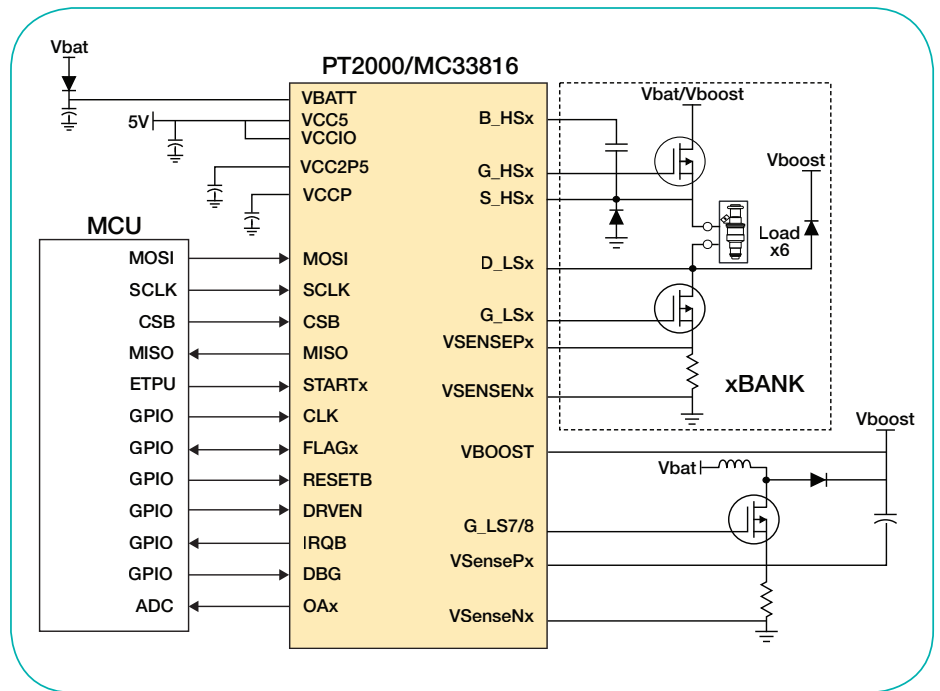
- ▶ Flexible current profile management through programmable microcores; allows concurrent and independent fine-grain control of solenoid parameters such as two cylinders per bank with inter-bank overlapping for 6-cylinder ICE
- ▶ Programmable VBOOST control optimizes performance versus power dissipation, per application requirements
- ▶ Dedicated DRVEN pin for safety helps to certify the system at ISO26262
- ▶ Outputs configurable into 3-bank operation with full overlap (ONLY PT2000) is mandatory for new 3-cylinder engine with turbo charging
- ▶ Programmable integrated diagnostics: overvoltage and undervoltage, open load, max current, overtemperature means faster fault detect response times, reduced computational load on MCU, and fewer external components



FEATURES AND BENEFITS CONTINUED

- ▶ Embedded encryption for microcode sent between MCU and driver results in increased security to protect customers against system hacking or IP theft
- ▶ SPI control with IRQB plus four interrupt flags enables fast hardware interrupt with efficient diagnosis reporting
- ▶ Integrated programmable end-of-injection (EOI) function (ONLY PT2000) gives precise injector control, even for multiple injections per cycle, so injector times remain accurate, even as injector ages over time
 - Measurement parameters can be adjusted to match injectors from different manufacturers

MC33816 VS PT2000 COMPARISON TABLE



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MC33816 VS PT2000 COMPARISON TABLE

	MC33816	MC33PT2000
Typical application	4, 6 cyl.	3, 4 & 6 cyl.
Number of bank	2	3
Number of high-side pre-drivers	5	7
Number of low-side pre-drivers	7	8
Number of current sense channels	4	6
Number of programmable cores	4	6
Voltage monitoring	V _{BOOST}	V _{BOOST} & V _{BAT}
DC-DC boost modes	PWM, hysteretic	PWM, Hyst., resonant
Microcore programming language	Assembler	Assembler
Code encryption (IP protection)	Yes	Yes
I/O short protection	18 V	36 V
Dedicated safety pin / ISO26262	No	Yes
End of actuation detection	No	Yes
Package	LQFP-64	LQFP-80
Development Tools		
Hardware enablement	EVB 4 cylinder + DCDC + FP	EVB 3 cylinders + DCDC + FP EVB 6 cylinders + DCDC + FP
Software enablement	Development Studio (IDE) SPIGEN PSC simulator Tracer	Development Studio (IDE) SPIGEN PSC simulator Tracer