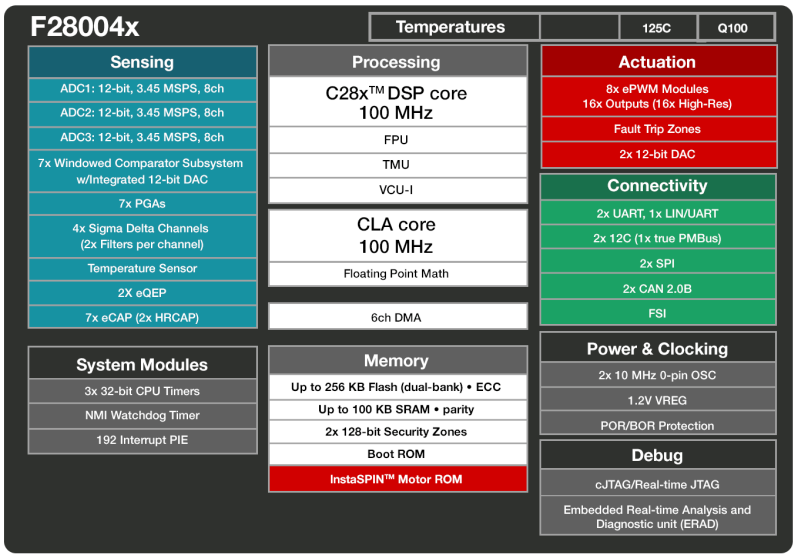
Texas Instruments C2000™ Piccolo™ F28004x Real-Time Controller Series

Optimized for power-control applications

- **Streamlined performance and power**
  - 100 MHz / 256 KB Flash / 100 KB SRAM
  - Floating-point and trigonometric math unit
  - Next-generation CLA; support for continuous background task
  - 60% lower power consumption vs. F2806x + DC-DC option
- **Advanced actuation and design flexibility**
  - 4th generation ePWM enables implementation of the most advanced switching techniques for increased efficiency and power density
  - Enhanced crossbars provide flexibility in combining inputs, outputs and internal resources for most advanced control and protection mechanisms
- **Integrated analog and protection**
  - 3 12-bit 3.45-MSPS ADC with post processing and threshold actions
  - 7 on-chip PGA (3/6/12/24) with post gain filtering and bypass option
  - 7 windowed comparators + 2 12-bit output DACs
  - 4 sigma-delta demodulation channels

With streamlined performance, the new C2000 F28004x MCU family is optimized for power control in cost-sensitive applications for electric vehicles, motor control inverters and industrial power supplies.



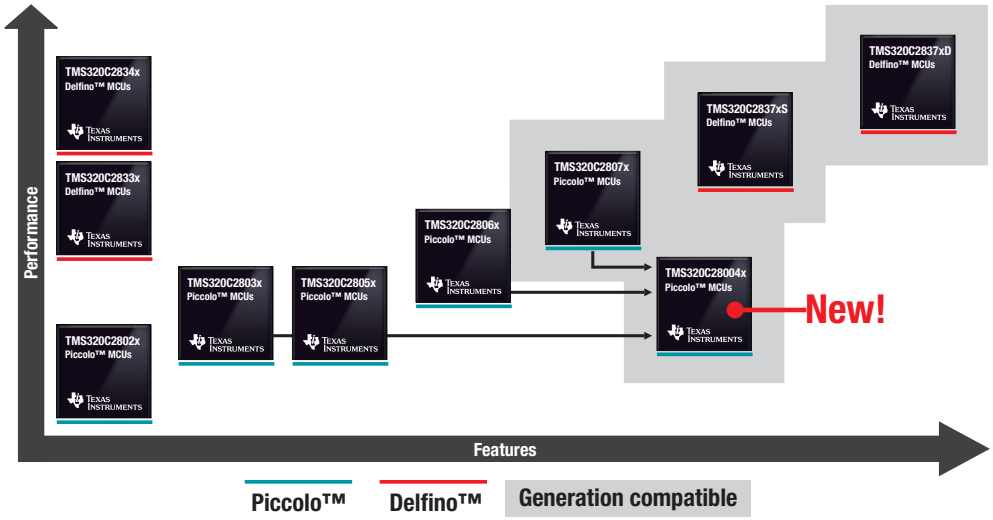
www.ti.com/F28004x

Markets	EV/HEV and Industrial Power	Motor Drive
Applications	On-board charging, DC/DC, charging pile, UPS, solar, servers, rectifiers, converters	Servo, robotics, CNC, AC drives, elevators, textile, compressors, pumps
Features	• Unique PWM capabilities for exotic switching topologies • Extensive analog integration • CLA for high speed parallel control loops • PMBus peripheral support • AEC Q100 qualification • Functional safety support planned • DigitalPower Software Development Kit with powerSUITE support along with multiple TI Designs available now	• Floating-point and trigonometric math units for high-performance processing • Three analog-to-digital converters with up to seven programmable gain amplifiers • Four sigma-delta demodulation channels • New fast serial interface for high-speed serial communications across isolation boundary • MotorControl Software Development Kit with InstaSPIN-FOC™ and DesignDRIVE support planned
Get started	• Introduction video • Introduction whitepaper • Comparison whitepaper • Data sheet • Technical reference manual • EVM • C2000Ware software	

Piccolo F28004x MCU	Flash	CLA	Extras
F280049C	256 KB	Yes	InstaSPIN-FOC motor control solutions and the configurable logic block (CLB)
F280049	256 KB	Yes	–
F280045	256 KB	No	–
F280041C	128 KB	No	InstaSPIN-FOC motor control solutions and the CLB
F280041	128 KB	No	–

C2000 Portfolio

The C2000 Piccolo F28004x MCU series builds on the generational improvements introduced in the Delfino™ F2837x and Piccolo F2807x series. These new real-time control solutions offer code compatibility with existing Piccolo MCUs, allowing customers to take advantage of the family's unique combination of premium performance in an affordable offering.



Comparison of Piccolo F2803x to F28004x series

	F28035	F280049
Total MIPS	120	200
CPU	60	100
FPU	No	Yes
TMU	No	Yes
VCU	No	Yes
DMA	No	Yes
CLA	Type-1	Type-2
Flash (KB)	128	256
RAM (KB)	20	100
ADC	1× 12-bit	3× 12 bit
Sample & Hold	2	3
ADC channels	16	21
ADC post processing	No	Yes
PGA channels	0	7
Comparators	3	CMPSS
CMPSS	No	7
Sigma-delta filter	0	4
ePWM technology	Type-2	Type 4
PWM channels	14	16
HRPWM channels	7	16
CLB / Position manager	No	Yes
InstaSPIN enabled	No	Yes
QEP	1	2
CAN	1	2
UART	1	2
I²C	1	1
SPI	2	2
PMBus	0	1
Packages	56, 64, 80	56, 64, 100
1 Ku SRP	U.S. $3.05–$5.80	U.S. $4.85–$7.95

Comparison of Piccolo F2806x to F28004x series

	F28069	F280049
Total MIPS	180	200
CPU	90	100
FPU	Yes	Yes
TMU	No	Yes
VCU	Yes	Yes
DMA	Yes	Yes
CLA	Type-1	Type-2
Flash (KB)	256	256
RAM (KB)	100	100
ADC	1× 12-bit	3× 12 bit
Sample & Hold	2	3
ADC channels	16	21
ADC post processing	No	Yes
PGA channels	0	7
Comparators	3	CMPSS
CMPSS	No	7
Sigma-delta filter	0	4
ePWM technology	Type-2	Type 4
PWM channels	16	16
HRPWM channels	8	16
CLB / Position manager	Yes	Yes
InstaSPIN enabled	Yes	Yes
QEP	2	2
CAN	1	2
UART	2	2
I²C	1	1
SPI	2	
USB	1	2
PMBus	0	1
Packages	80, 100	56, 64, 100
1 Ku SRP	U.S. $4.95–$10.51	U.S. $4.85–$7.95

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