GD32F4 SERIES OF MCUS

The GD32F4 series belongs to the high performance line of GD32 MCU Family. It is a new 32-bit generalpurpose microcontroller based on the ARM® Cortex®-M4 RISC core with best cost-performance ratio in terms of enhanced processing capacity, reduced power consumption and peripheral set. The Cortex®-M4 core features a Floating Point Unit (FPU) that accelerates single precision floating point math operations and supports all ARM® single precision instructions and data types.

The GD32F4 device incorporates the ARM® Cortex®-M4 32-bit processor core operating at up to 200 MHz frequency with Flash accesses zero wait states to obtain maximum efficiency. It provides up to 3072 KB on-chip Flash memory and 512 KB SRAM memory. An extensive range of enhanced I/Os and peripherals conne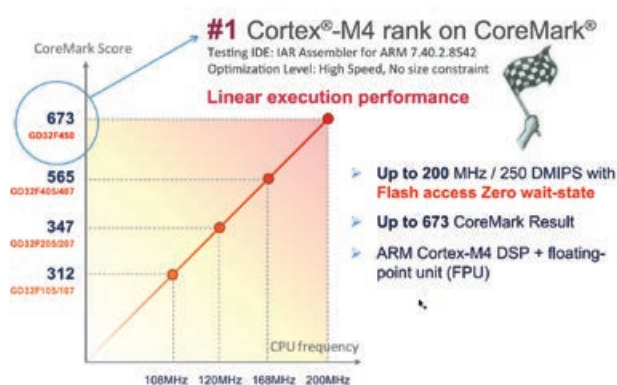cted to two APB buses. The devices offer up to three 12-bit 2.6 M SPS ADCs, two 12-bit DACs, up to eight general-purpose 16-bit timers, two 16-bit PWM advanced-control timers, two 32-bit general-purpose timers, and two 16-bit basic timers, as well as standard and advanced communication interfaces: up to six SPIs, three I2Cs, four USARTs and four UARTs, two I2Ss, two CANs, a SDIO, USB device/host/OTG FS and HS, and an Ethernet MAC. Additional peripherals as Digital camera interface (DCI), EXMC interface with SDRAM extension support, TFT-LCD Interface (TLI) and Image Processing Accelerator (IPA) are included.

The device operates from a 2.6 to 3.6 V power supply and available in −40 to +85 °C temperature range. Three power saving modes provide the flexibility for maximum optimization of power consumption, an especially important consideration in low power applications.

HIGH PERFORMANCE OF GD32F4

- Cortex®-M4 Core @ 200 MHz
- Support H/W DSP instructions + FPU
- Zero-wait state execution from Flash memory
- Flash from 512 KB to 3072 KB
- SRAM from 192 KB to 512 KB
- EXMC interface support external SDRAM & SRAM
- Up to 8 x UART (9 Mbit/s)
- Up to 6 x SPI (30 Mbit/s)
- Up to 3 x I2C (400 Kbit/s)

- Up to 2 x CAN2.0B
- Up to 2 x I2S
- Support SDIO, Ethernet MAC
- Support USB OTG FS + HS
- 8-14 bit Camera Interface
- LCD-TFT controller up to XGA resolution + IPA
- Up to 3 x 12 bit, 2.6M SPS ADCs (up to 24 chs)
- Up to 2 DACs
- Standby Current @ 2 uA

#1 Cortex®-M4 rank on CoreMark®
Testing IDE: IAR Assembler for ARM 7.40.2.8542
Optimization Level: High Speed, No size constraint
Linear execution performance

> Up to 200 MHz / 250 DMIPS with **Flash access Zero wait-state**
> Up to 673 CoreMark Result
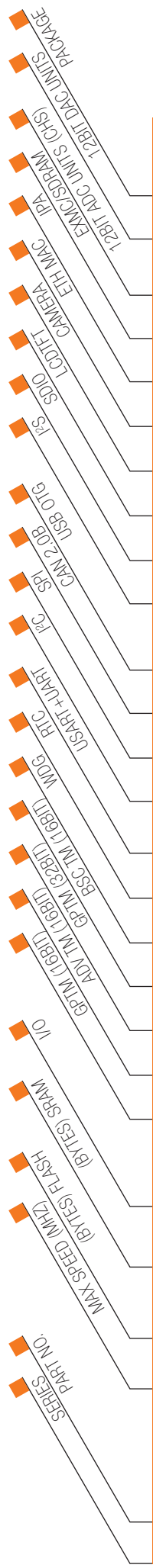> ARM Cortex-M4 DSP + floating-point unit (FPU)

TARGET APPLICATIONS

- Industrial automation
- Motor frequency conversion
- Security and alarm systems
- Graphic display
- Sensor network and nodes
- Consumer and handheld equipment
- High-end drone
- Intelligent robot
- IoT related

BGA176 (10*10 mm)
BGA100 (7*7 mm)
LQFP144 (20*20 mm)
LQFP100 (14*14 mm)
LQFP64 (10*10 mm)

GD32F4 SERIES OF 32-BIT ARM® CORTEX®-M4 MCUS SELECTION GUIDE

SERIES	PART NO.	MAX SPEED (MHZ)	FLASH (BYTES)	SRAM (BYTES)	I/O	ADV TM (16BIT)	GP TM (32BIT)	GP TM (16BIT)	BSC TM (16BIT)	WDG	RTC	USART+UART	I²C	SPI	I²S	CAN 2.0B	USB 2.0B OTG	SDIO	LCD TFT	CAMERA	ETH MAC	EXMC/SDRAM	IPA	12BIT ADC UNITS (CHS)	12BIT DAC UNITS	PACKAGE
GD32F450	GD32F450VET6	200	512 K	256 K	up to 82	2	2	8	2	2	1	4+4	3	5	2	2	FS+HS	1	1	1	1	1/0	1	3(16)	2	LQFP100
GD32F450	GD32F450VGT6	200	1024 K	256 K	up to 82	2	2	8	2	2	1	4+4	3	5	2	2	FS+HS	1	1	1	1	1/0	1	3(16)	2	LQFP100
GD32F450	GD32F450VIT6	200	2048 K	512 K	up to 82	2	2	8	2	2	1	4+4	3	5	2	2	FS+HS	1	1	1	1	1/0	1	3(16)	2	LQFP100
GD32F450	GD32F450VKT6	200	3072 K	256 K	up to 82	2	2	8	2	2	1	4+4	3	5	2	2	FS+HS	1	1	1	1	1/0	1	3(16)	2	LQFP100
GD32F450	GD32F450ZET6	200	512 K	256 K	up to 114	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/0	1	3(24)	2	LQFP144
GD32F450	GD32F450ZGT6	200	1024 K	256 K	up to 114	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/0	1	3(24)	2	LQFP144
GD32F450	GD32F450ZIT6	200	2048 K	512 K	up to 114	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/0	1	3(24)	2	LQFP144
GD32F450	GD32F450ZKT6	200	3072 K	256 K	up to 114	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/0	1	3(24)	2	LQFP144
GD32F450	GD32F450IGH6	200	1024 K	256 K	up to 140	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/1	1	3(24)	2	BGA176
GD32F450	GD32F450IIH6	200	2048 K	512 K	up to 140	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/1	1	3(24)	2	BGA176
GD32F450	GD32F450IKH6	200	3072 K	256 K	up to 140	2	2	8	2	2	1	4+4	3	6	2	2	FS+HS	1	1	1	1	1/1	1	3(24)	2	BGA176
GD32F405	GD32F405RET6	168	512 K	192 K	up to 51	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	LQFP64
GD32F405	GD32F405RGT6	168	1024 K	192 K	up to 51	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	LQFP64
GD32F405	GD32F405RKT6	168	3072 K	192 K	up to 51	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	LQFP64
GD32F405	GD32F405VGT6	168	1024 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	LQFP100
GD32F405	GD32F405VKT6	168	3072 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	LQFP100
GD32F405	GD32F405VGH6	168	1024 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	BGA100
GD32F405	GD32F405VKH6	168	3072 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(16)	2	BGA100
GD32F405	GD32F405ZGT6	168	1024 K	192 K	up to 114	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(24)	2	LQFP144
GD32F405	GD32F405ZKT6	168	3072 K	192 K	up to 114	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	–	–	–	–	3(24)	2	LQFP144
GD32F407	GD32F407RET6	168	512 K	192 K	up to 51	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	LQFP64
GD32F407	GD32F407RGT6	168	1024 K	192 K	up to 51	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	LQFP64
GD32F407	GD32F407RKT6	168	3072 K	192 K	up to 51	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	LQFP64
GD32F407	GD32F407VET6	168	512 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	LQFP100
GD32F407	GD32F407VGT6	168	1024 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	LQFP100
GD32F407	GD32F407VKT6	168	3072 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	LQFP100
GD32F407	GD32F407VEH6	168	512 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	BGA100
GD32F407	GD32F407VGH6	168	1024 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	BGA100
GD32F407	GD32F407VKH6	168	3072 K	192 K	up to 82	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(16)	2	BGA100
GD32F407	GD32F407ZET6	168	512 K	192 K	up to 114	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(24)	2	LQFP144
GD32F407	GD32F407ZGT6	168	1024 K	192 K	up to 114	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(24)	2	LQFP144
GD32F407	GD32F407ZKT6	168	3072 K	192 K	up to 114	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/0	–	3(24)	2	LQFP144
GD32F407	GD32F407IEH6	168	512 K	192 K	up to 140	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/1	–	3(24)	2	BGA176
GD32F407	GD32F407IGH6	168	1024 K	192 K	up to 140	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/1	–	3(24)	2	BGA176
GD32F407	GD32F407IKH6	168	3072 K	192 K	up to 140	2	2	8	2	2	1	4+2	3	3	2	2	FS+HS	1	–	1	1	1/1	–	3(24)	2	BGA176

Column groups: MEMORY (FLASH, SRAM) · TIMER (ADV TM, GP TM 32BIT, GP TM 16BIT, BSC TM, WDG, RTC) · CONNECTIVITY (USART+UART … IPA) · ANALOG INTERFACE (12BIT ADC UNITS (CHS), 12BIT DAC UNITS).