



Welcome to [E-XFL.COM](#)

What is "[Embedded - Microcontrollers](#)"?

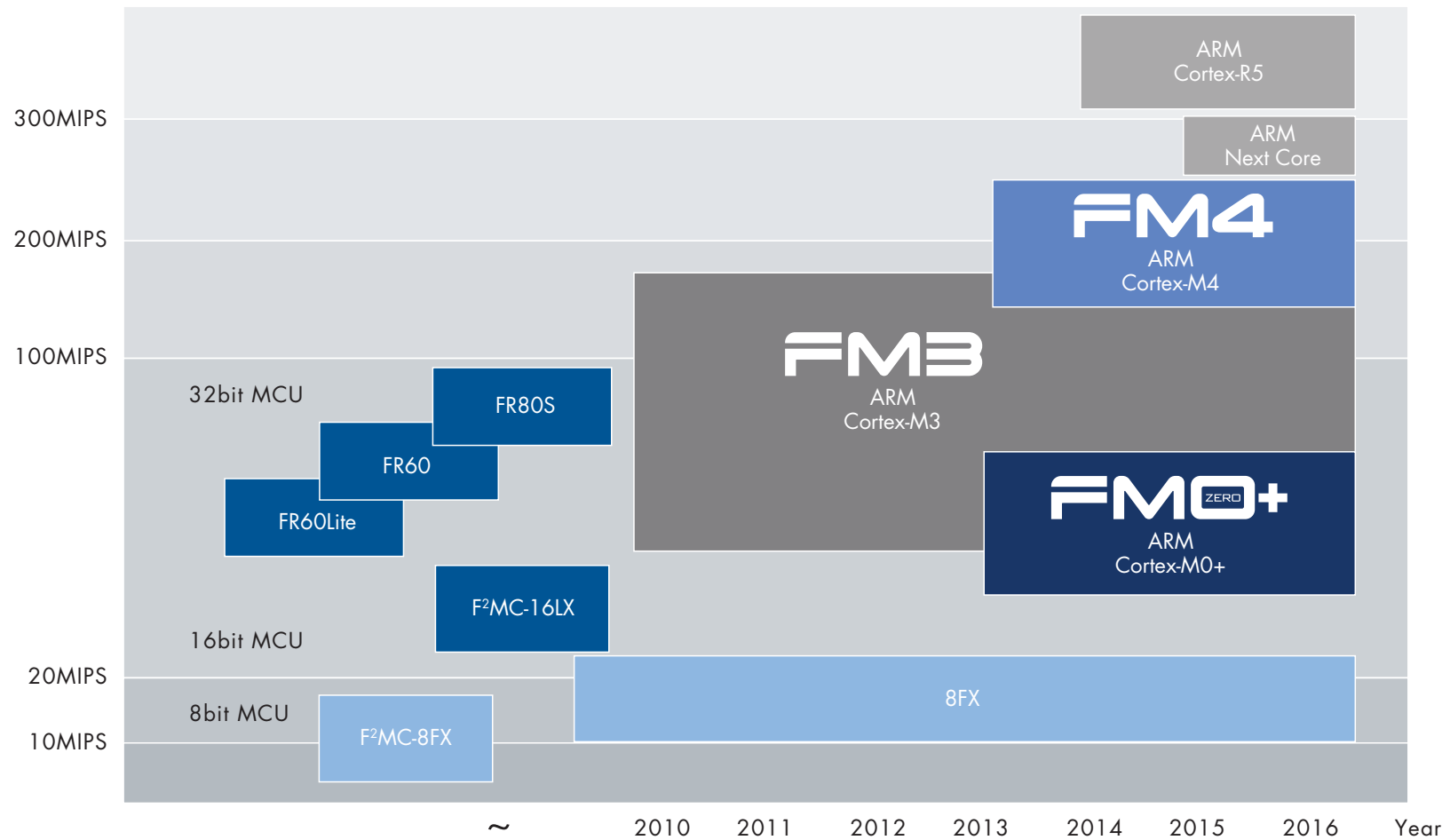
"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "[Embedded - Microcontrollers](#)"

Details

Product Status	Obsolete
Core Processor	F ² MC-8FX
Core Size	8-Bit
Speed	16MHz
Connectivity	I ² C, LINbus, SIO, UART/USART
Peripherals	POR, PWM, WDT
Number of I/O	20
Program Memory Size	20KB (20K x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	1K x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 5.5V
Data Converters	A/D 6x8/12b
Oscillator Type	External
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	24-TSSOP (0.173", 4.40mm Width)
Supplier Device Package	24-TSSOP
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/mb95f654lnpft-g-sne2

Consumer and Industrial MCU Core Roadmap



Consumer and Industrial MCU Family



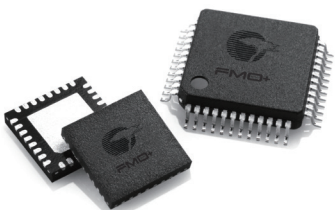
FM4 FAMILY

Cypress ARM® Cortex®-M4F microcontroller family is a high range line providing maximum CPU frequency of 200MHz, a high speed flash memory with DSP and FPU hardware instructions. Customers can select the best fitting device from a range of products, coming in packages from 48 pin to 216 pin and flash memory densities between 256KB and 2MB. The wide operation supply voltage range up to 5.5V which improves the signal to noise ratio, results in a robust design and is unique among Cortex-M4F microcontroller families. The MCUs are designed for applications that require advanced, high-speed computing performance such as general-purpose inverters, servomotors, PLCs and other industrial equipment, as well as inverter-based home appliances such as washing machines and air conditioners.



FM3 FAMILY

Cypress ARM Cortex-M3 microcontroller family is a scalable platform for many industrial applications. Customers can select the best fitting device from a range of products, coming in packages from 32 pin to 176 pin and flash memory densities between 32KB and 1MB. With a maximum CPU frequency of 144MHz and high speed flash memory, FM3 supports the fastest ARM Cortex-M3 devices on the market. The wide operation supply voltage range up to 5.5V, which improves the signal to noise ratio, results in a robust design and is quite unique among Cortex-M3 microcontroller families. The FM3 MCU family is split into four groups: high performance, basic, low power and ultra low leakage groups. The main differences between the groups are CPU operation frequency and supply voltage. All products are based on the same architecture (software compatible), use the same peripherals and are pin compatible in most cases. The ultra low leakage line products are based on an optimized low leakage process technology. Development tools and evaluation boards are offered from different vendors and Cypress.



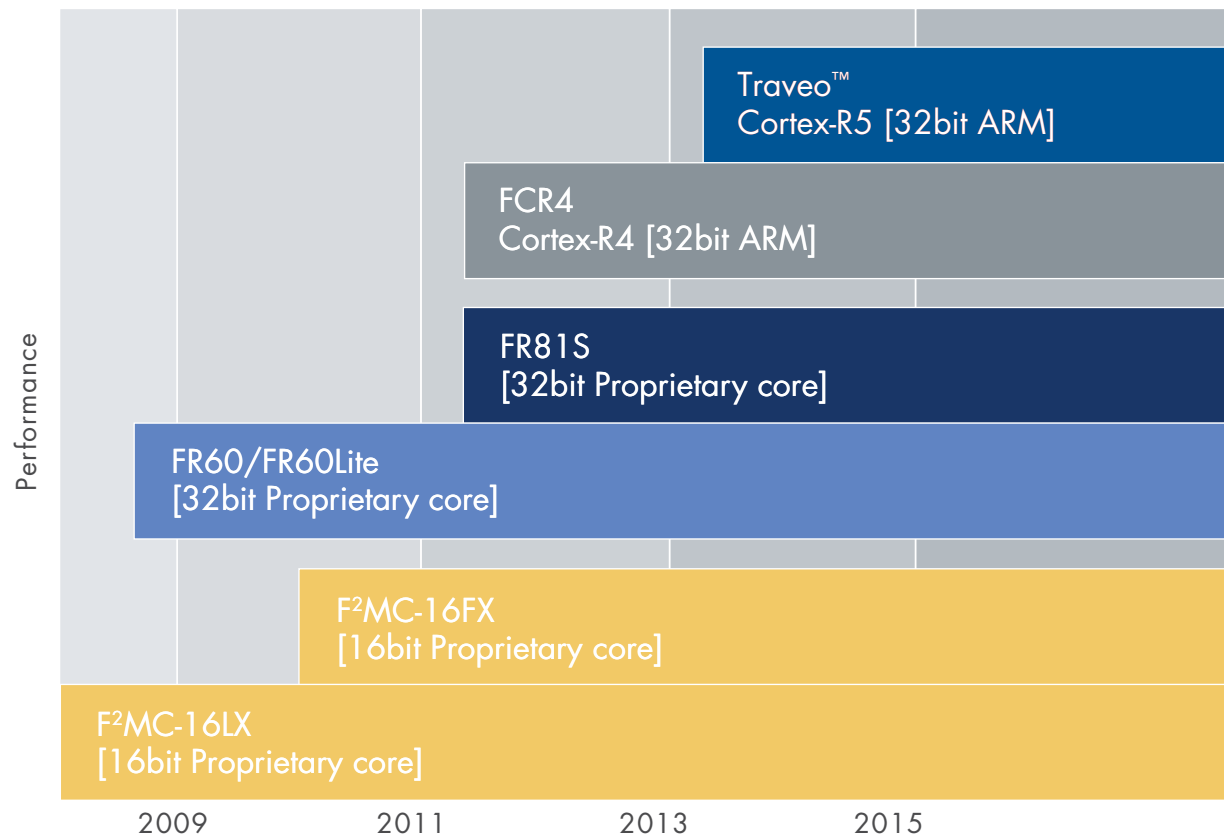
FM0+ FAMILY

The Cypress FM0+ family, which is based on the ARM Cortex-M0+ core, is designed for low power and cost-sensitive applications such as white goods, sensors, meters, HMI systems, power tools and Internet of Things (IoT) battery powered or energy harvesting wearable devices. These microcontrollers can be easily embedded into systems adopting 8-, 16- or 32-bit MCUs, accelerating product development and reducing development costs. The FM0+ family includes two groups for ultra-low-power and cost-effective applications. The devices in the ultra-low-power group have an operating voltage range of 1.65V to 3.6V, and a maximum CPU clock frequency of 40MHz, a RUN mode current of 70 μ A/MHz, an RTC mode current of 0.7 μ A and wake-up time of approximately 40 μ s.

8FX FAMILY

Cypress 8FX MCU family is a high-performance 8-bit microcontroller utilizing a different embedded flash memory size. This series uses the F2MC-8FX CISC CPU, which offers industry leading class performance of an 8-bit microcontroller unit enabling more instructions to be executed per cycle. On top of delivering industry class performance MCUs, the 8FX family also delivers low power efficient MCU products for the customer's usage. This series also features a variety of on-chip timers, A/D converters, analog and digital peripheral and communication interfaces such as LIN-UART (Local Interconnect Network Universal Asynchronous Receiver-Transmitter), CAN (controller area network) and I2C (Inter-Integrated Circuit) interface for various application usages. For easy development, the 8FX family also employs a 1-line on-chip debug that uses only one pin on the microcontroller, thereby minimizing the number of pins used for debugging in product development. Cypress also provides easy to use and cost competitive development starter kits and development environments for this MCU series.

Automotive MCU Core Roadmap



Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [pin]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer							Serial				Communication				Note	Evaluation Device							
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]			USB-Function [ch]	LCD Controller [seg x com]	Three-phase Inverter				
S6E2CC-V	S6E2CCAJGA	200	LQFP-176 BGA-192	2.7 to 5.5	✓	Main Flash +Main Flash	2M	256K	-	8	32	✓	152	-	32 (3)	12 x 2	Multi-Function Timer x3units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable), PPG 9ch	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 4	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	3 (2 x CAN + CAN FD)	2ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Timer Clock, Unique ID, DSTC×256ch, SDC, I2S 1ch(without 144pin), HDMI-CEC 2ch, High Speed Quad SPI x1(without 144pin), Programmable CRC, Eth1ch, Chipher, Voice	On-Chip Debug (SWJ-DP/ETM/ HTM)													
	1M		128K																																					
	2M		256K																																					
	1M		128K																																					
S6E2CC w/ Security	S6E2CCAHHA	200	LQFP-144	2.7 to 5.5	✓	Main Flash +Main Flash	2M	256K	-	8	32	✓	152	-	32 (3)	12 x 2	Multi-Function Timer x3units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable), PPG 9ch	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 4	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	3 (2 x CAN + CAN FD)	2ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Timer Clock, Unique ID, DSTC x 256ch, SDC, I2S 1ch(without 144pin), HDMI-CEC 2ch, High Speed Quad SPI x1(without 144pin), Programmable CRC, Eth1ch, Chipher	On-Chip Debug (SWJ-DP/ETM/ HTM)													
	S6E2CCAJHA		LQFP-176 BGA-192																									152	32 (3)											
	S6E2CCALHA		LQFP-216																									190	24 (3)											
	S6E2CC9HHA		LQFP-144																									120	24 (3)											
	S6E2CC9JHA		LQFP-176 BGA-192				1.5M	192K					1M	128K	152	-												32 (3)	12 x 2	Multi-Function Timer x3units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable), PPG 9ch	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 4	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	3 (2 x CAN + CAN FD)	2ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Timer Clock, Unique ID, DSTC x 256ch, SDC, I2S 1ch(without 144pin), HDMI-CEC 2ch, High Speed Quad SPI x1(without 144pin), Programmable CRC, Eth1ch, Chipher	On-Chip Debug (SWJ-DP/ETM/ HTM)
	S6E2CC9LHA		LQFP-216				190	24 (3)																																
	S6E2CC8HHA		LQFP-144				120	24 (3)																																
	S6E2CC8JHA		LQFP-176 BGA-192				152	32 (3)																																
S6E2CC8LHA	LQFP-216	190	24 (3)																																					
S6E2CC	S6E2CCAH0A	200	LQFP-144	2.7 to 5.5	✓	Main Flash +Main Flash	2M	256K	-	8	32	✓	152	-	32 (3)	12 x 2	Multi-Function Timer x3units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable), PPG 9ch	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 4	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	3 (2 x CAN + CAN FD)	2ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Timer Clock, Unique ID, DSTC x 256ch, SDC, I2S 1ch(without 144pin), HDMI-CEC 2ch, High Speed Quad SPI x1(without 144pin), Programmable CRC, Eth1ch	On-Chip Debug (SWJ-DP/ETM/ HTM)													
	S6E2CCAJ0A		LQFP-176 BGA-192																									152	32 (3)											
	S6E2CCAL0A		LQFP-216																									190	24 (3)											
	S6E2CC9H0A		LQFP-144																									120	24 (3)											
	S6E2CC9J0A		LQFP-176 BGA-192				1.5M	196K					1M	128K	152	-												32 (3)	12 x 2	Multi-Function Timer x3units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable), PPG 9ch	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 4	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	3 (2 x CAN + CAN FD)	2ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Timer Clock, Unique ID, DSTC x 256ch, SDC, I2S 1ch(without 144pin), HDMI-CEC 2ch, High Speed Quad SPI x1(without 144pin), Programmable CRC, Eth1ch	On-Chip Debug (SWJ-DP/ETM/ HTM)
	S6E2CC9L0A		LQFP-216				190	24 (3)																																
	S6E2CC8H0A		LQFP-144				120	24 (3)																																
	S6E2CC8J0A		LQFP-176 BGA-192				152	32 (3)																																
S6E2CC8L0A	LQFP-216	190	24 (3)																																					
S6E2C5	S6E2C5AH0A	200	LQFP-144	2.7 to 5.5	✓	Main Flash +Main Flash	2M	256K	-	8	32	✓	152	-	32 (3)	12 x 2	Multi-Function Timer x3units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable), PPG 9ch	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 4	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	3 (2 x CAN + CAN FD)	2ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Timer Clock, Unique ID, DSTC x 256ch, SDC, I2S 1ch(without 144pin), HDMI-CEC 2ch, High Speed Quad SPI x1(without 144pin), Programmable CRC	On-Chip Debug (SWJ-DP/ETM/ HTM)													
	S6E2C5AJ0A		LQFP-176 BGA-192																									152	32 (3)											
	S6E2C5AL0A		LQFP-216																									190	24 (3)											
	S6E2C59H0A		LQFP-144																									120	24 (3)											
	S6E2C59J0A		LQFP-176 BGA-192				1.5M	192K					1M	12																										

FM4 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch(unit)]	12bit AD Converter [ch(unit)]	DA Converter [bit x ch]	Timer									Serial				Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device											
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]	USB-Function [ch]															
MB9B460L	MB9BF464K	160	LQFP-48 QFN-48	2.7 to 5.5	✓	Main Flash +Work Flash	256K +32K	32K	-	8	-	-	-	-	12 x 2		Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 1	1	Multi Function Serial x 6ch (UART/CSIO/I2C/LIN Selectable)	1	-	-	-	✓	CAN: 32Msg-buffer, Dual Timer, Real Time Clock, Unique ID, DSTC x 128ch	On-chip Debug (SWJ-DP)																			
	MB9BF464L		LQFP-64 QFN-64																																												
	MB9BF465K		LQFP-48 QFN-48				384K +32K	48K																					-	8	-	-	-	-	12 x 2	Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 1	1	Multi Function Serial x 6ch (UART/CSIO/I2C/LIN Selectable)	1	-	-	-	✓	CAN: 32Msg-buffer, Dual Timer, Real Time Clock, Unique ID, DSTC x 128ch	On-chip Debug (SWJ-DP)
	MB9BF465L		LQFP-64 QFN-64																																												
	MB9BF466K		LQFP-48 QFN-48																																												
	MB9BF466L		LQFP-64 QFN-64				512K +32K	64K																																							

FM4 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer								Serial				Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]				
MB9B360L	MB9BF364K	160	LQFP-48 QFN-48	2.7 to 5.5 2.7 to 5.5	✓	Main Flash +Work Flash	256K +32K	32K	-	8	-	-	-	12 x 2	Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)								Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 1	1	Multi Function Serial x 6ch (UART/CSIO/I2C/LIN Selectable)	-	1ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer, Real Time Clock, Unique ID, DSTC x 128ch	On-chip Debug (SWJ-DP)			
	Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																																		
	Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																																		
	MB9BF364L		LQFP-64 QFN-64				Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																												
	MB9BF365K		LQFP-48 QFN-48				384K +32K	48K							Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																				
	MB9BF365L		LQFP-64 QFN-64												Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																				
MB9BF366K	LQFP-48 QFN-48	Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																																	
MB9BF366L	LQFP-64 QFN-64	512K +32K	64K	Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 6ch Selectable)																															

FM3 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [bit]	Ext. Interrupt [bit]	External Bus	Maximum I/O port [bit]	10bit AD Converter [bit(unit)]	12bit AD Converter [bit(unit)]	DA Converter [bit x bit]	Timer								Serial			Communication			Note	Evaluation Device
																	Output Compare [bit]	Free-Run Timer [bit]	Input Capture [bit]	Reload Timer [bit]	PWM Timer [bit]	PWC Timer [bit]	PPG Timer [bit]	Up/Down Counter [bit]	Other timers [bit]	I ² C [bit]	UART/ISI [bit]	SIO [bit]	LIN/UART/SIO [bit]	CAN [bit]		
HIGH-PERFORMANCE GROUP																																
MB9B500B	MB9BF504NB	80	LQFP-100 BGA-112	2.7 to 5.5	✓	FLASH	256K	32K	-	8	16	✓	80	-	16(3)	-	Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 2	1	Multi Function Serial x 8ch (UART/CSIO/I2C/LIN Selectable)	2	1ch (USB-Host/ USB-Function Selectable)	-	✓	CAN: 32Msg-buffer, Dual Timer	On-chip Debug (SWJ-DP/ETM)					
	MB9BF504RB		LQFP-120				100	80					100															80	100			
	MB9BF505NB		LQFP-100 BGA-112				80	80					100															80	100			
	MB9BF505RB		LQFP-120				100	80					100															80	100			
	MB9BF506NB		LQFP-100 BGA-112				80	80					100															80	100			
	MB9BF506RB		LQFP-120				100	80					100															80	100			
MB9B400A	MB9BF404NA	80	LQFP-100 BGA-112	2.7 to 5.5	✓	FLASH	256K	32K	-	8	16	✓	80	-	16(3)	-	Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 2	1	Multi Function Serial x 8ch (UART/CSIO/I2C/LIN Selectable)	2	-	-	-	✓	CAN: 32Msg-buffer, Dual Timer	On-chip Debug (SWJ-DP/ETM)				
	MB9BF404RA		LQFP-120				100	80					100																80	100		
	MB9BF405NA		LQFP-100 BGA-112				80	80					100																80	100		
	MB9BF405RA		LQFP-120				100	80					100																80	100		
	MB9BF406NA		LQFP-100 BGA-112				80	80					100																80	100		
	MB9BF406RA		LQFP-120				100	80					100																80	100		
MB9B300B	MB9BF304NB	80	LQFP-100 BGA-112	2.7 to 5.5	✓	FLASH	256K	32K	-	8	16	✓	80	-	16(3)	-	Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 2	1	Multi Function Serial x 8ch (UART/CSIO/I2C/LIN Selectable)	-	1ch (USB-Host/ USB-Function Selectable)	-	✓	Dual Timer	On-chip Debug (SWJ-DP/ETM)					
	MB9BF304RB		LQFP-120				100	80					100															80	100			
	MB9BF305NB		LQFP-100 BGA-112				80	80					100															80	100			
	MB9BF305RB		LQFP-120				100	80					100															80	100			
	MB9BF306NB		LQFP-100 BGA-112				80	80					100															80	100			
	MB9BF306RB		LQFP-120				100	80					100															80	100			
MB9B100A	MB9BF102NA	80	LQFP-100 BGA-112	2.7 to 5.5	✓	FLASH	128K	16K	-	8	16	✓	80	-	16(3)	-	Multi-Function Timer x 2units (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 2	1	Multi Function Serial x 8ch (UART/CSIO/I2C/LIN Selectable)	-	-	-	-	✓	Dual Timer	On-chip Debug (SWJ-DP/ETM)				
	MB9BF102RA		LQFP-120				100	80					100																80	100		
	MB9BF104NA		LQFP-100 BGA-112				80	80					100																80	100		
	MB9BF104RA		LQFP-120				100	80					100																80	100		
	MB9BF105NA		LQFP-100 BGA-112				80	80					100																80	100		
	MB9BF105RA		LQFP-120				100	80					100																80	100		
	MB9BF106NA		LQFP-100 BGA-112				80	80					100																80	100		
	MB9BF106RA		LQFP-120				100	80					100																80	100		
BASIC GROUP																																
MB9B520M	MB9BF521K	72	LQFP-48 QFN-48	2.7 to 5.5	✓	Dual Op. Flash (Main area + Work area)	64K +32K	16K	-	8	-	-	14	-	10bit x 2	Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 1	1	Multi Function Serial x 4ch (UART/CSIO/I2C/LIN Selectable)	1	1ch (USB-Host/ USB-Function Selectable)	-	✓	CAN: 32Msg-buffer, Dual Timer, Unique ID, Real Time Clock	On-chip Debug (SWJ-DP)						
	MB9BF521L		LQFP-64 QFN-64										19					50		23(2)							QPRC x 2	Multi Function Serial x 8ch (UART/CSIO/I2C/LIN Selectable)				
	MB9BF521M		LQFP-80 BGA-96										23					65		26(2)							QPRC x 1	Multi Function Serial x 4ch (UART/CSIO/I2C/LIN Selectable)				
	MB9BF522K		LQFP-48 QFN-48										14					35		14(2)							QPRC x 2	Multi Function Serial x 8ch (UART/CSIO/I2C/LIN Selectable)				
	MB9BF522L		LQFP-64 QFN-64				19	50					23(2)					QPRC x 1		Multi Function Serial x 4ch (UART/CSIO/I2C/LIN Selectable)												
	MB9BF522M		LQFP-80 BGA-96				23	65					26(2)																			
	MB9BF524K		LQFP-48 QFN-48				14	35					14(2)																			
	MB9BF524L		LQFP-64 QFN-64				19	50					23(2)																			
	MB9BF524M		LQFP-80 BGA-96				23	65					26(2)																			

FM3 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer								Serial				Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]				
BASIC GROUP																																			
MB9B320T	MB9BF328S*	60	LQFP-144	2.7 to 5.5	✓	Dual Op. Flash (Main area + Work area)	1M +64K	160K	-	8	32	✓	-	24(2)	10bit x 2		Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 1 QPRC x 2 QPRC x 1 QPRC x 2	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	-	1ch (USB-Host/ USB-Function Selectable)		-	✓	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP/ETM)							
	MB9BF328T*		LQFP-176 BGA-192				1.5M +64K	192K																											
	MB9BF329S*		LQFP-144				1.5M +64K	192K																											
	MB9BF329T*		LQFP-176 BGA-192				1.5M +64K	192K																											
MB9B120T	MB9BF128S*	60	LQFP-144	2.7 to 5.5	✓	Dual Op. Flash (Main area + Work area)	1M +64K	160K	-	8	32	✓	-	24(2)	10bit x 2		Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	QPRC x 1 QPRC x 2 QPRC x 1 QPRC x 2	1	Multi Function Serial x 16ch (UART/CSIO/I2C/LIN Selectable)	-	-	-	-	-	✓	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP/ETM)						
	MB9BF128T*		LQFP-176 BGA-192				1.5M +64K	192K																											
	MB9BF129S*		LQFP-144				1.5M +64K	192K																											
	MB9BF129T*		LQFP-176 BGA-192				1.5M +64K	192K																											
MB9A420L	MB9AF421K	40	LQFP-48 LQFP-52 QFN-48	2.7 to 5.5	✓	FLASH	64K	4K	-	-	14	-	-	8(1)	10bit x 1		Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 3ch/PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 4ch (UART/CSIO/I2C/LIN Selectable)	1	-	-	-	✓	CAN: 32Msg-buffer, Dual Timer, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP)							
	MB9AF421L		LQFP-64 QFN-64				19	51																											
MB9A120L	MB9AF121K	40	LQFP-48 LQFP-52 QFN-48	2.7 to 5.5	✓	FLASH	64K	4K	-	-	14	-	-	8(1)	10bit x 1		Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 3ch/PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 4ch (UART/CSIO/I2C/LIN Selectable)	-	-	-	-	✓	Dual Timer, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP)							
	MB9AF121L		LQFP-64 QFN-64				19	51																											

FM3 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bitAD Converter [ch/unit]	12bitAD Converter [ch/unit]	DA Converter [bit x ch]	Timer								Serial				Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device							
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]					USB-Function [ch]						
LOW-POWER GROUP																																										
MB9A150R	MB9AF154MA	40	LQFP-80 BGA-96	1.65 to 3.6	✓	Dual Op. Flash (Main area + Work area)	256K +32K	32K	-	8	23	66	-	17(2)	-	Multi-Function Timer x 1unit (Free-Run 3ch/ Output Compare 6ch/ Input Capture 4ch/ PPG 3ch/ Waveform Generator 3ch/ AD Activation Compare 3ch Selectable)	QPRC x 2	1	Base Timer x 15ch (Reload/PPG/PWM/ PWC Selectable)	-	-	-	-	-	-	-	-	-	-	-	-	-	Multi Function Serial x 10ch (UART/CSIO/I2C Selectable)	On-chip Debug (SWJ-DP)								
	MB9AF154NA		LQFP-100 BGA-112																																384K +32K	48K	24	✓	83	24(2)	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	Multi Function Serial x 14ch (UART/CSIO/I2C Selectable)
	MB9AF154RA		LQFP-120																																							
	MB9AF155MA		LQFP-80 BGA-96				23	66		17(2)	Base Timer x 15ch (Reload/PPG/PWM/ PWC Selectable)	Multi Function Serial x 10ch (UART/CSIO/I2C Selectable)		Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID																					✓							
	MB9AF155NA		LQFP-100 BGA-112				24	83		24(2)	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	Multi Function Serial x 14ch (UART/CSIO/I2C Selectable)																														
	MB9AF155RA		LQFP-120				103	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)		Multi Function Serial x 16ch (UART/CSIO/I2C Selectable)																																
	MB9AF156MA		LQFP-80 BGA-96				23	66		17(2)	Base Timer x 15ch (Reload/PPG/PWM/ PWC Selectable)	Multi Function Serial x 10ch (UART/CSIO/I2C Selectable)																														
	MB9AF156NA		LQFP-100 BGA-112				24	83		24(2)	Base Timer x 16ch (Reload/PPG/PWM/ PWC Selectable)	Multi Function Serial x 14ch (UART/CSIO/I2C Selectable)																														
	MB9AF156RA		LQFP-120				103	103		103	103	103																								103						
MB9AB40NA	MB9AFB41LB	40	LQFP-64 QFN-64	1.65 to 3.6	✓	Dual Op. Flash (Main area + Work area)	64K +32K	16K	-	8	8	-	51	12(2)	-	-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I2C Selectable)	-	1ch (USB-Host/ USB-Function Selectable)	-	-	-	-	-	-	20 x 8	On-chip Debug (SWJ-DP)										
	MB9AFB41MB		LQFP-80 BGA-96								11	66	17(2)																				33 x 8									
	MB9AFB41NB		LQFP-100 QFP-100 BGA-112								16	✓	83																				24(2)	40 x 8								
	MB9AFB42LB		LQFP-64 QFN-64				8				-	51	12(2)																				20 x 8									
	MB9AFB42MB		LQFP-80 BGA-96				11				66	17(2)	33 x 8																													
	MB9AFB42NB		LQFP-100 QFP-100 BGA-112				16				✓	83	24(2)																				40 x 8									
	MB9AFB44LB		LQFP-64 QFN-64				8	-			51	12(2)	20 x 8																													
	MB9AFB44MB		LQFP-80 BGA-96				11	66			17(2)	33 x 8																														
	MB9AFB44NB		LQFP-100 QFP-100 BGA-112				16	✓			83	24(2)	40 x 8																													
MB9AA40NA	MB9AFA41LB	40	LQFP-64 QFN-64	1.65 to 3.6	✓	Dual Op. Flash (Main area + Work area)	64K +32K	16K	-	8	8	-	51	12(2)	-	-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I2C Selectable)	-	-	-	-	-	-	-	-	20 x 8	On-chip Debug (SWJ-DP)										
	MB9AFA41MB		LQFP-80 BGA-96								11	66	17(2)																				33 x 8									
	MB9AFA41NB		LQFP-100 QFP-100 BGA-112								16	✓	83																				24(2)	40 x 8								
	MB9AFA42LB		LQFP-64 QFN-64				8				-	51	12(2)																				20 x 8									
	MB9AFA42MB		LQFP-80 BGA-96				11				66	17(2)	33 x 8																													
	MB9AFA42NB		LQFP-100 QFP-100 BGA-112				16				✓	83	24(2)																				40 x 8									
	MB9AFA44LB		LQFP-64 QFN-64				8	-			51	12(2)	20 x 8																													
	MB9AFA44MB		LQFP-80 BGA-96				11	66			17(2)	33 x 8																														
	MB9AFA44NB		LQFP-100 QFP-100 BGA-112				16	✓			83	24(2)	40 x 8																													

FM3 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit/AD Converter [ch/unit]	12bit/AD Converter [ch/unit]	DA Converter [bit x ch]	Timer								Serial			Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device																																							
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]					USB-Host [ch]	USB-Function [ch]																																					
LOW-POWER GROUP																																																																									
MB9A340NA	MB9AF341LB	40	LQFP-64 QFN-64	1.65 to 3.6	✓	Dual Op. Flash (Main area + Work area)	64K +32K	16K	-	8	8	-	51	-	12(2)	-	-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I ² C Selectable)	-	1ch (USB-Host/ USB-Function Selectable)	-	-	-	-	-	-	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP)																																								
	MB9AF341MB		LQFP-80 BGA-96								11	-	66		17(2)																																																										
	MB9AF341NB		LQFP-100 QFP-100 BGA-112								16	✓	83		24(2)																																																										
	MB9AF342LB		LQFP-64 QFN-64								8	-	51		12(2)																																																										
	MB9AF342MB		LQFP-80 BGA-96				128K +32K	32K			11	-	66	17(2)	-																		-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I ² C Selectable)	-	1ch (USB-Host/ USB-Function Selectable)	-	-	-	-	-	-	-	-	-	-	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP/ETM)																				
	MB9AF342NB		LQFP-100 QFP-100 BGA-112				16				✓	83	24(2)																																																												
	MB9AF344LB		LQFP-64 QFN-64				8				-	51	12(2)																																																												
	MB9AF344MB		LQFP-80 BGA-96				11				-	66	17(2)																																																												
MB9AF344NB	LQFP-100 QFP-100 BGA-112	16	✓	83	24(2)																																																																				
MB9A140NA	MB9AF141LB	40	LQFP-64 QFN-64	1.65 to 3.6	✓	Dual Op. Flash (Main area + Work area)	64K +32K	16K	-	8	8	-	51	-	12(2)	-	-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I ² C Selectable)	-	-	-	-	-	-	-	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP)																																									
	MB9AF141MB		LQFP-80 BGA-96								11	-	66		17(2)																																																										
	MB9AF141NB		LQFP-100 QFP-100 BGA-112								16	✓	83		24(2)																																																										
	MB9AF142LB		LQFP-64 QFN-64				128K +32K	16K			8	-	51	-	12(2)																	-	-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I ² C Selectable)	-	-	-	-	-	-	-	-	-	-	-	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP/ETM)																					
	MB9AF142MB		LQFP-80 BGA-96								11	-	66		17(2)																																																										
	MB9AF142NB		LQFP-100 QFP-100 BGA-112								16	✓	83		24(2)																																																										
	MB9AF144LB		LQFP-64 QFN-64				256K +32K	32K			8	-	51	-	12(2)																																						-	-	-	-	Base Timer x 8ch (Reload/PPG/PWM/ PWC Selectable)	-	1	Multi Function Serial x 8ch (UART/CSIO/I ² C Selectable)	-	-	-	-	-	-	-	-	-	-	-	Dual Timer, HDMI-CEC/Remote Control Reception x 2, Real Time Clock, Unique ID	On-chip Debug (SWJ-DP/ETM)
	MB9AF144MB		LQFP-80 BGA-96								11	-	66		17(2)																																																										
	MB9AF144NB		LQFP-100 QFP-100 BGA-112								16	✓	83		24(2)																																																										

FM0 + Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer							Serial			Communication			Note	Evaluation Device
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SIO [ch]	SIO [ch]	LIN/UART/SIO [ch]		
S6E1C3	S6E1C32D0A	40	LQFP-64	1.65 to 3.6	✓	Main Flash	128K	16K	-	-	12	-	54	-	8	-	-	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	-	1	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)	-	1ch (USB-Host/USB-Function Selectable)	-	-	Dual Timer, Real Timer Clock, Unique ID, DSTC x 64ch, Tiny I2S, Wakeup I2C, HDMI-CEC 2ch, CRC, Smart Card I/F	On-Chip Debug (SWJ-DP)				
	64K						12K																								
	S6E1C32C0A		LQFP-48				128K	16K										9										38	6	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)
	S6E1C31C0A						64K	12K										5										20	4	Base Timer x 3ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 2ch (UART/CSIO/I2C Selectable)
	S6E1C32B0A		WLCSP-26				128K	16K										7										24	6	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)
	S6E1C31B0A		LQFP-32				64K	12K										12										54	8	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)
	S6E1C32D0A		QFN-64				128K	16K										9										38	6	Base Timer x 3ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 2ch (UART/CSIO/I2C Selectable)
	S6E1C31D0A						64K	12K										7										24	4	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)
	S6E1C32C0A		QFN-48				128K	16K										12										54	8	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)
	S6E1C31C0A						64K	12K										9										38	6	Base Timer x 3ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 2ch (UART/CSIO/I2C Selectable)
S6E1C32B0A	QFN-32	128K	16K	7	24	4	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)																							
S6E1C31B0A		64K	12K	12	54	8	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)																							
S6E1C1	S6E1C12D0A	40	LQFP-64	1.65 to 3.6	✓	Main Flash	128K	16K	-	-	12	-	54	-	8	-	-	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	-	1	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)	-	-	-	-	Dual Timer, Real Timer Clock, Unique ID, DSTC x 64ch, Tiny I2S, HDMI-CEC 2ch, CRC, Smart Card I/F	On-Chip Debug (SWJ-DP)				
	64K						12K																								
	S6E1C12C0A		LQFP-48				128K	16K										9										38	6	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)
	S6E1C11C0A						64K	12K										7										24	4	Base Timer x 3ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 2ch (UART/CSIO/I2C Selectable)
	S6E1C12B0A		LQFP-32				128K	16K										12										54	8	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)
	S6E1C11B0A						64K	12K										9										38	6	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)
	S6E1C12D0A		QFN-64				128K	16K										7										24	4	Base Timer x 3ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 2ch (UART/CSIO/I2C Selectable)
	S6E1C11D0A						64K	12K										12										54	8	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)
	S6E1C12C0A		QFN-48				128K	16K										9										38	6	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)
	S6E1C11C0A						64K	12K										7										24	4	Base Timer x 3ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 2ch (UART/CSIO/I2C Selectable)
	S6E1C12B0A		QFN-32				128K	16K										12										54	8	Base Timer x 8ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 6ch (UART/CSIO/I2C Selectable)
	S6E1C11B0A						64K	12K										9										38	6	Base Timer x 5ch (Reload/PPG/PWM/PWC Selectable)	Multi Function Serial x 4ch (UART/CSIO/I2C Selectable)

8FX – 8bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer								Serial			Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device	
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]					USB-Host [ch]
STANDARD																																			
MB95650L	MB95F652E	16	TSSOP-24 SOP-24 QFN-32	1.8 to 5.5	✓	Dual Op. Flash	8K	256	-	-	6	-	21	-	6(1)	-	-	8/16bit Compound Timer x 2ch (Interval Timer/PWM/PWC/ Input Capture Selectable)	-	-	-	2	1	-	1	-	-	-	-	-	-	-	-	Low-voltage Detection Reset, Clock Supervisor	On-chip Debug
	MB95F652L							20																											
	MB95F653E							21																											
	MB95F653L							20																											
	MB95F654E							21																											
	MB95F654L							20																											
	MB95F656E							21																											
	MB95F656L							20																											
MB95810K	MB95F814K	16	LQFP-64	2.88 to 5.5	✓	Dual Op. Flash	20K	512	-	-	12	-	58	12(1)	-	-	-	Reload Timer x 1ch + 8/16bit Compound Timer x 2ch (Interval Timer/PWM/PWC/ Input Capture Selectable)	4	-	-	-	1	-	1	-	-	-	-	-	-	Low-voltage Detection Reset, Clock Supervisor	On-chip Debug		
	MB95F816K						36K	1K																											
	MB95F818K						60K	2K																											

Traveo Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC[V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	12bit AD Converter [ch/unit]	12bit AD Converter with 4ch sample & hold	DA Converter [bit x ch]	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I2C [ch]	UART/S [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]	USB-Function [ch]	LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
CAN/AUTOMOTIVE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
MB9D560	MB9DF564MA	200	TEQFP -208	1.1 to 1.3 4.5 to 5.5	-	Main Flash +Work Flash	(640K +64K) x2	64K x2	-	16	8	-	125	32(1)	8(2)	10bit x 2	32bitFree-Run Timer x 5ch	16bit Base Timer x 12ch (PWM/PPG/Reload/PWC Selectable)	32bitInput Capture x 3unit 6ch	16bitFree-Run Timer x 20ch	16bit Input Capture x 8unit 15ch	16bitOutput Compare x 12unit 24ch	Waveform Generator x 4unit 24ch	4	-	Multi Function Serial x 5ch (LIN/UART/SIO Selectable)	3	-	-	-	✓	ARM Cortex-R5 CAN: 64msb, RDC x 2unit, Motor vector accelaretor x 2unit	On-Chip Debug																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	MB9DF564MG																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	MB9DF565MA																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	MB9DF565MG																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
	MB9DF566MA						(1152K +64K) x2	128K x2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

Traveo Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	12bit AD Converter [ch/unit]	12bit AD Converter with 4ch sample & hold	DA Converter [bit x ch]	Timer								Serial			Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I2C [ch]	UART/SI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]				
CAN/AUTOMOTIVE																																		
S6J3200	S6J323CKS	240	TEQFP -208	1.1 to 1.3 3.0 to 3.6 4.5 to 5.5	✓	Main Flash +Work Flash	2112K + 112K	TC-RAM: 128KB System - RAM: 128KB Backup - RAM: 16KB VRAM: 2048KB	Instruction: 16 Data: 16	16	16	-	120	46(1)	-	-	24	12	24	Reload Timer x 14ch 16bit Base Timer x 24ch (PWM/PPC/Reload/PWC Selectable)	2	RTC x 1ch	Multi Function Serial x 12ch (LIN/UART/SIO/I2C Selectable)	CAN-FD x 4ch	-	-	30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,	On-Chip Debug					
	S6J323CKU		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J323CLS		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J323CLU		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J324CKS		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J324CKU		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J324CLS		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J325CKS		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J325CKU		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system,			
	S6J325CLS		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch,			
	S6J325CLU		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch,			
	S6J326CKS		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system,			
	S6J326CKU		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system,			
	S6J326CLS		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system,			
	S6J326CLU		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system,			
	S6J327CKS		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system,			
	S6J327CKU		TEQFP -208																											30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system,			
	S6J327CLS		TEQFP -216 (0.4mm pitch)																											32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system			
S6J327CLU	TEQFP -216 (0.4mm pitch)	32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D Graphic Engine, Display Output x 2ch, Sound system																															
S6J328CKS	TEQFP -208	30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system																															
S6J328CKU	TEQFP -208	30 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system																															
S6J328CLS	TEQFP -216 (0.4mm pitch)	32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system																															
S6J328CLU	TEQFP -216 (0.4mm pitch)	32 x 4	ARM Cortex-R5, Ethernet AVB, Media-LB, SHE(Secure Hardware Extension), SMC x 6ch, Sound generator x 4ch, 2D+3D Graphic Engine, Display Output x 2ch, FPD-Link, Sound system																															

FCR4 Family – 32bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer										Serial		Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I2C [ch]	UART/SPI [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]				
HYBRID AUTOMOTIVE INSTRUMENTS CLUSTER																																			
MB9DF125	MB9DF125PMC	128	LQFP-176	1.1 to 1.3 3.0 to 5.5	✓	FLASH	1088	128	8	8	32	-	123	50(1)	-	-	8	8	8	10	-	-	24	2	-	1	2	3	2	2	-	-	-	ARM Cortex R4, SHE (Secure Hardware Extension), Real Time Clock, Stepper Motor Controller (SMC): 4 ch, Data Flash: 48KB, Windows Watchdog, Clock supervisor, Sound Generator, I2S: 2 ch, Quad SPI Flash Interface: 1 ch, NMI (intern/extern): 32/1 ch, CRC Hardware Module: 1 ch, Protection Unit: MPU, PPU, TPU, various Power Down modes	On-chip Debug
	MB9DF125EPMC																																ARM Cortex R4, SHE (Secure Hardware Extension), Real Time Clock, Stepper Motor Controller (SMC): 6 ch, Data Flash: 48KB, Windows Watchdog, Clock supervisor, Sound Generator, I2S: 2 ch, Quad SPI Flash Interface: 1 ch, NMI (intern/extern): 32/1 ch, CRC Hardware Module: 1 ch, Protection Unit: MPU, PPU, TPU, various Power Down modes	On-chip Debug	
MB9DF126	MB9DF126BPMC	128	LQFP-176	1.1 to 1.3 3.0 to 5.5	✓	FLASH	2176	208	16	8	32	-	110	50(1)	-	-	8	8	8	10	-	-	24	2	-	1	2	3	2	3	-	-	-	ARM Cortex R4, APIX Remote handler with 2 ch AIC (APIX Inter Connect), APIX1 Phy: 1 ch, Real Time Clock, Stepper Motor Controller (SMC): 6 ch, Data Flash: 64KB, Windows Watchdog, Clock supervisor, Sound Generator, I2S: 2 ch, Quad SPI Flash Interface: 1 ch, NMI (intern/extern): 32/1 ch, CRC Hardware Module: 1 ch, Protection Unit: MPU, PPU, TPU, various Power Down modes	On-chip Debug
MB9EF226	MB9EF226PMC	128	LQFP-176	1.1 to 1.3 3.0 to 5.5	✓	FLASH	2176	128	16	8	32	-	117	50(1)	-	-	8	8	8	10	-	-	24	2	-	1	2	3	2	2	-	-	-	ARM Cortex R4, 2D Graphics Engine: scaler, color palette, gamma correction, blending, raster operation, various alpha blending modes, run-length decoding, hor/ver flip and rotation, affine transformations, Embedded Video-RAM: 1MB, TFT Output Interface: RGB888/RSDS Output, SHE (Secure Hardware Extension), Real Time Clock, Stepper Motor Controller (SMC): 4 ch, Data Flash: 48KB, Windows Watchdog, Clock supervisor, Sound Generator, I2S: 2 ch, Quad SPI Flash Interface: 2 ch(1 ch for MCU and 1 ch for Graphic), NMI (intern/extern): 32/1 ch, MediaLB (3 wire): 1 ch, CRC Hardware Module: 1 ch, Protection Unit: MPU, PPU, TPU, various Power Down modes	On-chip Debug
	MB9EF226EPMC																																	ARM Cortex R4, 2D Graphics Engine: scaler, color palette, gamma correction, blending, raster operation, various alpha blending modes, run-length decoding, hor/ver flip and rotation, affine transformations, Embedded Video-RAM: 1MB, TFT Output Interface: RGB888/RSDS Output, SHE (Secure Hardware Extension), Real Time Clock, Stepper Motor Controller (SMC): 6 ch, Data Flash: 48KB, Windows Watchdog, Clock supervisor, Sound Generator, I2S: 2 ch, Quad SPI Flash Interface: 2 ch(1 ch for MCU and 1 ch for Graphic), NMI (intern/extern): 32/1 ch, MediaLB (3 wire): 1 ch, CRC Hardware Module: 1 ch, Protection Unit: MPU, PPU, TPU, various Power Down modes	On-chip Debug

[illegible]

CYPRESS SEMICONDUCTOR | MICROCONTROLLER PRODUCT SELECTOR GUIDE

* In development; **Planning

F²MC-16FX – 16bit Microcontrollers

Series Name	Product Name	Maximum Internal Clock Frequency [MHz]	Package [pin]	Operating Voltage: VCC [V]	Sub Clock	Memory Type	ROM [byte]	RAM [byte]	Cache [Kbyte]	DMAC [ch]	Ext. Interrupt [ch]	External Bus	Maximum I/O port [ch]	10bit AD Converter [ch/unit]	12bit AD Converter [ch/unit]	DA Converter [bit x ch]	Timer										Serial		Communication			LCD Controller [seg x com]	Three-phase Inverter	Note	Evaluation Device																																
																	Output Compare [ch]	Free-Run Timer [ch]	Input Capture [ch]	Reload Timer [ch]	PWM Timer [ch]	PWC Timer [ch]	PPG Timer [ch]	Up/Down Counter [ch]	Other timers [ch]	I ² C [ch]	UART/Sl [ch]	SIO [ch]	LIN/UART/SIO [ch]	CAN [ch]	USB-Host [ch]					USB-Function [ch]																															
AUTOMOTIVE																																																																			
MB96340	MB96345RS	56	LQFP-100	3.0 to 5.5	-	MASK	160K	8K	-	6	16	✓	82	24(1)	-	-	8	2	8	4 +1 (Dedicated for PPG)	-	16	-	-	-	2	-	-	7	2	-	-	-	-	Option without CAN	MB96V300C																															
	MB96345RW				✓		288K	16K																						80																																					
	MB96346RS				-		160K +64K	8K																						82							1																														
	MB96346RW				✓																									80							-																														
	MB96F345DS	40			-	FLASH	288K	16K																						-							6	16	✓	82	2																										
	MB96F345DW				✓																																			80	-																										
	MB96F346AS				-		416K	24K																																82	-																										
	MB96F346AW				✓																																			80	-																										
	MB96F346RS	56			-		544K	24K																																82	2																										
	MB96F346RW				✓																																			80	-																										
	MB96F347AS				-		544K	24K																																82	-																										
	MB96F347AW				✓																																			80	-																										
	MB96F347RS				-		544K	24K																																82	2																										
	MB96F347RW				✓																																			80	-																										
	MB96F348AS				-		544K	24K																																82	-																										
	MB96F348AW				✓																																			80	-																										
	MB96F348RS				-		544K	24K																																82	2																										
	MB96F348RW				✓																																			80	-																										
	MB96F348HS				-		544K +32K	24K																																82	2																										
	MB96F348HW				✓																																			80	-																										
MB96350	MB96F353AS	56	LQFP-64	3.0 to 5.5	-	FLASH	96K	8K	-	4	13	✓	51	15(1)	-	-	4	4	6 +3 (Dedicated for LIN)	4 +1 (Dedicated for PPG)	-	-	20	-	-	1	-	-	4		1	-	-	-	-	Option without CAN				MB96V300C																											
	MB96F353AW				✓								49																		-																																				
	MB96F353RS				-								51																		-																																				
	MB96F353RW				✓								49																		-																																				
	MB96F355AS				-		160K	12K					51																		-																																				
	MB96F355AW				✓								49																		-																																				
	MB96F355RS				-								51																		-																																				
	MB96F355RW				✓								49																		-																																				
	MB96F356AS				-		288K	12K					51																		-																																				
	MB96F356AW				✓								49																		-																																				
	MB96F356RS				-								51																		-																																				
	MB96F356RW				✓								49																		-																																				
	MB96370				MB96F378HS		40	LQFP-144					3.0 to 5.5																	-	FLASH						544K +32K	28K	-		7	8	✓	120	22(1)	-	-	6	2	8	4 +1 (Dedicated for PPG)	-	-	12	-	-	2	-	-	6	2	-	-	72 x 4	-	SMC x 6ch Sound generator x 2ch	MB96V300C
					MB96F378HW																									✓							118	-																													
MB96F379RS		-	120	-																																																															
MB96F379RW		✓	118	-																																																															
MB96380	MB96384RS	56	LQFP-120	3.0 to 5.5	-	MASK	128K	6K	-	7	8	✓	96	16(1)	-	-	4	2	8	4 +1 (Dedicated for PPG)	5	-	8	-	-	1	-	-	5	1	-	-	65 x 4	-	SMC x 5ch Sound generator x 2ch	MB96V300C																															
	MB96384RW				✓		94	-																																																											
	MB96385RS				-		96	-																																																											
	MB96385RW				✓		94	-																																																											
	MB96F385RS	40			-	FLASH	160K	6K					96																	-																																					
	MB96F385RW				✓								94																	-																																					
	MB96F386RS				-		288K	16K					96																	-																																					
	MB96F386RW				✓								94																	-																																					
	MB96F387RS	56			-		416K	16K					96																	-																																					
	MB96F387RW				✓								94																	-																																					
	MB96F388HS				-		544K +32K	28K					96																	-																																					
	MB96F388HW				✓								94																	-																																					
	MB96F389RS	40			-	544K	32K	96					-																																																						
	MB96F389RW				✓			94					-																																																						
	MB96390	MB96393RS			40	LQFP-100	3.0 to 5.5	-					MASK																	96K							5K	-	-	8	-	76	11(1)	-	-	4	2	4	4 +1 (Dedicated for PPG)	4	-	4	-	-	1	-	-	3	1	-	-	49 x 4	-	SMC x 4ch Sound generator x 1ch	MB96V300C		
		MB96393RW						✓																						74							-																														
MB96395RS		-	76	-																																																															
MB96395RW		✓	74	-																																																															
MB96F395RS		40						-	FLASH	160K	8K	76	-																																																						
MB96F395RW								✓				76	-																																																						
MB96F395RS								-		160K	8K	76	-																																																						
MB96F395RW								✓				74	-																																																						



Cypress Semiconductor Corporation

198 Champion Court, San Jose CA 95134

phone +1 408.943.2600 fax +1 408.943.6848

toll free +1 800.858.1810 (U.S. only) Press "1" to reach your local sales representative

© 2015 Cypress Semiconductor Corporation. All rights reserved. All other trademarks are the property of their respective owners.

Doc# 002-06949 Rev. *A