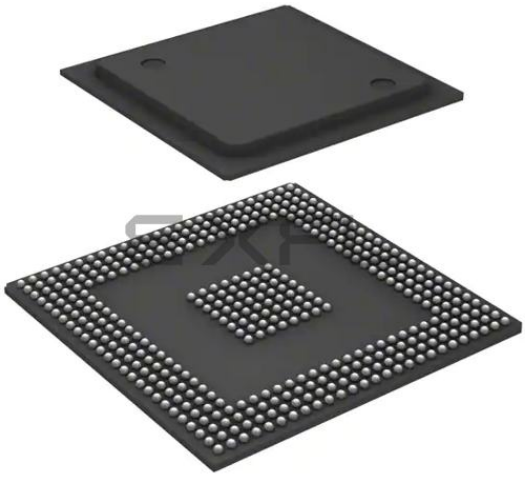

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What is "Embedded - Microcontrollers"?

"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	TriCore™
Core Size	32-Bit Single-Core
Speed	180MHz
Connectivity	ASC, CANbus, EBI/EMI, MLI, MSC, SSC
Peripherals	DMA, POR, WDT
Number of I/O	219
Program Memory Size	4MB (4M x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	224K x 8
Voltage - Supply (Vcc/Vdd)	1.42V ~ 1.58V
Data Converters	A/D 48x12b
Oscillator Type	External
Operating Temperature	-40°C ~ 125°C (TA)
Mounting Type	Surface Mount
Package / Case	416-BBGA
Supplier Device Package	PG-BGA-416-10
Purchase URL	https://www.e-xfl.com/product-detail/infineon-technologies/sak-tc1797-512f180e-ac

egister names contain a module name prefix , separated by an underscore character "_" from the actual register name (for example, "ASC0_CON", where "ASC0" is the module name prefix, and "CON" is the kernel register name). In chapters describing the kernels of the peripheral units, the kernel register names The peripheral unit registers are referenced in their the actual register names with the prefixes

- Variables used to describe sets of p ering units separate register name "MSGCFG" refers to the prand variables. For example, egi register variable n The bits of the variables are always given where the register position is used (for example, "n = 0-31"), and are separated as needed in the rest of the text

- The default radix is decimal Hexadecimal constants are fix ed in a subscript letter "H", as in 100 $_H$. Binary constants are fixed in a subscript letter "B", as in 111$_B$.

- When the rest of register fields, groups of bits, or groups of bits are clearly named in the body of the document, they are represented as "NAME[A:B]", which defines a range from the name and groups B to A. Individual bits in a group are given as "NAME[C]", where the range of the variable C is given in the text. For example CFG[2:0] and SRPN[0].

- Units are abbreviated as follows
  - MHz = Megahertz
  - µs = Microseconds
  - kBaud, kbit = 1000 characters/bits per second
  - MBaud, Mbit = 1,000,000 characters/bits per second
  - Kbyte, KB = 1024 bytes/bytes per
  - Mbyte, MB = 1048576 bytes/bytes per

  In general, the k prefix scales a unit by 1000, whereas the K prefix scales a unit by 1024. Hence, the Kbyte unit scales the exponent preceding it by 1024. The kBaud unit scales the exponent preceding it by 1000. The M prefix scales by

  - f_{GPTA}/4 maximum signal frequency in 2-sensor Mode, f_{GPTA}/6 maximum signal frequency in 3-sensor Mode
- Duty Cycle Measurement (DCM)
  - Four independent units
  - 0 - 100% range and interrupt handling
  - f_{GPTA} clock
  - f_{GPTA}/2 maximum signal frequency
- Digital Phase Locked Loop (PLL)
  - One unit
  - Ability to multiply factor between 1 and 65535
  - f_{GPTA} clock
  - f_{GPTA}/2 maximum signal frequency
- Clock Distribution Unit (CDU)
  - One unit
  - Provides internal clock signals
    f_{GPTA}, divided f_{GPTA} clocks, FPC1/FPC4 prescaler, DCM clock, LTC prescaler clock

Signal Generation Unit

- Global Timers (GT)
  - Two independent units
  - Two operating modes (Free-Running Timer and Reload Timer)
  - 24-bit data width
  - f_{GPTA} clock
  - f_{GPTA}/2 maximum signal frequency
- Global Timer Cell (GTC)
  - 32 interrupt lines to the Global Timers
  - Two operating modes (Capture, Compare and Capture after Compare)
  - 24-bit data width
  - f_{GPTA} clock
  - f_{GPTA}/2 maximum signal frequency
- Local Timer Cell (LTC)
  - 64 independent units
  - Three basic operating modes (Timer, Capture and Compare) for 63 units
  - Special compare mode for one unit
  - 16-bit data width
  - f_{GPTA} clock
  - f_{GPTA}/2 maximum signal frequency

Interrupt Sharing Unit

- 286 interrupt lines, generating up to 92 service requests

Table 11 ADC Characteristics (cont'd) (Operating Conditions apply)

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gain error [9)5)]	EA_{GAIN} CC	–	±0.5	±3.5	LSB	12-bit conversion mode [8)10)]
Offset error [9)5)]	EA_{OFF} CC	–	±1.0	±4.0	LSB	12-bit conversion mode [8)10)]
Input leakage current at analog inputs ADC0/1 [11) 12) 13)]	I_{OZ1} CC	-300	–	100	nA	(0% V_{DDM}) < V_{IN} < (3% V_{DDM})
		-100	–	200	nA	(3% V_{DDM}) < V_{IN} < (97% V_{DDM})
		-100	–	300	nA	(97% V_{DDM}) < V_{IN} < (100% V_{DDM})
Input leakage current at $V_{AREF0/1/2}$, pins	I_{OZ2} CC	–	–	±1.5	µA	0 V < V_{AREF} < V_{DDM}, converter stopped
Input current at $V_{AREF0/1/2}$ [16)], pins	I_{AREF} CC	–	35	75	µA	0 V < V_{AREF} < V_{DDM} [14)]
Total capacitance of the voltage reference input [15)16)]	$C_{AREFTOT}$ CC	–	20	40	pF	[8)]
Switched capacitance at the reference voltage input [16)]	C_{AREFSW} CC	–	15	30	pF	[8)17)]
Resistance of the reference voltage input path [15)]	R_{AREF} CC	–	500	1000	Ω	500 Ohm reserved for AN[1:0] used as reference input [8)]
Total capacitance of the analog input [15)]	C_{AINTOT} CC	–	25	30	pF	[1)8)]

5.2.3 Fast Analog to Digital Converter (FADC)

All parameters of the FADC are indifferential mode, which is the default and the intended mode of operation, and which takes advantage of any noise cancellation effects inherent to differential measurements in general.

Table 13 FADC Characteristics (Operating Conditions)

Parameter	Symbol		Values			Unit	Note / Test Condition
			Min.	Typ.	Max.		
DNL error	EF_{DNL}	CC	–	–	1	LSB	9)
INL error	EF_{INL}	CC	–	–	4	LSB	9)
Gradient error 9)	EF_{GRAD}	CC	–	–	5	%	With calibration, gain 1, 2, 4
			–	–	6	%	With calibration, gain 8
Offset error 9)1)	EF_{OFF} 2)	CC	–	–	20 3)	mV	With calibration 1)
			–	–	90 3)	mV	Without calibration
Reference error of internal $V_{FAREF}/2$	EF_{REF}	CC	–	–	60	mV	–
Analog power supplies	V_{DDMF}	SR	3.13	–	3.47 4)	V	–
	V_{DDAF}	SR	1.42	–	1.58 5)	V	–
Analog ground voltage	V_{SSAF}	SR	-0.1	–	0.1	V	–
Analog reference voltage	V_{FAREF}	SR	3.13	–	3.47 4)6)	V	Nominal 3.3 V
Analog reference ground	V_{FAGND}	SR	V_{SSAF} - 0.05 V	–	V_{SSAF} + 0.05 V	V	–
Analog input voltage range	V_{AINF}	SR	V_{FAGND}	–	V_{DDMF}	V	–
Analog power supply currents	I_{DDMF}	SR	–	–	15	mA	–
	I_{DDAF}	SR	–	–	12	mA	7)
Input current at V_{FAREF}	I_{FAREF}	CC	–	–	120	µA/MHz	Independent of conversion
Input leakage current at V_{FAREF} 8)	I_{FOZ2}	CC	–	–	500	nA	0 V < V_{IN} < V_{DDMF}
Input leakage current at V_{FAGND} 8)	I_{FOZ3}	CC	–	–	8	µA	0 V < V_{IN} < V_{DDMF}