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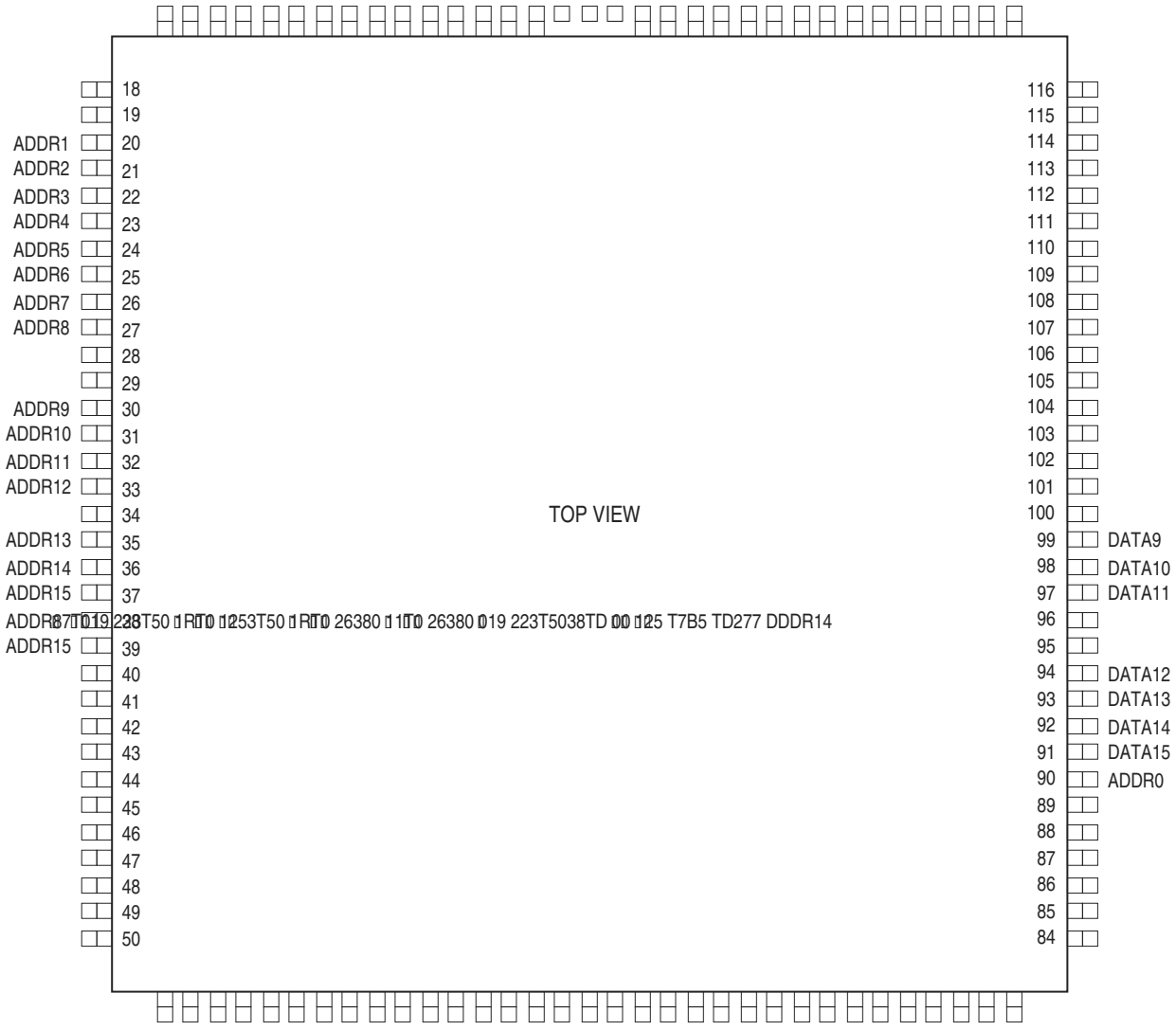
What is "Embedded - Microcontrollers"?

"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	CPU32
Core Size	32-Bit Single-Core
Speed	20.97MHz
Connectivity	EBI/EMI, SCI, SPI, UART/USART
Peripherals	WDT
Number of I/O	48
Program Memory Size	-
Program Memory Type	ROMless
EEPROM Size	-
RAM Size	2K x 8
Voltage - Supply (Vcc/Vdd)	4.5V ~ 5.5V
Data Converters	-
Oscillator Type	External
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Through Hole
Package / Case	132-BPGA
Supplier Device Package	132-PGS (34.55x34.55)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/ts68332vr16a

Figure 3. CERQUAD Terminal Designation



The total thermal resistance of a package ($_{JA}$) can be separated into two components, $_{JC}$ and $_{CA}$, representing the barrier to heat flow from the semiconductor junction to the package (case), surface ($_{JC)}$ and from the case to the outside ambient ($_{CA}$). These terms are related by the equation:

$$_{JA} = _{JC} + _{CA} \quad (4)$$

$_{JC}$ is device related and cannot be influenced by the user. However, $_{CA}$ is user dependent and can be minimized by such ther mal management techniques as heat sinks, ambient air cooling and thermal convection. Thus, good thermal management on the part of the user can significantly reduce $_{CA}$ so that $_{JA}$ approximately equals $_{JC}$. Substitution of $_{JC}$ for $_{JA}$ in equation (1) will result in a lower semiconductor junction temperature.

Mechanical and Environment

The microcircuits shall meet all mechanica l environmental requirements of either MIL-STD-883 for class B devices or screened according to Atmel-Grenoble standards devices.

Marking

The document where are defined the marking are identified in the related reference documents. Each microcircuit are legible and permanently marked with the following information as minimum:

- Atmel logo
- Manufacturer's part number
- Class B identification
- Date-code of inspection lot
- ESD identifier if available
- Country of manufacturing

Quality Conformance Inspection

DESC/MIL-STD-883

Is in accordance with MIL-M-38535 and method 5005 of MIL-STD-883. Group A and B inspections are performed on each production lot. Group C and D inspection are performed on a periodical basis.

Electrical Characteristics

General Requirements

All static and dynamic electrical characteristics specified and the relevant measurement conditions are given below. For inspection purpose, refer to relevant specification:

- DSCC

(last issue on request to our marketing services)

Table 4: Static electrical characteristics for all electrical variants.

Table 6: Dynamic electrical characteristics for 6832-16 (16.78 MHz).

For static characteristics, test methods refer to IEC 748-2 method number, where existing.

For dynamic characteristics, test methods refer to clause 5.4 hereafter of this specification.

Static Characteristics

Table 4. DC Characteristics. V_{DD} and V_{DDSYN} = 5.0V$_{DC}$ ± 10% for 16.78 MHz and 5.0V $_{DC}$ ± 5% for 20.97 MHz; V_{SS} = 0V$_{DC}$; T_C = -55°C to +125°C or -40°C to +85°C

Number	Symbol	Parameter		16.78 MHz		20.97 MHz		Unit
				Min	Max	Min	Max	
1	V_{IH}	Input High Voltage		0.7 (V_{DD})	V_{DD}+0.3	0.7(V_{DD})	V_{DD}+0.3	V
2	V_{IL}	Input Low Voltage		V_{SS} - 0.3	0.2(V_{DD})	V_{SS} - 0.3	0.2(V_{DD})	V
3	V_{HYS}	Input Hysteresis[1]		0.5	-	0.5	-	V
4	I_{IN}	Input Leakage Current[2] V_{IN} = V_{DD} or V_{SS}	Input-only pins	- 2.5	2.5	- 2.5	2.5	µA
5	I_{OZ}	High Impedance (off-state) Leakage Current [2] V_{IN} = V_{DD} or $V_{SS\,L}$	All input/output and output pins	- 2.5	2.5	- 2.5	2.5	µA
6	V_{OH}	CMOS Output High Voltage [2][3] I_{OH} = -10.0 µA	Group 1, 2, 4 input/output and all output pins and all output pins	V_{DD} - 0.2	-	V_{DD} - 0.2	-	V
7	V_{OL}	CMOS Output High Voltage [2] I_{OH} = -10.0 µA	Group 1, 2, 4 input/output and all output pins	-	0.2	-	0.2	V
8	V_{OH}	Output High Voltage [2][3] I_{OH} = -0.8 mA	Group 1, 2, 4 input/output and all output pins	V_{DD} - 0.8	-	V_{DD} - 0.8	-	V
9	V_{OL}	Output Low Voltage [2]						
		I_{OL} = 1.6 mA	Group 1 I/O pins CLKOUT, FREEZE/QUOT, $\overline{IPIPE}$	-	0.4	-	0.4	V
		I_{OL} = 5.3 mA	Group 2, 4 I/O pins, $\overline{CSBOOT}$, $\overline{BG}$/$\overline{CS}$	-	0.4	-	0.4	V
		I_{OL} = 12 mA	Group 3	-	0.4	-	0.4	V
10	V_{IHTSC}	Three State Control Input High Voltage		1.6(V_{DD})	9.1	1.6(V_{DD})	9.1	V
11	I_{MSP}	Data Bus Mode Select Pull-up Current[5]						
		V_{IN} = V_{IL}	DATA [15:0]	-	-120	-	-120	µA
		V_{IN} = V_{IH}	DATA [15:0]	-15	-	- 15	-	µA
12		V_{DD} supply current[5]						
	I_{DD}	RUN[6]		-	124	-	140	mA
	I_{DD}	RUN, TPU emulation mode		-	134	-	150	mA
	S_{IDD}	LPSTOP, 32.768 kHz crystal, VCO off (STSIM = 0)		-	350	-	350	µA
	S_{IDD}	LPSTOP (external clock input frequency = maximum f_{sys})		-	5	-	5	mA

Test Conditions Specific to the Device

Time Definitions

The times specified in Table 6 as dynamic characteristics are defined in Figure 4 to Figure 15 below, by a reference number given the column “NUM” of the tables together with the relevant figure number.

Figure 4. Clkout Output Timing Diagram

Note: Timing shown with respect to 20% and 70% V_{DD}.

Figure 5. External Input Timing Diagram

Note: Timing shown with respect to 20% and 70% V_{DD}. Pulse width shown with respect to 50% $V_{DD.}$

Figure 6. ECLK Output Timing Diagram

Note: Timing Shown With Respect To 20% And 7% V_{DD}.

Figure 11. Bus Arbitration Timing Diagram – Active Bus Case

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