TS6303 • TS63A03 • TS63B03

PRODUCT PREVIEW

8-BIT MICROPROCESSING UNIT

The TS6303 is an 8-bit CMOS microprocessing unit which has the completely compatible instruction set with the TS6301. 128 bytes RAM, Serial Communication Interface (SCI), parallel I/O ports and multi function timer are incorporated in the TS6303. It is bus compatible with TS6800 and can be expanded up to 65 kwords. Like the TS6800 family, I/O levels is TTL compatible with +5.0 V single power supply. As the TS6303 is CMOS MPU, power dissipation is extremely low. And also TS6303 has Sleep Mode and Stand-by Mode as lower power dissipation mode. Therefore, flexible low power consumption application is possible.

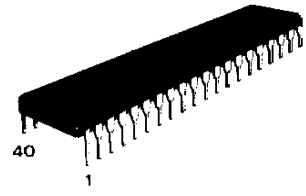
- Object Code Upward Compatible with the TS6800, TS6801, TS6802.
- Multiplexed Bus ($D_0 \sim D_7/A_0 \sim A_7$), Non Multiplexed Bus.
- Abundant On-Chip Functions Compatible with the TS6301; 128 Bytes RAM, 13 Parallel I/O Lines, 16-bit Timer, Serial Communication Interface (SCI).
- Low Power Consumption Mode; Sleep Mode, Stand-by Mode.
- Minimum Instruction Execution Time
  1 μs (f = 1 MHz), 0.67 μs (f = 1.5 MHz), 0.5 μs (f = 2.0 MHz).
- Bit Manipulation, Bit Test Instruction.
- Error Detecting Function; Address Trap, Op Code Trap.
- Up to 65 kwords Address Space.

PART NUMBER	CLOCK FREQ
TS6303R	1 MHz
TS63A03R	1.5 MHz
TS63B03R	2 MHz

CMOS

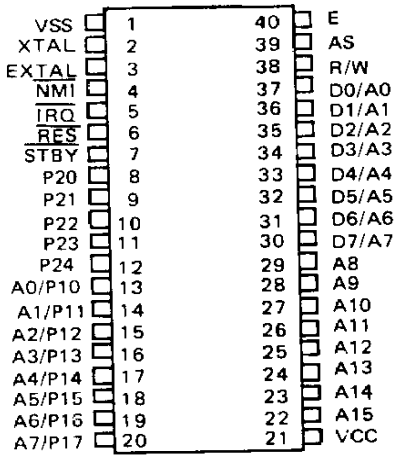
8-BIT MICROPROCESSING UNIT

CASE CB-182



P SUFFIX
PLASTIC PACKAGE

PIN ASSIGNMENT



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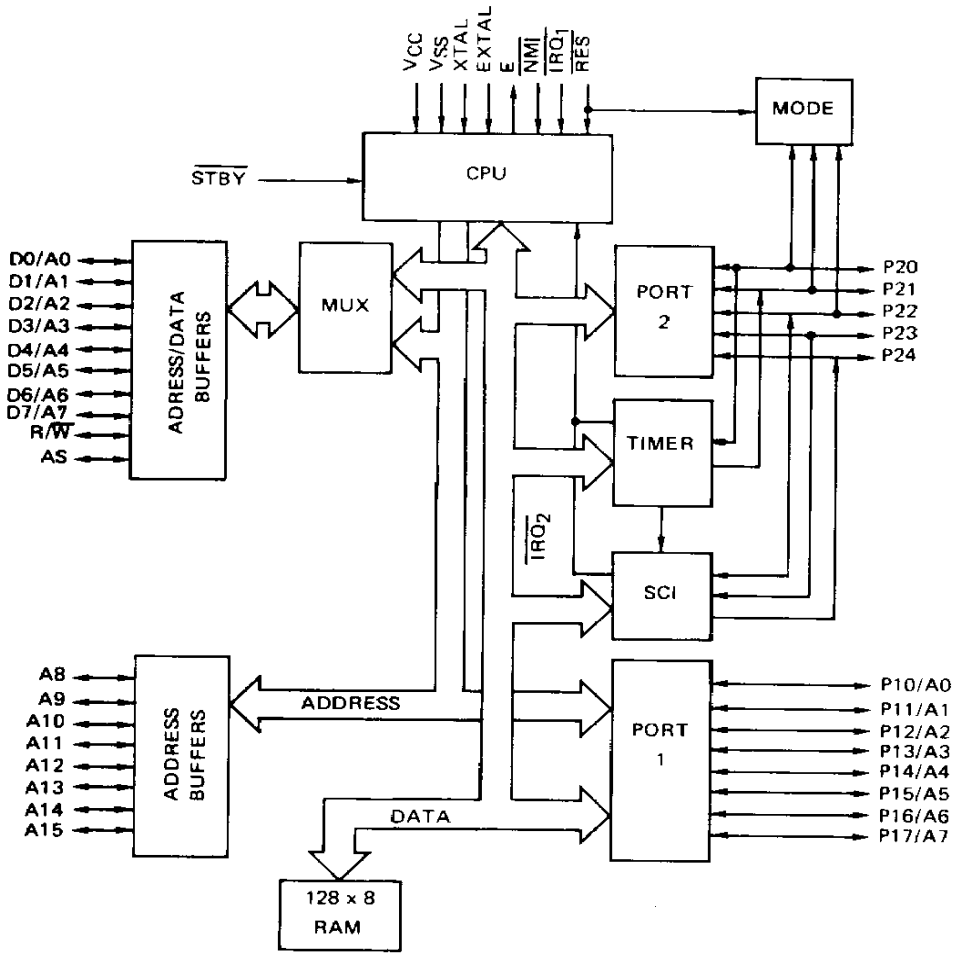
BLOCK DIAGRAM



These specifications are subject to change without notice.
Please inquire with our sales offices about the availability of the different packages

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MICROCOMPUTERS

4 BITS: ET9400 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 4	INSTRUCTION CYCLE (µs)	SUPPLY (V)	ALT. SOURCE	Nb PINS
ETL9410/11/13	NMOS Low Power	512	32	15-40	4.5-6.3	COP410L/11L/13L	24/20
ET9420/21/22	NMOS	1024	64	4-10	4.5-6.3	COP420/21/22	28/24/20
ETL9420/21/22	NMOS Low Power	1024	64	15-40	4.5-6.3	COP420L/21L/22L	28/24/20
ETL9444/45	NMOS Low Power	2048	128	15-40	4.5-6.3	COP444L/45L	28/24
ET94100/110/144	NMOS	512 to 2048	32 to 128	4-15	4.5-6.3	—	24/28/40

Common features: software compatible (same instruction set). Pin compatible. Three levels of stack. 8 bidirectional tristate I/O. Serial I/O and internal counter, interrupt programmable I/O. All devices are with plastic package (DIL) and also available with extended temperature range (-40°C to +85°C): ET93XX or ETC93XX.

MICROCOMPUTERS

8 BITS: EF6804 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 8	I/O	ALT. SOURCE	Nb PINS
EF6804P2	HMOS	1024	32	20	MC6804P2	28
EF6804J2*	HMOS	1024	32	12	MC6804J2	20
EF68HC04J3*	HCMOS	2048	124	12		20

Available in plastic, ceramic, DIL packages or chip-carriers. All software compatible. Timer.

MICROCOMPUTERS

8 BITS: EF6805 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 8	I/O	FEATURES	ALT. SOURCE	Nb PINS
EF6805P2	HMOS	1100	64	20	—	MC6805P2-HD6805S1	28
EF6805P4	HMOS	1100	112	20	Stand-by RAM	MC6805P4	28
EF6805P6	HMOS	1796	64	20	—	MC6805P6	28
EF6805R2	HMOS	2048	64	32	A/D Converter	MC6805R2	40
EF6805R3	HMOS	3776	112	32	A/D Converter	MC6805R3-HD6805W0	40
EF6805T2	HMOS	2508	64	19	On-chip PLL	MC6805T2	28
EF6805U2	HMOS	2048	64	32	—	MC6805U2	40
EF6805U3	HMOS	3776	112	32	—	MC6805U3	40
EF6805CT4	HMOS	4096	240	29	UACC, stand-by RAM	MC6805CT	40
EF6805TV*	HMOS	6144	96	32	Remote contl. interf.		40

Available in plastic, ceramic, DIL packages or chip-carrier. Ext. temp range (-40°C, +85°C). All software compatible. Interrupt capabilities. Timer.

MICROCOMPUTERS

8 BITS: EF6801 FAMILY

PART Nber	TECHNOLOGY	ROM x 8	RAM x 8	I/O	FEATURES	ALT. SOURCE	Nb PINS
EF6801	HMOS	2048	128	31	SCI, Timer, stand-by RAM	MC6801 HD6801-S0	40
EF6801-U4	HMOS	4096	192	31	Enhanced SCI and Timer Stand-by RAM	MC6801-U4 HD6801-V0	40
EF68HC11*	HCMOS	4096	256		SCI-SPI-EEPROM ADC-Enhanced Timer Real Time Inter. Watchdog	MC68HC11A4	48/52

Common features: 8 x 8 multiply instruction. Timer. 64 Kbyte addressing space. Serial communication interface. All devices available with DIL ceramic or plastic package and surface mount package (-40°C to +85°C).

* To be introduced.

PART Nber	DESCRIPTION	ALT. SOURCE	Nb PINS
TS2901B	4 Bit bipolar microprocessor slice	AM2901B	40
TS2901C	Improved speed 4 Bit microprocessor slice	AM2901C	40
TS2902A	High speed look-ahead carry generator	AM2902A	16
TS2909A	Microprogram sequencer	AM2909	28
TS2910	Microprogram controller	AM2910	40
TS2911A	Microprogram sequencer	AM2911	20
TS2914	Vectored priority interrupt controller	AM2914	40
TS2915A	Quad 3 State Bus Transceiver with interface logic	AM2915	24
TS2917A	Quad 3 State Bus Transceiver with interface logic	AM2917A	20
TS2918	Quad D register with standard and 3 State Outputs	AM2918	16
TS2919	Quad D register with Dual 3 State Outputs	AM2919	20

6800 MICROPROCESSORS

8 BIT MPU

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF6800	Bidirectional data and address bus 16 bit address bus	NMOS	MC6800	1
EF68A00	DMA capabilities		MC68A00	1.5
EF68B00	72 instructions - 7 addressing modes		MC68B00	2
EF6802	128 bytes of RAM On chip oscillator	NMOS	MC6802	1
EF68A02	Expandable up to 64 kbytes 72 instructions - 7 addressing modes		MC68A02	1.5
EF68B02	6800 compatible		MC68B02	2
EF6803	EF6801 without ROM - 128 bytes of RAM	HMOS	MC6803	1
EF6803-1	Multiplexed address and data bus 16 bit address bus - 8 x 8 multiply		MC6803-1	1.25
EF68A03	Serial communication interface		MC68A03	1.5
EF68B03	16 bit timer - 6800 compatible		MC68B03	2
EF6803U4	Same as above with 192 bytes of RAM and enhanced timer	HMOS	MC6803U4	1
EF68A03U4			MC68A03U4	1.5
EF68B03U4			MC68B03U4	2
EF68HC05E2	Low power consumption - 6805 family Fully compatible with MC146805E2	HCMOS		1
EF6809	High performance 8-bit MPU with n-chip clock 64 kbytes addressing space	HMOS	MC6809	1
EF68A09	Internal 16 bit structure 59 instruction types - 10 addressing modes		MC68A09	1.5
EF68B09	6800 compatible		MC68B09	2
EF6809E	External clock version of EF6809	HMOS	MC6809E	1
EF68A09E			MC68A09E	1.5
EF68B09E			MC68B09E	2

MICROPROCESSORS

16 BITS: EF68000 FAMILY

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF68000-8	16 bit MPU 32 bit data and address registers	HMOS	MC68000-8	8
EF68000-10	16 megabyte direct addressing range 56 powerful instruction types		MC68000-10	10
EF68000-12	Memory mapped I/O		MC68000-12	12.5
EF68000-16	14 addressing modes			16
EF68008-8	8 bit data bus version of EF68000	HMOS	MC68008-8	8
EF68008-10	1 megabyte direct addressing space Complete code compatibility with the EF68000		MC68008-10	10
EF68008-12			MC68008-12	12.5

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
TS68020	32-bit MPU 4 Gigabyte direct, addressing range Virtual memory machine support Coprocessor interface Object code compatible with the EF68000 family	HCMOS	MC68020	

6800 PERIPHERALS

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF6821	Peripheral Interface Adapter (PIA)	NMOS	MC6821	1
EF68A21	Two bidirectional 8-bit buses for interfaces to peripherals		MC68A21	1.5
EF68B21	Two programmable control registers Two programmable data direction registers		MC68B21	2
EF6840	Programmable Timer Module (PTM)	NMOS	MC6840	1
EF68A40	Three 16-bit binary counters		MC68A40	1.5
EF68B40	Selectable gating for frequency or pulse-width comparison		MC68B40	2
EF6850	Asynchronous Communication Interface Adapter (ACIA)	NMOS	MC6850	1
EF68A50	8 and 9 bit transmission		MC68A50	1.5
EF68B50	Peripheral/modem control functions		MC68B50	2
EF6852	Synchronous Serial Data Adapter (SSDA)	NMOS	MC6852	1
EF68A52	7, 8 or 9 bit transmission Peripheral/modem control functions		MC68A52	1.5
EF6854	Advance Data-Link Controller (ADLC)		MC6854	1
EF68A54			MC68A54	1.5
EF68B54			MC68B54	2

68000 PERIPHERALS

PART Nber	DESCRIPTION	TECHNOLOGY	ALT. SOURCE	CLOCK FREQ. (MHz)
EF68230-8	Parallel Interface/Timer (PI/T)	HMOS	MC68230-8	8
EF68230-10	EF68000 Bus Compatible		MC68230-10	10
EF68230-12	24 bit Programmable Timer Modes		MC68230-12	12.5
TS68564	Serial input/output	HMOS	MK68564	3-4-5
TS68901	Multi function peripheral	HMOS	MC68901	4
TS68HC901	CMOS Multi function peripheral	HCMOS	—	4

OTHER PERIPHERALS AND CRT CONTROLLERS

PART Nber	DESCRIPTION	TECHNOLOGY
EF9340 EF9341	Alphanumeric, semigraphic display processor 25/21 rows of 40 Color and B/W	NMOS
EF9345	Single chip alphanumeric and semigraphic display processor 25/21 rows of 40 or 80 characters Multipage memory Color and B/W	HMOS
EF9365	Graphic display coprocessor Up to 512 x 512 interlaced Upto 256 x 256 non interlaced Color and B/W	NMOS
EF9366	Graphic display coprocessor Up to 256 x 512 non interlaced Color and B/W	NMOS
EF9367	Graphic display coprocessor Up to 512 x 1024 interlaced 50/60 Hz Color and B/W	HMOS
EF9369	"Palette" circuit for selection 16 colors among 9046 Complatible with all display circuits	HMOS
EF68483	High performance display coprocessor	HMOS

STATIC RAMS

PART Nber	ORGANIZATION (word x bit)	ACCESS TIME (ns)	TECHNOLOGY	I_{CC} (mA)	I_{SB} (mA)
ET2128-3	2k x 8	150	NMOS	70	10
ET2128-4	2k x 8	200		70	10
ET2147-1	4k x 1	35	NMOS	180	30
ET2147-2	4k x 1	45		180	30
ET2147-3	4k x 1	55		180	30
ETL2147-3	4k x 1	55		125	20
EF6810			MC6810		1
EF68A10	128 x 8 static RAM		NMOS MC68A10		1.5
EF68B10			MC68B10		2

DYNAMIC RAMS

PART Nber	ORGANIZATION (word x bit)	ACCESS TIME (ns)	TECHNOLOGY	POWER SUPPLY
TS4164-2	16k x 1	150	NMOS	+5 V (±10%)
TS4164-3	16k x 1	200		+5 V (±10%)
TS41256-12	256k x 1	120	NMOS	+5 V (±10%)
TS41256-15		150		
TS41257-12	256k x 1	120	NMOS	
TS41257-15		150		

EPROMS

PART Nber	ORGANIZATION (word x bit)	ACCESS TIME (ns)	TECHNOLOGY	CONSUMPTION (mW)
ET2716Q	2k x 8	450	NMOS	525/132
ET2716Q1	2k x 8	350		525/132
ETC2716Q	2k x 8	450	CMOS	25/0.5
ETC2716Q1	2k x 8	350		25/0.5
ETC2732Q35	4k x 8	350	CMOS	25/0.5
ETC2732Q45	4k x 8	450		25/0.5
ET2764Q	8k x 8	250	NMOS	525/132
ET2764Q3	8k x 8	300		525/132
ET2764Q4	8k x 8	450		525/132
TS27C64-20	8k x 8	200	CMOS	75/0.5
TS27C64-25	8k x 8	250		75/0.5
TS27C64-30	8k x 8	300		75/0.5
ET27128Q	16k x 8	250	NMOS	525/158
ET27128Q3	16k x 8	300		525/158
ET27128Q4	16k x 8	450		525/158
TS27C256-20	32k x 8	200	CMOS	200/0.5
TS27C256-25	32k x 8	250		200/0.5
TS27C256-30	32k x 8	300		200/0.5

OTP (One Time Programmable EPROMS)

TS2764P	8k x 8	NMOS	

BIPOLAR PROMS (supply = +5 V)

PART Nber	DESCRIPTION	OUTPUT	ACCESS TIME (ns)	PACKAGE
TS71180A	1k x 8	Op. Col.	45 ns	DIL
TS71180B	1k x 8	Op. Col.	35 ns	DIL
TS71180C	1k x 8	Op. Col.	25 ns	DIL
TS71181A	1k x 8	3 State	45 ns	DIL
TS71181B	1k x 8	3 State	35 ns	DIL
TS71181C	1k x 8	3 State	25 ns	DIL
TS71280A	1k x 8	Op. Col.	45 ns	Slim Line
TS71280B	1k x 8	Op. Col.	35 ns	Slim Line
TS71280C	1k x 8	Op. Col.	25 ns	Slim Line
TS71281A	1k x 8	3 State	45 ns	Slim Line
TS71281B	1k x 8	3 State	35 ns	Slim Line
TS71281C	1k x 8	3 State	25 ns	Slim Line
TS71190A	2k x 8	Op. Col.	60 ns	DIL
TS71190B	2k x 8	Op. Col.	45 ns	DIL
TS71190C	2k x 8	Op. Col.	35 ns	DIL
TS71191A	2k x 8	3 State	60 ns	DIL
TS71191B	2k x 8	3 State	45 ns	DIL
TS71191C	2k x 8	3 State	35 ns	DIL
TS71290C	2k x 8	Op. Col.	35 ns	Slim Line
TS71291C	2k x 8	3 State	35 ns	DIL
TS71321B	4k x 8	3 State	55 ns	DIL
TS71321C	4k x 8	3 State	45 ns	DIL
TS71641	8k x 8	3 State	55 ns	DIL