

IN80CL31N/IN80CL51N

CMOS LOW-VOLTAGE SINGLE-CHIP 8-BIT MICROCONTROLLER

The 80CL31/80CL51 is a high-performance microcontroller fabricated with high-density CMOS technology. The instruction set is based on that the 80C51. The 80CL51 is general purpose microcontroller especially suited for battery powered applications. The device has low power consumption and a wide range of supply voltage.

The 80CL51 contains a 4k x 8 ROM, a 128 x 8 RAM, 32 I/O lines, two 16-bit counter/timers, a five-source, two-priority level nested interrupt structure, a serial I/O port for either multi-processor communications, I/O expansion or full duplex UART, and on-chip oscillator and clock circuits.

The device has two software selectable modes of power reduction — idle mode and power-down mode. The idle mode freezes the CPU while allowing the RAM, timers, serial port, and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator, causing all other chip functions to be inoperative.

FEATURES

— Full static 80C51 CPU

- 4k x 8 ROM (80CL51)
- ROMless (80CL31)
- 128 x 8 RAM
- Two 16-bit counter/timers
- Full duplex serial channel
- Boolean processor
- Memory addressing capability
 - 64k ROM and 64k RAM
- Power control modes:
 - Idle mode
 - Power-down mode
- CMOS and TTL compatible
 - Thirteen source, thirteen vector interrupt structure with two priority levels
- Wake-up via external interrupts in Port1
- **Single supply voltage of 1.8V to 6.0V**
- **Frequency range of 0 to 16 MHz**
- Very low current consumption

PIN CONFIGURATIONS

NT2/P1.0	1	PLASTIC DUAL IN-LINE PACKAGE	40	V _{CC}
NT3/P1.1	2		39	P0.0/AD0
NT4/P1.2	3		38	P0.1/AD1
NT5/P1.3	4		37	P0.2/AD2
NT6/P1.4	5		36	P0.3/AD3
NT7/P1.5	6		35	P0.4/AD4
NT8/P1.6	7		34	P0.5/AD5
NT9/P1.7	8		33	P0.6/AD6
RST	9		32	P0.7/AD6
EA/P3.0	10		31	EA
CLK/P3.2	11		30	ALE
INT0/P3.2	12		29	PSEN
INT1/P3.3	13		28	P2.7/A15
T0/P3.4	14		27	P2.6/A14
T1/P3.5	15		26	P2.5/A13
WR/P3.6	16		25	P2.4/A12
RD/P3.7	17		24	P2.3/A11
XTAL2	18		23	P2.2/A10
XTAL1	19		22	P2.1/A9
V _{SS}	20		21	P2.0/A8

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DC ELECTRICAL CHARACTERISTICS FOR INTEGRAL DEVICES

T=-10 °C to + 70°C; Vcc= 5V ± 10%

	Parameter Symbol	Test conditions	Limits	
			Min	Max
Vcc			1,8	6,0
Vcc1	RAM retention in power down mode, V		1,0	
SUPPLY CURRENT OPERATING				
Icc1	OSC 1 option, mA	Vcc = 1,8 V Fclc = 32MHz	-	50
Icc2	OSC 1 option, mA	Vcc = 3,0 V Fclc = 3,58MHz	-	2,5
Icc3	OSC 1 option, mA	Vcc = 5,0 V Fclc = 16MHz		26
IDLE MODE				
Icc1	OSC 1 option, mA	Vcc = 1,8 V Fclc = 32MHz	-	25
Icc2	OSC 1 option, mA	Vcc = 3,0 V Fclc = 3,58MHz	-	1,0
Icc3	OSC 1 option, mA	Vcc = 5,0 V Fclc = 16MHz		12
Ipd	Pover-down current, mkA	Vcc=1,8V; Tamb+25°C	-	10
INPUTS:				
Vil	LOW level input voltage, V		Vss	0,3Vcc
Vih	HIGH level input voltage, V		0,2Vcc +0,9	Vcc
Iil	Input current logic 0, mA (Ports 1, 2 and 3)	Vi=0,4 V, Vcc=5V	-	100
		Vi=0,4 V, Vcc=2,5V		50
Iil	Input current logic 1, mA (Ports 1, 2 and 3)	Vi=2 V, Vcc=5V	-	1000
		Vi=2 V, Vcc=2,5V		500
±Ili	Input leakage current, mkA (Port 0, EA)	Vss≤Vi≤Vcc	-	10
OUTPUTS:				
Iol	Output sink current LOW, mA	Vol = 0,4 V, Vcc=5V	1,6	
		Vol = 0,4 V, Vcc=2,5V	0,7	
Ioh	Output source current	Vol = Vcc-0,4 V, Vcc=5V	1,6	-
	HIGH, (Push-pull options only), mA	Vol = Vcc-0,4 V, Vcc=2,5V	0,7	
Rrst	RST pull-down resistor, kOm		10	200

AC ELECTRICAL CHARACTERISTICS FOR INTEGRAL DEVICES

T=-10 °C to + 70°C; Vcc= 5V ± 10%

Symbol	Parameter	Variable Oscillator		Unit
Fclc		Min	Max	
	Oscillator Frequency:			
	IN80CL31N - 12	0	12	MHz
	IN80CL31N - 16	0	16	MHz
	IN80CL51N - 12	0	12	MHz
	IN80CL51N - 16	0	16	MHz