

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 of the 80C51. The 80CL51 is a 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
$\overline{\text{INT0}}$ /P3.2	12		29	$\overline{\text{PSEN}}$
$\overline{\text{INT1}}$ /P3.3	13		28	P2.7/A15
T0/P3.4	14		27	P2.6/A14
T1/P3.5	15		26	P2.5/A13
$\overline{\text{WR}}$ /P3.6	16		25	P2.4/A12
$\overline{\text{RD}}$ /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 Vi=0,4 V, Vcc=2,5V	-	100 50
Iil	Input current logic 1, mA (Ports 1, 2 and 3)	Vi=2 V, Vcc=5V Vi=2 V, Vcc=2,5V	-	1000 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 Vol = 0,4 V, Vcc=2,5V	1,6 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
		Min	Max	
Fclc				
Oscillator Frequency:				
	IN80CL31N - 12	0	12	MHz
	IN80CL31N - 16	0	16	MHz
	IN80CL51N - 12	0	12	MHz
	IN80CL51N - 16	0	16	MHz