# 4-BIT SINGLE CHIP MICROCOMPUTER

DESCRIPTION

The µPD651 is a µCOM-44 4-bit single chip microcomputer manufactured with a low-power-consumption CMOS process, allowing use of a single +5V power supply. The µPD651 provides all of the hardware features of the µCOM-44 family, except that it has two subroutine stack levels to enhance software development. The µPD651 executes all 58 instructions of the µCOM-44 instruction set, and it is available either in a 42-pin Dual-in-line package (µPD651C), or in a space-saving 52-pin Flat-package (µPD651G).

PIN CONFIGURATION
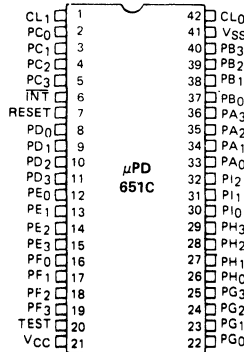
PIN NAMES

PA_0-PA_3	Input Port A
PB_0-PB_3	Input Port B
PC_0-PC_3	Input/Output Port C
PD_0-PD_3	Input/Output Port D
PE_0-PE_3	Output Port E
PF_0-PF_3	Output Port F
PG_0-PG_3	Output Port G
PH_0-PH_3	Output Port H
PI_0-PI_2	Output Port I
$\overline{INT}$	Interrupt Input
CL_0-CL_1	External Clock Signals
RESET	Reset
V_{CC}	Power Supply Positive
V_{SS}	Ground
TEST	Factory Test Pin (Connect to V_{CC})
NC	No Connection

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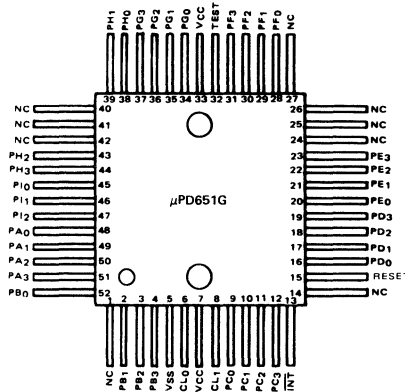
ABSOLUTE MAXIMUM RATINGS*

Operating Temperature . . . . –30°C to +85°C
Storage Temperature . . . . –55°C to +125°C
Supply Voltage . . . . –0.3 to +7.0 Volts
Input Voltages (Port A through D, $\overline{INT}$, RESET) . . . . –0.3 to +7.3 Volts
Output Voltages . . . . –0.3 to +7.3 Volts
Output Current (Ports C through I, each bit) . . . . 2.5 mA
                 (Total, all ports) . . . . 28 mA

COMMENT: Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

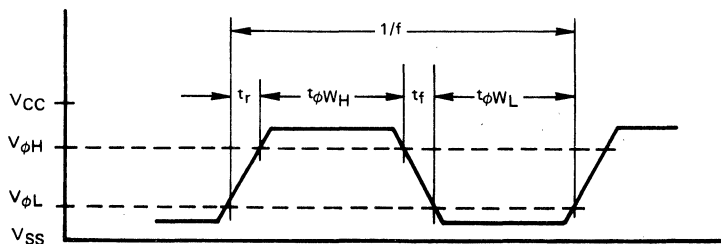*T_a = 25°C

μPD651

$T_a = -30°C$ to $+85°C$; $V_{CC} = +5V \pm 10\%$

PARAMETER	SYMBOL	LIMITS			UNIT	TEST CONDITIONS
		MIN	TYP	MAX		
Input Voltage High	V_{IH}	$0.7 V_{CC}$		V_{CC}	V	Ports A through D, $\overline{INT}$ RESET
Input Voltage Low	V_{IL}	0		$0.3 V_{CC}$	V	Ports A through D, $\overline{INT}$ RESET
Clock Voltage High	$V_{\phi H}$	$0.7 V_{CC}$		V_{CC}	V	CL_0 Input, External Clock
Clock Voltage Low	$V_{\phi L}$	0		$0.3 V_{CC}$	V	CL_0 Input, External Clock
Input Leakage Current High	I_{LIH}			+10	μA	Ports A through D, $\overline{INT}$ RESET, $V_I = V_{CC}$
Input Leakage Current Low	I_{LIL}			−10	μA	Ports A through D, $\overline{INT}$, RESET, $V_I = 0V$
Clock Input Leakage Current High	$I_{L\phi H}$			+200	μA	CL_0 Input, $V_{\phi H} = V_{CC}$
Clock Input Leakage Current Low	$I_{L\phi L}$			−200	μA	CL_0 Input, $V_{\phi L} = 0V$
Output Voltage High	V_{OH_1}	$V_{CC} -0.5$			V	Ports C through I, $I_{OH} = -1.0$ mA
	V_{OH_2}	$V_{CC} -2.5$			V	Ports C through I, $I_{OH} = -2.0$ mA
Output Voltage Low	V_{OL_1}			+0.6	V	Ports E through I, $I_{OL} = +2.0$ mA
	V_{OL_2}			+0.4	V	Ports E through I, $I_{OL} = +1.2$ mA
Output Leakage Current Low	I_{LOL}			−10	μA	Ports C, D, $V_O = 0V$
Supply Current	I_{CC}		+0.8	+2.0	mA	

$T_a = -30°C$ to $+85°C$; $V_{CC} = +5 \pm 10\%$

PARAMETER	SYMBOL	LIMITS			UNIT	TEST CONDITIONS
		MIN	TYP	MAX		
Oscillator Frequency	f	150		440	KHz	
Rise and Fall Times	t_r, t_f	0		0.3	μS	
Clock Pulse Width High	$t_{\phi W_H}$	0.5		5.6	μS	EXTERNAL CLOCK
Clock Pulse Width Low	$t_{\phi W_L}$	0.5		5.6	μS	

$T_a = 25°C$

PARAMETER	SYMBOL	LIMITS			UNIT	TEST CONDITIONS
		MIN	TYP	MAX		
Input Capacitance	C_I			15	pF	
Output Capacitance	C_O			15	pF	f = 1 MHz
Input/Output Capacitance	C_{IO}			15	pF	

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