DATA SHEET

PCK2014A

CK98 (100/133 MHz) spread spectrum system clock generator

Product specification

2001 Apr 02

ICL03 — PC Motherboard ICs; Logic Products Group

Philips Semiconductors

PHILIPS

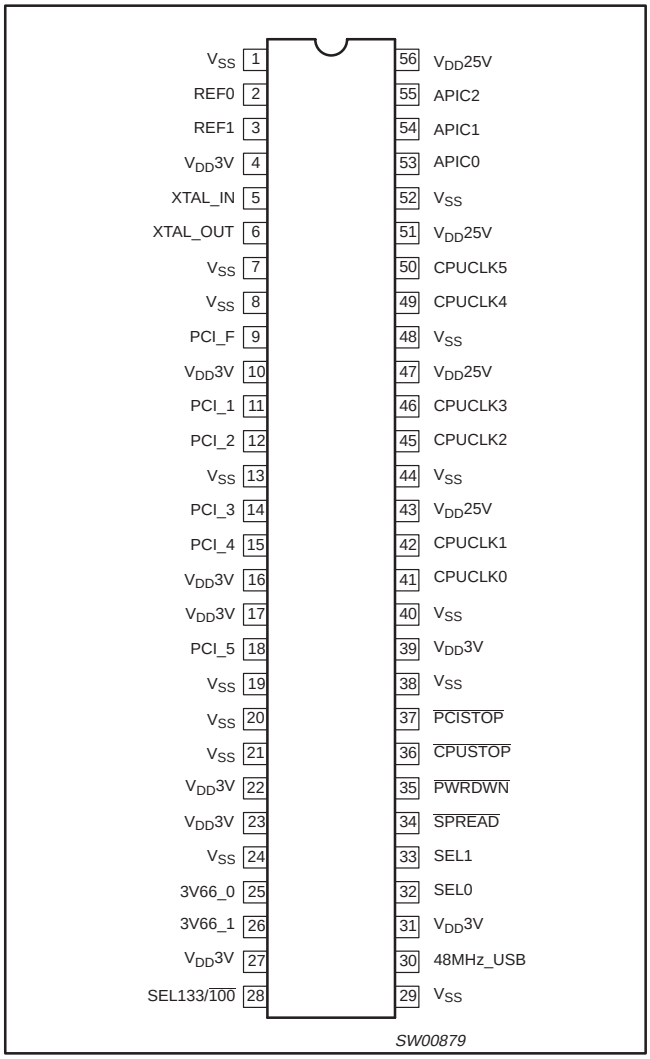
CK98 (100/133 MHz) spread spectrum system clock generator

PCK2014A

FEATURES

- ESD classification testing is done to JEDEC Standard JESD22. Protection exceeds 2000 V to HBM per method A114.
- Latch-up testing is done to JEDEC Standard JESD78 which exceeds 100 mA.
- Mixed 2.5 V and 3.3 V operation
- Six CPU clocks at 2.5 V
- Six PCI clocks at 3.3 V, one free-running (synchronous with CPU clocks)
- Two 3.3 V fixed clocks @ 66 MHz
- Three 2.5 V IOAPIC clocks @ 16.67 MHz
- One 3.3 V 48 MHz USB clock
- Two 3.3 V reference clocks @ 14.318 MHz
- Reference 14.31818 MHz Xtal oscillator input
- 133 MHz or 100 MHz operation
- Power management control input pins
- CPU clock jitter ≤ 150 ps cycle-cycle
- CPU clock skew ≤ 175 ps pin-pin
- 0.0 ns – 1.5 ns CPU - 3V66 delay
- 1.5 ns – 3.5 ns 3V66 - PCI delay
- 1.5 ns – 4.0 ns CPU - IOAPIC delay
- 1.5 ns – 4.0 ns CPU - PCI delay
- Available in 56-pin SSOP package
- ±0.6% Center spread spectrum capability via select pins
- –0.6% Down spread spectrum capability via select pins

PIN CONFIGURATION



DESCRIPTION

The PCK2014A is a clock generator (frequency synthesizer) chip for a Pentium III and other similar processors.

The PCK2014A has six CPU clock outputs at 2.5 V, two 3V66 clocks running at 66 MHz. there are six PCI clock outputs running at 33 MHz. Additionally, the part has three 2.5 V IOAPIC clock outputs at 16.67 MHz and two 3.3 V reference clock outputs at 14.318 MHz. All clock outputs meet Intel's drive strength, rise/fall time, jitter, accuracy, and skew requirements.

The part possesses dedicated power-down, $\overline{\text{CPUSTOP}}$, and $\overline{\text{PCISTOP}}$ input pins for power management control. These inputs are synchronized on-chip and ensure glitch-free output transitions. When the $\overline{\text{CPUSTOP}}$ input is asserted, the CPU clock outputs and 3V66 clock outputs are driven LOW. When the $\overline{\text{PCISTOP}}$ input is asserted, the PCI clock outputs are driven LOW.

Finally, when the $\overline{\text{PWRDWN}}$ input pin is asserted, the internal reference oscillator and PLLs are shut down, and all outputs are driven LOW.

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE	DRAWING NUMBER
56-pin plastic SSOP	0 to +70 °C	PCK2014ADL	SOT371-1

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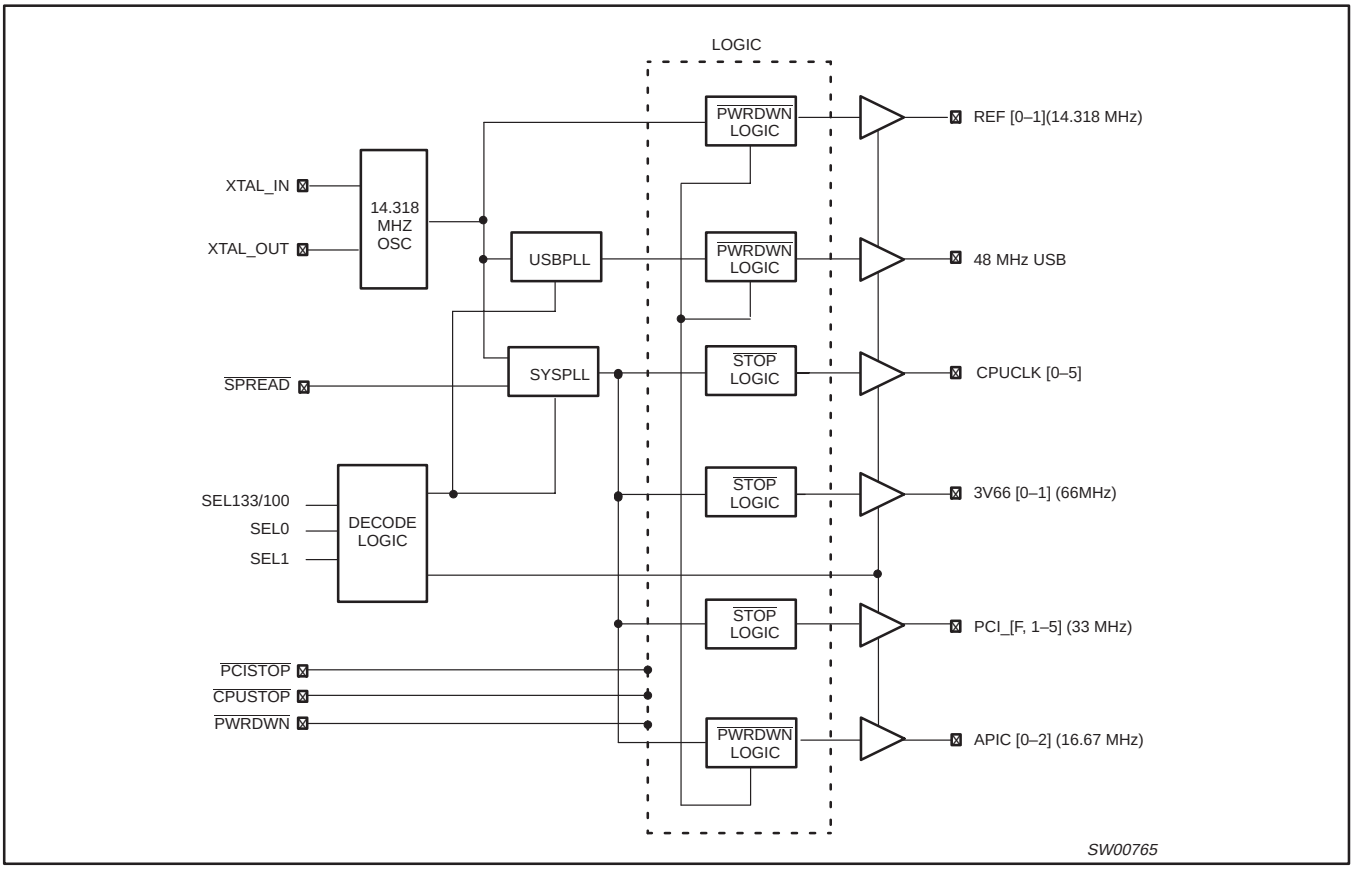
PIN DESCRIPTION

PIN NUMBER	SYMBOL	FUNCTION
2, 3	REF [0–1]	3.3 V 14.318 MHz clock output
5	XTAL_IN	14.318 MHz crystal input
6	XTAL_OUT	14.318 MHz crystal output
9, 11, 12, 14, 15, 18	PCI_[F, 1–5]	3.3 V PCI clock outputs, pin 9 is a free running PCI clock
25, 26	3V66 [0–1]	3.3 V fixed 66 MHz clock outputs
28	SEL133/$\overline{100}$	Select input pin for enabling 133 MHz or 100 MHz CPU outputs. H = 133 MHz, L = 100 MHz
30	48 MHz USB	3.3 V fixed 48 MHZ clock output
32, 33	SEL [0–1]	Logic select pins. TTL levels.
34	$\overline{\text{SPREAD}}$	3.3 V LVTTL input. Enables spread spectrum mode when held LOW.
35	$\overline{\text{PWRDWN}}$	3.3 V LVTTL input. Device enters powerdown mode when held LOW.
36	$\overline{\text{CPUSTOP}}$	3.3 V LVTTL input. Stops all CPU clocks and 3V66 clocks when held LOW. CPUDIV_2 output remains on all the time.
37	$\overline{\text{PCISTOP}}$	3.3 V LVTTL input. Stops all PCI clocks except PCICLK_F when held LOW.
41, 42, 45, 46, 49, 50	CPUCLK [0–5]	2.5 V CPU output. 133 MHz or 100 MHz depending on state of input pin SEL133/100.
53, 54, 55	APIC [0–2]	2.5 V clock outputs running divide synchronous with the CPU clock frequency. Fixed 16.67 MHz limit.
4, 10, 16, 17, 22, 23, 27, 31, 39	V_{DD3V}	3.3 V power supply, pins 22 and 23 are analog V_{DD}.
1, 7, 8, 13, 19, 20, 21, 24, 29, 38, 40, 44, 48, 52	V_{SS}	Ground, pins 20 and 21 are analog V_{SS}.
43, 47, 51, 56	V_{DD25V}	2.5 V power supply

NOTE:

1. V_{DD3V}, V_{DD25V} and V_{SS} in the above table reflects a likely internal POWER and GROUND partition to reduce the effects of internal noise on the performance of the device. In reality, the platform will be configured with the V_{DD25V} pins tied to a 2.5 V supply, all remaining V_{DD} pins tied to a common 3.3 V supply and all V_{SS} pins being common.
2. Pins 20 and 21 are analog ground and should be tied to a ground plane. Pins 22 and 23 are analog V_{DD} should be properly decoupled to a 3.3 V supply. These analog power supply pins should not be tied to the PCI power and ground to avoid noise coupling into the analog power supply pins. The PCK2014 provides separate power supplies for the internal digital circuitry (pin 39, V_{CC}) and the internal PLLs of the device (pins 22 and 23, V_{CC}). The purpose of this approach is to try and isolate the high switching noise digital outputs from relatively sensitive analog blocks. In controlled environments such as a test board this level is very well controlled. However, in a mixed signal environment, a second level of isolation may be required.

BLOCK DIAGRAM



FUNCTION TABLE

SEL 133/100	SEL1	SEL0	CPU	3V66	PCI	48 MHz	REF	IOAPIC	NOTES
0	0	0	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z	HI-Z	1
0	0	1	100 MHz	66 MHz	33 MHz	48 MHz	14.318 MHz	16.67 MHz	2
0	1	0	100 MHz	66 MHz	33 MHz	HI-Z	14.318 MHz	16.67 MHz	3
0	1	1	100 MHz	66 MHz	33 MHz	48 MHz	14.318 MHz	16.67 MHz	4, 7, 8
1	0	0	TCLK/2	TCLK/4	TCLK/8	TCLK/2	TCLK	TCLK/16	5, 6
1	0	1	133 MHz	66 MHz	33 MHz	48 MHz	14.318 MHz	16.67 MHz	2
1	1	0	133 MHz	66 MHz	33 MHz	HI-Z	14.318 MHz	16.67 MHz	3
1	1	1	133 MHz	66 MHz	33 MHz	48 MHz	14.318 MHz	16.67 MHz	4, 7, 8

NOTES:
1. Required for board level “bed-of-nails” testing.
2. Philips center spread mode.
3. 48 MHz PLL disabled to reduce component jitter. 48 MHz outputs to be held Hi-Z instead of driven to LOW state.
4. “Normal” mode of operation.
5. TCLK is a test clock over driven on the XTALIN input during test mode. TCLK mode is based on 133 MHz CPU select logic.
6. Required for DC output impedance verification.
7. Frequency accuracy of 48 MHz must be +167 PPM to match USB default.
8. Range of reference frequency allowed is MIN = 14.316 MHz, NOMINAL = 14.31818 MHz, MAX = 14.32 MHz

CLOCK OUTPUT	TARGET FREQUENCY (MHz)	ACTUAL FREQUENCY (MHz)	PPM
USBCLK[7]	48.0	48.008	167

CLOCK ENABLE CONFIGURATION

CPUSTOP	$\overline{\text{PWRDWN}}$	$\overline{\text{PCISTOP}}$	CPUCLK	APIC	3V66	PCI	REF / 48 MHz	OSC	VCOs
X	0	X	LOW	LOW	LOW	LOW	LOW	OFF	OFF
0	1	0	LOW	ON	LOW	LOW	ON	ON	ON
0	1	1	LOW	ON	LOW	ON	ON	ON	ON
1	1	0	ON	ON	ON	LOW	ON	ON	ON
1	1	1	ON	ON	ON	ON	ON	ON	ON

NOTES:
1. LOW means outputs held static LOW as per latency requirement below
2. ON means active.
3. $\overline{\text{PWRDWN}}$ pulled LOW, impacts all outputs including REF and 48 MHz outputs.
4. All 3V66 clocks as well as CPU clocks should stop cleanly when CPUSTOP is pulled LOW.
5. CPUDIV2, IOAPIC, REF, 48 MHz signals are not controlled by the CPUSTOP functionality and are enabled all in all conditions except when $\overline{\text{PWRDWN}}$ is LOW.

POWER MANAGEMENT REQUIREMENTS

SIGNAL	SIGNAL STATE	LATENCY
		NO. OF RISING EDGES OF FREE RUNNING PCICLK
$\overline{\text{CPUSTOP}}$	0 (DISABLED)	1
	1 (ENABLED)	1
$\overline{\text{PCISTOP}}$	0 (DISABLED)	1
	1 (ENABLED)	1
$\overline{\text{PWRDWN}}$	1 (NORMAL OPERATION)	3 ms
	0 (POWER DOWN)	2 MAX

NOTES:
1. Clock ON/OFF latency is defined as the number of rising edges of free running PCICLKs between the clock disable goes HIGH/LOW to the first valid clock that comes out of the device.
2. Power up latency is when $\overline{\text{PWRDWN}}$ goes inactive (HIGH) to when the first valid clocks are driven from the device.

ABSOLUTE MAXIMUM RATINGS[1, 2]

In accordance with the Absolute Maximum Rating System (IEC 134).
Voltages are referenced to V_{SS} (V_{SS} = 0 V).

SYMBOL	PARAMETER	CONDITION	LIMITS		UNIT
			MIN	MAX	
V_{DD3}	DC 3.3 V core supply voltage		–0.5	+4.6	V
V_{DDQ3}	DC 3.3 V I/O supply voltage		–0.5	+4.6	V
V_{DDQ2}	DC 2.5 V I/O supply voltage		–0.5	+3.6	V
I_{IK}	DC input diode current	V_I < 0		–50	mA
V_I	DC input voltage	Note 2	–0.5	5.5	V
I_{OK}	DC output diode current	$V_O > V_{CC}$ or V_O < 0		±50	mA
V_O	DC output voltage	Note 2	–0.5	V_{CC} + 0.5	V
I_O	DC output source or sink current	V_O = 0 to V_{CC}		±50	mA
T_{stg}	Storage temperature range		–65	+150	°C
P_{TOT}	Power dissipation per package plastic medium-shrink (SSOP)	For temperature range: –40 to +125 °C above +55 °C derate linearly with 11.3 mW/K		850	mW

NOTES:
1. Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	CONDITIONS	LIMITS		UNIT
			MIN	MAX	
V_{DD3V}	DC 3.3 V core supply voltage		3.135	3.465	V
V_{DD25V}	DC 2.5 V I/O supply voltage		2.375	2.625	V
C_L	Capacitive load on:				
	CPUCLK	1 device load, possible 2 loads	10	20	pF
	PCI	Must meet PCI 2.1 requirements	10	30	pF
	3V66	1 device load, possible 2 loads	10	30	pF
	48 MHz clock USB	1 device load	10	20	pF
	REF	1 device load	10	20	pF
	APIC	1 device load	10	20	pF
V_I	DC input voltage range		0	V_{DD3V}	V
V_O	DC output voltage range		0	V_{DD25V} V_{DD3V}	V
f_{REF}	Reference frequency, oscillator nominal value		14.31818	14.31818	MHz
T_{amb}	Operating ambient temperature range in free air		0	+70	°C

POWER MANAGEMENT

CK133 CONDITION	MAXIMUM 2.5V SUPPLY CONSUMPTION MAXIMUM DISCRETE CAP LOADS, V_{DD25V} = 2.625 V ALL STATIC INPUTS = V_{DD3V} OR V_{SS}	MAXIMUM 3.3V SUPPLY CONSUMPTION MAXIMUM DISCRETE CAP LOADS, V_{DD25V}= 3.465 V ALL STATIC INPUTS = V_{DD3V} OR V_{SS}
Power-down mode ($\overline{PWRDWN}$ = 0)	100 µA	200 µA
Full active 100 MHz SEL133/$\overline{100}$ = 0 SEL1, 0 = 1 1 CPUSTOP, PCISTOP = 1	80 mA	80 mA
Full active 133 MHz SEL133/$\overline{100}$ = 1 SEL1, 0 = 1 1 CPUSTOP, PCISTOP = 1	90 mA	80 mA

DC CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS			LIMITS			UNIT
					T_{amb} = 0 to +70 °C			
		V_{DD} (V)	OTHER		MIN	TYP	MAX	
V_{IH}	HIGH level input voltage	3.135 to 3.465		V_{DD25V} = 2.5 V ±5%	2.0		V_{DD} + 0.3	V
V_{IL}	LOW level input voltage	3.135 to 3.465		V_{DD3V} = 3.3 V ±5%	V_{SS} – 0.3		0.8	V
V_{OH2}	2.5 V output HIGH voltage CPUCLK, APIC	2.375 to 2.625	I_{OH} = –1 mA		2.3		–	V
V_{OL2}	2.5 V output LOW voltage CPUCLK, APIC	2.375 to 2.625	I_{OL} = 1 mA		–		0.25	V
V_{OH3}	3.3 V output HIGH voltage REF, 48 MHz USB	3.135 to 3.465	I_{OH} = –1 mA		2.0		–	V
V_{OL3}	3.3 V output LOW voltage REF, 48 MHz USB	3.135 to 3.465	I_{OL} = 1 mA		–		0.4	V
V_{OH3}	3.3 V output HIGH voltage PCI, 3V66	3.135 to 3.465	I_{OH} = –1 mA		2.4		–	V
V_{OL3}	3.3 V output LOW voltage PCI, 3V66	3.135 to 3.465	I_{OL}= 1 mA		–		0.55	V
I_{OH}	APIC, CPUCLK output HIGH current	2.375	V_{OUT} = 1.0 V		–27		–	mA
		2.625	V_{OUT} = 2.375 V		–		–27	
I_{OH}	48 MHz USB, REF output HIGH current	3.135	V_{OUT} = 1.0 V		–29		–	mA
		3.465	V_{OUT} = 3.135 V		–		–23	
I_{OH}	PCI, 3V66 output HIGH current	3.135	V_{OUT} = 1.0 V		–33		–	mA
		3.465	V_{OUT} = 3.135 V		–		–33	
I_{OL}	APIC, CPUCLK output LOW current	2.375	V_{OUT} = 1.2 V		27		–	mA
		2.625	V_{OUT} = 0.3 V		–		30	
I_{OL}	48 MHz USB, REF output LOW current	3.135	V_{OUT} = 1.95 V		29		–	mA
		3.465	V_{OUT} = 0.4 V		–		27	
I_{OL}	PCI, 3V66 output LOW current	3.135	V_{OUT} = 1.95 V		30		–	mA
		3.465	V_{OUT} = 0.4 V		–		38	
$\pm I_I$	Input leakage current	3.465			–		5	µA
$\pm I_{OZ}$	3-State output OFF-State current	3.465	V_{OUT} = V_{dd} or GND	I_O = 0	–		10	µA
Cin	Input pin capacitance						5	pF
Cxtal	Xtal pin capacitance, as seen by external crystal					18		pF
Cout	Output pin capacitance						6	pF

AC CHARACTERISTICS

V_{DD3V} = 3.3 V ± 5%; VDDAPIC = V_{DD25V} = 2.5 V ± 5%; $f_{crystal}$ = 14.31818 MHz

CPU CLOCK OUTPUTS, CPU(0–5) (LUMP CAPACITANCE TEST LOAD = 20 pF)

SYMBOL	PARAMETER	LIMITS T_{amb} = 0 to +70 °C		LIMITS T_{amb} = 0 to +70 °C		UNIT	NOTES
		133 MHz MODE		100 MHz MODE			
		MIN	MAX	MIN	MAX		
$T_{HKP(avg)}$	Average CPUCLK period	7.5	7.65	10.0	10.3	ns	2, 9
$T_{HKP(abs_,om)}$	Absolute minimum CPUCLK period	7.35	n/a	9.85	n/a	ps	
T_{HKH}	CPUCLK HIGH time	1.87	n/a	3.0	n/a	ns	5, 10
T_{HKL}	CPUCLK LOW time	1.67	n/a	2.8	n/a	ns	6, 10
T_{HRISE}	CPUCLK rise time	0.4	1.6	0.4	1.6	ns	8
T_{HFALL}	CPUCLK fall time	0.4	1.6	0.4	1.6	ns	8
T_{JITTER}	CPUCLK cycle-cycle jitter		150		150	ps	
DUTY CYCLE	Output Duty Cycle	45	55	45	55	%	1
T_{HSKW}	CPUCLK pin-pin skew		175		175	ps	2

PCI CLOCK OUTPUTS, PCI(0–5) (LUMP CAPACITANCE TEST LOAD = 30 pF)

SYMBOL	PARAMETER	LIMITS T_{amb} = 0 to +70 °C		LIMITS T_{amb} = 0 to +70 °C		UNIT	NOTES
		133 MHz MODE		100 MHz MODE			
		MIN	MAX	MIN	MAX		
T_{HKP}	PCI period	30.0	n/a	30.0	n/a	ns	2, 9
T_{HKH}	PCI HIGH time	12.0	n/a	12.0	n/a	ns	5, 10
T_{HKL}	PCI LOW time	12.0	n/a	12.0	n/a	ns	6, 10
T_{HRISE}	PCI rise time	0.5	2.0	0.5	2.0	ns	8
T_{HFALL}	PCI fall time	0.5	2.0	0.5	2.0	ns	8
T_{JITTER}	PCI cycle-cycle jitter		300		300	ps	
DUTY CYCLE	PCI Duty Cycle	45	55	45	55	%	1
T_{HSKW}	PCI pin-pin skew		500		500	ps	2

APIC(0–1) CLOCK OUTPUT (LUMP CAPACITANCE TEST LOAD = 20 pF)

SYMBOL	PARAMETER	LIMITS T_{amb} = 0 to +70 °C		LIMITS T_{amb} = 0 to +70 °C		UNIT	NOTES
		133 MHz MODE		100 MHz MODE			
		MIN	MAX	MIN	MAX		
T_{HKP}	APIC CLK period	60.0	61.2	60.0	61.2	ns	2, 9
T_{HKH}	APIC CLK HIGH time	25.5	n/a	25.5	n/a	ns	5, 10
T_{HKL}	APIC CLK LOW time	25.3	n/a	25.3	n/a	ns	6, 10
T_{HRISE}	APIC CLK rise time	0.4	1.6	0.4	1.6	ns	8
T_{HFALL}	APIC CLK fall time	0.4	1.6	0.4	1.6	ns	8
T_{JITTER}	APIC CLK cycle-cycle jitter		500		500	ps	
DUTY CYCLE	APIC CLK Duty Cycle	45	55	45	55	%	1
T_{HSKW}	APIC CLK pin-pin skew		250		250	ps	2

3V66 CLOCK OUTPUT, 3V66 (0–1) (LUMP CAPACITANCE TEST LOAD = 30 pF)

SYMBOL	PARAMETER	LIMITS T_{amb} = 0 to +70 °C		LIMITS T_{amb} = 0 to +70 °C		UNIT	NOTES
		133 MHz MODE		100 MHz MODE			
		MIN	MAX	MIN	MAX		
T_{HKP}	3V66 CLK period	15.0	15.3	15.0	15.3	ns	2, 9, 4
T_{HKH}	3V66 CLK HIGH time	4.95	n/a	4.95	n/a	ns	5, 10
T_{HKL}	3V66 CLK LOW time	4.55	n/a	4.55	n/a	ns	6, 10
T_{HRISE}	3V66 CLK rise time	0.5	2.0	0.5	2.0	ns	8
T_{HFALL}	3V66 CLK fall time	0.5	2.0	0.5	2.0	ns	8
T_{JITTER}	3V66 CLK cycle-cycle jitter		500		500	ps	
DUTY CYCLE	3V66 CLK Duty Cycle	45	55	45	55	%	1
T_{HSKW}	3V66 CLK pin-pin skew		250		250	ps	2

48MHZ CLOCK OUTPUT (LUMP CAPACITANCE TEST LOAD = 20 pF)

SYMBOL	PARAMETER	LIMITS 133 MHz T_{amb} = 0 to +70 °C		LIMITS 100 MHz T_{amb} = 0 to +70 °C		UNIT	NOTES
		MIN	MAX	MIN	MAX		
T_{HKP}	48 MHz clock period average	20.83	20.83	20.83	20.83	ns	2
T_{HKH}	48 MHz clock HIGH time	7.57	n/a	7.57	n/a	ns	
T_{HKL}	48 MHz clock LOW time	7.17	n/a	7.17	n/a	ns	
T_{HRISE} (t_R)	Output rise edge rate	1	4	1	4	ns	
T_{HFALL} (t_F)	Output fall edge rate	1	4	1	4	ns	
DUTY CYCLE (t_D)	Duty Cycle	45	55	45	55	%	
T_{JITTER}	CLK cycle-cycle jitter		500		500	ps	
T_{HSTB} (f_{ST})	Frequency stabilization from Power-up (cold start)				3	ms	

NOTE:
1. See Figure 5 for measure points.
2. Average period over 1 μs.

AC CHARACTERISTICS (Continued)

SYMBOL	PARAMETER	TEST CONDITIONS		LIMITS T_{amb} = 0 to +70 °C			UNIT	NOTES
		Measurement loads (lumped)	Measure points	MIN	TYP	MAX		
$T_{HPOFFSET}$	CPUCLK to 3V66 CLK, CPU leads	CPU@20 pF, 3V66@30 pF	CPU@1.25 V, 3V66@1.5 V	0.0	0.45	1.5	ns	1
$T_{HPOFFSET}$	3V66 CLK to PCI, 3V66 leads	3V66@30 pF, PCI@30 pF	3V66@1.5 V, PCI@1.5 V	1.5	2.0	3.5	ns	1
$T_{HPOFFSET}$	CPUCLK to APIC, CPU leads	CPU@20 pF, IOAPIC@20 pF	3CPU@1.25 V, IOAPIC@1.25 V	1.5	2.4	4.0	ns	1
$T_{HPOFFSET}$	CPUCLK to PCI, CPU leads	CPU@20 pF PCI@30 pF	CPU@1.25 V PCI@1.5 V	1.5	2.7	4.0	ns	

NOTES:
1. Output drivers must have monotonic rise/fall times through the specified V_{OL}/V_{OH} levels.
2. Period, jitter, offset and skew measured on rising edge @1.25 V for 2.5 V clocks and @ 1.5 V for 3.3 V clocks.
3. The PCI is the CPUCLK divided by four at CPUCLK = 133 MHz. The 3V66 CLK is internal VCO frequency divided by three at CPUCLK = 100 MHz.
4. 3V66 CLK is internal VCO frequency divided by two at CPUCLK = 133 MHz. The 3V66 CLK is internal VCO frequency divided by three at CPUCLK = 100 MHz.
5. T_{HKH} is measured at 2.0 V for 2.5 V outputs, 2.4 V for 3.3 V outputs as shown in Figure 4.
6. T_{HKL} is measured at 0.4 V for all outputs as shown in Figure 4.
7. The time is specified from when V_{DDQ} achieves its nominal operating level (typical condition V_{DDQ} = 3.3 V) until the frequency output is stable and operating within specification.
8. T_{HRISE} and T_{HFALL} are measured as a transition through the threshold region V_{OL} = 0.4 V and V_{OH} = 2.4 V for 3 V outputs, V_{OL} = 0.4 V, and V_{OH} = 2.0 V for 2.5 V outputs. (1 mA) JEDEC specification.
9. The average period over any 1 µs period of time must be greater than the minimum specified period.
10. Calculated at minimum edge-rate (1 V/ns) to guarantee 45/55% duty-cycle. Pulse width is required to be wider at faster edge-rate to ensure duty-cycle specification is met.
11. Output (see Figure 5 for measure points).

SPREAD SPECTRUM FUNCTION TABLE

SPREAD#	SEL133/100#	SEL1	SEL0	Function
pin 34	pin 28	pin 33	pin 32	
0 (active)	0 (100 MHz)	0	0	3-State to High Impedance
0 (active)	0 (100 MHz)	0	1	100 MHz, Center Spread ±0.6%
0 (active)	0 (100 MHz)	1	0	100 MHz, Down Spread –0.6%
0 (active)	0 (100 MHz)	1	1	100 MHz, Down Spread –0.6%
0 (active)	1 (133 MHz)	0	0	Test Mode
0 (active)	1 (133 MHz)	0	1	133 MHz, Center Spread ±0.6%
0 (active)	1 (133 MHz)	1	0	133 MHz, Down Spread –0.6%
0 (active)	1 (133 MHz)	1	1	133 MHz, Down Spread –0.6%
1 (inactive)	0 (100 MHz)	0	0	3-State to High Impedance
1 (inactive)	0 (100 MHz)	0	1	100 MHz, No Center Spread
1 (inactive)	0 (100 MHz)	1	0	100 MHz, No Down Spread
1 (inactive)	0 (100 MHz)	1	1	100 MHz, No Down Spread
1 (inactive)	1 (133 MHz)	0	0	Test Mode
1 (inactive)	1 (133 MHz)	0	1	133 MHz, No Center Spread
1 (inactive)	1 (133 MHz)	1	0	133 MHz, No Down Spread
1 (inactive)	1 (133 MHz)	1	1	133 MHz, No Down Spread

AC WAVEFORMS

V_M = 1.25 V @ V_{DDQ2} and 1.5 V @ V_{DDQ3}
$V_X = V_{OL}$ + 0.3 V
$V_Y = V_{OH}$ –0.3 V
V_{OL} and V_{OH} are the typical output voltage drop that occur with the output load.

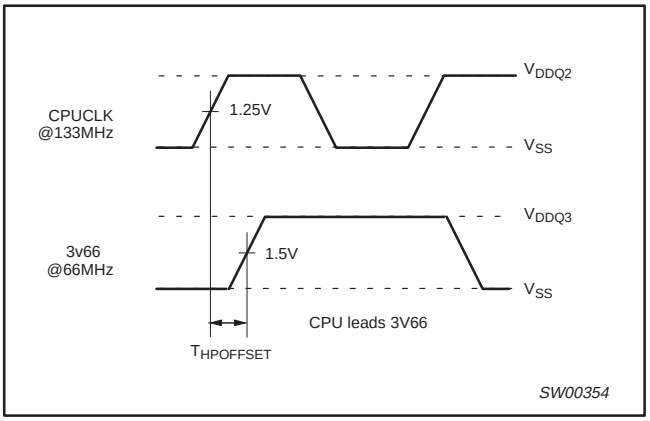


Figure 1. CPUCLK to 3V66 offset

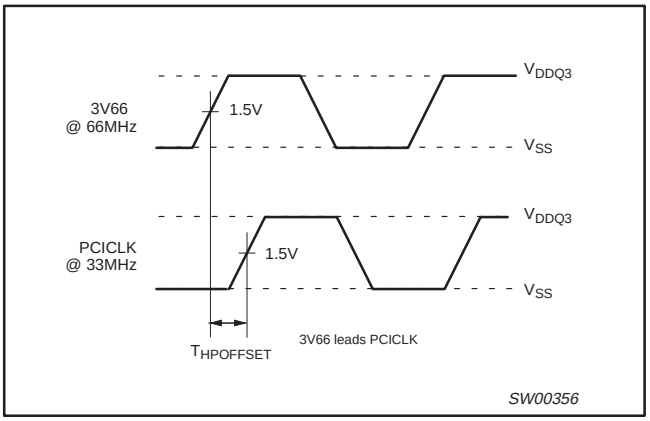


Figure 2. 3V66 to PCI offset

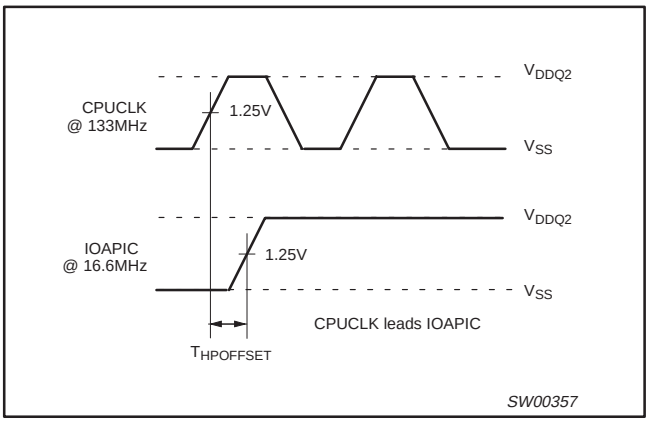


Figure 3. CPU to IOAPIC offset

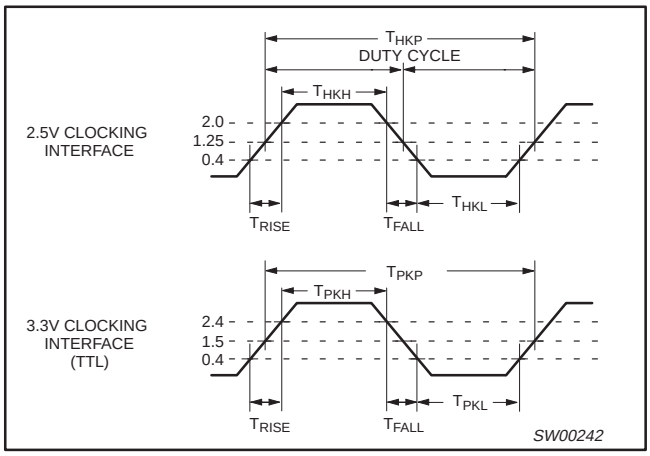


Figure 4. 2.5V/3.3V clock waveforms

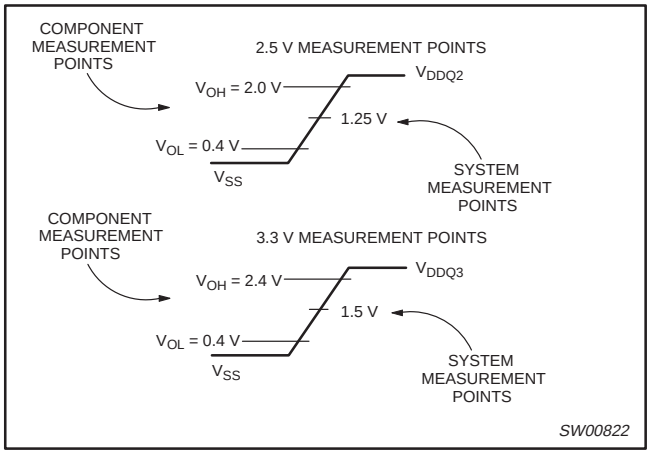


Figure 5. Component versus system measure points

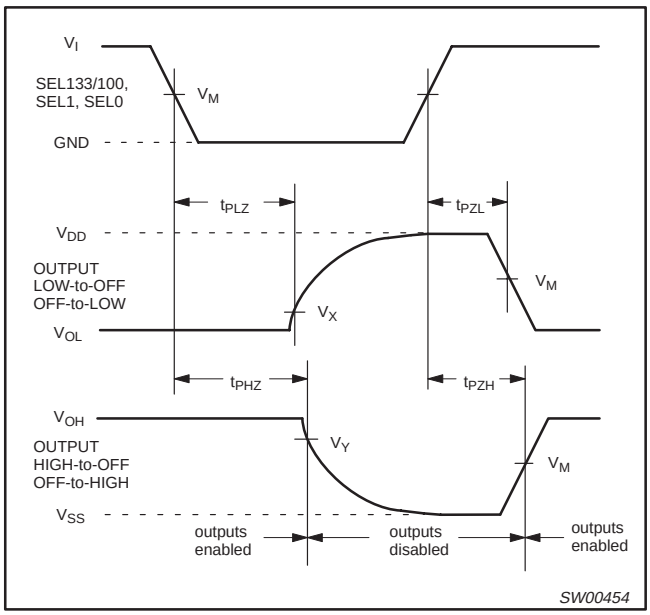


Figure 6. 3-State enable and disable times

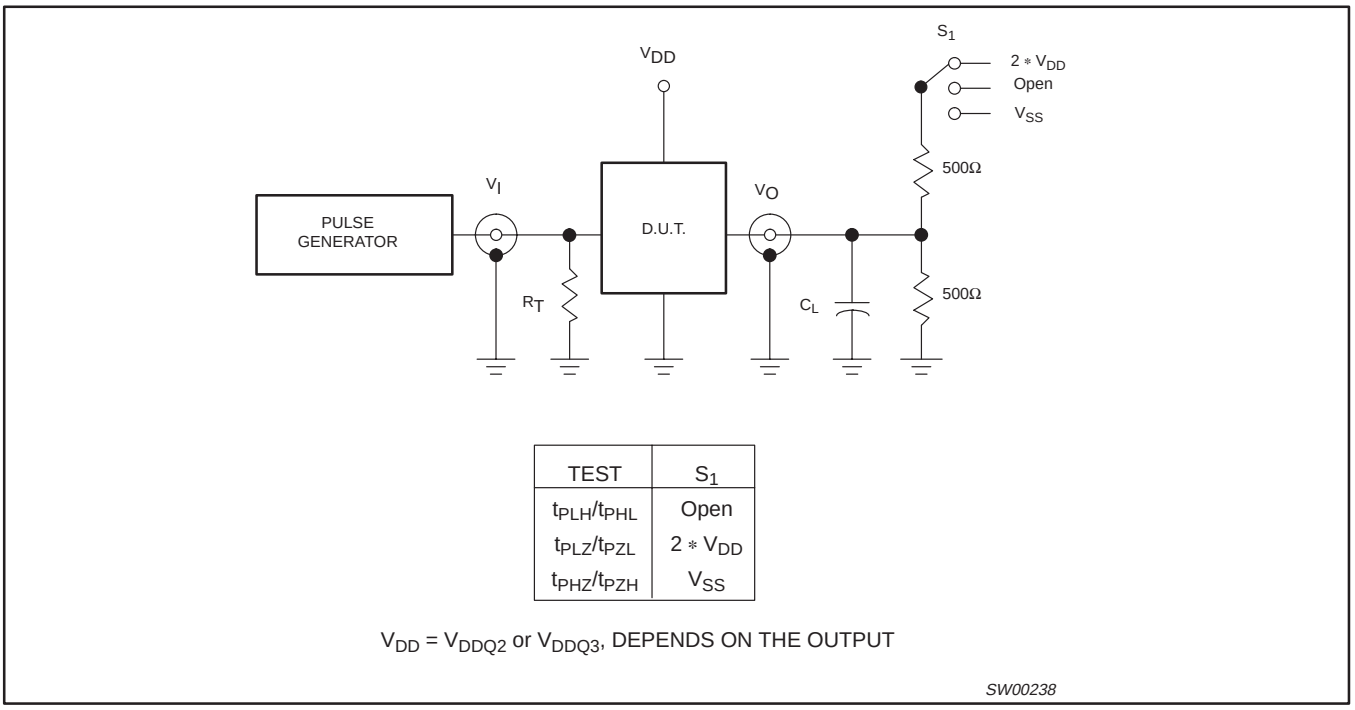


Figure 7. Load circuitry for switching times

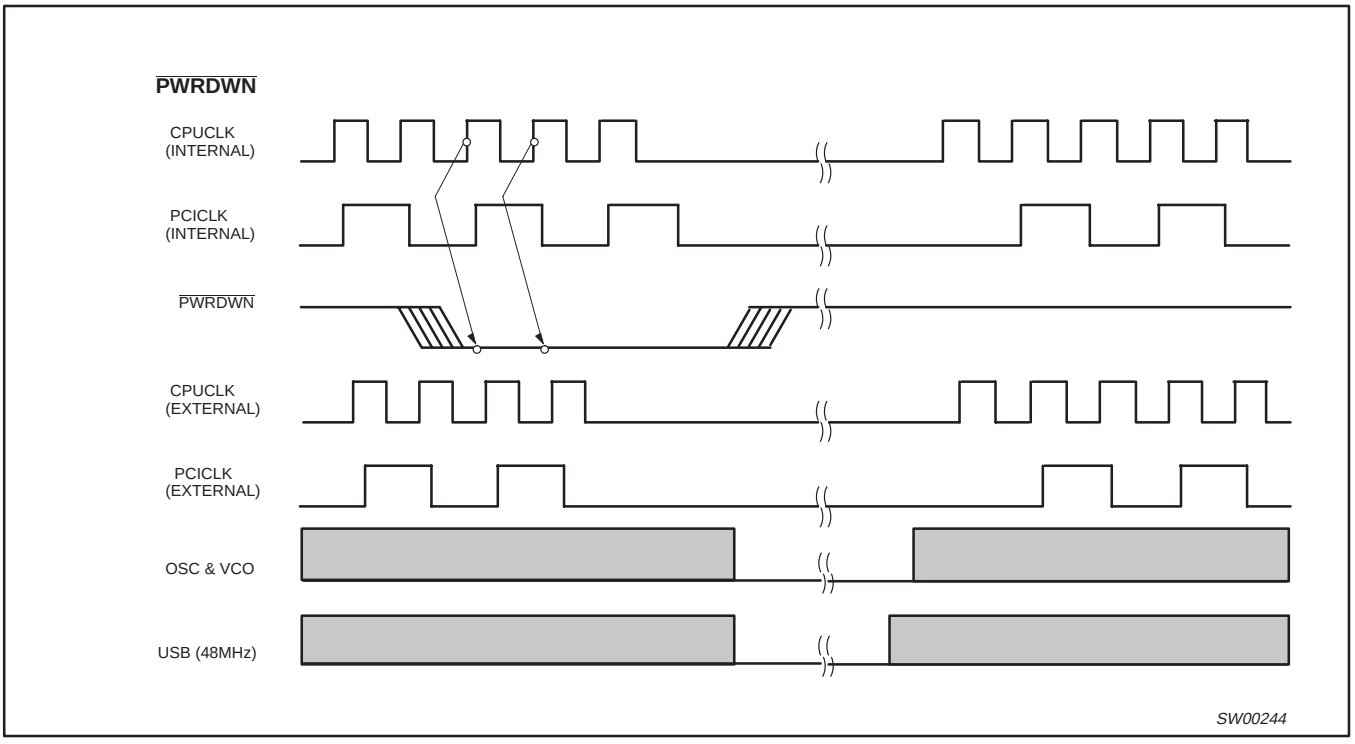
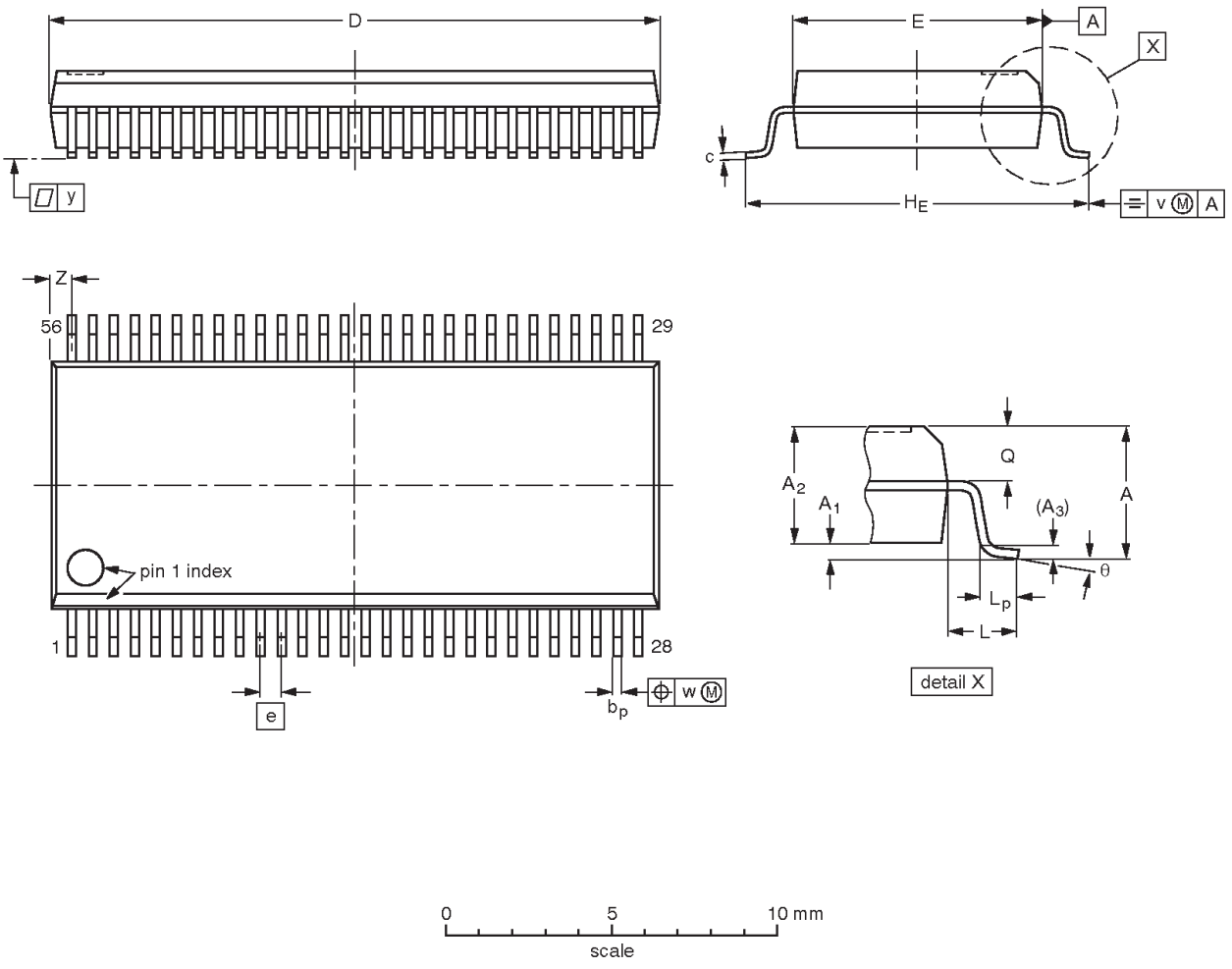


Figure 8. Power Management

SSOP56: plastic shrink small outline package; 56 leads; body width 7.5 mm **SOT371-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	2.8	0.4 0.2	2.35 2.20	0.25	0.3 0.2	0.22 0.13	18.55 18.30	7.6 7.4	0.635	10.4 10.1	1.4	1.0 0.6	1.2 1.0	0.25	0.18	0.1	0.85 0.40	8^o 0^o

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT371-1		MO-118				~~95-02-04~~ 99-12-27

NOTES

CK98 (100/133 MHz) spread spectrum system clock generator

PCK2014A

Data sheet status

Data sheet status	Product status	Definition [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

[1] Please consult the most recently issued datasheet before initiating or completing a design.

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