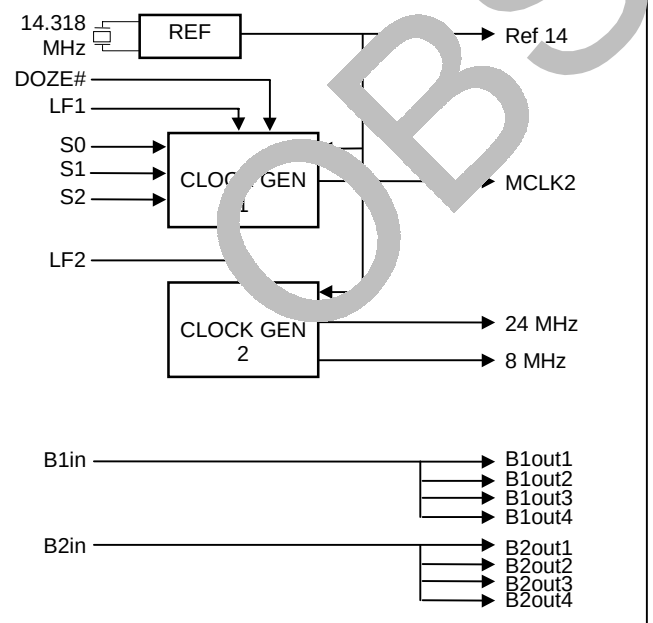
Motherboard Clock Chip

Approved Product

PRODUCT FEATURES

- Generates all essential clock signals for the Motherboards
- 4V to 7V operating supply range
- Supports 8086, 80286, 80386 and 80486 including S Series® and Pentium™ based designs
- Supports ISA, VESA and PCI based designs
- Supports GREEN PC applications
- On-chip dual QUAD buffers
- Integrates CPU clock and buffered 14.318 Mhz output
- Wide range of selectable output frequencies including 80, 66.6, 60, 50, 40, 33.3, 16 and 8 Mhz
- Doze mode for low power consumption
- single, low cost crystal (14.318 Mhz) used as reference frequency
- Smooth and glitch-free switching during DOZE# to be active
- 50% duty cycle
- TTL or CMOS compatible outputs
- Low, short and long term jitter
- 28 PDIP and 28 Pin SSOP (209 mil body) package options

BLOCK DIAGRAM



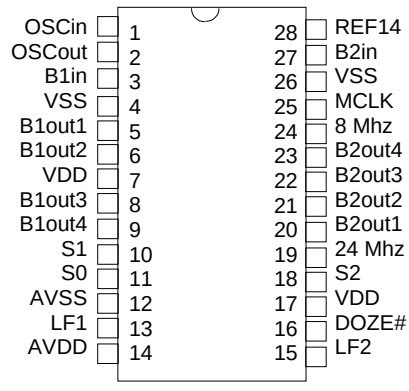
PRODUCT DESCRIPTION

The IMISC468 is a clock chip for Motherboards. The IMISC468 includes two independent VCO's and uses a single 14.318 Mhz external crystal to generate all essential clock signals. The IMISC468 is designed to generate CPU clock options of 80 Mhz, 66.6 Mhz, 60 Mhz, 50 Mhz, 40 Mhz, 33.3 Mhz, 16 Mhz and 8 Mhz, giving flexibility to the user. The frequency selection on the MCLK outputs is determined by the S0-S2 pins. A second fixed frequency clock generator provides 24 Mhz and 8 Mhz. In addition, the REF14 output provides a buffered (14.318 Mhz) output. DOZE# pin gives additional flexibility to the user for Green PC applications. Activating the DOZE# pin smoothly switches the MCLK output to preprogrammed DOZE frequencies. Deactivating the DOZE input allows the CPU output to return to full speed. On-chip buffers provide the required buffering for PCI ro VESA applicatios.

FREQUENCY TABLE (MHz)

INPUTS			MCLK OUTPUT	
LF2	S1	S0	DOZE# = 1	DOZE# = 0
0	0	0	66.6	16
0	0	1	80	16
0	1	0	60	33.3
0	1	1	30	8
1	0	0	33.3	8
1	0	1	40	8
1	1	0	50	16
1	1	1	25	8

CONNECTION DIAGRAM



Motherboard Clock Chip

Approved Product

PIN DESCRIPTION

PIN No.	Pin Name	PWR	I/O	TYPE	Description
1	**OSCin**	VDD	I	PAD	These pins form an on-chip refernced oscillator when connected to terminal of an external parallel resonant crystal (nominally 14.318 Mhz). OSCin may also serve as input for an externally generated reference signal.
2	**OSCout**	VDD	O	PAD	
3	**B1in**	VDD	I	PAD	On-chip buffer inputs. These pins have internal pull-ups.
27	**B2in**	VDD	I	PAD	
5, 6, 8, 9	**B1out1, B1out2, B1out3, B1out4**	VDD	O	BUF	Buffered output pins of B1in. These buffers are capable to sink or source 12 ma. They can be used to buffer critical clock lines for PCI or VESA applications.
10, 11, 18	**S0:2**	VDD	I	PAD	Standard frequency select inputs. These inputs control the high speed CLK frequency selection. S0-S2 inputs controls the CPU clock frequencies. All these inputs have internal pull-ups.
4, 26	**VSS**	-	-	PWR	Ground pins for the device.
7,17	**VDD**	-	-	PWR	Positive Power Supply.
12	**AVSS**	-	-	PWR	Analog circuit ground.
13, 15	**LF1, LF2**	VDD	-	PAD	These are the phase detector outputs for the clock generators. They are single-ended, tri-state output for use as loop error signal. A 0.1 uF capacitor to ground should be connected from this pin to form the loop filter.
16	**DOZE#**	VDD	I	PAD	DOZE control pin. When DOZE# is high, the clock chip operates in the standard mode. When this pin goes low, output frequencies are switched to the pre-programmed DOZE frequencies. Switching to DOZE frequencies occur smoothly to allow tracking by 486 CPU internal PLL. this pin has an internal pull-up.
19	**24 Mhz**	VDD	O	BUF	24 Mhz floppy drive clock output.
20, 21, 22, 23	**B2out1, B2out2, B2out3, B2out4**	VDD	O	BUF	Buffered output pins of B2in. These buffers are capable to sink or source 12 ma. They can be used to buffer critical clock lines for PCI or VESA applications.
24	**8 Mhz**	VDD	O	BUF	8 Mhz keyboard clock output.
25	**MCLK**	VDD	O	BUF	Master clock output. Programmable output frequencies can be selected using S0-S2 inputs.
28	**REF14**	VDD	O	BUF	14.31818 Mhz output. Buffered output of on-chip reference oscillator or externally provided referenced.

Motherboard Clock Chip

Approved Product

MAXIMUM RATINGS

Voltage Relative to VSS:	-0.3V to 7V
Voltage Relative to VDD:	0.3V
Storage Temperature:	0ºC to + 125ºC
Operating Temperature:	0ºC to +70ºC
Recommended Operating Range:	4V - 7V

This device contains circuitry to protect the inputs against damage due to high static voltages or electric field; however, precautions should be taken to avoid application of any voltage higher than the maximum rated voltages to this circuit. For proper operation, Vin and Vout should be constrained to the range

VSS ≤ (Vin or Vout) ≤ VDD

Unused inputs must always be tied to an appropriate logic voltage level (either VSS or VDD).

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Units	Conditions
Input Low Voltage	VIL	-	-		Vdc	S0-S2 Inputs
Input High Voltage	VIH	2.0	-	-	Vdc	S0-S2 Inputs
Input Low Voltage	VIL	-	-	0.8	Vdc	B1in, B2in Inputs
Input High Voltage	VIH	2.0	-	-	Vdc	B1in, B2in Inputs
Input Low Current with Pull-up or Pull-down	IIL			5 ± 50	uA	S0-S2 Input
Input High Current with Pull-up or Pull-down	IIH	-	-	5 ± 50	µA	
Output Low Voltage IOL = 12 mA	VOL	-	-	0.4	Vdc	All Outputs
Output High Voltage IOH = 12 mA	VOH	2.4	-	-	Vdc	All Outputs
Tri-State Leakage Current	IOZ	-	-	10	uA	LF1, LF2
Dynamic Supply Current	ICC	-	-	35	mA	VDD@5V, MCLK2 = 50 Mhz
Short Circuit Current	ISC	25	-	-	mA	

VDD = 5V ± 10%, TA = 0°C to + 70°C

Motherboard Clock Chip

Approved Product

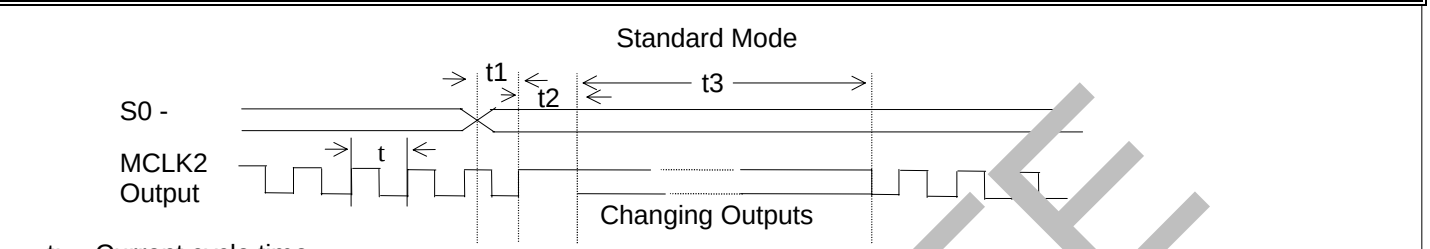
SWITCHING CHARACTERISTICS						
Characteristic	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Conditions**
Output Rise (0.8V - 2.0V) and Fall (2.0V-0.8V) Time All Outputs	tTLH, tTHL	-	-	2	nS	30 pf Load
Duty Cycle MCLK and REF14		-	50/50	45/55	%	
Propagation Delay Bin to Bout	tPLH, tPHL	2.0	3.2	4.2	nS	15 pf Load measured at 1.4V
Buffer out Skew B1out1-B1out4 or B2out1-B2out4	tSKEW	-	-	250	ps	15 pf Load Measured at 1.4V
Jitter One Sigma MCLK and REF14	tj1s	-	-	± 2	%	As compared with clock period
Jitter Absolute MCLK and REF14	tjab	-	-	± 5	%	As compared with clock period
Input Rise/Fall Time S0-S2		-	-	2	us	note1
						VDD = 5V ± 10%, TA = 0°C to + 70°C

OSCILLATOR CHARACTERISTICS						
Characteristic	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Conditions**
Transconductance	gm	20	330	-	millimhos	@ 14.3 Mhz
Output Impedance	Zo	-	200	800	ohms	@ 14.3 Mhz
Input Capacitance	Ci	8	13	18	pf	
Output Capacitance	Co		6	9	pf	
DC Bias Voltage	VB	1.5	VDD/2	3.5	Volt	
Start-up Time	ts	-	-	10	ms	@ 14.3 Mhz
Input Rise Time OSCIN	ICLKr	-	-		us	
Inut Fall Time OSCIN	ICLKf	-	-	2	us	
						VDD = 5V ± 10%, TA = 0°C to + 70°C

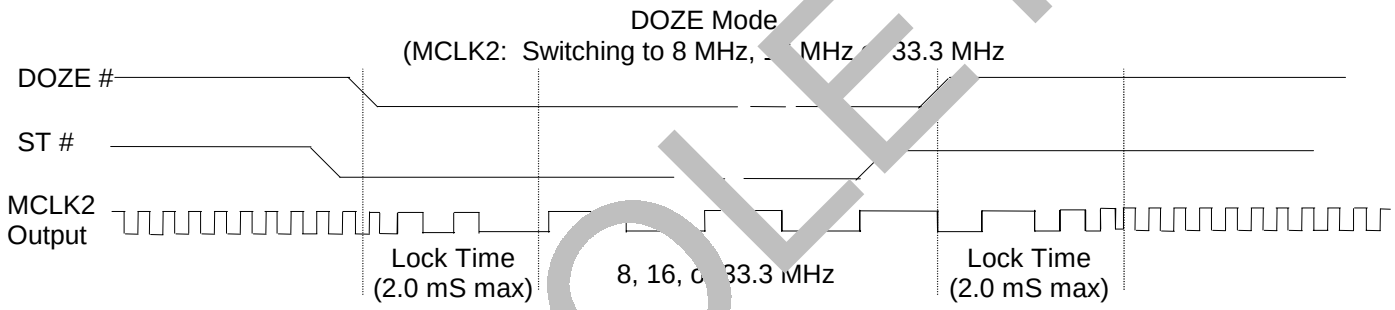
Motherboard Clock Chip

Approved Product

TIMING DIAGRAMS



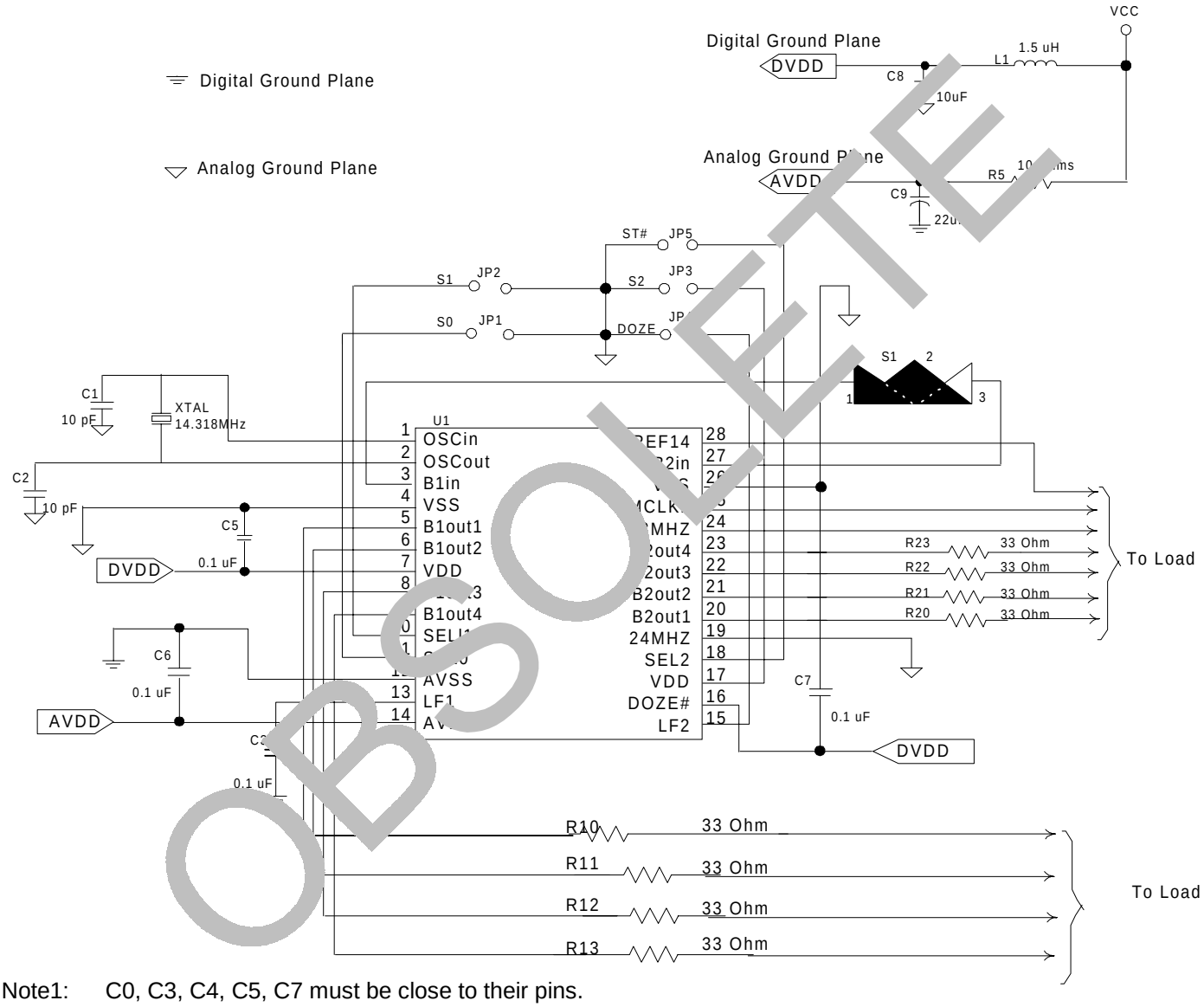
t: Current cycle time
t1: Time to first positive edge after address change
t2: Ouput high time. t2 - 4 t
t3: Lock time. 2.0ms max



Motherboard Clock Chip

Approved Product

APPLICATION SUGGESTION



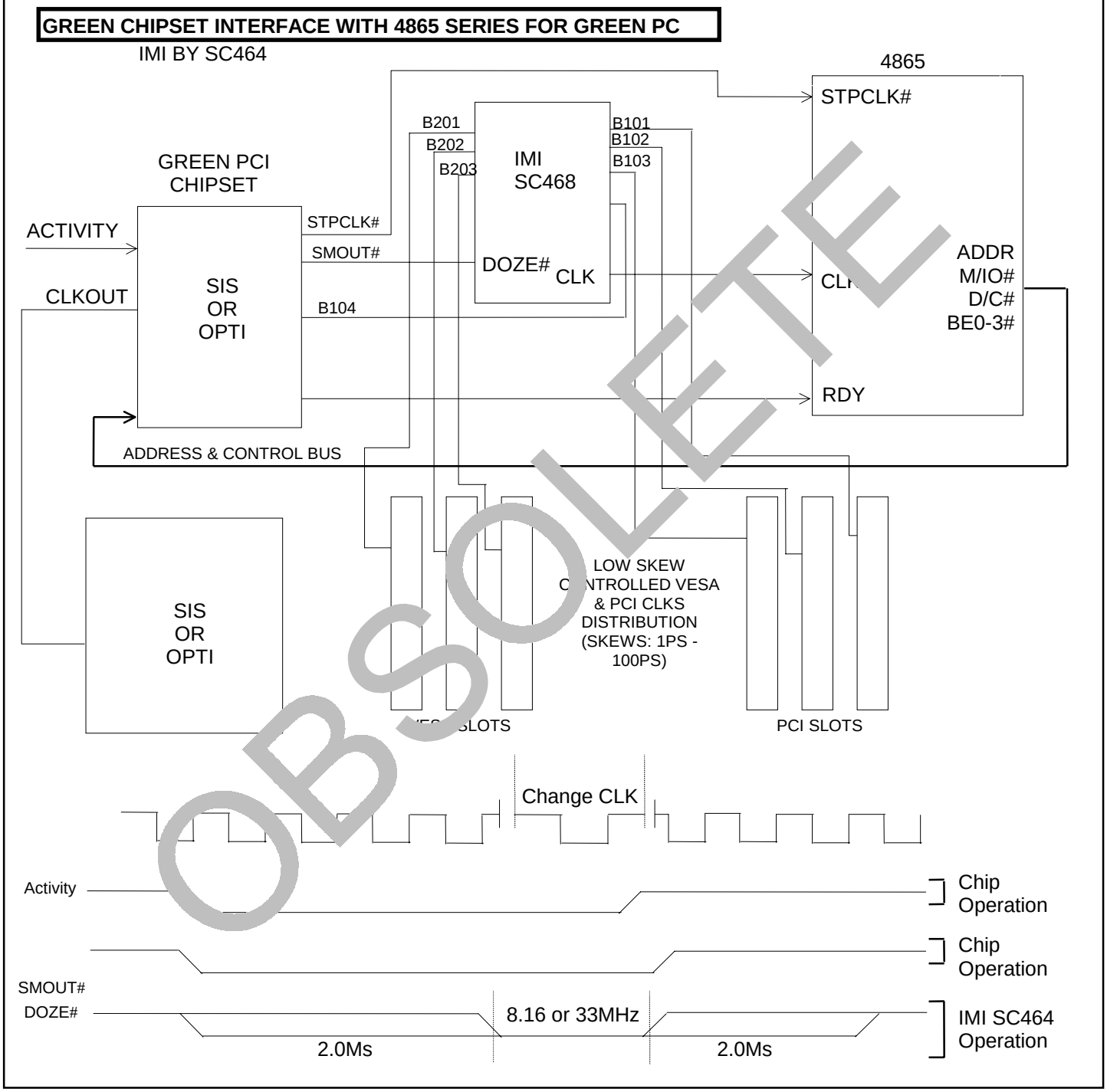
Note1: C0, C3, C4, C5, C7 must be close to their pins.
Note2: R10, R11, R12, R13, R20, R21, R22,and R23 are close to their pins with equal traces to the probe holes.
Note3: R0 must be close to its pin.
Note4: C6, C9, R5 must be close to AVDD and AVSS.
Note5: Connect digital ground and analog ground through onepoint only on PC board.

Please consult IMI technical support for Pentium Mercury application.

Motherboard Clock Chip

Approved Product

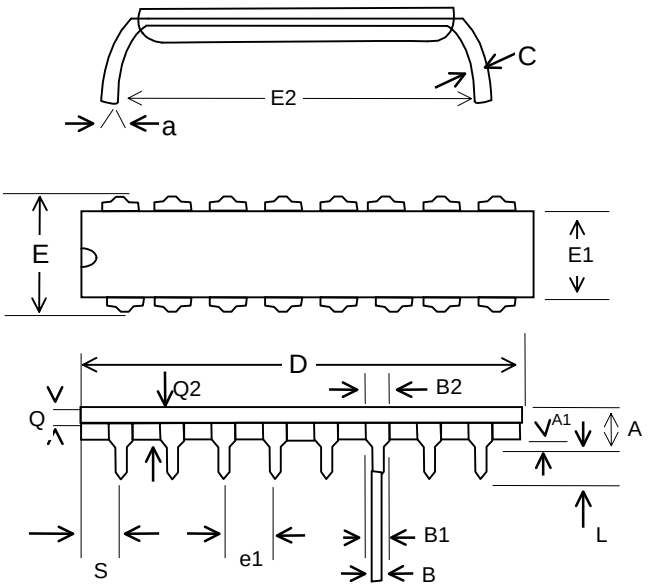
APPLICATION DIAGRAM



Motherboard Clock Chip

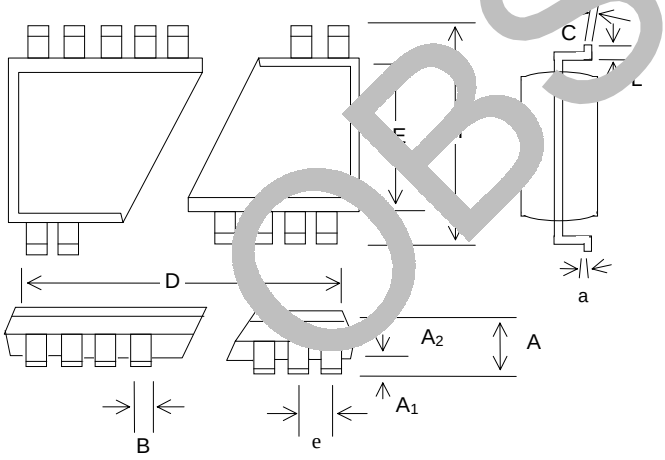
Approved Product

PACKAGE DRAWING AND DIMENSIONS



28 PIN SKINNY PLASTIC DIP DIMENSIONS

SYMBOL	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	.180	-	-	4.57
A_1	0.020	-	-	.51	-	-
B	0.015	0.0	.02	0.38	.46	0.51
B_1	0.045	.050	0.0	1.14	1.27	1.40
B_2	0.035	0.040	0.045	.89	1.02	1.14
C	0.008	0.01	0.012	0.20	0.25	0.30
D	1.360	1.365	1.370	34.54	34.67	34.80
E	0.300	-	0.325	7.62	-	8.255
E_1	0.2	0.282	0.284	7.11	7.16	7.2`
E_2	.282	0.2 4	0.286	7.16	7.21	7.25
e_1	0.100 BSC			2.54 BSC		
L	0.12	0.130	0.135	3.18	3.30	3.43
a	0°	7°	15°	0°	7°	15°
	0.055	0.060	0.065	1.40	1.52	1.65
Q_2	-	130	-	-	3.30	-
S	0.028	0.033	0.038	0.71	0.84	0.97



28 PIN SSOP OUTLINE DIMENSIONS

SYMBOL	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.08	0.073	0.078	1.73	1.8	1.99
A_1	0.002	0.005	0.008	0.05	0.13	0.21
A2	0.066	0.068	0.070	1.68	1.73	1.78
B	0.010	0.012	0.015	0.25	0.30	0.38
C	0.005	0.006	0.009	0.13	0.15	0.22
D	0.397	0.402	0.407	10.07	10.20	10.33
E	0.205	0.209	0.212	5.20	5.30	5.38
e	0.0256 BSC			0.65 BSC		
H	0.301`	0.307	0.311	7.65	7.80	7.90
a	0°	4°	8°	0°	4°	8°
L	0.022	0.030	0.037	0.55	0.75	0.95

Motherboard Clock Chip

Approved Product

ORDERING INFORMATION		
Part Number	**Package Type**	**Production Flow**
IMISC468APB	Plastic Dip	Commercial, 0ºC to +70ºC
IMISC468AYB	SSOP	

Note: The ordering part number is formed by a combination of device number, device revision, package style, and screening as shown below.

Marking: Example: IMI
SC468APB
Date Code, Lot #

IMISC468APB

- Flow
  B = Commercial, 0ºC to + 70ºC
- Package
  P = Plastic Dip
  Y = SSOP
- Revision
- IMI Device Number