

Low Voltage 1:18 Clock Distribution Chip

The MPC942 is a 1:18 low voltage clock distribution chip with 2.5V or 3.3V LVCMOS output capabilities. The device is offered in two versions; the MPC942C has an LVCMOS input clock while the MPC942P has a LVPECL input clock. The 18 outputs are 2.5V or 3.3V LVCMOS compatible and feature the drive strength to drive 50Ω series or parallel terminated transmission lines. With output-to-output skews of 200ps, the MPC942 is ideal as a clock distribution chip for the most demanding of synchronous systems. The 2.5V outputs also make the device ideal for supplying clocks for a high performance Pentium II™ microprocessor based design.

- LVCMOS/LVTTL Clock Input
- 2.5V LVCMOS Outputs for Pentium II Microprocessor Support
- 150ps Maximum Targeted Output-to-Output Skew
- Maximum Output Frequency of 250MHz @ 3.3 V_{CC}
- 32-Lead TQFP Packaging
- Single 3.3V or 2.5V Supply

With a low output impedance ($\approx 12\Omega$), in both the HIGH and LOW logic states, the output buffers of the MPC942 are ideal for driving series terminated transmission lines. With an output impedance of 12Ω the MPC942 can drive two series terminated transmission lines from each output. This capability gives the MPC942 an effective fanout of 1:36. The MPC942 provides enough copies of low skew clocks for most high performance synchronous systems.

The LVCMOS/LVTTL input of the MPC942C provides a more standard LVCMOS interface. The OE pins will place the outputs into a high impedance state. The OE pin has an internal pullup resistor.

The MPC942 is a single supply device. The V_{CC} power pins require either 2.5V or 3.3V. The 32-lead TQFP package was chosen to optimize performance, board space and cost of the device. The 32-lead TQFP has a 7x7mm body size with a conservative 0.8mm pin spacing.

MPC942C

**LOW VOLTAGE
1:18 CLOCK
DISTRIBUTION CHIP**

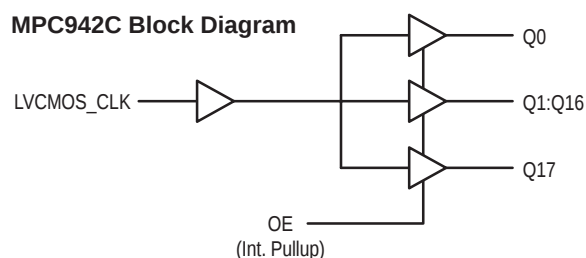


FA SUFFIX
32-LEAD TQFP PACKAGE
CASE 873A-02

Pentium II is a trademark of Intel Corporation.



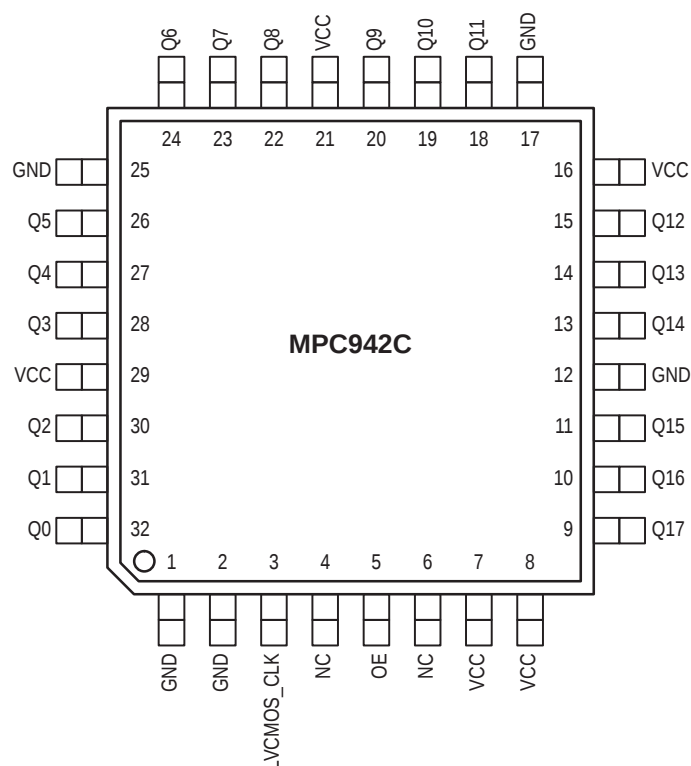
LOGIC DIAGRAM



FUNCTION TABLE

OE	Output
0	HIGH IMPEDANCE
1	OUTPUTS ENABLED

Pinout: 32-Lead (Top View)



ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Min	Max	Unit
V _{CC}	Supply Voltage	-0.3	3.6	V
V _I	Input Voltage	-0.3	V _{CC} + 0.3	V
I _{IN}	Input Current		±20	mA
T _{Stor}	Storage Temperature Range	-40	125	°C

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

DC CHARACTERISTICS ($T_A = 0^\circ$ to 70°C , $V_{CCI} = 2.5\text{V} \pm 5\%$, $V_{CCO} = 2.5\text{V} \pm 5\%$)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
V_{IH}	Input HIGH Voltage	2.0		V_{CCI}	V	
V_{IL}	Input LOW Voltage			0.8	V	
V_{OH}	Output HIGH Voltage	2.0			V	$I_{OH} = -16\text{ mA}$
V_{OL}	Output LOW Voltage			0.5	V	$I_{OL} = 16\text{ mA}$
I_{IN}	Input Current			± 200	μA	
C_{IN}	Input Capacitance		4.0		pF	
CPD	Power Dissipation Capacitance		14		pF	Per Output
Z_{OUT}	Output Impedance		12		Ω	
I_{CC}	Maximum Quiescent Supply Current		0.5		mA	

AC CHARACTERISTICS ($T_A = 0^\circ$ to 70°C , $V_{CCI} = 2.5\text{V} \pm 5\%$, $V_{CCO} = 2.5\text{V} \pm 5\%$)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
F_{max}	Maximum Frequency			200	MHz	
t_{PLH}	Propagation Delay	1.5		2.8	ns	
$t_{sk(o)}$	Output-to-Output Skew			200	ps	
$t_{sk(pr)}$	Part-to-Part Skew			1.3	ns	Notes 1, 2
$t_{sk(pr)}$	Part-to-Part Skew			600	ps	Notes 1, 3
d_t	Duty Cycle	45		55	%	
t_r, t_f	Output Rise/Fall Time	0.2		1.0	ns	

DC CHARACTERISTICS ($T_A = 0^\circ$ to 70°C , $V_{CCI} = 3.3\text{V} \pm 5\%$, $V_{CCO} = 3.3\text{V} \pm 5\%$)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
V_{IH}	Input HIGH Voltage	2.4		V_{CCI}	V	
V_{IL}	Input LOW Voltage			0.8	V	
V_{OH}	Output HIGH Voltage	2.4			V	$I_{OH} = -20\text{ mA}$
V_{OL}	Output LOW Voltage			0.5	V	$I_{OL} = 20\text{ mA}$
I_{IN}	Input Current			± 200	μA	
C_{IN}	Input Capacitance		4.0		pF	
CPD	Power Dissipation Capacitance		14		pF	Per Output
Z_{OUT}	Output Impedance		12		Ω	
I_{CC}	Maximum Quiescent Supply Current		0.5		mA	

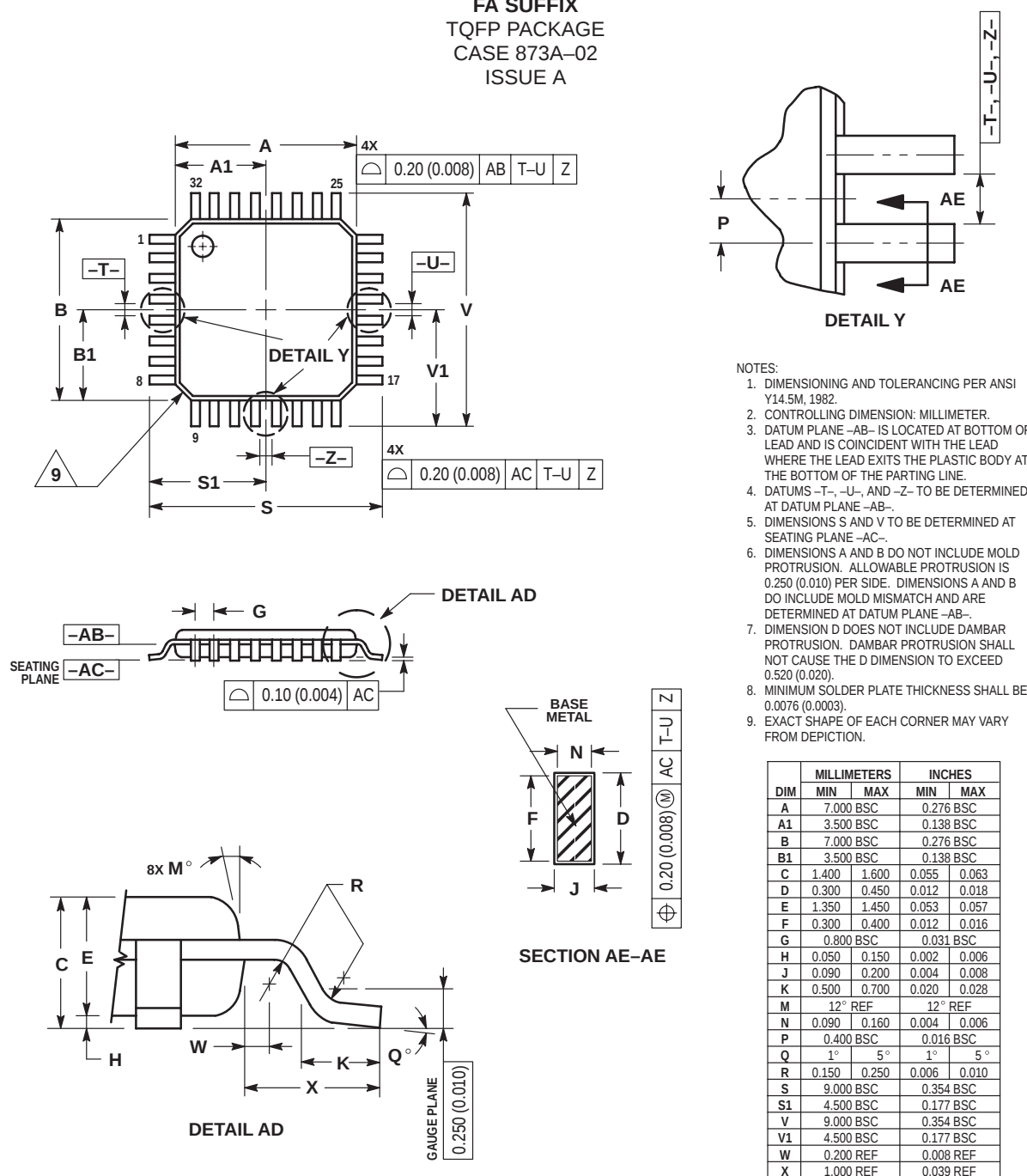
AC CHARACTERISTICS ($T_A = 0^\circ$ to 70°C , $V_{CCI} = 3.3\text{V} \pm 5\%$, $V_{CCO} = 3.3\text{V} \pm 5\%$)

Symbol	Characteristic	Min	Typ	Max	Unit	Condition
F_{max}	Maximum Frequency			250	MHz	
t_{PLH}	Propagation Delay	1.3		2.3	ns	Note 1
$t_{sk(o)}$	Output-to-Output Skew			200	ps	
$t_{sk(pr)}$	Part-to-Part Skew			1.0	ns	Notes 1, 2
$t_{sk(pr)}$	Part-to-Part Skew			500	ps	Notes 1, 3
d_t	Duty Cycle	45		55	%	
t_r, t_f	Output Rise/Fall Time	0.2		1.0	ns	

1. Tested using standard input levels, production tested @ 133 MHz.
2. Across temperature and voltage ranges, includes output skew.
3. For a specific temperature and voltage, includes output skew.

OUTLINE DIMENSIONS

FA SUFFIX
TQFP PACKAGE
CASE 873A-02
ISSUE A



How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 1-303-675-2140 or 1-800-441-2447

Customer Focus Center: 1-800-521-6274

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 1-602-244-6609
Motorola Fax Back System – US & Canada ONLY 1-800-774-1848
– http://sps.motorola.com/mfax/

HOME PAGE: http://motorola.com/sps/

JAPAN: Motorola Japan Ltd.; SPD, Strategic Planning Office, 141,
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan. 81-3-5487-8488

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Centre,
2, Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong.
852-26668334

Mfax is a trademark of Motorola, Inc.



MOTOROLA

For More Information On This Product,
Go to: www.freescale.com

MPC942C/D