



National Semiconductor

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**CD4723BM/CD4723BC Dual 4-Bit Addressable Latch
CD4724BM/CD4724BC 8-Bit Addressable Latch**

CD4723BM/CD4723BC Dual 4-Bit Addressable Latch CD4724BM/CD4724BC 8-Bit Addressable Latch

General Description

The CD4723B is a dual 4-bit addressable latch with common control inputs, including two address inputs (A0, A1), an active low enable input (\bar{E}), and an active high clear input (CL). Each latch has a data input (D) and four outputs (Q0–Q3). The CD4724B is an 8-bit addressable latch with three address inputs (A0–A2), an active low enable input (\bar{E}), active high clear input (CL), a data input (D) and eight outputs (Q0–Q7).

Data is entered into a particular bit in the latch when that is addressed by the address inputs and the enable (\bar{E}) is low. Data entry is inhibited when enable (\bar{E}) is high.

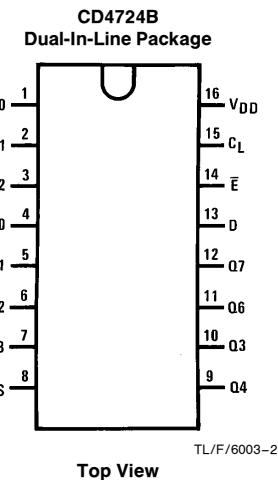
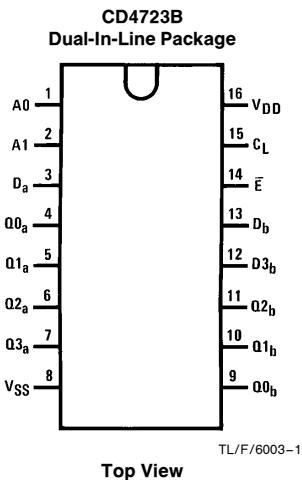
When clear (CL) and enable (\bar{E}) are high, all outputs are low. When clear (CL) is high and enable (\bar{E}) is low, the channel demultiplexing occurs. The bit that is addressed has an active output which follows the data input while all unaddressed bits are held low. When operating in the address-

able latch mode ($\bar{E} = CL = \text{low}$), changing more than one bit of the address could impose a transient wrong address. Therefore, this should only be done while in the memory mode ($\bar{E} = \text{high}, CL = \text{low}$).

Features

- Wide supply voltage range 3.0V to 15V
- High noise immunity 0.45 V_{DD} (typ.)
- Low power TTL fan out of 2 driving 74L or 1 driving 74LS compatibility
- Serial to parallel capability
- Storage register capability
- Random (addressable) data entry
- Active high demultiplexing capability
- Common active high clear

Connection Diagrams



Order Number CD4723B or
CD4724B

Truth Table

Mode Selection				
\bar{E}	CL	Addressed Latch	Unaddressed Latch	Mode
L	L	Follows Data	Holds Previous Data	Addressable Latch
H	L	Hold Previous Data	Holds Previous Data	Memory
L	H	Follows Data	Reset to "0"	Demultiplexer
H	H	Reset to '0'	Reset to "0"	Clear

Absolute Maximum Ratings (Notes 1 & 2)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

DC Supply Voltage (V_{DD})	-0.5V to +18 V _{DC}
Input Voltage (V_{IN})	-0.5V to V_{DD} +0.5 V _{DC}
Storage Temperature (T_S)	-65°C to +150°C
Power Dissipation (P_D)	
Dual-In-Line	700 mW
Small Outline	500 mW
Lead Temperature (T_L) (Soldering, 10 seconds)	260°C

Recommended Operating Conditions (Note 2)

DC Supply Voltage (V_{DD})	3.0V to 15 V _{DC}
Input Voltage (V_{IN})	0V to V_{DD} V _{DC}
Operating Temperature Range (T_A)	
CD4723BM/CD4724BM	-55°C to +125°C
CD4723BC/CD4724BC	-40°C to +85°C

DC Electrical Characteristics CD4723BM/CD4724BM (Note 2)

Symbol	Parameter	Conditions	-55°C		+25°C			+125°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	Quiescent Device Current	$V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$		5.0 10 20		0.02 0.02 0.02	5.0 10 20		150 300 600	μA μA μA
V_{OL}	Low Level Output Voltage	$ I_O \leq 1 \mu A$ $V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$		0.05 0.05 0.05		0 0 0	0.05 0.05 0.05		0.05 0.05 0.05	V V V
V_{OH}	High Level Output Voltage	$ I_O \leq 1 \mu A$ $V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$	4.95 9.95 14.95		4.95 9.95 14.95	5.0 10 15		4.95 9.95 14.95		V V V
V_{IL}	Low Level Input Voltage	$V_{DD} = 5V, V_O = 0.5V$ or $4.5V$ $V_{DD} = 10V, V_O = 1V$ or $9V$ $V_{DD} = 15V, V_O = 1.5V$ or $13.5V$		1.5 3.0 4.0		2.25 4.5 6.75	1.5 3.0 4.0		1.5 3.0 4.0	V V V
V_{IH}	High Level Input Voltage	$V_{DD} = 5V, V_O = 0.5V$ or $4.5V$ $V_{DD} = 10V, V_O = 1V$ or $9V$ $V_{DD} = 15V, V_O = 1.5V$ or $13.5V$	3.5 7.0 11.0		3.5 7.0 11.0	2.75 5.5 8.25		3.5 7.0 11.0		V V V
I_{OL}	Low Level Output Current (Note 3)	$V_{DD} = 5V, V_O = 0.4V$ $V_{DD} = 10V, V_O = 0.5V$ $V_{DD} = 15V, V_O = 1.5V$	0.64 1.6 4.2		0.51 1.3 3.4	0.88 2.25 8.8		0.36 0.9 2.4		mA mA mA
I_{OH}	High Level Output Current (Note 3)	$V_{DD} = 5V, V_O = 4.6V$ $V_{DD} = 10V, V_O = 9.5V$ $V_{DD} = 15V, V_O = 13.5V$	-0.64 -1.6 -4.2		-0.51 -1.3 -3.4	-0.88 -2.25 -8.8		-0.36 -0.9 -2.4		mA mA mA
I_{IN}	Input Current	$V_{DD} = 15V, V_{IN} = 0V$ $V_{DD} = 15V, V_{IN} = 15V$		-0.1 0.1		-10 ⁻⁵ 10 ⁻⁵	-0.1 0.1		-1.0 1.0	μA μA

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed; they are not meant to imply that the devices should be operated at these limits. The tables of "Recommended Operating Conditions" and Electrical Characteristics provide conditions for actual device operation.

Note 2: $V_{SS} = 0V$ unless otherwise specified.

Note 3: I_{OL} and I_{OH} are tested one output at a time.

DC Electrical Characteristics CD4723BC/CD4724BC (Note 2)

Symbol	Parameter	Conditions	−40°C		+25°C		+85°C		Units
			Min	Max	Min	Typ	Max	Min	
I _{DD}	Quiescent Device Current	V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V		20 40 80		0.02 0.02 0.02	20 40 80		150 300 600 μA
V _{OOL}	Low Level Output Voltage	I _O ≤ 1 μA V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V		0.05 0.05 0.05		0 0 0	0.05 0.05 0.05		0.05 0.05 0.05 V
V _{OOL}	High Level Output Voltage	I _O ≤ 1 μA V _{DD} = 5V V _{DD} = 10V V _{DD} = 15V	4.95 9.95 14.95		4.95 9.95 14.95	5.0 10 15		4.95 9.95 14.95	V
V _{IL}	Low Level Input Voltage	V _{DD} = 5V, V _O = 0.5V or 4.5V V _{DD} = 10V, V _O = 1V or 9V V _{DD} = 15V, V _O = 1.5V or 13.5V		1.5 3.0 4.0		2.25 4.5 6.75	1.5 3.0 4.0		1.5 3.0 4.0 V
V _{IH}	High Level Input Voltage	V _{DD} = 5V, V _O = 0.5V or 4.5V V _{DD} = 10V, V _O = 1V or 9V V _{DD} = 15V, V _O = 1.5V or 13.5V	3.5 7.0 11.0		3.5 7.0 11.0	2.75 5.5 8.25		3.5 7.0 11.0	V
I _{OOL}	Low Level Output Current (Note 3)	V _{DD} = 5V, V _O = 0.4V V _{DD} = 10V, V _O = 0.5V V _{DD} = 15V, V _O = 1.5V	0.52 1.3 3.6		0.44 1.1 3.0	0.88 2.25 8.8		0.36 0.9 2.4	mA
I _{OIH}	High Level Output Current (Note 3)	V _{DD} = 5V, V _O = 4.6V V _{DD} = 10V, V _O = 9.5V V _{DD} = 15V, V _O = 13.5V	-0.52 -1.3 -3.6		-0.44 -1.1 -3.0	-0.88 -2.25 -8.8		-0.36 -0.9 -2.4	mA
I _{IN}	Input Current	V _{DD} = 15V, V _{IN} = 0V V _{DD} = 15V, V _{IN} = 15V		-0.30 0.30		-10 ⁻⁵ 10 ⁻⁵	-0.30 0.30		-1.0 1.0 μA

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed; they are not meant to imply that the devices should be operated at these limits. The tables of "Recommended Operating Conditions" and Electrical Characteristics" provide conditions for actual device operation.

Note 2: V_{SS} = 0V unless otherwise specified.

Note 3: I_{OOL} and I_{OIH} are tested one output at a time.

AC Electrical Characteristics*

$T_A = 25^\circ\text{C}$, $C_L = 50 \text{ pF}$, $R_L = 200\text{k}$, Input $t_r = t_f = 20 \text{ ns}$, unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHL}, t_{PLH}	Propagation Delay Data to Output	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		200 75 50	400 150 100	ns ns ns
t_{PLH}, t_{PHL}	Propagation Delay Enable to Output	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		200 80 60	400 160 120	ns ns ns
t_{PHL}	Propagation Delay Clear to Output	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		175 80 65	350 160 130	ns ns ns
t_{PLH}, t_{PHL}	Propagation Delay Address to Output	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		225 100 75	450 200 150	ns ns ns
t_{THL}, t_{TLH}	Transition Time (Any Output)	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		100 50 40	200 100 80	ns ns ns
T_{WH}, T_{WL}	Minimum Data Pulse Width	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		100 50 40	200 100 80	ns ns ns
t_{WH}, t_{WL}	Minimum Address Pulse Width	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		200 100 65	400 200 125	ns ns ns
t_{WH}	Minimum Clear Pulse Width	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		75 40 25	150 75 50	ns ns ns
t_{SU}	Minimum Setup Time Data to E	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		40 20 15	80 40 30	ns ns ns
t_H	Minimum Hold Time Data to E	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		60 30 25	120 60 50	ns ns ns
t_{SU}	Minimum Setup Time Address to E	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		-15 0 0	50 30 20	ns ns ns
t_H	Minimum Hold Time Address to E	$V_{DD} = 5\text{V}$ $V_{DD} = 10\text{V}$ $V_{DD} = 15\text{V}$		-50 -20 -15	15 10 5	ns ns ns
C_{PD}	Power Dissipation Capacitance	Per Package (Note 4)		100		pF
C_{IN}	Input Capacitance	Any Input		5.0	7.5	pF

*AC Parameters are guaranteed by DC correlated testing.

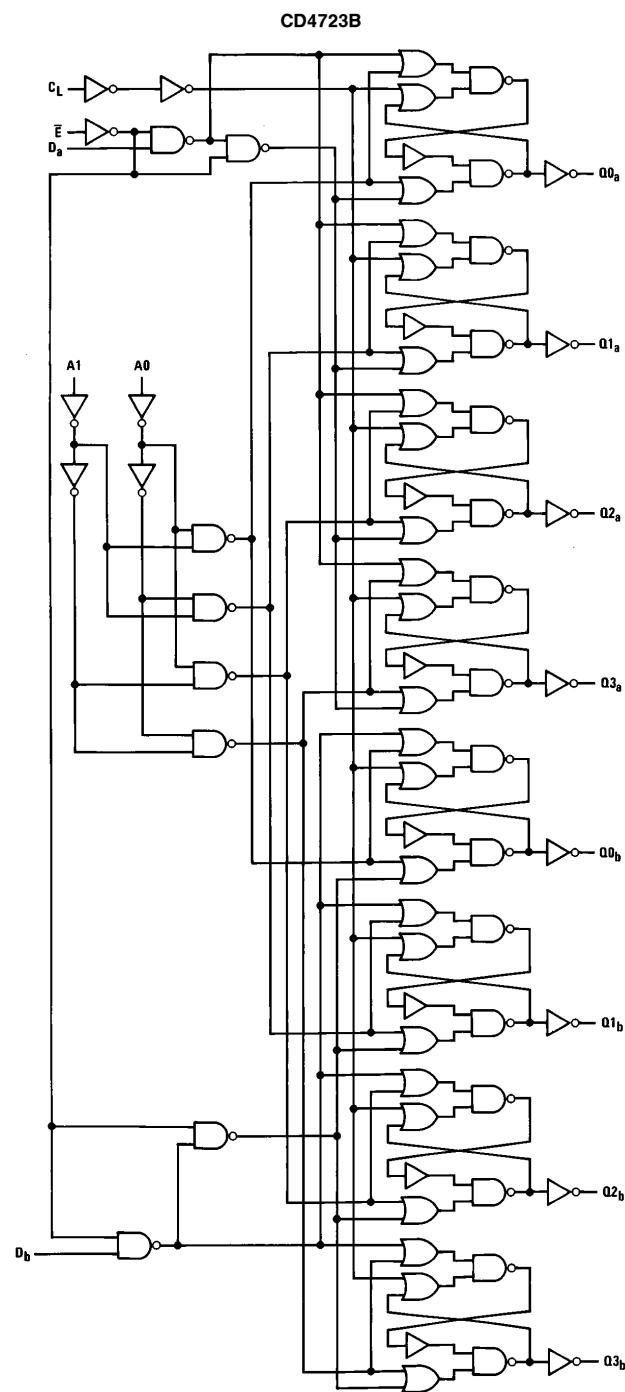
Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed; they are not meant to imply that the devices should be operated at these limits. The tables of "Recommended Operating Conditions" and Electrical Characteristics" provide conditions for actual device operation.

Note 2: $V_{SS} = 0\text{V}$ unless otherwise specified.

Note 3: I_{OL} and I_{OH} are tested one output at a time.

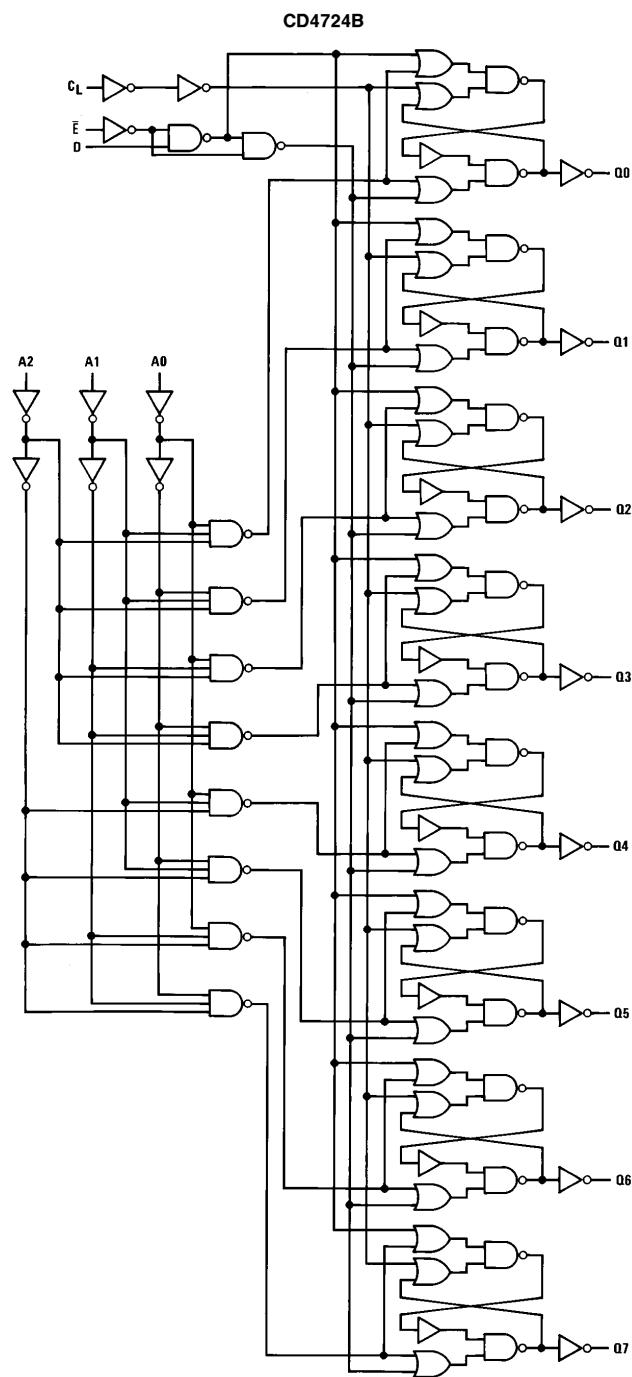
Note 4: Dynamic power dissipation (P_D) is given by: $P_D = (C_{PD} + C_L) V_{CC}^2 f + P_Q$; where C_L = load capacitance; f = frequency of operation; for further details, see Application Note AN-90, "54C/74C Family Characteristics".

Logic Diagrams



TL/F/6003-3

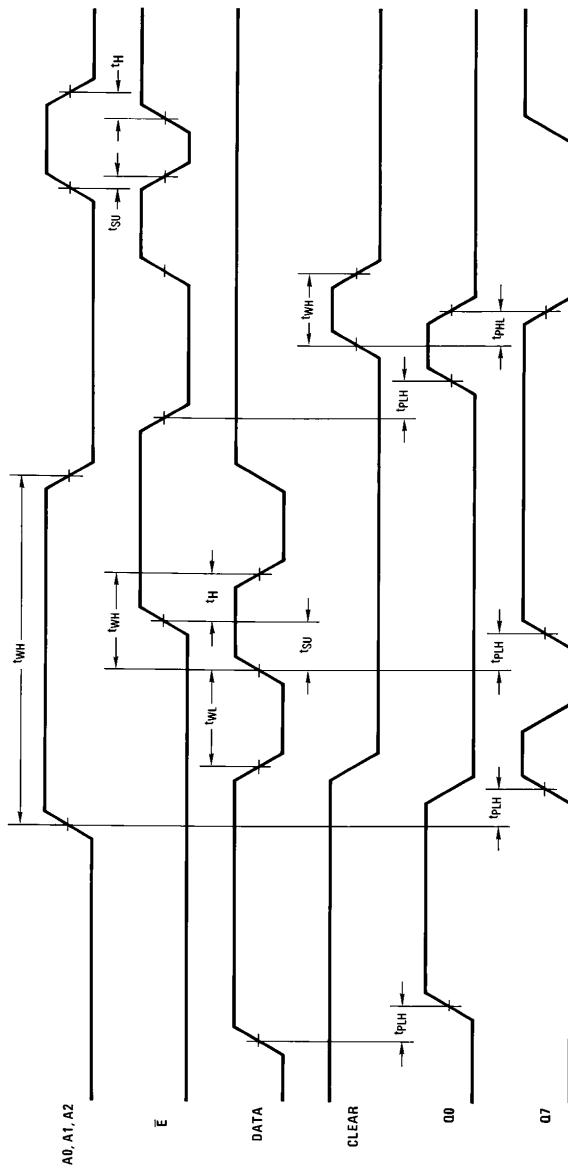
Logic Diagrams (Continued)



TL/F/6003-4

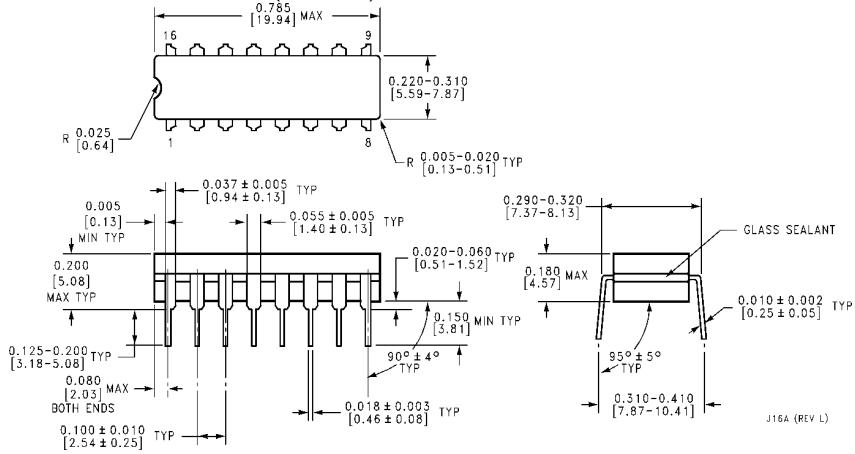
Switching Time Waveforms

TL/F/6003-5



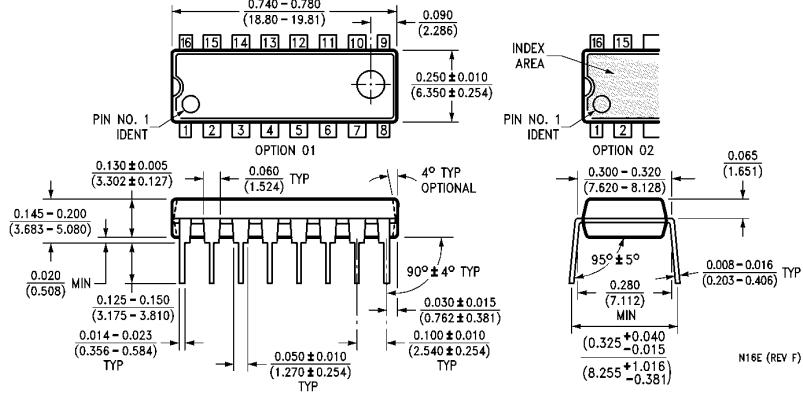
CD4723BM/CD4723BC Dual 4-Bit Addressable Latch CD4724BM/CD4724BC 8-Bit Addressable Latch

Physical Dimensions inches (millimeters)



Ceramic Dual-In-Line Package (J)

Order Number CD4723BMJ, CD4723BCJ, CD4724BMJ or CD4724BCJ
NS Package Number J16A



Molded Dual-In-Line Package (N)

Order Number CD4723BMN, CD4723BCN, CD4724BNN or CD4724BCN
NS Package Number N16E

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National Semiconductor Corporation
1111 West Bardin Road
Arlington, TX 76017
Tel: (800) 272-9959
Fax: (800) 737-7018

National Semiconductor Europe
Fax: (+49) 0-180-530 85 86
Email: cnjwge@tevm2.nsc.com
Deutsch Tel: (+49) 0-180-530 85 85
English Tel: (+49) 0-180-532 78 32
Français Tel: (+49) 0-180-532 93 58
Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
Tel: 81-043-299-2309
Fax: 81-043-299-2406

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