

## DM74ALS174 • DM74ALS175 Hex/Quad D-Type Flip-Flops with Clear

### General Description

These positive-edge-triggered flip-flops utilize TTL circuitry to implement D-type flip-flop logic. Both have an asynchronous clear input, and the quad (DM74ALS175) version features complementary outputs from each flip-flop.

Information at the D inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse. Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse. When the clock input is at either the HIGH or LOW level, the D input signal has no effect at the output.

### Features

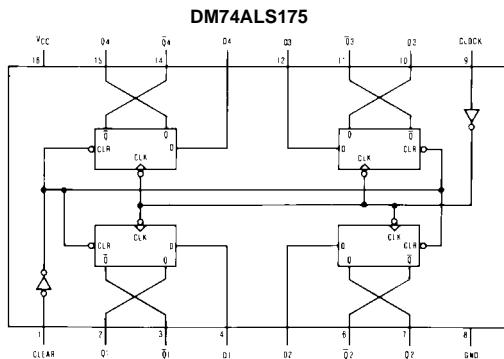
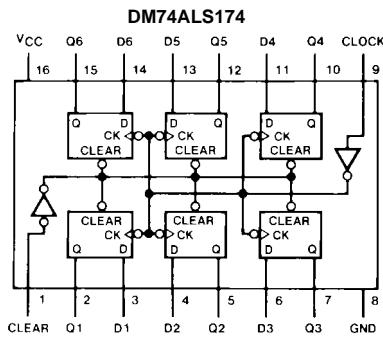
- Advanced oxide-isolated ion-implanted Schottky TTL process
- Pin and functional compatible with LS family counterpart
- Typical clock frequency maximum is 80 MHz
- Switching performance guaranteed over full temperature and  $V_{CC}$  supply range

### Ordering Code:

Ordering Code	Package Number	Package Description
DM74ALS174M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS174SJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
DM74ALS174N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM74ALS175M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS175SJ	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
DM74ALS175N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

### Connection Diagrams



## Function Table

Inputs			Outputs	
Clear	Clock	D	Q	$\bar{Q}$ (Note 1)
L	X	X	L	H
H	↑	H	H	L
H	↑	L	L	H
H	L	X	$Q_0$	$\bar{Q}_0$

H = HIGH Level (steady state)

L = LOW Level (steady state)

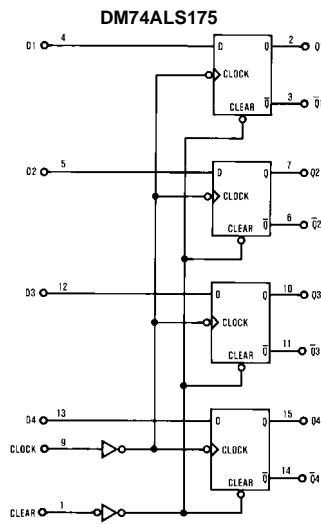
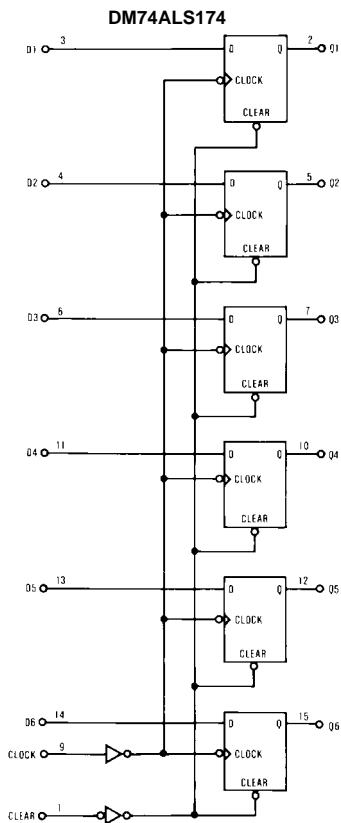
X = Don't Care

↑ = Transition from LOW-to-HIGH Level

 $Q_0$  = the level of Q before the indicated steady-state input conditions were established

Note 1: applies to DM74ALS175 only

## Logic Diagrams



### Absolute Maximum Ratings (Note 2)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical $\theta_{JA}$	
N Package	77.9°C/W
M Package	107.3°C/W

**Note 2:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

### Recommended Operating Conditions

Symbol	Parameter		Min	Nom	Max	Units
$V_{CC}$	Supply Voltage		4.5	5	5.5	V
$V_{IH}$	HIGH Level Input Voltage		2			V
$V_{IL}$	LOW Level Input Voltage				0.8	V
$I_{OH}$	HIGH Level Output Current				-0.4	mA
$I_{OL}$	LOW Level Output Current				8	mA
$t_W$	Pulse Width	Clock HIGH or LOW	10			ns
		Clear LOW	10			
$t_{SETUP}$	Setup Time (Note 3)	Data Input	10↑			ns
		Clear Inactive State	6↑			
$t_{HOLD}$	Data Hold Time (Note 3)		0↑			ns
$f_{CLOCK}$	Clock Frequency		0		50	MHz
$T_A$	Free Air Operating Temperature		0		70	°C

**Note 3:** The symbol ↑ indicates that the rising edge of the clock is used as reference.

## Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ .

Symbol	Parameter	Conditions		Min	Typ	Max	Units
$V_{IK}$	Input Clamp Voltage	$V_{CC} = 4.5V$ , $I_{IN} = -18 \text{ mA}$				-1.5	V
$V_{OH}$	HIGH Level Output Voltage	$I_{OH} = -400 \mu\text{A}$ $V_{CC} = 4.5V$ to $5.5V$		$V_{CC} - 2$	$V_{CC} - 1.6$		V
$V_{OL}$	LOW Level Output Voltage	$V_{CC} = 4.5V$	$I_{OL} = 8 \text{ mA}$		0.35	0.5	V
$I_I$	Input Current at Max Input Voltage	$V_{CC} = 5.5V$ , $V_{IN} = 7V$				0.1	mA
$I_{IH}$	HIGH Level Input Current	$V_{CC} = 5.5V$ , $V_{IH} = 2.7V$				20	$\mu\text{A}$
$I_{IL}$	LOW Level Input Current	$V_{CC} = 5.5V$ , $V_{IN} = 0.4V$				-0.1	mA
$I_O$	Output Drive Current	$V_{CC} = 5.5V$ , $V_O = 2.25V$		-30		-112	mA
$I_{CC}$	Supply Current	$V_{CC} = 5.5V$ Clock = 4.5V Clear = GND D Input = GND	DM74ALS174		11	19	mA
			DM74ALS175		8	14	

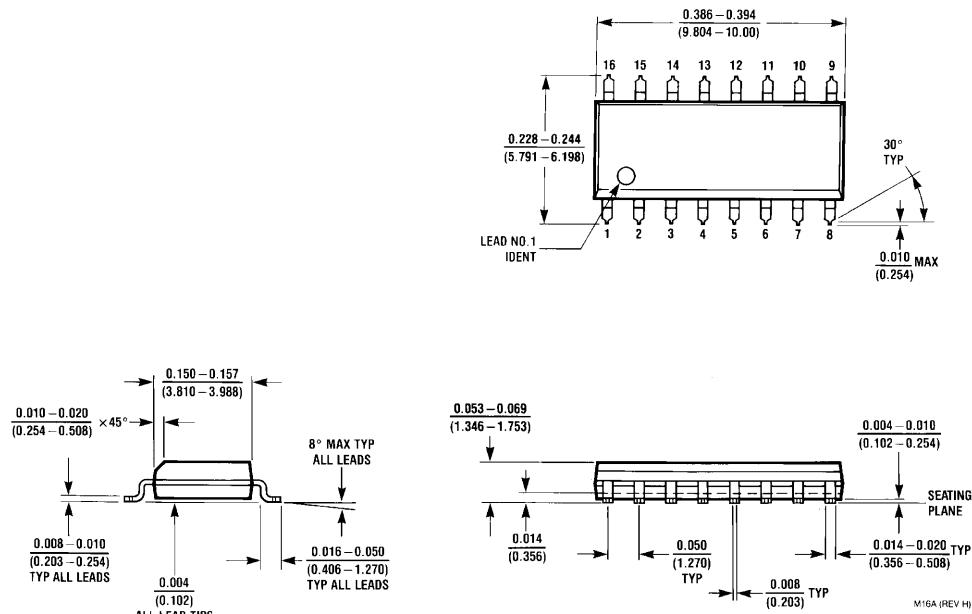
## Switching Characteristics

over recommended operating free air temperature range

Symbol	Parameter	Conditions	Min	Max	Units
$f_{MAX}$	Maximum Clock Frequency	$R_L = 500\Omega$	50		MHz
$t_{PLH}$	Propagation Delay Time LOW-to-HIGH Level Output From Clear (175 Only)	$C_L = 50 \text{ pF}$ $V_{CC} = 4.5V$ to $5.5V$	5	18	ns
$t_{PHL}$	Propagation Delay Time HIGH-to-LOW Level Output From Clear		8	23	ns
$t_{PLH}$	Propagation Delay Time LOW-to-HIGH Level Output From Clock		3	15	ns
$t_{PHL}$	Propagation Delay Time HIGH-to-LOW Level Output From Clock		5	17	ns

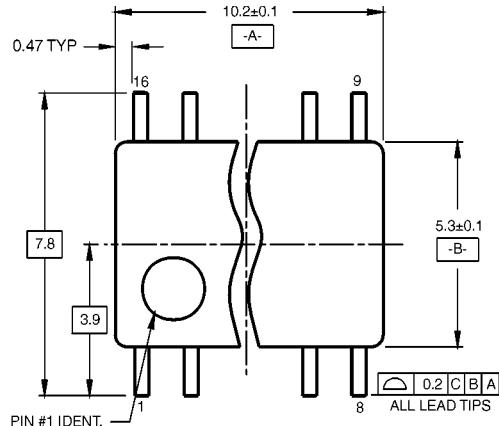
### Physical Dimensions

inches (millimeters) unless otherwise noted

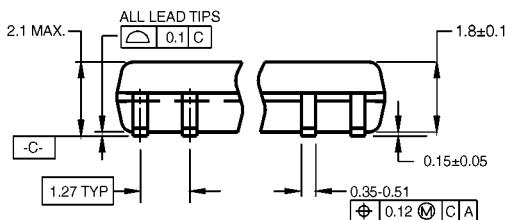


16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow  
Package Number M16A

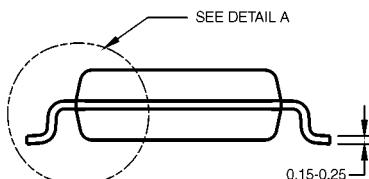
## **Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



#### LAND PATTERN RECOMMENDATION



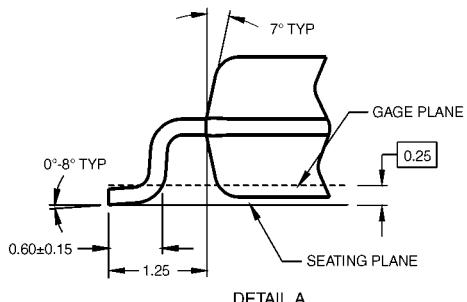
DIMENSIONS ARE IN MILLIMETERS



## NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION,  
ESTABLISHED IN DECEMBER, 1998.
  - B. DIMENSIONS ARE IN MILLIMETERS.
  - C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD  
FLASH, AND TIE BAR EXTRUSIONS.

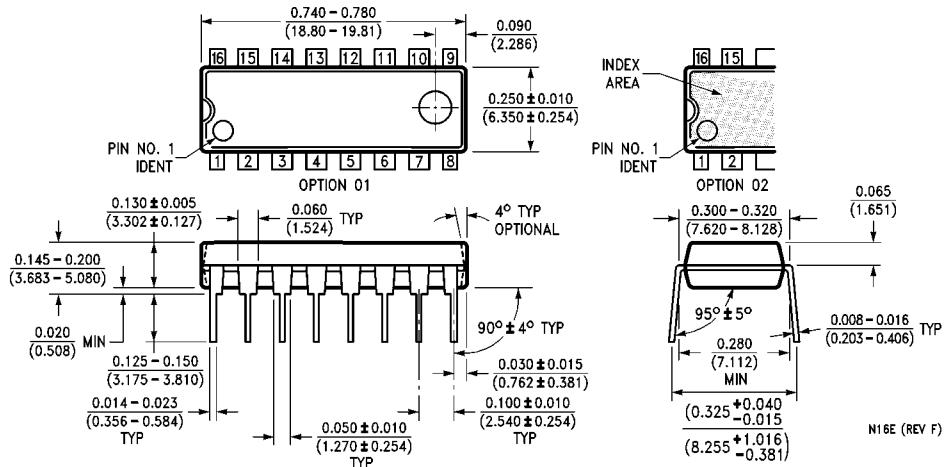
M16DRevB1



**DETAIL A**

**16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide  
Package Number M16D**

**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



Fairchild does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and Fairchild reserves the right at any time without notice to change said circuitry and specifications.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

[www.fairchildsemi.com](http://www.fairchildsemi.com)



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

#### Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помошь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помошь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: [org@eplast1.ru](mailto:org@eplast1.ru)

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.