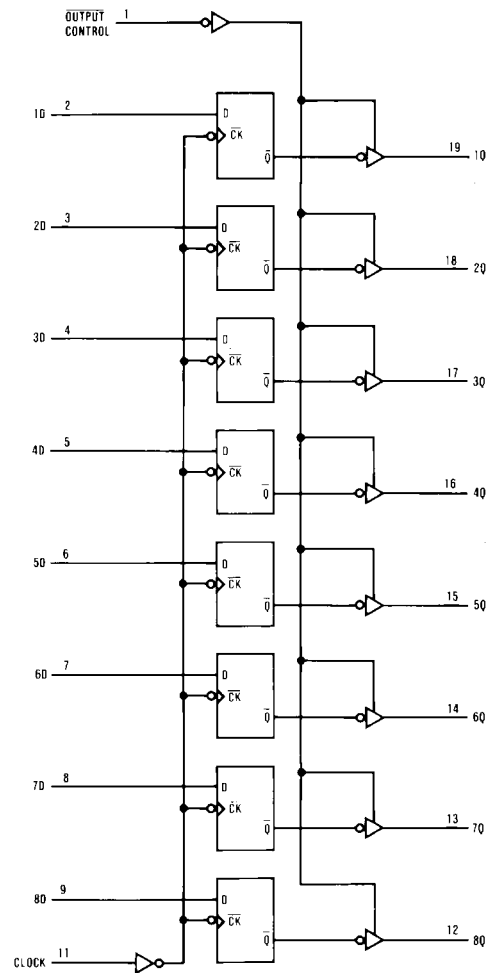


Function Table

Output Control	Clock	D	Output Q
L	\uparrow	H	H
L	\uparrow	L	L
L	L	X	Q_0
H	X	X	Z

L = LOW State
 H = HIGH State
 X = Don't Care
 \uparrow = Positive Edge Transition
 Z = High Impedance State
 Q_0 = Previous Condition of Q

Logic Diagram



Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Voltage Applied to Disabled Output	5.5V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical θ_{JA}	
N Package	56.0°C/W
M Package	75.0°C/W

Note 1: 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			-2.6	mA
I_{OL}	LOW Level Output Current			24	mA
f_{CLOCK}	Clock Frequency	0		35	MHz
t_W	Width of Clock Pulse	HIGH	14		ns
		LOW	14		ns
t_{SU}	Data Setup Time (Note 2)	15 \uparrow			ns
t_H	Data Hold Time (Note 2)	0 \uparrow			ns
T_A	Free Air Operating Temperature	0		70	°C

Note 2: The (\uparrow) arrow indicates the positive edge of the Clock is used for reference.

Electrical Characteristics

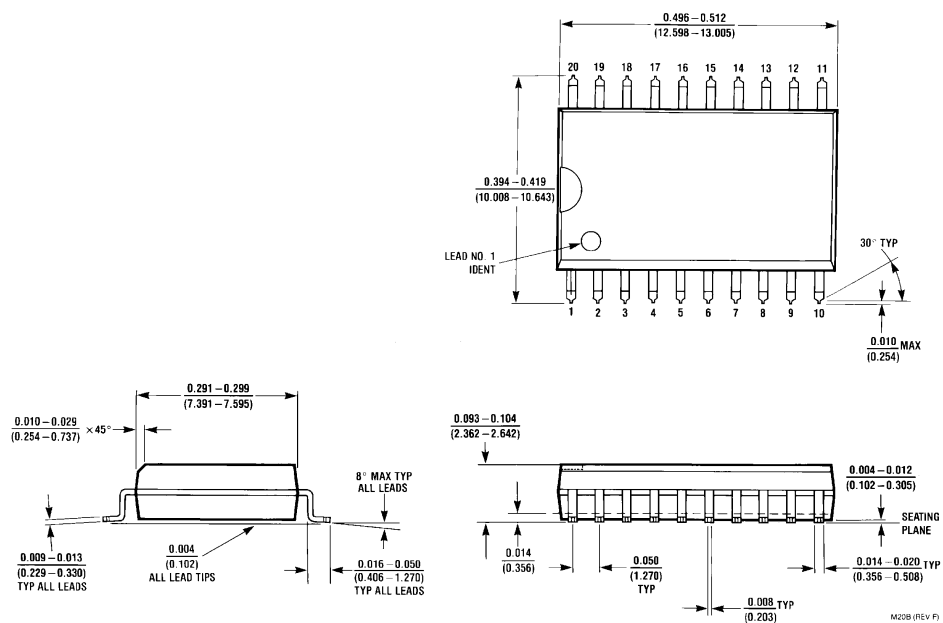
over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	$V_{CC} = 4.5V$, $I_I = -18\text{ mA}$			-1.2	V
V_{OH}	HIGH Level Output Voltage	$V_{CC} = 4.5V$ $V_{IL} = V_{IL\text{ Max}}$	$I_{OH} = \text{Max}$	2.4	3.2	V
		$V_{CC} = 4.5V$ to $5.5V$	$I_{OH} = -400\text{ }\mu A$	$V_{CC} - 2$		V
V_{OL}	LOW Level Output Voltage	$V_{CC} = 4.5V$ $V_{IH} = 2V$	$I_{OL} = 12\text{ mA}$	0.25	0.4	V
			$I_{OL} = 24\text{ mA}$	0.35	0.5	V
I_I	Input Current at Max Input Voltage	$V_{CC} = 5.5V$, $V_{IH} = 7V$			0.1	mA
I_{IH}	HIGH Level Input Current	$V_{CC} = 5.5V$, $V_{IH} = 2.7V$			20	μA
I_{IL}	LOW Level Input Current	$V_{CC} = 5.5V$, $V_{IL} = 0.4V$			-0.2	mA
I_O	Output Drive Current	$V_{CC} = 5.5V$, $V_O = 2.25V$	-30		-112	mA
I_{OZH}	OFF-State Output Current HIGH Level Voltage Applied	$V_{CC} = 5.5V$, $V_{IH} = 2V$ $V_O = 2.7V$			20	μA
I_{OZL}	OFF-State Output Current d LOW Level Voltage Applied	$V_{CC} = 5.5V$, $V_{IH} = 2V$ $V_O = 0.4V$			-20	μA
I_{CC}	Supply Current	$V_{CC} = 5.5V$ Outputs Open	Outputs HIGH	11	18	mA
			Outputs LOW	17	27	mA
			Outputs Disabled	17	28	mA

Switching Characteristics

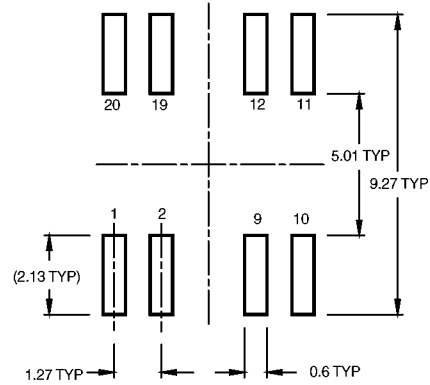
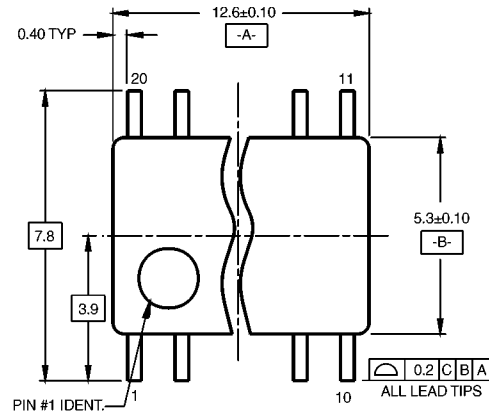
over recommended operating free air temperature range

Symbol	Parameter	Conditions	From	To	Min	Max	Units
f_{MAX}	Maximum Clock Frequency	$V_{CC} = 4.5V$ to $5.5V$ $R_L = 500\Omega$ $C_L = 50$ pF			35		MHz
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		Clock	Any Q	4	14	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		Clock	Any Q	4	14	ns
t_{PZH}	Output Enable Time to HIGH Level Output		Output Control	Any Q	4	18	ns
t_{PZL}	Output Enable Time to LOW Level Output		Output Control	Any Q	4	18	ns
t_{PHZ}	Output Disable Time from HIGH Level Output		Output Control	Any Q	2	10	ns
t_{PLZ}	Output Disable Time from LOW Level Output		Output Control	Any Q	2	12	ns

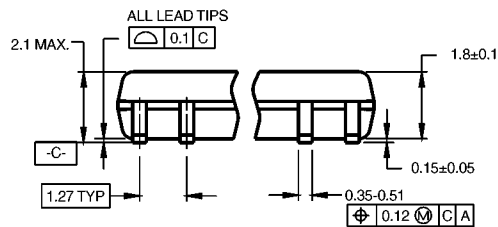


**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
Package Number M20B**

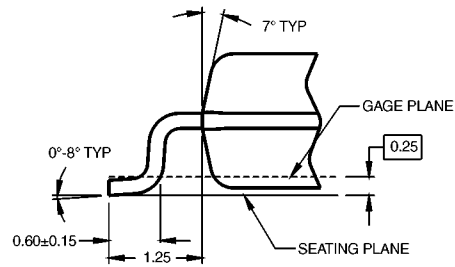
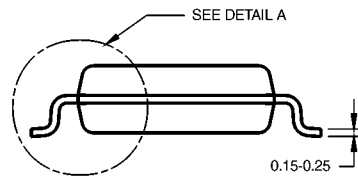
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



LAND PATTERN RECOMMENDATION



DIMENSIONS ARE IN MILLIMETERS



DETAIL A

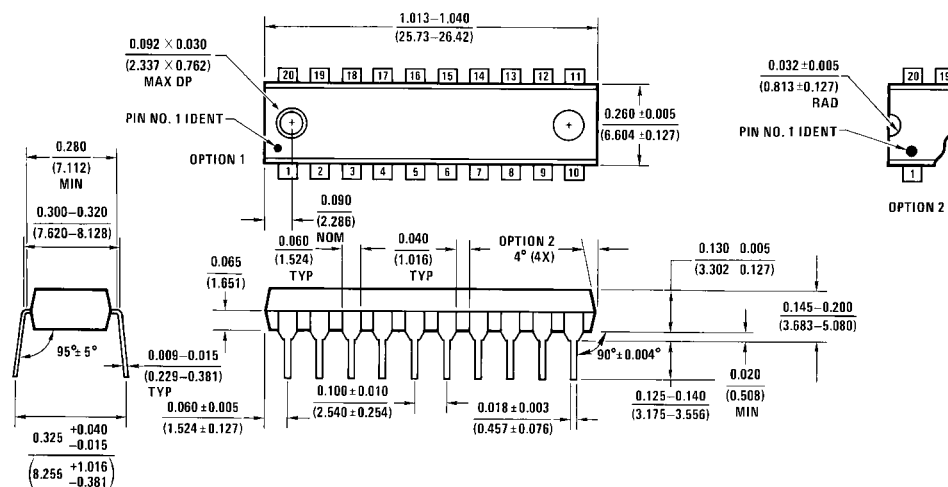
NOTES:

- 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.

M20DRevB1

20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M20D

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



20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N20A

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