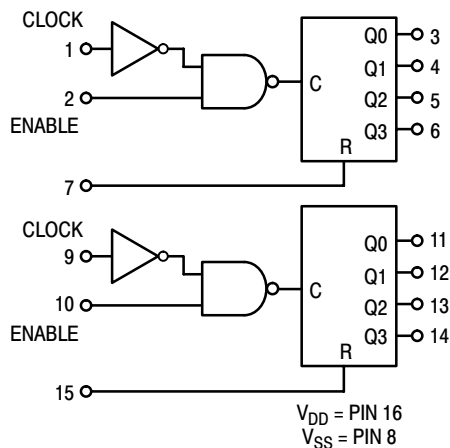


MC14518B, MC14520B

BLOCK DIAGRAM



TRUTH TABLE

Clock	Enable	Reset	Action
↗	1	0	Increment Counter
0	↘	0	Increment Counter
↘	X	0	No Change
X	↗	0	No Change
↗	0	0	No Change
1	↘	0	No Change
X	X	1	Q0 thru Q3 = 0

X = Don't Care

ORDERING INFORMATION

Device	Package	Shipping [†]
MC14518BDWG	SOIC-16 WB (Pb-Free)	47 Units / Rail
MC14518BDWR2G	SOIC-16 WB (Pb-Free)	1000 Units / Tape & Reel
NLV14518BDWR2G*	SOIC-16 WB (Pb-Free)	1000 Units / Tape & Reel
MC14520BDWG	SOIC-16 WB (Pb-Free)	47 Units / Rail
MC14520BDWR2G	SOIC-16 WB (Pb-Free)	1000 Units / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

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ELECTRICAL CHARACTERISTICS (Voltages Referenced to V_{SS})

Characteristic	Symbol	V _{DD} Vdc	- 55° C		25° C			125° C		Unit	
			Min	Max	Min	Typ (Note 3)	Max	Min	Max		
Output Voltage V _{in} = V _{DD} or 0	"0" Level	V _{OL}	5.0	–	0.05	–	0	0.05	–	0.05	Vdc
			10	–	0.05	–	0	0.05	–	0.05	
			15	–	0.05	–	0	0.05	–	0.05	
	"1" Level	V _{OH}	5.0	4.95	–	4.95	5.0	–	4.95	–	Vdc
			10	9.95	–	9.95	10	–	9.95	–	
			15	14.95	–	14.95	15	–	14.95	–	
Input Voltage (V _O = 4.5 or 0.5 Vdc) (V _O = 9.0 or 1.0 Vdc) (V _O = 13.5 or 1.5 Vdc)	"0" Level	V _{IL}	5.0	–	1.5	–	2.25	1.5	–	1.5	Vdc
			10	–	3.0	–	4.50	3.0	–	3.0	
			15	–	4.0	–	6.75	4.0	–	4.0	
	"1" Level	V _{IH}	5.0	3.5	–	3.5	2.75	–	3.5	–	Vdc
			10	7.0	–	7.0	5.50	–	7.0	–	
			15	11	–	11	8.25	–	11	–	
Output Drive Current (V _{OH} = 2.5 Vdc) (V _{OH} = 4.6 Vdc) (V _{OH} = 9.5 Vdc) (V _{OH} = 13.5 Vdc)	Source	I _{OH}	5.0	–3.0	–	–2.4	–4.2	–	–1.7	–	mA _{dc}
			5.0	–0.64	–	–0.51	–0.88	–	–0.36	–	
			10	–1.6	–	–1.3	–2.25	–	–0.9	–	
			15	–4.2	–	–3.4	–8.8	–	–2.4	–	
	Sink	I _{OL}	5.0	0.64	–	0.51	0.88	–	0.36	–	mA _{dc}
			10	1.6	–	1.3	2.25	–	0.9	–	
15	4.2	–	3.4	8.8	–	2.4	–	–			
Input Current	I _{in}	15	–	±0.1	–	±0.00001	±0.1	–	±1.0	μA _{dc}	
Input Capacitance (V _{in} = 0)	C _{in}	–	–	–	–	5.0	7.5	–	–	pF	
Quiescent Current (Per Package)	I _{DD}	5.0	–	5.0	–	0.005	5.0	–	150	μA _{dc}	
		10	–	10	–	0.010	10	–	300		
		15	–	20	–	0.015	20	–	600		
Total Supply Current (Notes 4, 5) (Dynamic plus Quiescent, Per Package) (C _L = 50 pF on all outputs, all buffers switching)	I _T	5.0	I _T = (0.6 μA/kHz) f + I _{DD}							μA _{dc}	
		10	I _T = (1.2 μA/kHz) f + I _{DD}								
		15	I _T = (1.7 μA/kHz) f + I _{DD}								

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

3. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.
4. The formulas given are for the typical characteristics only at 25°C.
5. To calculate total supply current at loads other than 50 pF:

$$I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) Vfk$$

where: I_T is in μA (per package), C_L in pF, V = (V_{DD} – V_{SS}) in volts, f in kHz is input frequency, and k = 0.002.

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SWITCHING CHARACTERISTICS (Note 6) ($C_L = 50 \text{ pF}$, $T_A = 25^\circ\text{C}$)

Characteristic	Symbol	V_{DD}	All Types			Unit
			Min	Typ (Note 7)	Max	
Output Rise and Fall Time $t_{TLH}, t_{THL} = (1.5 \text{ ns/pF}) C_L + 25 \text{ ns}$ $t_{TLH}, t_{THL} = (0.75 \text{ ns/pF}) C_L + 12.5 \text{ ns}$ $t_{TLH}, t_{THL} = (0.55 \text{ ns/pF}) C_L + 9.5 \text{ ns}$	t_{TLH}, t_{THL}	5.0 10 15	– – –	100 50 40	200 100 80	ns
Propagation Delay Time Clock to Q/Enable to Q $t_{PLH}, t_{PHL} = (1.7 \text{ ns/pF}) C_L + 215 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.66 \text{ ns/pF}) C_L + 97 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.5 \text{ ns/pF}) C_L + 75 \text{ ns}$ Reset to Q $t_{PHL} = (1.7 \text{ ns/pF}) C_L + 265 \text{ ns}$ $t_{PHL} = (0.66 \text{ ns/pF}) C_L + 117 \text{ ns}$ $t_{PHL} = (0.66 \text{ ns/pF}) C_L + 95 \text{ ns}$	t_{PLH}, t_{PHL} t_{PHL}	5.0 10 15 5.0 10 15	– – – – – –	280 115 80 330 130 90	560 230 160 650 230 170	ns
Clock Pulse Width	$t_{w(H)}$ $t_{w(L)}$	5.0 10 15	200 100 70	100 50 35	– – –	ns
Clock Pulse Frequency	f_{cl}	5.0 10 15	– – –	2.5 6.0 8.0	1.5 3.0 4.0	MHz
Clock or Enable Rise and Fall Time	t_{THL}, t_{TLH}	5.0 10 15	– – –	– – –	15 5 4	μs
Enable Pulse Width	$t_{WH(E)}$	5.0 10 15	440 200 140	220 100 70	– – –	ns
Reset Pulse Width	$t_{WH(R)}$	5.0 10 15	280 120 90	125 55 40	– – –	ns
Reset Removal Time	t_{rem}	5.0 10 15	–5 15 20	–45 –15 –5	– – –	ns

- The formulas given are for the typical characteristics only at 25°C .
- Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

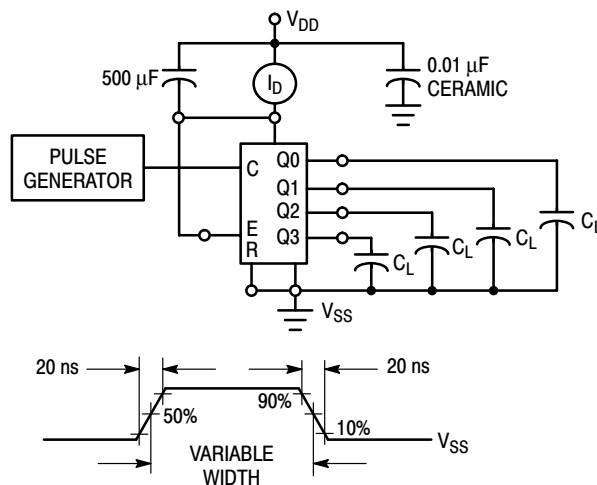


Figure 1. Power Dissipation Test Circuit and Waveform

MC14518B, MC14520B

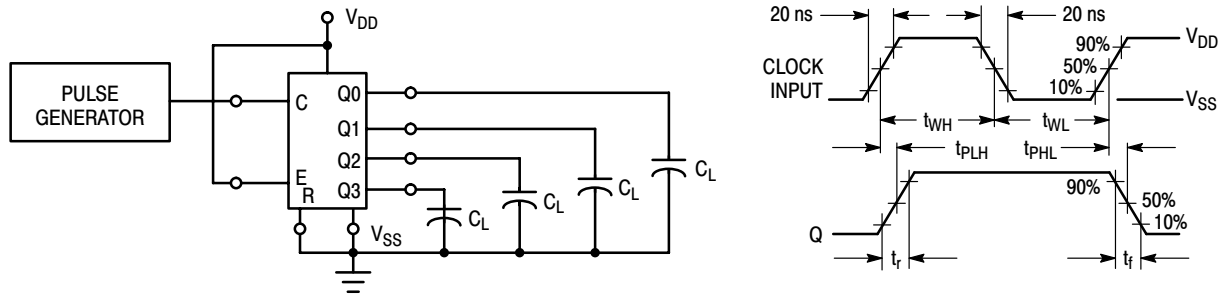


Figure 2. Switching Time Test Circuit and Waveforms

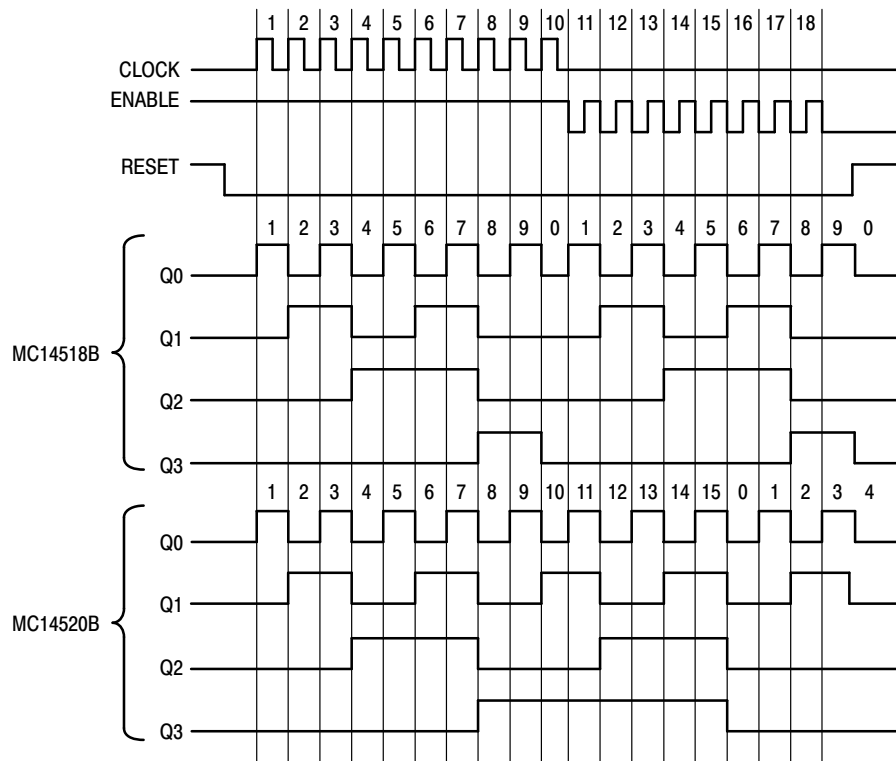


Figure 3. Timing Diagram

MC14518B, MC14520B

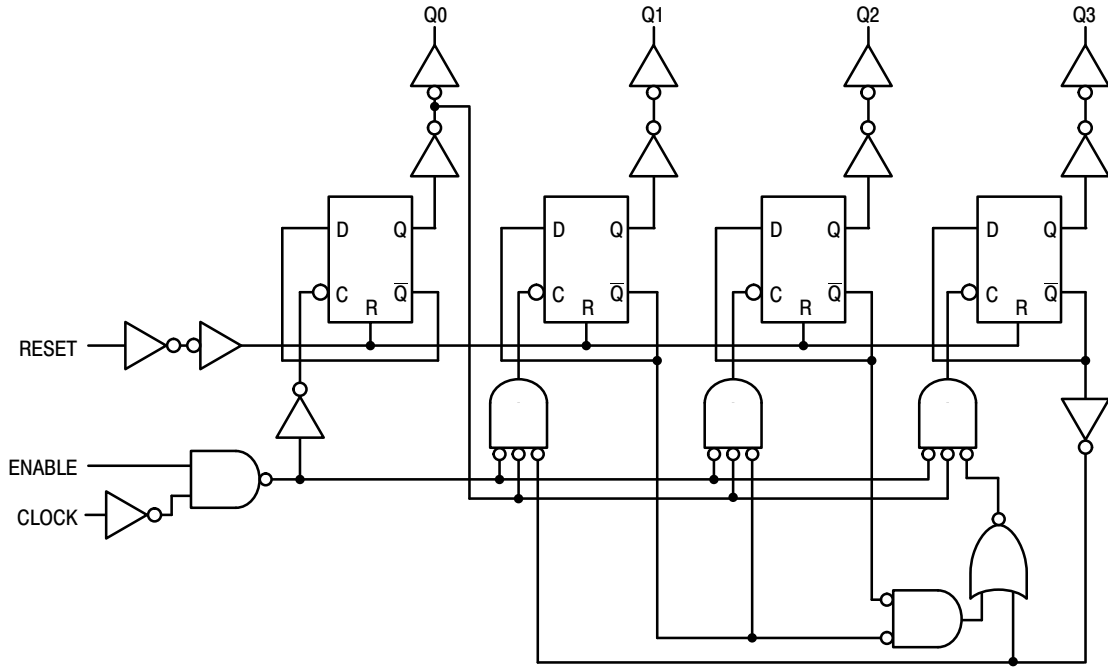


Figure 4. Decade Counter (MC14518B) Logic Diagram
(1/2 of Device Shown)

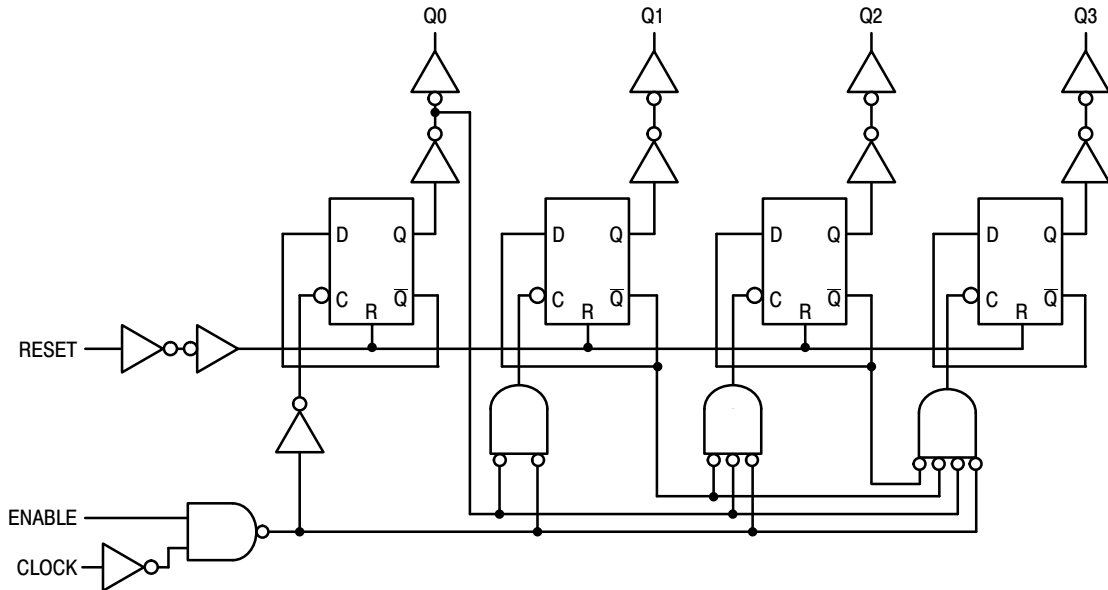


Figure 5. Binary Counter (MC14520B) Logic Diagram
(1/2 of Device Shown)

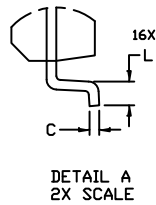
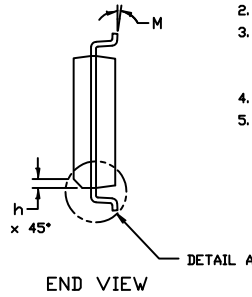
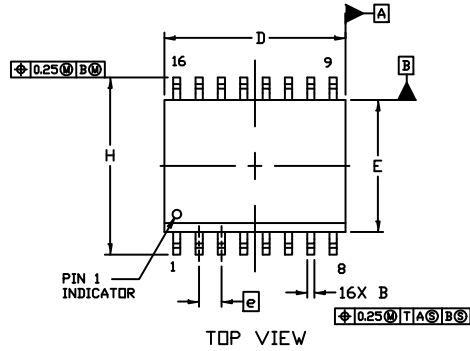
MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



1
SCALE 1:1

SOIC-16 WB
CASE 751G
ISSUE E

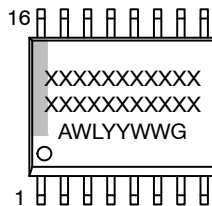
DATE 08 OCT 2021



- NOTES:
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 - CONTROLLING DIMENSION: MILLIMETERS
 - DIMENSION *b* DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF *B* DIMENSION AT MAXIMUM MATERIAL CONDITION.
 - DIMENSIONS *D* AND *E* DO NOT INCLUDE MOLD PROTRUSIONS.
 - MAXIMUM MOLD PROTRUSION OR FLASH TO BE 0.15 PER SIDE.

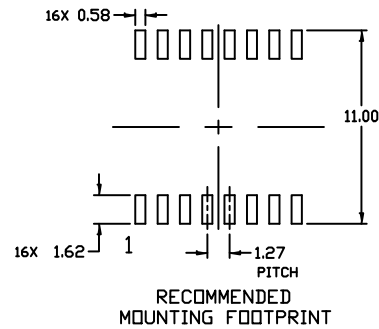
DIM	MILLIMETERS	
	MIN.	MAX.
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	10.15	10.45
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.53 REF	
L	0.50	0.90
M	0°	7°

GENERIC MARKING DIAGRAM*



- XXXXX = Specific Device Code
- A = Assembly Location
- WL = Wafer Lot
- YY = Year
- WW = Work Week
- G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



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