

MC14538B

Dual Precision Retriggerable/Resettable Monostable Multivibrator

The MC14538B is a dual, retriggerable, resettable monostable multivibrator. It may be triggered from either edge of an input pulse, and produces an accurate output pulse over a wide range of widths, the duration and accuracy of which are determined by the external timing components, C_X and R_X . Output Pulse Width $T = R_X \cdot C_X$ (secs)

$$R_X = \Omega$$

$$C_X = \text{Farads}$$

Features

- Unlimited Rise and Fall Time Allowed on the A Trigger Input
- Pulse Width Range = 10 μ s to 10 s
- Latched Trigger Inputs
- Separate Latched Reset Inputs
- 3.0 Vdc to 18 Vdc Operational Limits
- Triggerable from Positive (A Input) or Negative-Going Edge (B-Input)
- Capable of Driving Two Low-Power TTL Loads or One Low-Power Schottky TTL Load Over the Rated Temperature Range
- Pin-for-pin Compatible with MC14528B and CD4528B (CD4098)
- Use the MC54/74HC4538A for Pulse Widths Less Than 10 μ s with Supplies Up to 6 V
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-Free and are RoHS Compliant

MAXIMUM RATINGS (Voltages Referenced to V_{SS})

Symbol	Parameter	Value	Unit
V_{DD}	DC Supply Voltage Range	-0.5 to +18.0	V
V_{in}, V_{out}	Input or Output Voltage Range (DC or Transient)	-0.5 to $V_{DD} + 0.5$	V
I_{in}, I_{out}	Input or Output Current (DC or Transient) per Pin	± 10	mA
P_D	Power Dissipation, per Package (Note 1)	500	mW
T_A	Operating Temperature Range	-55 to +125	$^{\circ}$ C
T_{stg}	Storage Temperature Range	-65 to +150	$^{\circ}$ C
T_L	Lead Temperature (8-Second Soldering)	260	$^{\circ}$ C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Temperature Derating: "D/DW" Packages: -7.0 mW/ $^{\circ}$ C From 65 $^{\circ}$ C To 125 $^{\circ}$ C

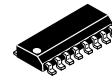
This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation, V_{in} and V_{out} should be constrained to the range $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$.

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either V_{SS} or V_{DD}). Unused outputs must be left open.

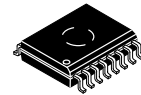


ON Semiconductor®

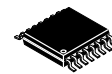
<http://onsemi.com>



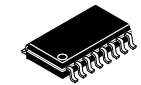
SOIC-16
D SUFFIX
CASE 751B



SOIC-16WB
DW SUFFIX
CASE 751G

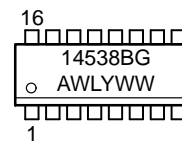


TSSOP-16
DT SUFFIX
CASE 948F

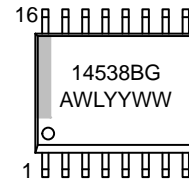


SOEIAJ-16
F SUFFIX
CASE 966

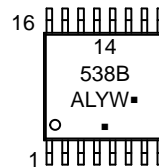
MARKING DIAGRAMS



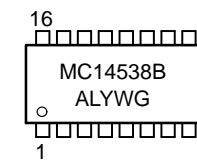
SOIC-16



SOIC-16WB



TSSOP-16



SOEIAJ-16

- A = Assembly Location
- WL, L = Wafer Lot
- YY, Y = Year
- WW, W = Work Week
- G or \blacksquare = Pb-Free Indicator

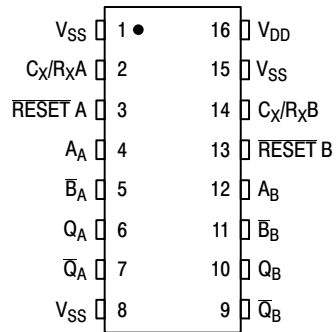
(Note: Microdot may be in either location)

ORDERING INFORMATION

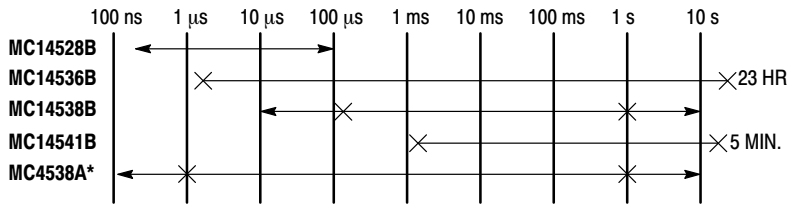
See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

MC14538B

PIN ASSIGNMENT



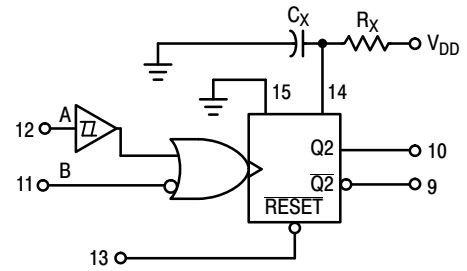
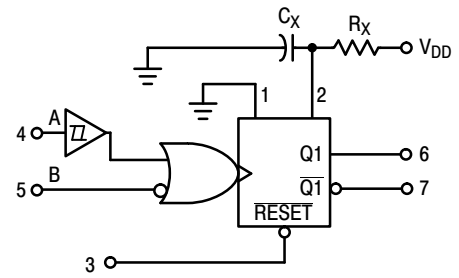
ONE-SHOT SELECTION GUIDE



*LIMITED OPERATING VOLTAGE (2 - 6 V)

TOTAL OUTPUT PULSE WIDTH RANGE ← →
 RECOMMENDED PULSE WIDTH RANGE × — ×

BLOCK DIAGRAM



R_X AND C_X ARE EXTERNAL COMPONENTS.
 V_{DD} = PIN 16
 V_{SS} = PIN 8, PIN 1, PIN 15

ORDERING INFORMATION

Device	Package	Shipping [†]
MC14538BDG	SOIC-16 (Pb-Free)	48 Units / Rail
NLV14538BDG*	SOIC-16 (Pb-Free)	48 Units / Rail
MC14538BDR2G	SOIC-16 (Pb-Free)	2500 Units / Tape & Reel
NLV14538BDR2G*	SOIC-16 (Pb-Free)	2500 Units / Tape & Reel
MC14538BDTR2G	TSSOP-16 (Pb-Free)	2500 Units / Tape & Reel
NLV14538BDTR2G*	TSSOP-16 (Pb-Free)	2500 Units / Tape & Reel
MC14538BDWG	SOIC-16 WB (Pb-Free)	47 Units / Rail
NLV14538BDWG*	SOIC-16 WB (Pb-Free)	47 Units / Rail
MC14538BDWR2G	SOIC-16 WB (Pb-Free)	1000 Units / Tape & Reel
NLV14538BDWR2G*	SOIC-16 WB (Pb-Free)	1000 Units / Tape & Reel
MC14538BFG	SOEIAJ-16 (Pb-Free)	50 Units / Rail
MC14538BFELG	SOEIAJ-16 (Pb-Free)	2000 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.

MC14538B

ELECTRICAL CHARACTERISTICS (Voltages Referenced to V_{SS})

Characteristic	Symbol	V _{DD} Vdc	- 55°C		25°C			125°C		Unit	
			Min	Max	Min	Typ (Note 2)	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	-	
	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, Pin 2 or 14	I _{in}	15	-	±0.05	-	±0.00001	±0.05	-	±0.5	μA _{dc}	
Input Current, Other Inputs	I _{in}	15	-	±0.1	-	±0.00001	±0.1	-	±1.0	μA _{dc}	
Input Capacitance, Pin 2 or 14	C _{in}	-	-	-	-	25	-	-	-	pF	
Input Capacitance, Other Inputs (V _{in} = 0)	C _{in}	-	-	-	-	5.0	7.5	-	-	pF	
Quiescent Current (Per Package) Q = Low, \bar{Q} = High	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		
Quiescent Current, Active State (Both) (Per Package) Q = High, \bar{Q} = Low	I _{DD}	5.0	-	2.0	-	0.04	0.20	-	2.0	mA _{dc}	
		10	-	2.0	-	0.08	0.45	-	2.0		
		15	-	2.0	-	0.13	0.70	-	2.0		
Total Supply Current at an external load capacitance (C _L) and at external timing network (R _X , C _X) (Note 3)	I _T	5.0 10	$I_T = (3.5 \times 10^{-2}) R_X C_X f + 4C_X f + 1 \times 10^{-5} C_L f$ $I_T = (8.0 \times 10^{-2}) R_X C_X f + 9C_X f + 2 \times 10^{-5} C_L f$ $I_T = (1.25 \times 10^{-1}) R_X C_X f + 12C_X f + 3 \times 10^{-5} C_L f$ where: I _T in μA (one monostable switching only), C _X in μF, C _L in pF, R _X in k ohms, and f in Hz is the input frequency.							μA _{dc}	

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.

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

OPERATING CONDITIONS

External Timing Resistance	R _X	-	5.0	-	(Note 4)	kΩ
External Timing Capacitance	C _X	-	0	-	No Limit (Note 5)	μF

- The maximum usable resistance R_X is a function of the leakage of the capacitor C_X, leakage of the MC14538B, and leakage due to board layout and surface resistance. Susceptibility to externally induced noise signals may occur for R_X > 1 MΩ.
- If C_X > 15 μF, use discharge protection diode per Fig. 11.

MC14538B

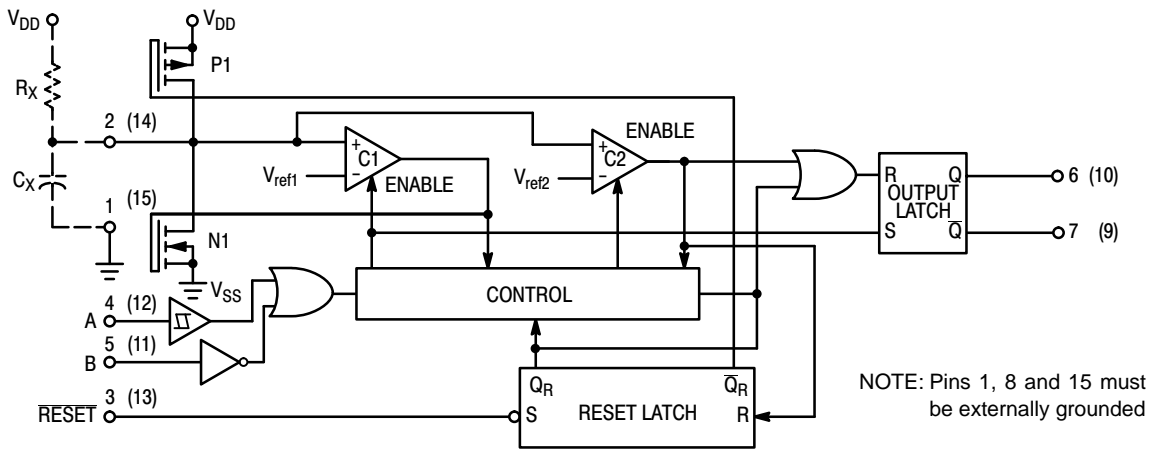
SWITCHING CHARACTERISTICS (Note 6) ($C_L = 50 \text{ pF}$, $T_A = 25^\circ\text{C}$)

Characteristic	Symbol	V_{DD} Vdc	All Types			Unit
			Min	Typ (Note 7)	Max	
Output Rise Time $t_{TLH} = (1.35 \text{ ns/pF}) C_L + 33 \text{ ns}$ $t_{TLH} = (0.60 \text{ ns/pF}) C_L + 20 \text{ ns}$ $t_{TLH} = (0.40 \text{ ns/pF}) C_L + 20 \text{ ns}$	t_{TLH}	5.0 10 15	– – –	100 50 40	200 100 80	ns
Output Fall Time $t_{THL} = (1.35 \text{ ns/pF}) C_L + 33 \text{ ns}$ $t_{THL} = (0.60 \text{ ns/pF}) C_L + 20 \text{ ns}$ $t_{THL} = (0.40 \text{ ns/pF}) C_L + 20 \text{ ns}$	t_{THL}	5.0 10 15	– – –	100 50 40	200 100 80	ns
Propagation Delay Time A or B to Q or \bar{Q} $t_{PLH}, t_{PHL} = (0.90 \text{ ns/pF}) C_L + 255 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.36 \text{ ns/pF}) C_L + 132 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.26 \text{ ns/pF}) C_L + 87 \text{ ns}$ Reset to Q or \bar{Q} $t_{PLH}, t_{PHL} = (0.90 \text{ ns/pF}) C_L + 205 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.36 \text{ ns/pF}) C_L + 107 \text{ ns}$ $t_{PLH}, t_{PHL} = (0.26 \text{ ns/pF}) C_L + 82 \text{ ns}$	$t_{PLH},$ t_{PHL}	5.0 10 15 5.0 10 15	– – – – – –	300 150 100 250 125 95	600 300 220 500 250 190	ns ns
Input Rise and Fall Times Reset B Input A Input	t_r, t_f	5 10 15 5 10 15 5 10 15	– – – – – – No Limit	– – – 300 1.2 0.4	15 5 4 1.0 0.1 0.05	μs ms –
Input Pulse Width A, B, or Reset	$t_{WH},$ t_{WL}	5.0 10 15	170 90 80	85 45 40	– – –	ns
Retrigger Time	t_{rr}	5.0 10 15	0 0 0	– – –	– – –	ns
Output Pulse Width — Q or \bar{Q} Refer to Figures 8 and 9 $C_X = 0.002 \mu\text{F}, R_X = 100 \text{ k}\Omega$ $C_X = 0.1 \mu\text{F}, R_X = 100 \text{ k}\Omega$ $C_X = 10 \mu\text{F}, R_X = 100 \text{ k}\Omega$	T	5.0 10 15 5.0 10 15 5.0 10 15	198 200 202 9.3 9.4 9.5 0.91 0.92 0.93	210 212 214 9.86 10 10.14 0.965 0.98 0.99	230 232 234 10.5 10.6 10.7 1.03 1.04 1.06	μs ms s
Pulse Width Match between circuits in the same package. $C_X = 0.1 \mu\text{F}, R_X = 100 \text{ k}\Omega$	100 [($T_1 - T_2$)/ T_1]	5.0 10 15	– – –	± 1.0 ± 1.0 ± 1.0	± 5.0 ± 5.0 ± 5.0	%

6. The formulas given are for the typical characteristics only at 25°C .

7. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

MC14538B



**Figure 1. Logic Diagram
(1/2 of Device Shown)**

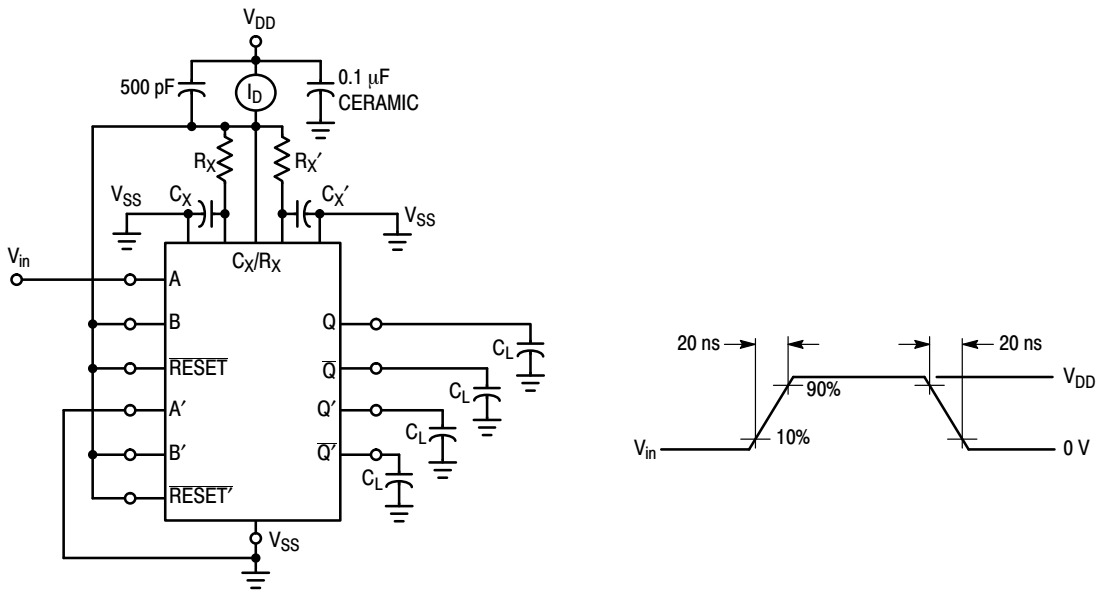
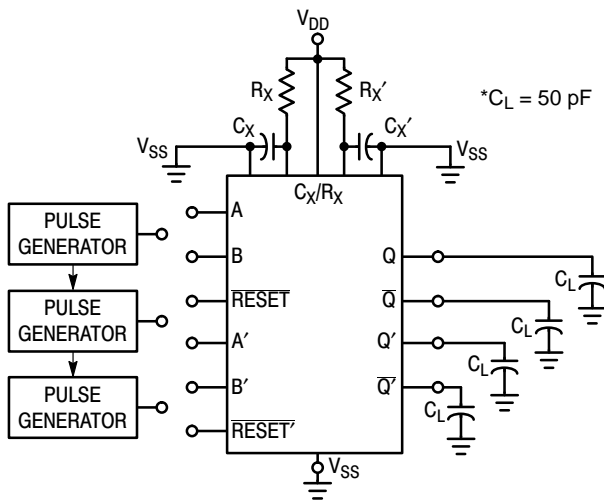


Figure 2. Power Dissipation Test Circuit and Waveforms



INPUT CONNECTIONS

Characteristics	Reset	A	B
t_{PLH} , t_{PHL} , t_{TLH} , t_{THL} , T , t_{WH} , t_{WL}	V_{DD}	PG1	V_{DD}
t_{PLH} , t_{PHL} , t_{TLH} , t_{THL} , T , t_{WH} , t_{WL}	V_{DD}	V_{SS}	PG2
$t_{PLH(R)}$, $t_{PHL(R)}$, t_{WH} , t_{WL}	PG3	PG1	PG2

*Includes capacitance of probes, wiring, and fixture parasitic.
NOTE: Switching test waveforms for PG1, PG2, PG3 are shown in Figure 4.

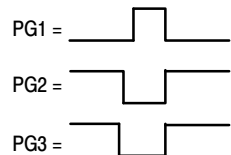


Figure 3. Switching Test Circuit

MC14538B

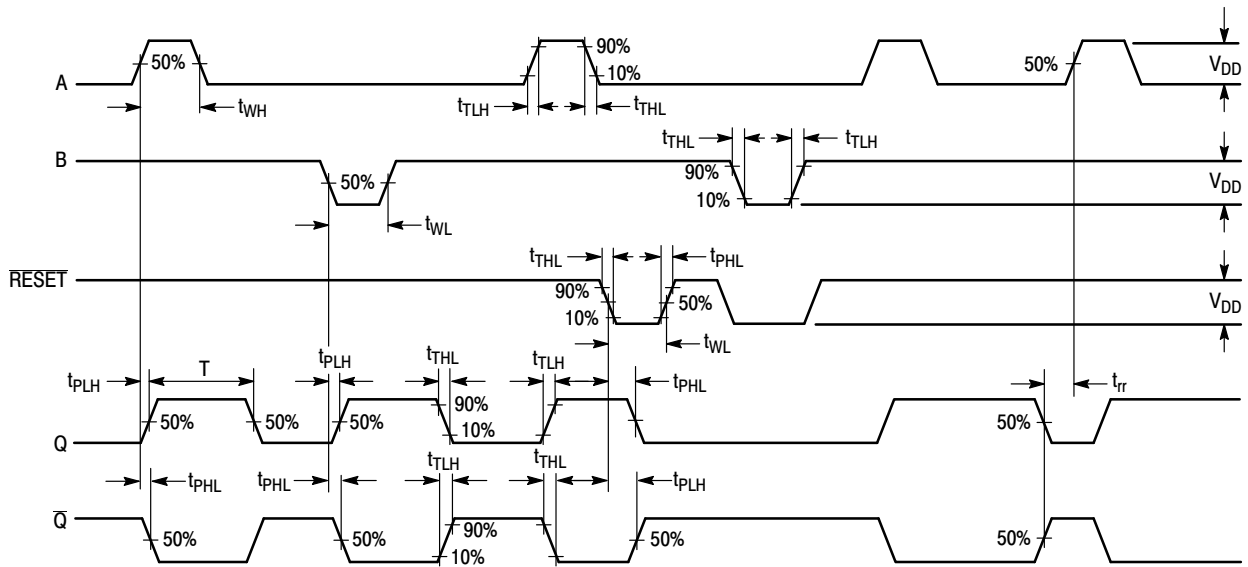


Figure 4. Switching Test Waveforms

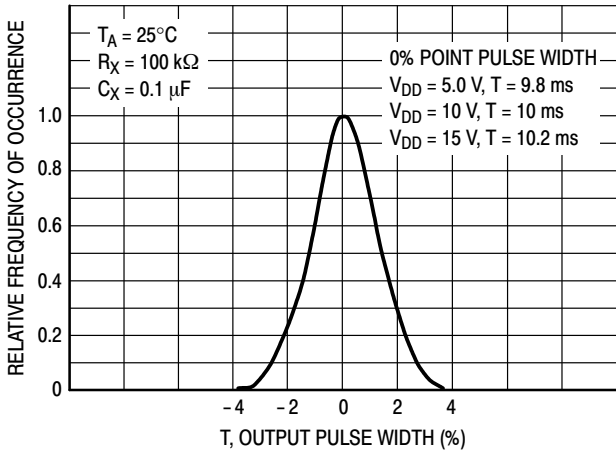


Figure 5. Typical Normalized Distribution of Units for Output Pulse Width

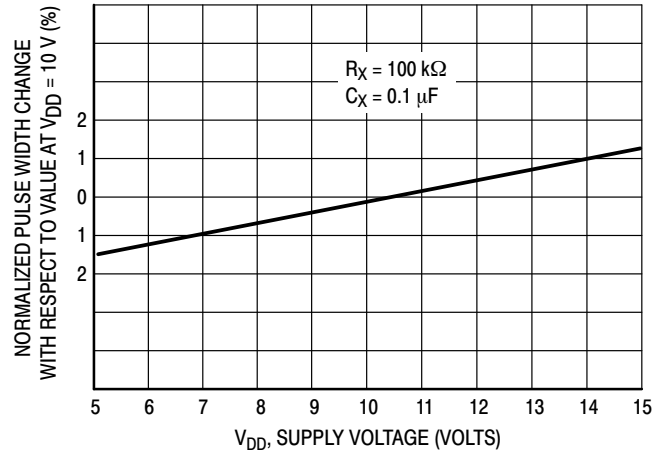


Figure 6. Typical Pulse Width Variation as a Function of Supply Voltage V_{DD}

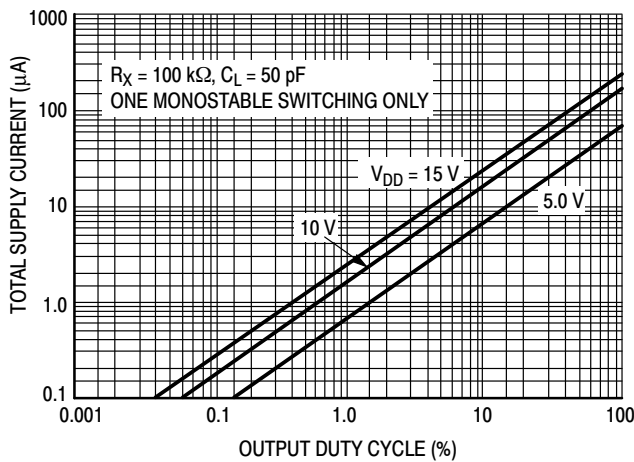


Figure 7. Typical Total Supply Current versus Output Duty Cycle

FUNCTION TABLE

Inputs			Outputs	
Reset	A	B	Q	\bar{Q}
H		H		
H	L			
H		L	Not Triggered	Not Triggered
H	H		Not Triggered	Not Triggered
H	L, H,	H	Not Triggered	Not Triggered
H	L	L, H,	Not Triggered	Not Triggered
L	X	X	L	H
	X	X	Not Triggered	Not Triggered

MC14538B

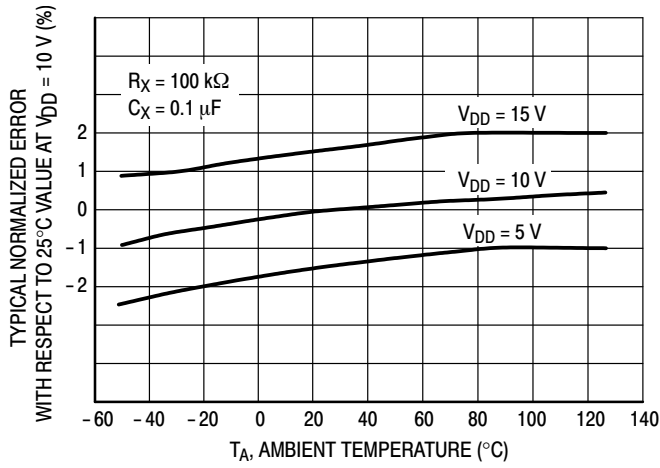


Figure 8. Typical Error of Pulse Width Equation versus Temperature

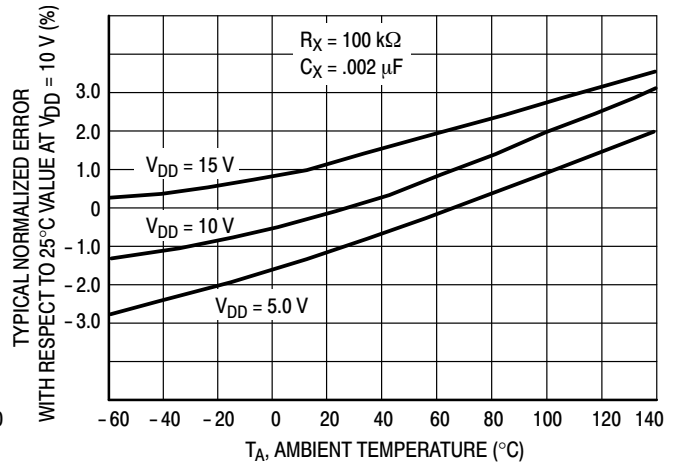


Figure 9. Typical Error of Pulse Width Equation versus Temperature

THEORY OF OPERATION

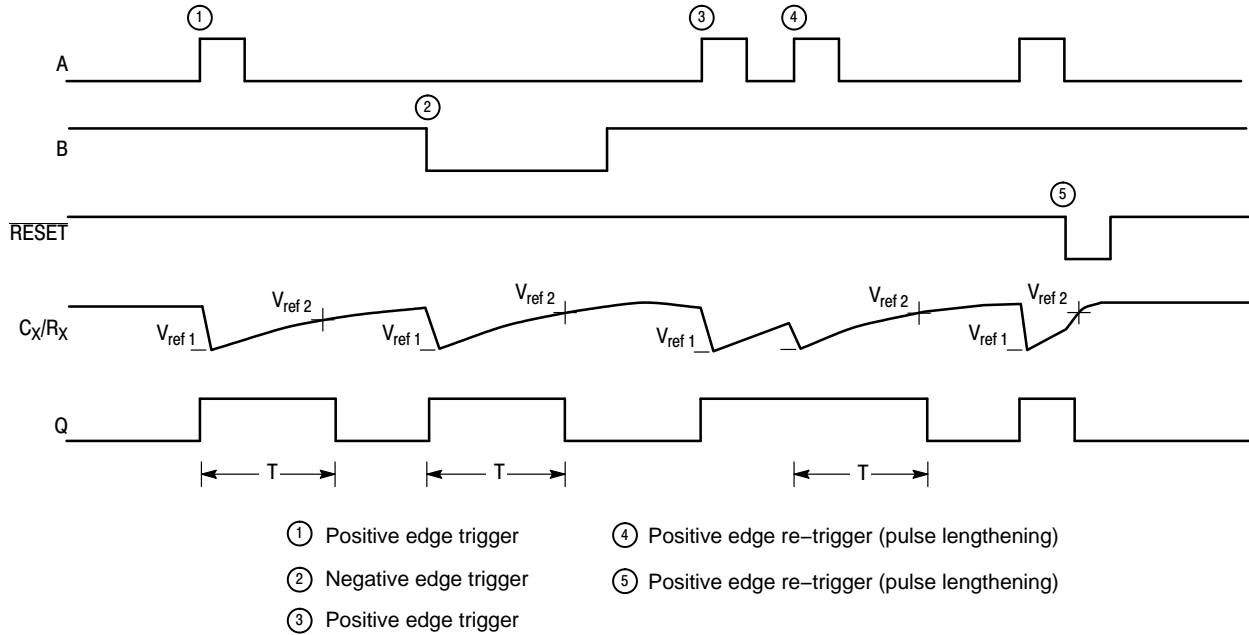


Figure 10. Timing Operation

TRIGGER OPERATION

The block diagram of the MC14538B is shown in Figure 1, with circuit operation following.

As shown in Figure 1 and 10, before an input trigger occurs, the monostable is in the quiescent state with the Q output low, and the timing capacitor C_X completely charged to V_{DD} . When the trigger input A goes from V_{SS} to V_{DD} (while inputs B and $\overline{\text{Reset}}$ are held to V_{DD}) a valid trigger is recognized, which turns on comparator C1 and N-channel transistor N1 ①. At the same time the output latch is set. With transistor N1 on, the capacitor C_X rapidly discharges toward V_{SS} until V_{ref1} is reached. At this point the output of comparator C1 changes state and transistor N1 turns off. Comparator C1 then turns off while at the same time comparator C2 turns on. With transistor N1 off, the capacitor C_X begins to charge through the timing resistor, R_X , toward V_{DD} . When the voltage across C_X equals V_{ref2} , comparator C2 changes state, causing the output latch to reset (Q goes low) while at the same time disabling comparator C2 ②. This ends at the timing cycle with the monostable in the quiescent state, waiting for the next trigger.

In the quiescent state, C_X is fully charged to V_{DD} causing the current through resistor R_X to be zero. Both comparators are “off” with total device current due only to reverse junction leakages. An added feature of the MC14538B is that the output latch is set via the input trigger without regard to the capacitor voltage. Thus, propagation delay from trigger to Q is independent of the value of C_X , R_X , or the duty cycle of the input waveform.

RETRIGGER OPERATION

The MC14538B is retriggered if a valid trigger occurs ③ followed by another valid trigger ④ before the Q output has returned to the quiescent (zero) state. Any retrigger, after the timing node voltage at pin 2 or 14 has begun to rise from V_{ref1} , but has not yet reached V_{ref2} , will cause an increase in output pulse width T. When a valid retrigger is initiated ④, the voltage at C_X/R_X will again drop to V_{ref1} before progressing along the RC charging curve toward V_{DD} . The Q output will remain high until time T, after the last valid retrigger.

RESET OPERATION

The MC14538B may be reset during the generation of the output pulse. In the reset mode of operation, an input pulse

on $\overline{\text{Reset}}$ sets the reset latch and causes the capacitor to be fast charged to V_{DD} by turning on transistor P1 ⑤. When the voltage on the capacitor reaches V_{ref2} , the reset latch will clear, and will then be ready to accept another pulse. If the $\overline{\text{Reset}}$ input is held low, any trigger inputs that occur will be inhibited and the Q and \overline{Q} outputs of the output latch will not change. Since the Q output is reset when an input low level is detected on the $\overline{\text{Reset}}$ input, the output pulse T can be made significantly shorter than the minimum pulse width specification.

POWER-DOWN CONSIDERATIONS

Large capacitance values can cause problems due to the large amount of energy stored. When a system containing the MC14538B is powered down, the capacitor voltage may discharge from V_{DD} through the standard protection diodes at pin 2 or 14. Current through the protection diodes should be limited to 10 mA and therefore the discharge time of the V_{DD} supply must not be faster than $(V_{DD}) \cdot (C)/(10 \text{ mA})$. For example, if $V_{DD} = 10 \text{ V}$ and $C_X = 10 \mu\text{F}$, the V_{DD} supply should discharge no faster than $(10 \text{ V}) \times (10 \mu\text{F})/(10 \text{ mA}) = 10 \text{ ms}$. This is normally not a problem since power supplies are heavily filtered and cannot discharge at this rate.

When a more rapid decrease of V_{DD} to zero volts occurs, the MC14538B can sustain damage. To avoid this possibility use an external clamping diode, D_X , connected as shown in Fig. 11.

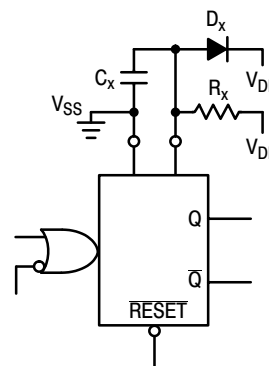


Figure 11. Use of a Diode to Limit Power Down Current Surge

MC14538B

TYPICAL APPLICATIONS

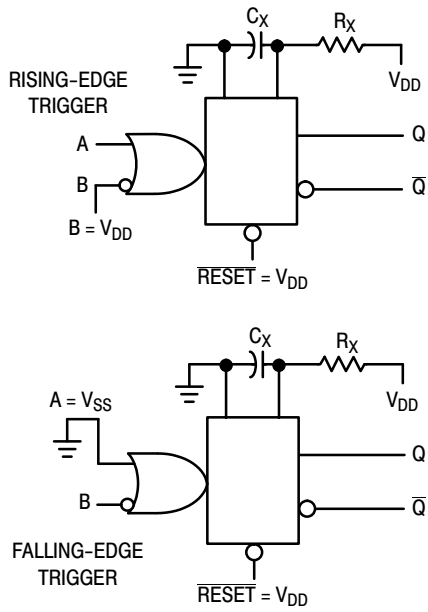


Figure 12. Retriggerable Monostables Circuitry

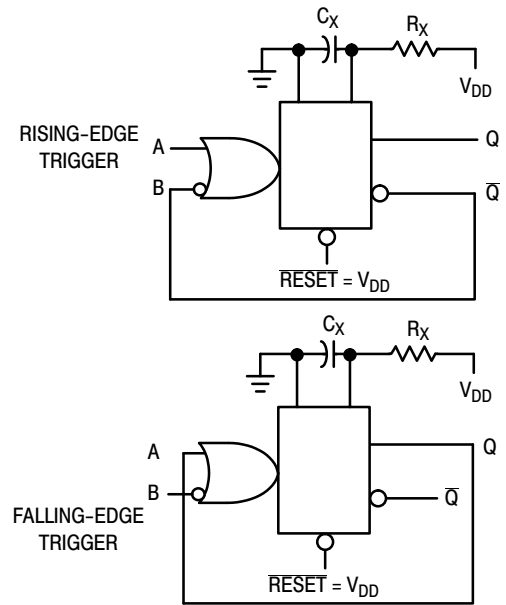


Figure 13. Non-Retriggerable Monostables Circuitry

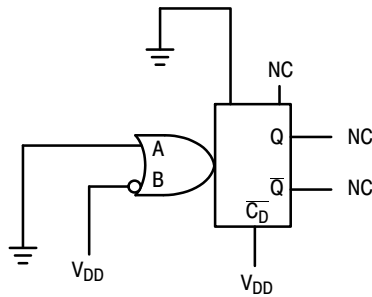
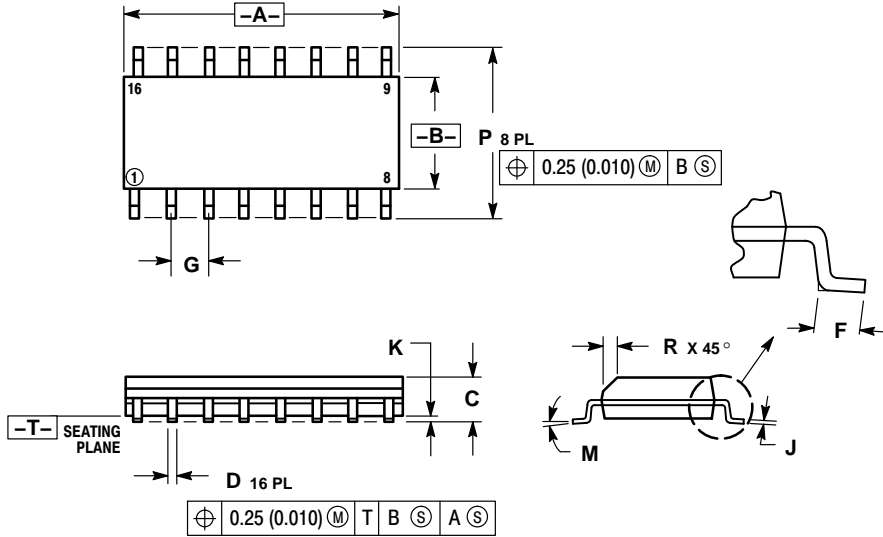


Figure 14. Connection of Unused Sections

MC14538B

PACKAGE DIMENSIONS

SOIC-16
D SUFFIX
CASE 751B-05
ISSUE K

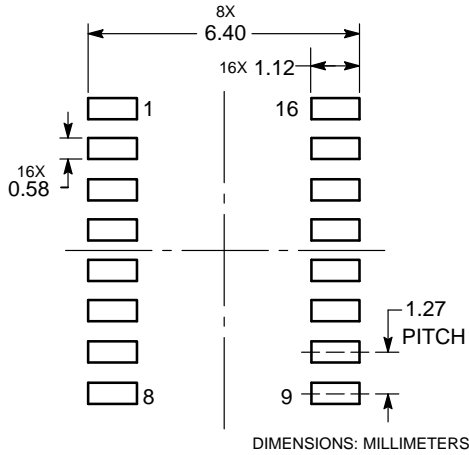


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

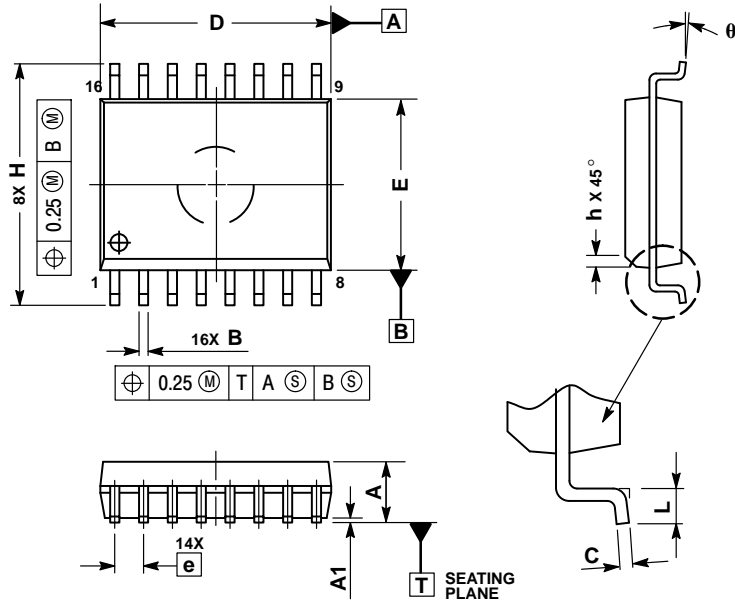
SOLDERING FOOTPRINT



MC14538B

PACKAGE DIMENSIONS

SOIC-16 WB
DW SUFFIX
CASE 751G-03
ISSUE D

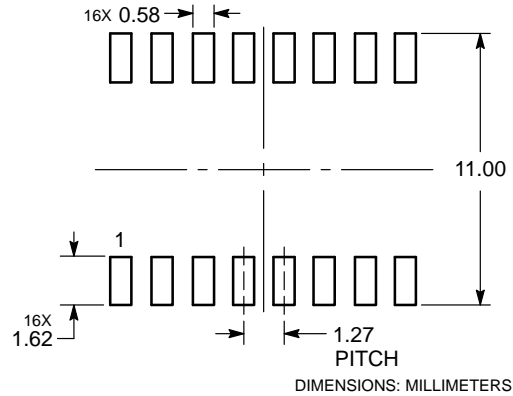


NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

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	0.25	0.75
L	0.50	0.90
q	0 °	7 °

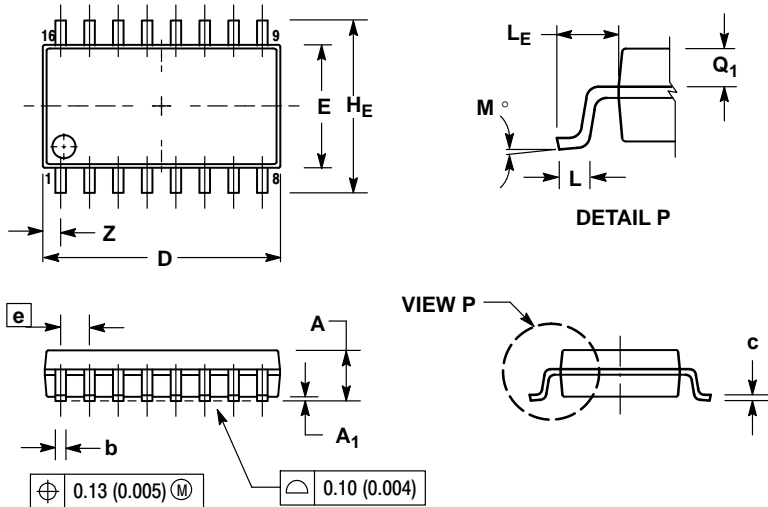
SOLDERING FOOTPRINT



MC14538B

PACKAGE DIMENSIONS


SOEIAJ-16
F SUFFIX
CASE 966
ISSUE A



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A ₁	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.10	0.20	0.007	0.011
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
HE	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
LE	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q ₁	0.70	0.90	0.028	0.035
Z	---	0.78	---	0.031

ON Semiconductor and the  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries. SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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 special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC 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 SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative



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, помощь 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 помощь 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

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