

# MC1741C

## Internally Compensated, High Performance Operational Amplifier

The MC1741C was designed for use as a summing amplifier, integrator, or amplifier with operating characteristics as a function of the external feedback components.

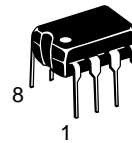
- No Frequency Compensation Required
- Short Circuit Protection
- Offset Voltage Null Capability
- Wide Common Mode and Differential Voltage Ranges
- Low Power Consumption
- No Latch Up



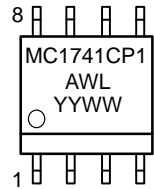
ON Semiconductor

<http://onsemi.com>

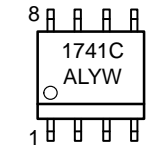
### MARKING DIAGRAMS



PDIP-8  
P1 SUFFIX  
CASE 626



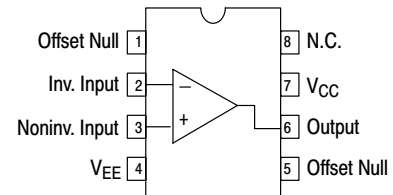
SO-8  
D SUFFIX  
CASE 751



A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week

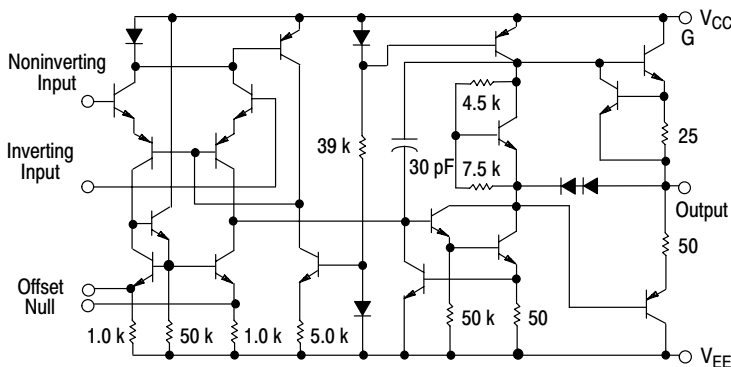
Datasheet.Directory

### PIN CONNECTIONS



(Top View)

### Equivalent Circuit Schematic (1/4 of Circuit Shown)



### ORDERING INFORMATION

Device	Package	Shipping
MC1741CD	SO-8	98 Units/Rail
MC1741CDR2	SO-8	2500 Tape & Reel
MC1741CP1	PDIP-8	50 Units/Rail

# MC1741C

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}, V_{EE}$	$\pm 18$	Vdc
Input Differential Voltage	$V_{ID}$	$\pm 30$	V
Input Common Mode Voltage (Note 1.)	$V_{ICM}$	$\pm 15$	V
Output Short Circuit Duration (Note 2.)	$t_{SC}$	Continuous	–
Operating Ambient Temperature Range	$T_A$	0 to +70	°C
Storage Temperature Range	$T_{stg}$	–55 to +125	°C

1. For supply voltages less than +15 V, the absolute maximum input voltage is equal to the supply voltage.
2. Supply voltage equal to or less than 15 V.

## ELECTRICAL CHARACTERISTICS ( $V_{CC} = +15$ V, $V_{EE} = -15$ V, $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage ( $R_S \leq 10$ k)	$V_{IO}$	–	2.0	6.0	mV
Input Offset Current	$I_{IO}$	–	20	200	nA
Input Bias Current	$I_{IB}$	–	80	500	nA
Input Resistance	$r_i$	0.3	2.0	–	M $\Omega$
Input Capacitance	$C_i$	–	1.4	–	pF
Offset Voltage Adjustment Range	$V_{IOR}$	–	$\pm 15$	–	mV
Common Mode Input Voltage Range	$V_{ICR}$	$\pm 12$	$\pm 13$	–	V
Large Signal Voltage Gain ( $V_O = \pm 10$ V, $R_L \geq 2.0$ k)	$A_{VOL}$	20	200	–	V/mV
Output Resistance	$r_o$	–	75	–	$\Omega$
Common Mode Rejection ( $R_S \leq 10$ k)	CMR	70	90	–	dB
Supply Voltage Rejection ( $R_S \leq 10$ k)	PSR	75	–	–	dB
Output Voltage Swing ( $R_L \geq 10$ k) ( $R_L \geq 2.0$ k)	$V_O$	$\pm 12$ $\pm 10$	$\pm 14$ $\pm 13$	– –	V
Output Short Circuit Current	$I_{SC}$	–	20	–	mA
Supply Current	$I_D$	–	1.7	2.8	mA
Power Consumption	$P_C$	–	50	85	mW
Transient Response (Unity Gain, Noninverting) ( $V_i = 20$ mV, $R_L \geq 2.0$ k, $C_L \leq 100$ pF) Rise Time	$t_{TLH}$	–	0.3	–	$\mu\text{s}$
( $V_i = 20$ mV, $R_L \geq 2.0$ k, $C_L \leq 100$ pF) Overshoot	os	–	15	–	%
( $V_i = 10$ V, $R_L \geq 2.0$ k, $C_L \leq 100$ pF) Slew Rate	SR	–	0.5	–	V/ $\mu\text{s}$

## ELECTRICAL CHARACTERISTICS ( $V_{CC} = +15$ V, $V_{EE} = -15$ V, $T_A = T_{low}$ to $T_{high}$ , unless otherwise noted.)\*

Characteristic	Symbol	Min	Typ	Max	Unit
Input Offset Voltage ( $R_S \leq 10$ k $\Omega$ )	$V_{IO}$	–	–	7.5	mV
Input Offset Current ( $T_A = 0^\circ$ to $+70^\circ\text{C}$ )	$I_{IO}$	–	–	300	nA
Input Bias Current ( $T_A = 0^\circ$ to $+70^\circ\text{C}$ )	$I_{IB}$	–	–	800	nA
Supply Voltage Rejection ( $R_S \leq 10$ k)	PSR	75	–	–	dB
Output Voltage Swing ( $R_L \geq 2.0$ k)	$V_O$	$\pm 10$	$\pm 13$	–	V
Large Signal Voltage Gain ( $R_L \geq 2.0$ k, $V_O = \pm 10$ V)	$A_{VOL}$	15	–	–	V/mV

\*  $T_{low} = 0^\circ\text{C}$      $T_{high} = 70^\circ\text{C}$

# MC1741C

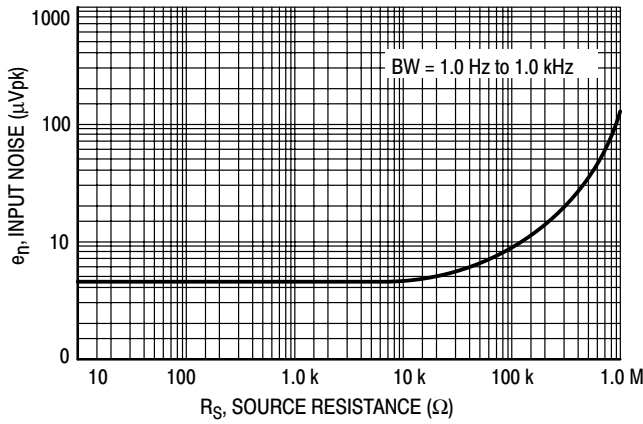


Figure 1. Burst Noise versus Source Resistance

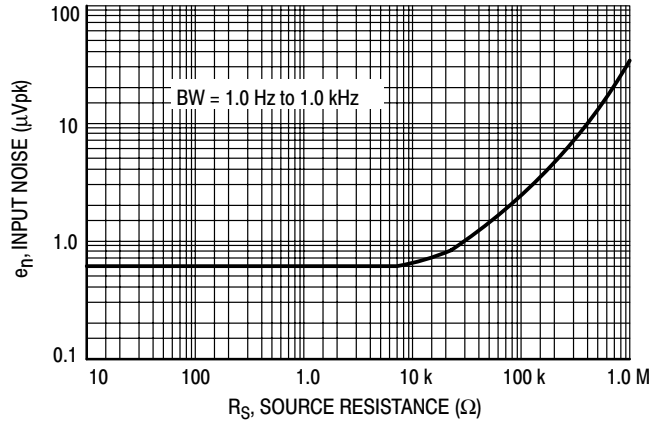


Figure 2. RMS Noise versus Source Resistance

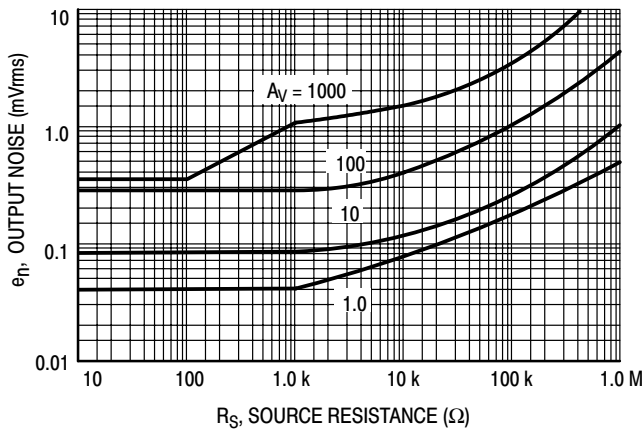


Figure 3. Output Noise versus Source Resistance

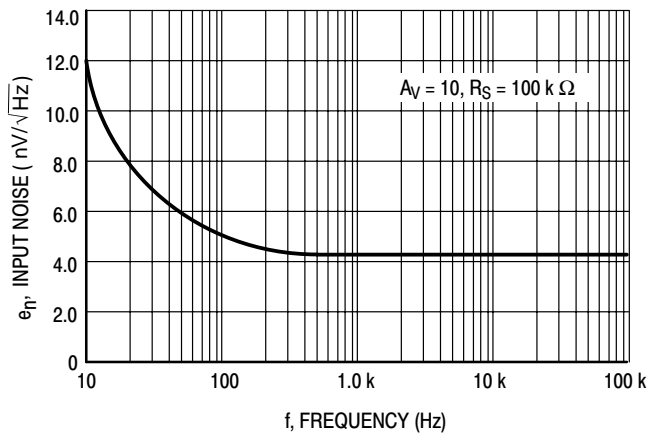
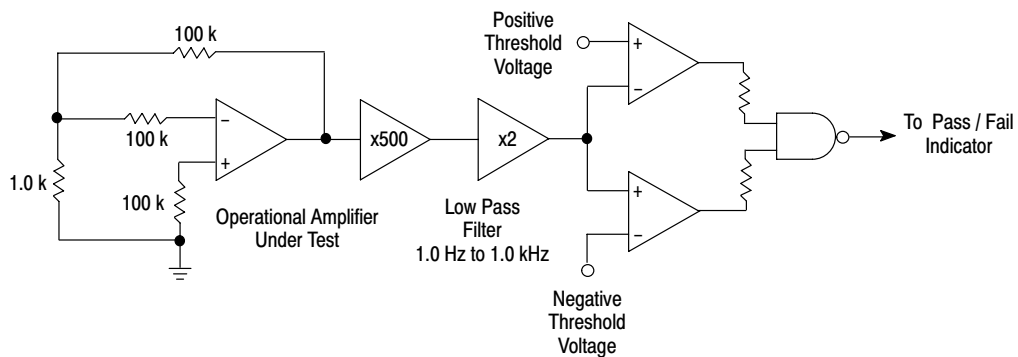


Figure 4. Spectral Noise Density

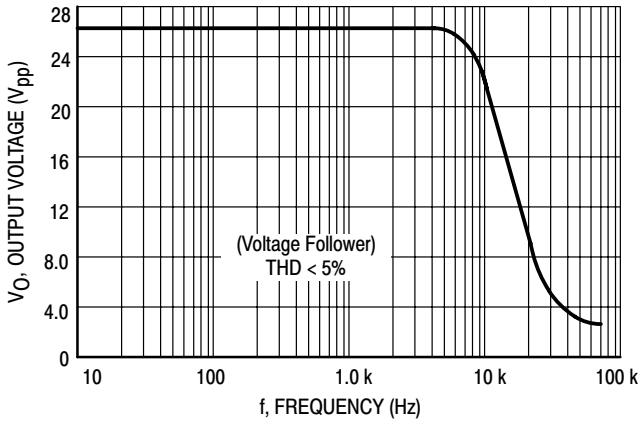


Unlike conventional peak reading or RMS meters, this system was especially designed to provide the quick response time essential to burst (popcorn) noise testing.

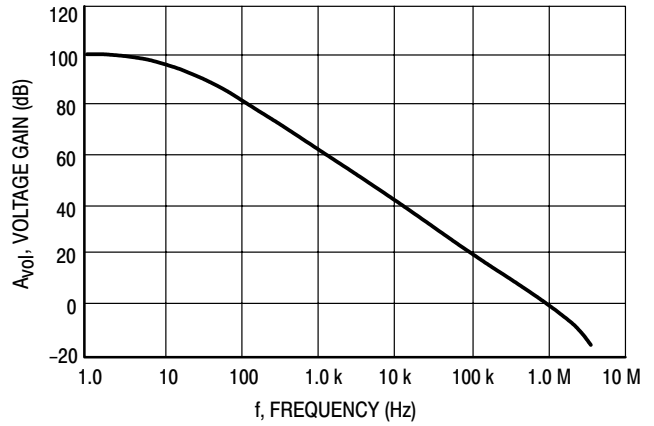
The test time employed is 10 sec and the 20 mV peak limit refers to the operational amplifier input thus eliminating errors in the closed loop gain factor of the operational amplifier.

Figure 5. Burst Noise Test Circuit

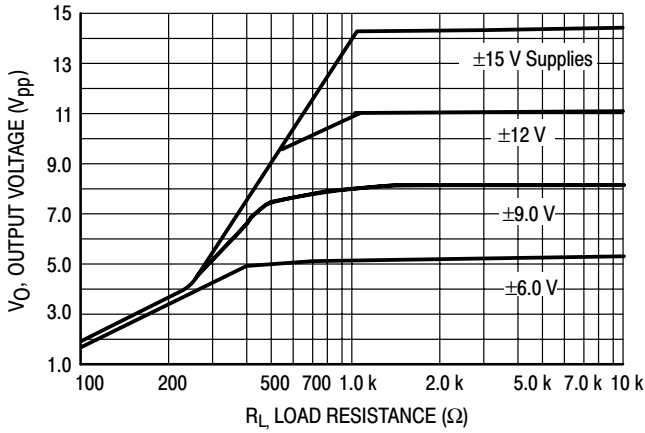
# MC1741C



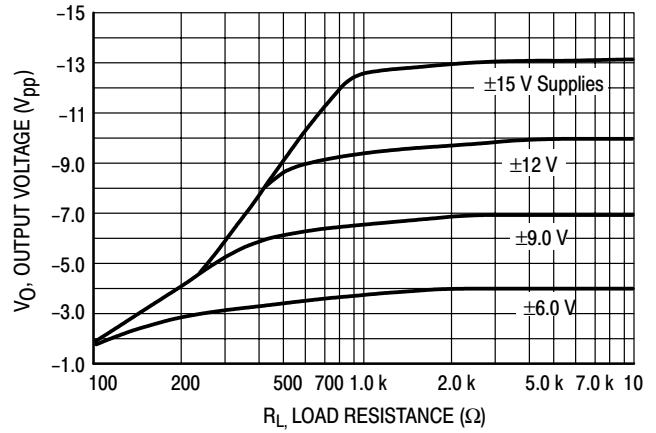
**Figure 6. Power Bandwidth (Large Signal Swing versus Frequency)**



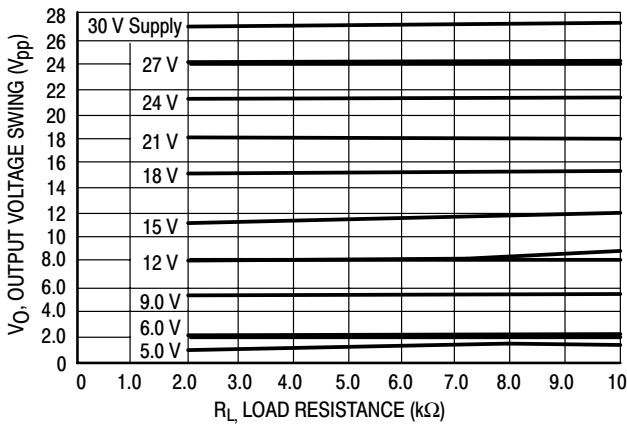
**Figure 7. Open Loop Frequency Response**



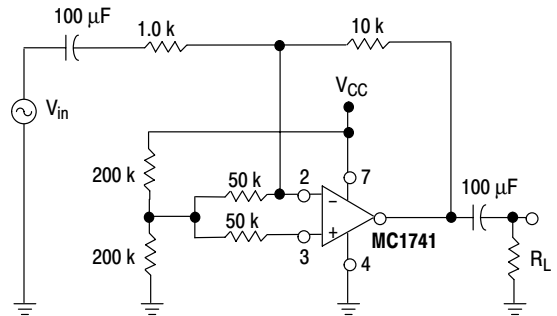
**Figure 8. Positive Output Voltage Swing versus Load Resistance**



**Figure 9. Negative Output Voltage Swing versus Load Resistance**

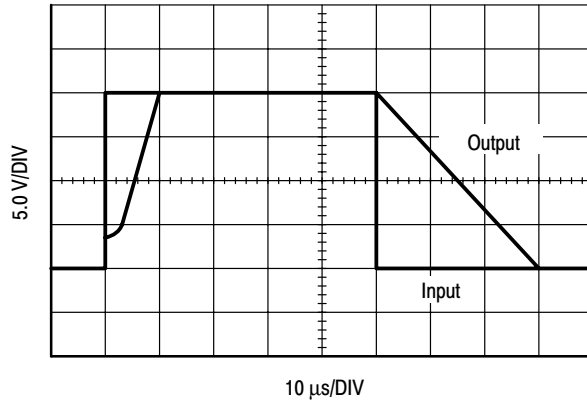


**Figure 10. Output Voltage Swing versus Load Resistance (Single Supply Operation)**

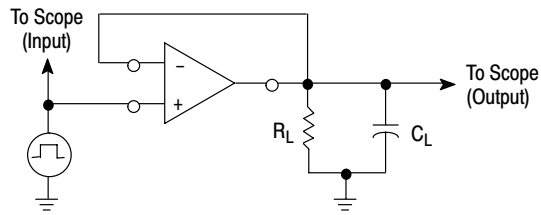


**Figure 11. Single Supply Inverting Amplifier**

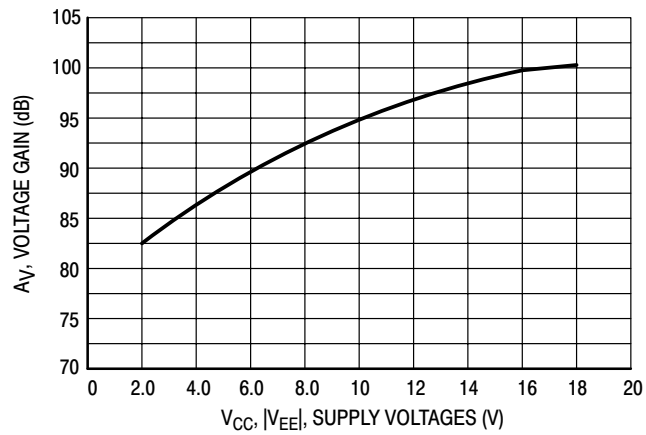
# MC1741C



**Figure 12. Noninverting Pulse Response**



**Figure 13. Transient Response Test Circuit**

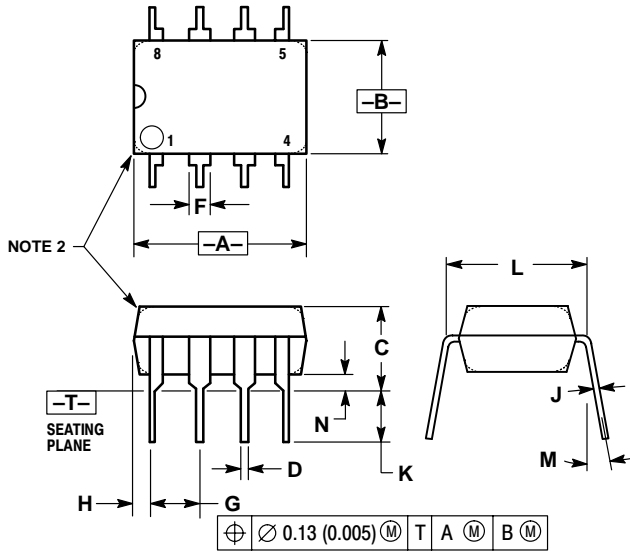


**Figure 14. Open Loop Voltage Gain versus Supply Voltage**

# MC1741C

## PACKAGE DIMENSIONS

PDIP-8  
P1 SUFFIX  
CASE 626-05  
ISSUE K

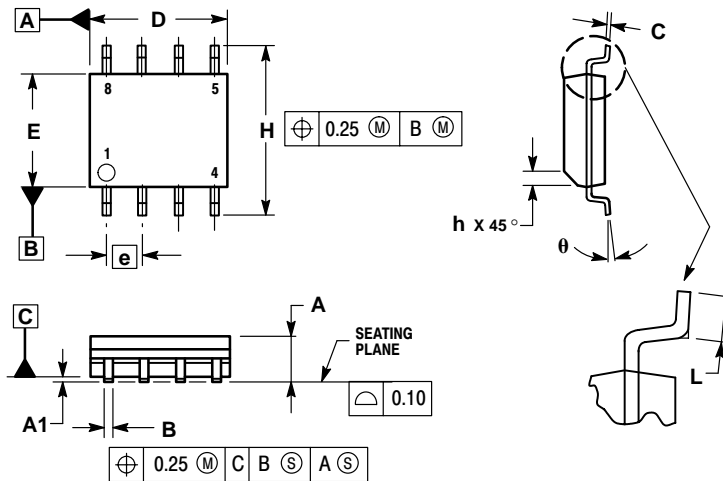


NOTES:

1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	---	10°	---	10°
N	0.76	1.01	0.030	0.040

SO-8  
D SUFFIX  
CASE 751-06  
ISSUE T




NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION 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 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
$\theta$	0°	7°

**Notes**

**ON Semiconductor** and  are trademarks of Semiconductor Components Industries, LLC (SCILLC). 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.

## PUBLICATION ORDERING INFORMATION

### **NORTH AMERICA 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:** ONlit@hibbertco.com  
Fax Response Line: 303-675-2167 or 800-344-3810 Toll Free USA/Canada

**N. American Technical Support:** 800-282-9855 Toll Free USA/Canada

**EUROPE:** LDC for ON Semiconductor – European Support

**German Phone:** (+1) 303-308-7140 (M-F 1:00pm to 5:00pm Munich Time)  
**Email:** ONlit-german@hibbertco.com  
**French Phone:** (+1) 303-308-7141 (M-F 1:00pm to 5:00pm Toulouse Time)  
**Email:** ONlit-french@hibbertco.com  
**English Phone:** (+1) 303-308-7142 (M-F 12:00pm to 5:00pm UK Time)  
**Email:** ONlit@hibbertco.com

**EUROPEAN TOLL-FREE ACCESS\*: 00-800-4422-3781**

\*Available from Germany, France, Italy, England, Ireland

### **CENTRAL/SOUTH AMERICA:**

**Spanish Phone:** 303-308-7143 (Mon-Fri 8:00am to 5:00pm MST)  
**Email:** ONlit-spanish@hibbertco.com

**ASIA/PACIFIC:** LDC for ON Semiconductor – Asia Support

**Phone:** 303-675-2121 (Tue-Fri 9:00am to 1:00pm, Hong Kong Time)  
Toll Free from Hong Kong & Singapore:  
**001-800-4422-3781**  
**Email:** ONlit-asia@hibbertco.com

**JAPAN:** ON Semiconductor, Japan Customer Focus Center  
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031

**Phone:** 81-3-5740-2745  
**Email:** r14525@onsemi.com

**ON Semiconductor Website:** <http://onsemi.com>

For additional information, please contact your local Sales Representative.