

# CM1621

## LCD and Camera EMI Filter Array with ESD Protection

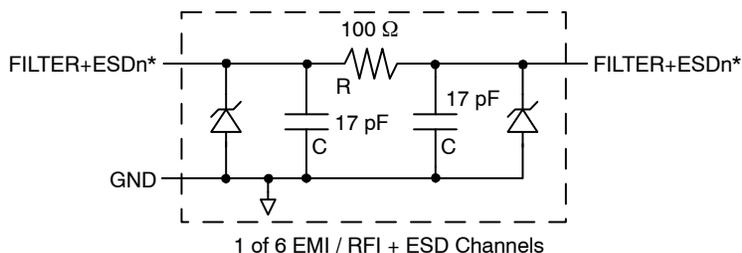
### Features

- Six Channels of EMI Filtering with Integrated ESD Protection
- Pi-Style EMI Filters in a Capacitor-Resistor-Capacitor (C-R-C) Network
- $\pm 15$  kV ESD Protection on Each Channel (IEC 61000-4-2 Level 4, Contact Discharge)
- $\pm 30$  kV ESD Protection on Each Channel (HBM)
- Greater than 40 dB Attenuation (Typical) at 1 GHz
- uDFN Package with 0.40 mm Lead Pitch:
  - 12-Lead: 2.50 mm x 1.20 mm x 0.50 mm
- These Devices are Pb-Free and are RoHS Compliant

### Applications

- LCD and Camera Data Lines in Mobile Handsets
- I/O Port Protection for Mobile Handsets, Notebook Computers, PDAs, etc.
- EMI Filtering for Data Ports in Cell Phones, PDAs or Notebook Computers
- Wireless Handsets
- Handheld PCs/PDAs

### BLOCK DIAGRAM

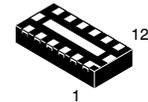


\*See Package/Pinout Diagrams for expanded pin information.



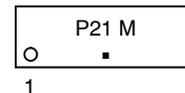
**ON Semiconductor®**

<http://onsemi.com>



**UDFN12  
DE SUFFIX  
CASE 517AE**

### MARKING DIAGRAM



P21 = CM1621-06DE  
M = Month Code  
■ = Pb-Free Package

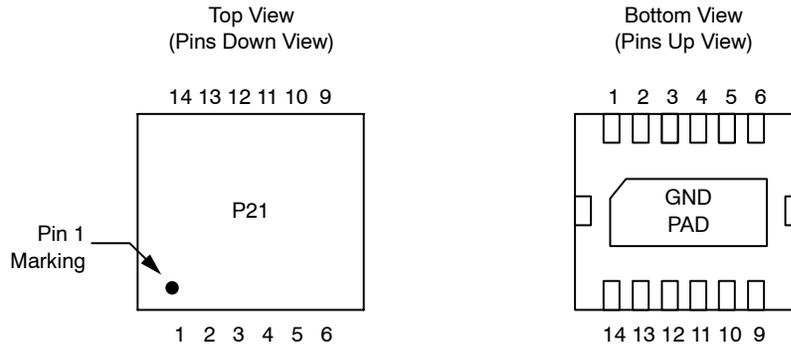
### ORDERING INFORMATION

Device	Package	Shipping†
CM1621-06DE	uDFN-12 (Pb-Free)	3000/Tape & Reel

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

# CM1621

## PACKAGE / PINOUT DIAGRAMS



12-Lead UDFN Package

**Table 1. PIN DESCRIPTIONS**

Device Pin(s)	Name	Description	Device Pin(s)	Name	Description
1	FILTER1	Filter + ESD Channel 1	12	FILTER1	Filter + ESD Channel 1
2	FILTER2	Filter + ESD Channel 2	11	FILTER2	Filter + ESD Channel 2
3	FILTER3	Filter + ESD Channel 3	10	FILTER3	Filter + ESD Channel 3
4	FILTER4	Filter + ESD Channel 4	9	FILTER4	Filter + ESD Channel 4
5	FILTER5	Filter + ESD Channel 5	8	FILTER5	Filter + ESD Channel 5
6	FILTER6	Filter + ESD Channel 6	7	FILTER6	Filter + ESD Channel 6
GND PAD	GND	Device Ground			

## SPECIFICATIONS

**Table 2. ABSOLUTE MAXIMUM RATINGS**

Parameter	Rating	Units
Storage Temperature Range	-65 to +150	°C
DC Power per Resistor	100	mW
DC Package Power Rating	500	mW

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

**Table 3. STANDARD OPERATING CONDITIONS**

Parameter	Rating	Units
Operating Temperature Range	-40 to +85	°C

# CM1621

**Table 4. ELECTRICAL OPERATING CHARACTERISTICS** (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
R	Resistance		85	100	115	$\Omega$
C <sub>TOTAL</sub>	Total Channel Capacitance	At 2.5 VDC Reverse Bias, 1 MHz, 30 mVAC	27	34	41	pF
C	Capacitance C	At 2.5 VDC Reverse Bias, 1 MHz, 30 mVAC		17		pF
V <sub>DIODE</sub>	Standoff Voltage	I <sub>DIODE</sub> = 10 $\mu$ A		6.0		V
I <sub>LEAK</sub>	Diode Leakage Current (reverse bias)	V <sub>DIODE</sub> = +3.3 V			100	nA
V <sub>SIG</sub>	Signal Clamp Voltage	I <sub>LOAD</sub> = 1.0 mA	6.0	7.0	8.0	V
V <sub>ESD</sub>	In-system ESD Withstand Voltage a) Human Body Model (HBM), MIL-STD-883, Method 3015 b) Contact Discharge per IEC 61000-4-2 Level 4	(Note 2)		$\pm$ 30 $\pm$ 15		kV
R <sub>DYN</sub>	Dynamic Resistance Positive Negative			2.3 0.9		$\Omega$
f <sub>C</sub>	Cut-off Frequency Z <sub>SOURCE</sub> = 50 $\Omega$ , Z <sub>LOAD</sub> = 50 $\Omega$	Channel R = 100 $\Omega$ , Channel C = 15 pF		90	135 (Note 3)	MHz
A <sub>1GHZ</sub>	Absolute Attenuation at 1 GHz from 0 dB Level	Z <sub>SOURCE</sub> = 50 $\Omega$ , Z <sub>LOAD</sub> = 50 $\Omega$ , DC Bias = 0 V; (Notes 1 and 3)		-40		dB
A <sub>800MHz - 3 GHz</sub>	Absolute Attenuation at 800 MHz to 3 Ghz from 0 dB Level	Z <sub>SOURCE</sub> = 50 $\Omega$ , Z <sub>LOAD</sub> = 50 $\Omega$ , DC Bias = 0 V; (Notes 1 and 3)		-35		dB

1. T<sub>A</sub> = 25°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.
3. Attenuation / RF curves characterized by a network analyzer using microprobes.

# CM1621

## PERFORMANCE INFORMATION

Typical Filter Performance ( $T_A = 25^\circ\text{C}$ , DC Bias = 0 V, 50  $\Omega$  Environment)

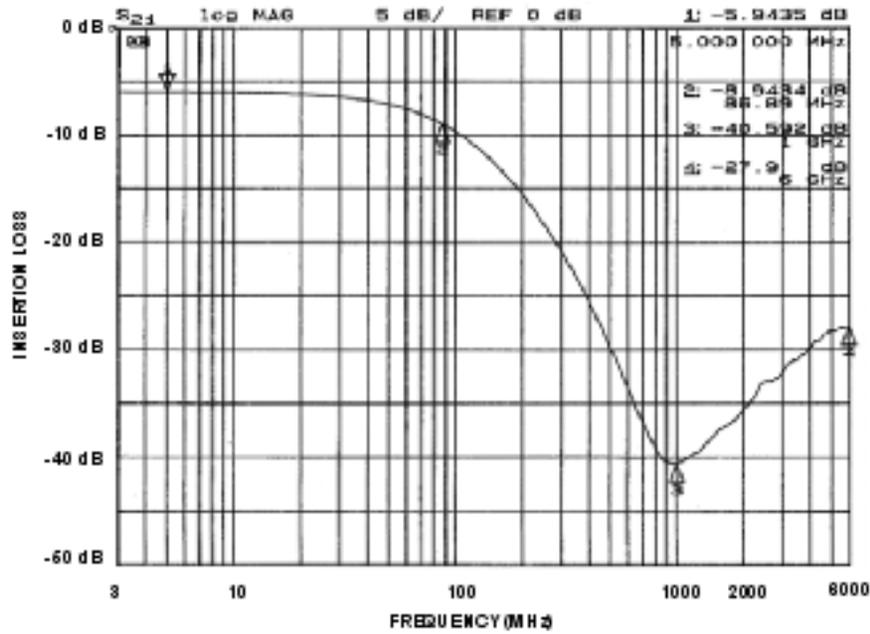


Figure 1. Insertion Loss vs. Frequency (FILTER1 Input to GND, CM1621-06DE)  
Typical Diode Capacitance vs. Input Voltage

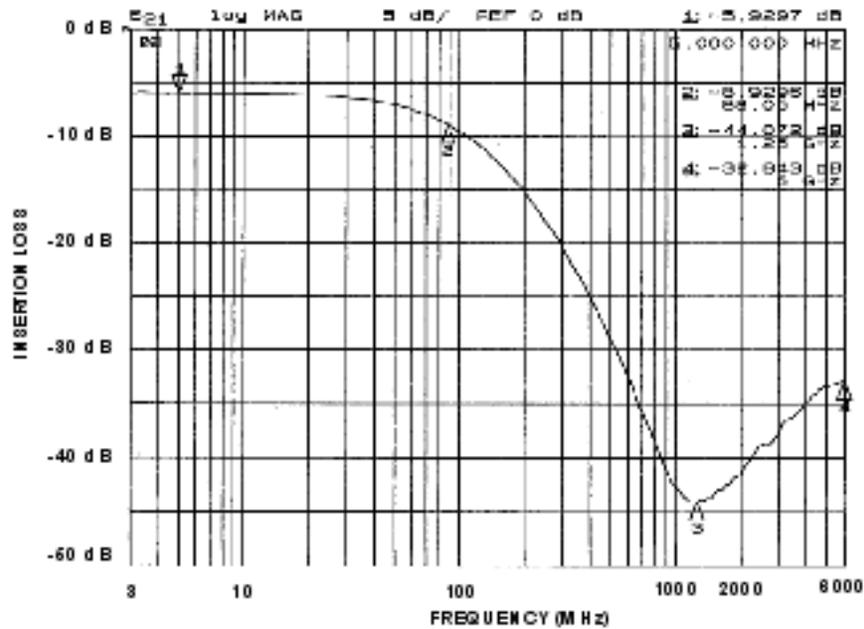


Figure 2. Insertion Loss vs. Frequency (FILTER2 Input to GND, CM1621-06DE)  
Typical Diode Capacitance vs. Input Voltage

# CM1621

## PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance ( $T_A = 25^\circ\text{C}$ , DC Bias = 0 V, 50  $\Omega$  Environment)

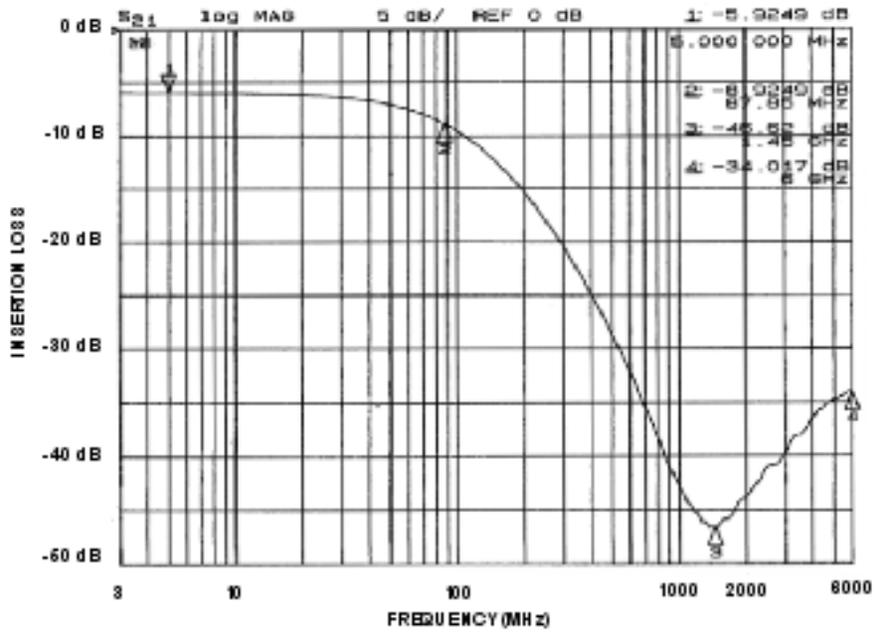


Figure 3. Insertion Loss vs. Frequency (FILTER3 Input to GND, CM1621-06DE)  
Typical Diode Capacitance vs. Input Voltage

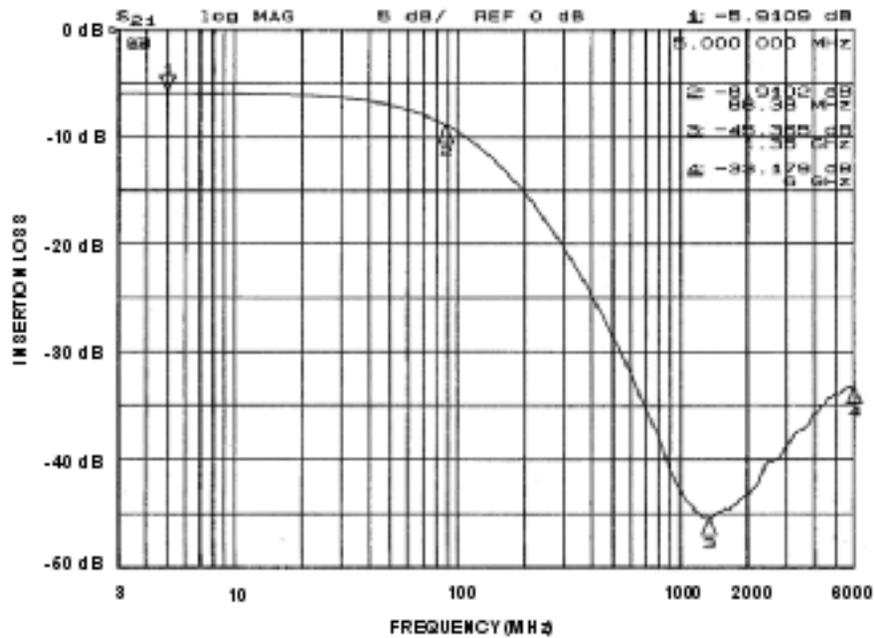


Figure 4. Insertion Loss vs. Frequency (FILTER4 Input to GND, CM1621-06DE)  
Typical Diode Capacitance vs. Input Voltage

# CM1621

## PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance ( $T_A = 25^\circ\text{C}$ , DC Bias = 0 V, 50  $\Omega$  Environment)

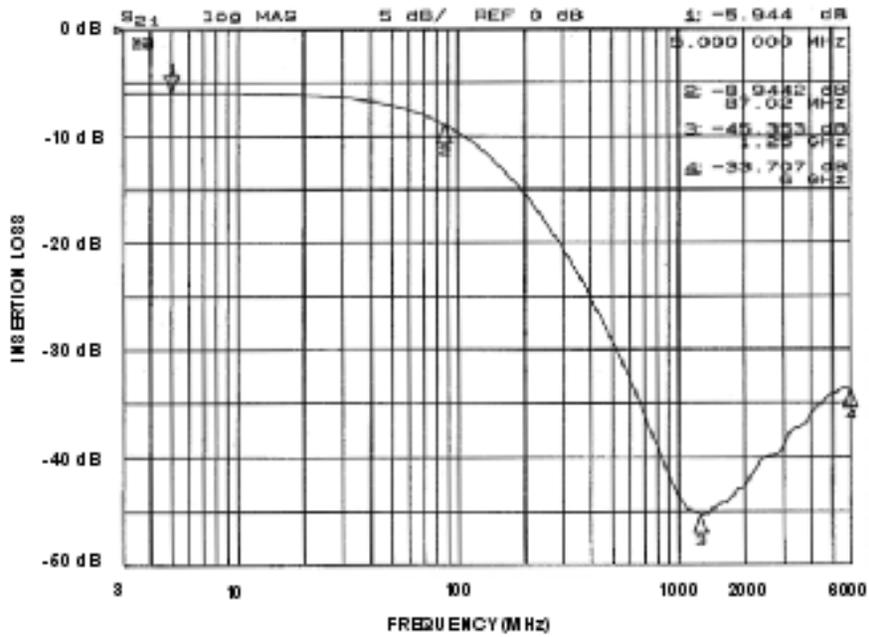


Figure 5. Insertion Loss vs. Frequency (FILTER5 Input to GND, CM1621-06DE)  
Typical Diode Capacitance vs. Input Voltage

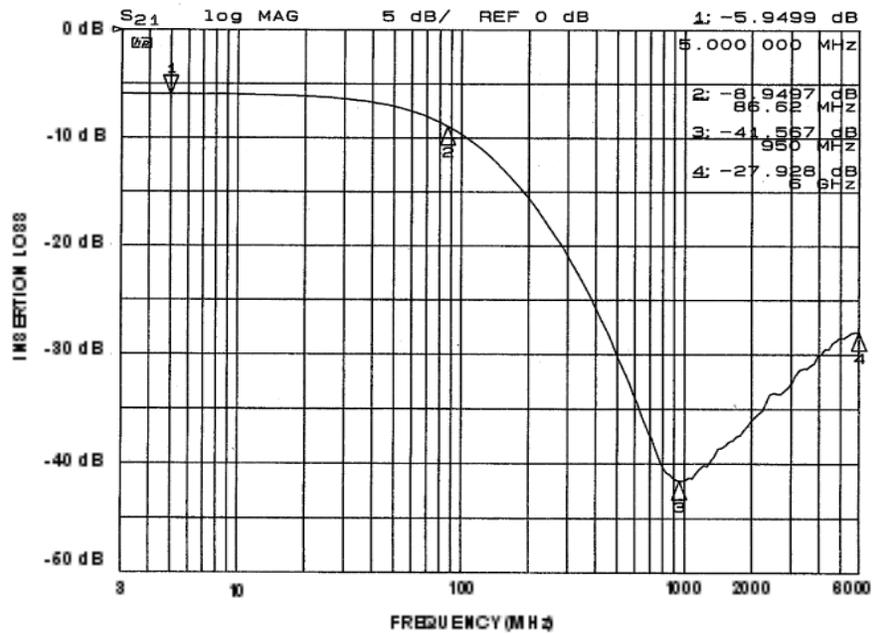
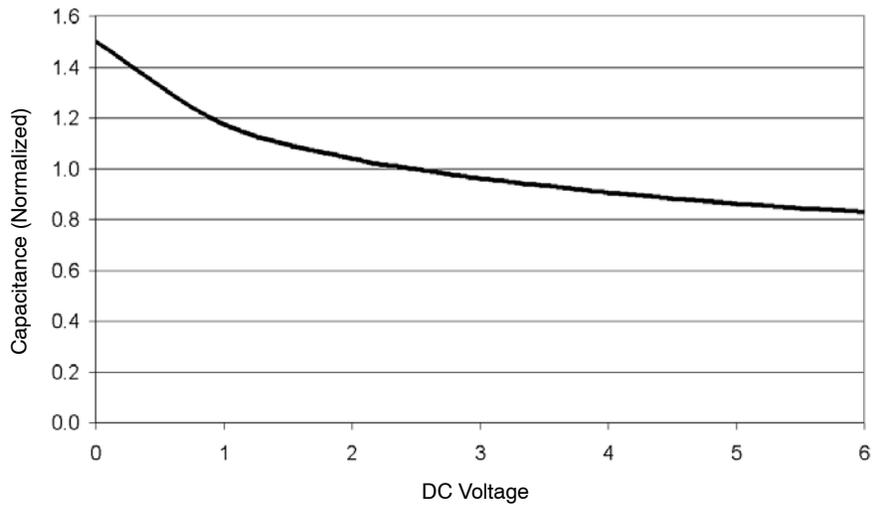


Figure 6. Insertion Loss vs. Frequency (FILTER6 Input to GND, CM1621-06DE)  
Typical Diode Capacitance vs. Input Voltage

PERFORMANCE INFORMATION (Cont'd)

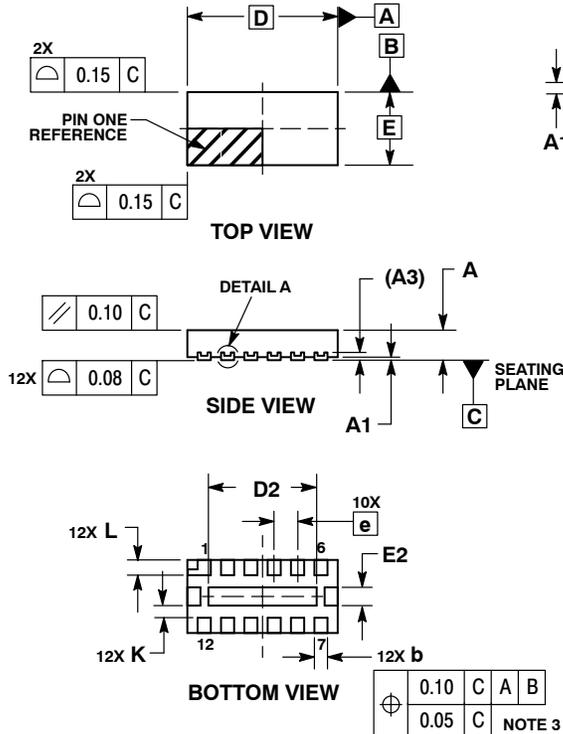


**Figure 7. Filter Capacitance vs. Input Voltage  
(normalized to capacitance at 2.5 VDC and 25°C)**

# CM1621

## PACKAGE DIMENSIONS

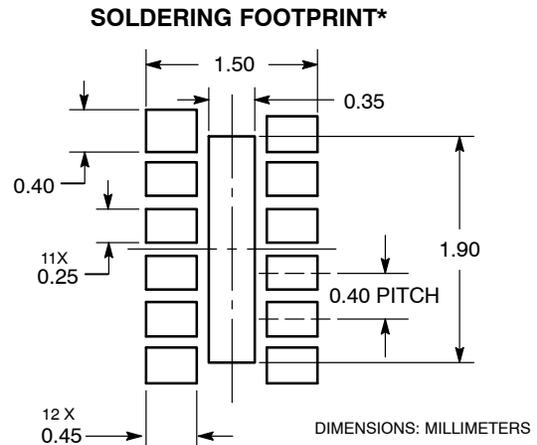
UDFN12, 2.5x1.2, 0.4P  
CASE 517AE-01  
ISSUE B



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 mm FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.45	0.50	0.55
A1	0.00	0.03	0.05
A3	0.127 REF		
b	0.15	0.20	0.25
D	2.50 BSC		
D2	1.70	1.80	1.90
E	1.20 BSC		
E2	0.20	0.30	0.40
e	0.40 BSC		
K	0.20	---	---
L	0.20	0.25	0.30



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor and are registered 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. 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: 81-3-5773-3850

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local Sales Representative