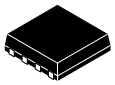
CM1683

Praetorian® L-C EMI Filter with ESD Protection for Headsets/Speakers

ON Semiconductor®

http://onsemi.com



CUDFN8
DE SUFFIX
CASE 505AF

Product Description

The CM1683 is an L−C EMI filter array with ESD protection, which integrates two Pi−filters (C−L−C) for the headset speaker. The CM1683 has component values of 100 pF − 3 nH − 100 pF. The parts include ESD protection diodes on all input/output pins, which provide a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). The ESD diodes connected to the filter ports safely dissipate ESD strikes of ±8 kV, beyond the maximum requirement of the IEC61000−4−2 international standard. Using the MIL−STD−883 (Method 3015) specification for Human Body Model (HBM) ESD, the pins are protected for contact discharges at greater than ±15 kV.

This device is particularly well suited for portable electronics (e.g. mobile handsets, PDAs, notebook computers) because of its small package format and easy−to−use pin assignments. In particular, the CM1683 is ideal for EMI filtering and protecting speaker output lines from ESD for the headset speaker in mobile handsets. Most speakers have impedance of 8 Ω and in order to maximize the power output, the resistance of an EMI filter needs to be as low as possible and the CM1683 addresses this by having a C−L−C based EMI filter where the inductor has less than 1 Ω of resistance.

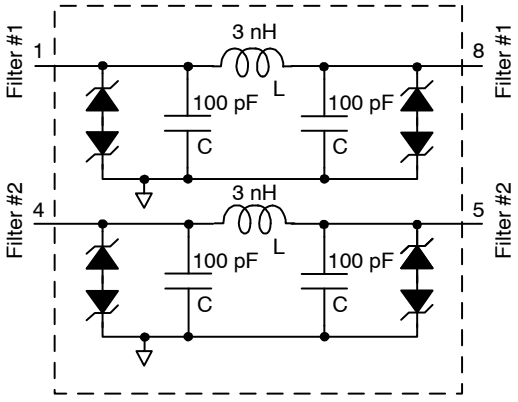
Features

- Two Channels of EMI Filtering
- ±8 kV ESD Protection (IEC 61000−4−2, Contact Discharge)
- ±15 kV ESD Protection (HBM)
- Greater than −40 dB of Attenuation at 1 GHz
- 8−Lead, 2.00 mm x 2.00 mm, 0.5 mm Pitch CUDFN Package
- These Devices are Pb−Free and are RoHS Compliant

Applications

- Headset Speaker Port 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

ELECTRICAL SCHEMATIC



MARKING DIAGRAM



P83 = CM1683−02DE

ORDERING INFORMATION

Device	Package	Shipping†
CM1683−02DE	CUDFN−8 (Pb−Free)	3000/Tape & Reel

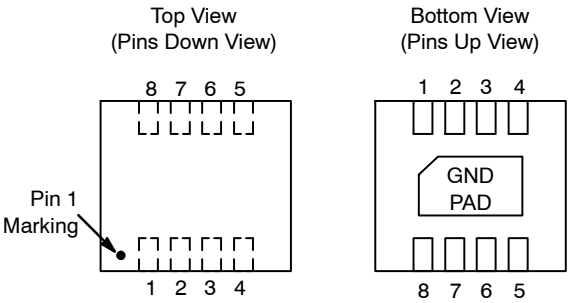
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

© Semiconductor Components Industries, LLC, 2011

Table 1. PIN DESCRIPTIONS

8−Lead CUDFN Package		
Pin	**Name**	**Description**
1	Filter #1	Filter #1
2	NC	No connect
3	NC	No connect
4	Filter #2	Filter #2
5	Filter #2	Filter #2
6	NC	No connect
7	NC	No connect
8	Filter #1	Filter #1
GND PAD	GND	Ground

PACKAGE / PINOUT DIAGRAMS



CM1683−02DE
8−Lead CUDFN Package

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°C
DC current per inductor	30	mA
DC package power rating	0.5	W

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

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
L	Inductance			3.0		nH
R	DC Channel Resistance			0.75	1	Ω
C_{TOT}	Total Channel Capacitance	2.5 V DC; 1 MHz, 30 mV AC	160	200	240	pF
C	Capacitance C	2.5 V DC; 1 MHz, 30 mV AC		100		pF
I_{LEAK}	Diode Leakage Current	V_{IN} = +5.0 V		0.1	1.0	μA
		V_{IN} = −5.0 V	−1.0	−0.1		μA
V_{SIG}	Signal Clamp Voltage Positive Clamp Negative Clamp	 I_{LOAD} = 10 mA I_{LOAD} = −10 mA	 5 −15	 7 −10	 15 −5	V
V_{ESD}	In−system ESD Withstand Voltage: a) Human Body Model, MIL−STD−883, Method 3015 b) Contact Discharge per IEC 61000−4−2 Level 4	(Note 2)	 ±15 ±8			kV
f_C	Cut−off frequency Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω	L = 3 nH, C = 100 pF		31		MHz

1. T_A = 25°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.

PERFORMANCE INFORMATION

Typical Filter Performance (nominal conditions unless specified otherwise, 50 Ω Environment)

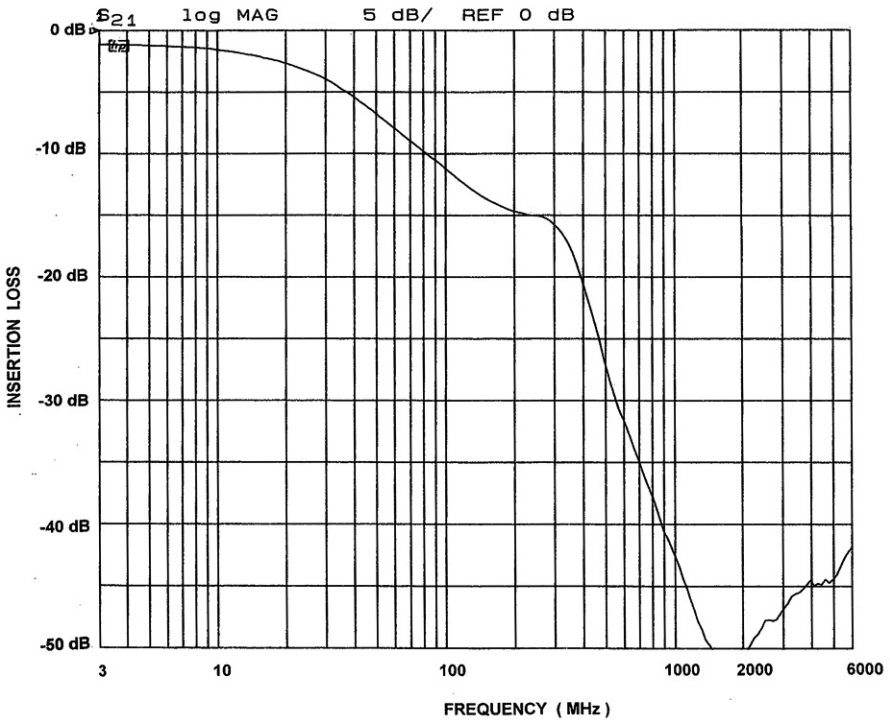


Figure 1. Insertion Loss vs. Frequency (Filter #1 to GND)

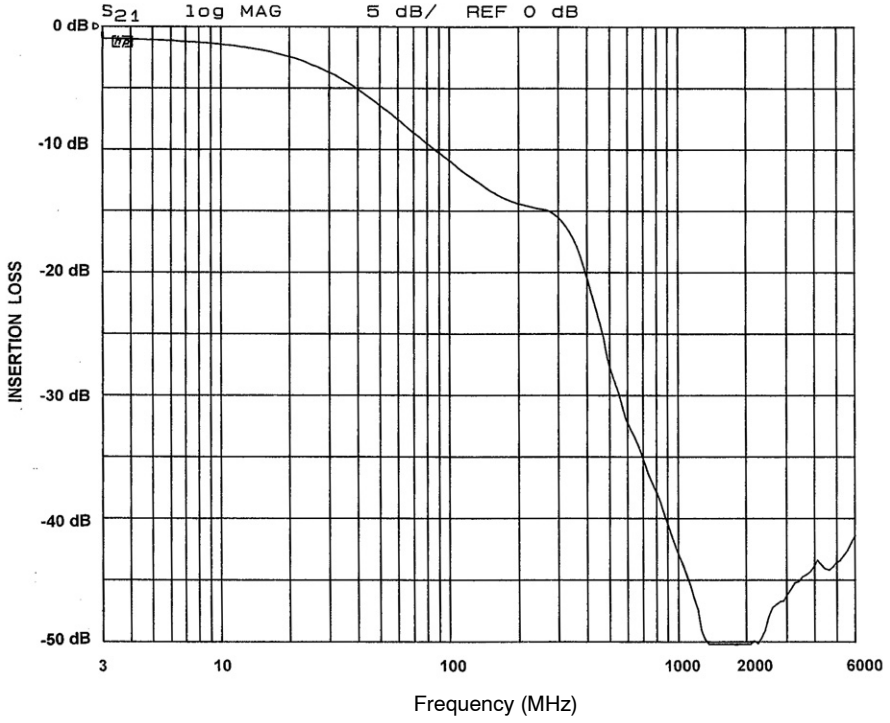
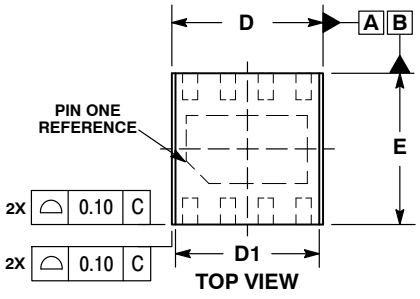
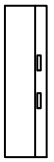


Figure 2. Insertion Loss vs. Frequency (Filter #2 to GND)

PACKAGE DIMENSIONS

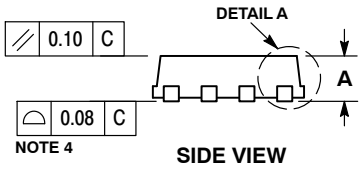
CUDFN8, 2x2, 0.5P
CASE 505AF−01
ISSUE O

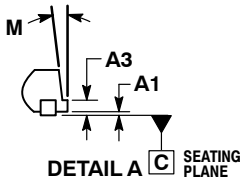


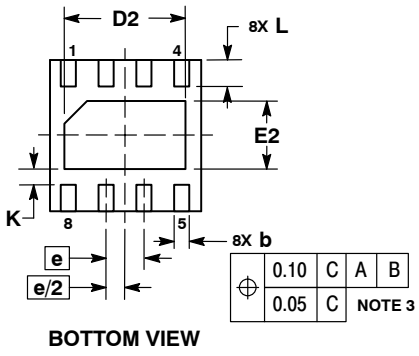


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.10 AND 0.20mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

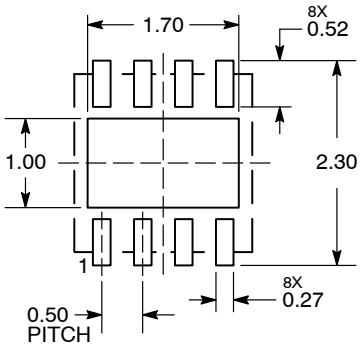
	MILLIMETERS	
DIM	MIN	MAX
A	0.55	0.65
A1	0.00	0.05
A3	0.20 REF	
b	0.15	0.25
D	2.00 BSC	
D1	1.80 BSC	
D2	1.50	1.70
E	2.00 BSC	
E2	0.80	1.00
e	0.50 BSC	
K	0.20	---
L	0.25	0.35
M	---	10°







RECOMMENDED MOUNTING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

Praetorian® is a registered trademark of Semiconductor Components Industries, LLC.

ON Semiconductor and ON 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**

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

For additional information, please contact your local Sales Representative