

# NZF220DFT1G, SNZF220DFT1G

## EMI Filter with ESD Protection

### Features

- 2 EMI/RFI Bi-directional “Pi” Low-Pass Filters
- ESD Protection Meets IEC61000-4-2
- Diode Capacitance: 7 – 10 pF
- Zener/Resistor Line Capacitance:  $22 \pm 20\%$  pF
- Low Zener Diode Leakage: 1  $\mu$ A Maximum
- Zener Breakdown Voltage; 6 – 8 V
- AEC-Q101 Qualified and PPAP Capable – SNZF220DFT1G
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These are Pb-Free Devices

### Benefits

- Designed to suppress EMI/RFI Noise in Systems Subjected to Electromagnetic Interference
- Nominal Cutoff Frequency of 220 MHz (per Figure 2)
- Small Package Size Minimizes Parasitic Inductance, Thus a More “Ideal” Low Pass Filtering Response

### Typical Applications

- Cellular Phones
- Communication Systems
- Computers
- Portable Products with Input/Output Conductors

### MAXIMUM RATINGS

| Rating                                                       | Symbol   | Value | Unit         |
|--------------------------------------------------------------|----------|-------|--------------|
| Peak Power Dissipation (Note 1)<br>$8 \times 20 \mu$ s Pulse | $P_{PK}$ | 14    | W            |
| Maximum Junction Temperature                                 | $T_J$    | 150   | $^{\circ}$ C |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

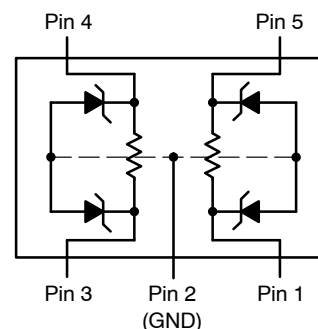
1. Between I/O Pins



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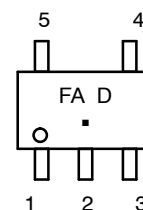
<http://onsemi.com>

### CIRCUIT DESCRIPTION



**SC-88A  
DF SUFFIX  
CASE 419A**

### MARKING DIAGRAM



FA = Specific Device Code  
D = Date Code  
▪ = Pb-Free Package

### ORDERING INFORMATION

| Device       | Package             | Shipping†          |
|--------------|---------------------|--------------------|
| NZF220DFT1G  | SC-88A<br>(Pb-Free) | 3000 / Tape & Reel |
| SNZF220DFT1G | SC-88A<br>(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 Specifications Brochure, BRD8011/D.

## NZF220DFT1G, SNZF220DFT1G

### ELECTRICAL CHARACTERISTICS

| Symbol         | Characteristic                                     | Min  | Typ | Max  | Unit          |
|----------------|----------------------------------------------------|------|-----|------|---------------|
| $V_Z$          | Zener Breakdown Voltage, @ $I_{ZT} = 1 \text{ mA}$ | 6.0  | –   | 8.0  | V             |
| $I_r$          | Zener Leakage Current, @ $V_R = 3 \text{ V}$       | N/A  | –   | 1.0  | $\mu\text{A}$ |
| $V_F$          | Zener Forward Voltage, @ $I_F = 50 \text{ mA}$     | N/A  | –   | 1.5  | V             |
| Capacitance    | Zener Internal Capacitance, @ 0 V Bias             | 7.0  | –   | 10   | pF            |
| Capacitance    | Zener/Resistor Array Line Capacitance              | 17.6 | –   | 26.4 | pF            |
| Resistor       | Resistance                                         | 90   | –   | 110  | $\Omega$      |
| $F_C$ (Note 2) | Cutoff Frequency                                   | –    | 220 | –    | MHz           |

2. 50  $\Omega$  Source and 50  $\Omega$  Lead Termination per Figure 2.

### Applications Information

#### Suppressing Noise at the Source

- Filter all I/O signals leaving the noisy environment
- Locate I/O driver circuits close to the connector
- Use the longest rise/fall times possible for all digital signals

#### Reducing Noise at the Receiver

- Filter all I/O signals entering the unit
- Locate the I/O filters as close as possible to the connector

#### Minimizing Noise Coupling

- Use multilayer PCBs to minimize power and ground inductance
- Keep clock circuits away from the I/O connector
- Ground planes should be used whenever possible
- Minimize the loop area for all high speed signals
- Provide for adequate power decoupling

#### ESD Protection

- Locate the suppression devices as close to the I/O connector as possible
- Minimize the PCB trace length to the suppression device
- Minimize the PCB trace length for the ground return for the suppression device

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## FREQUENCY RESPONSE SPECIFICATION

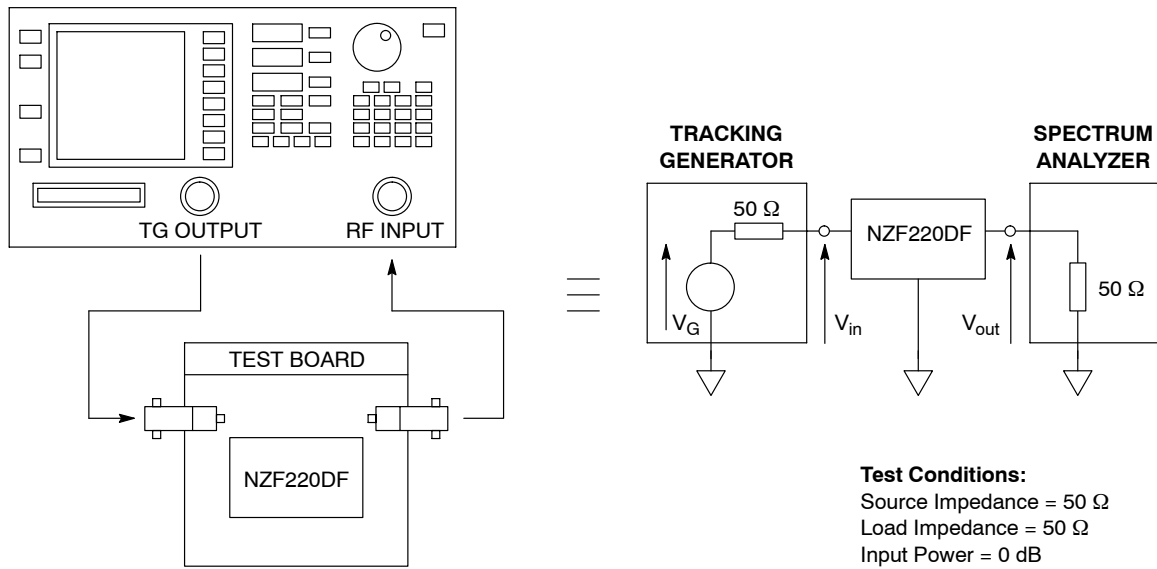


Figure 1. Measurement Conditions

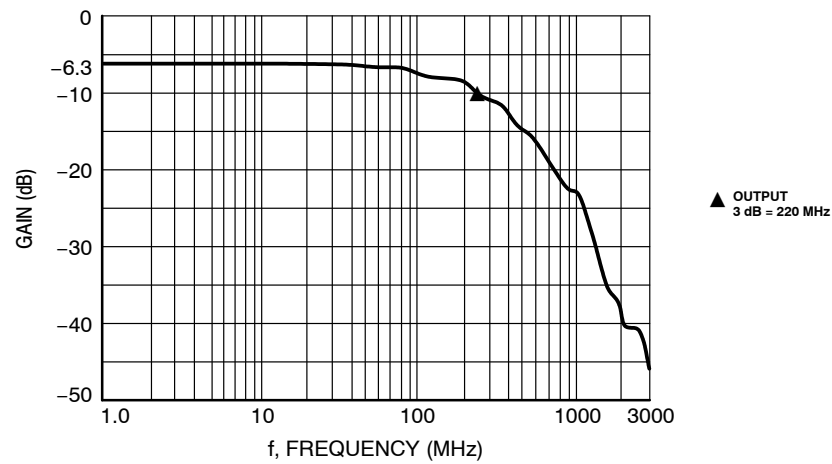


Figure 2. Typical EMI Filter Response  
 (50  $\Omega$  Source and 50  $\Omega$  Lead Termination)

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

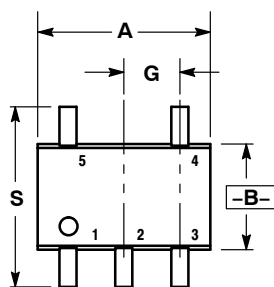
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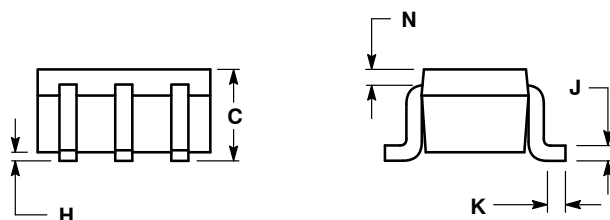
SCALE 2:1

SC-88A (SC-70-5/SOT-353)  
CASE 419A-02  
ISSUE L

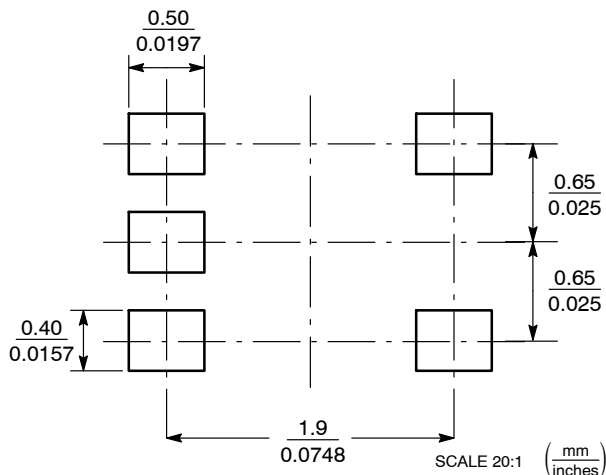
DATE 17 JAN 2013



D 5 PL  $\oplus$  0.2 (0.008) (M) B (M)



## SOLDER FOOTPRINT

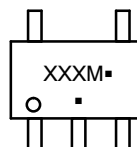


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419A-01 OBSOLETE. NEW STANDARD 419A-02.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

| DIM | INCHES    |       | MILLIMETERS |      |
|-----|-----------|-------|-------------|------|
|     | MIN       | MAX   | MIN         | MAX  |
| A   | 0.071     | 0.087 | 1.80        | 2.20 |
| B   | 0.045     | 0.053 | 1.15        | 1.35 |
| C   | 0.031     | 0.043 | 0.80        | 1.10 |
| D   | 0.004     | 0.012 | 0.10        | 0.30 |
| G   | 0.026 BSC |       | 0.65 BSC    |      |
| H   | ---       | 0.004 | ---         | 0.10 |
| J   | 0.004     | 0.010 | 0.10        | 0.25 |
| K   | 0.004     | 0.012 | 0.10        | 0.30 |
| N   | 0.008 REF |       | 0.20 REF    |      |
| S   | 0.079     | 0.087 | 2.00        | 2.20 |

## GENERIC MARKING DIAGRAM\*



XXX = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*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.

### STYLE 1:

- PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

### STYLE 2:

- PIN 1. ANODE
2. EMITTER
3. BASE
4. COLLECTOR
5. CATHODE

### STYLE 3:

- PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. CATHODE 1

### STYLE 4:

- PIN 1. SOURCE 1
2. DRAIN 1/2
3. SOURCE 1
4. GATE 1
5. GATE 2

### STYLE 5:

- PIN 1. CATHODE
2. COMMON ANODE
3. CATHODE 2
4. CATHODE 3
5. CATHODE 4

### STYLE 6:

- PIN 1. EMITTER 2
2. BASE 2
3. EMITTER 1
4. COLLECTOR
5. COLLECTOR 2/BASE 1

### STYLE 7:

- PIN 1. BASE
2. EMITTER
3. BASE
4. COLLECTOR
5. COLLECTOR

### STYLE 8:

- PIN 1. CATHODE
2. COLLECTOR
3. N/C
4. BASE
5. EMITTER

### STYLE 9:

- PIN 1. ANODE
2. CATHODE
3. ANODE
4. ANODE
5. ANODE

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

|                  |                          |                                                                                                                                                                                     |
|------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SC-88A (SC-70-5/SOT-353) | PAGE 1 OF 1                                                                                                                                                                         |

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