

# NZF220DFT1

## 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 Volts

### 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) $8 \times 20 \mu$ s Pulse	$P_{PK}$	14	Watts
Maximum Junction Temperature	$T_J$	150	$^{\circ}$ C

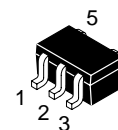
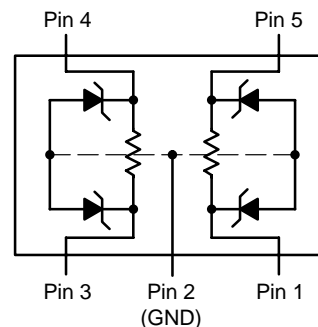
1. Between I/O Pins



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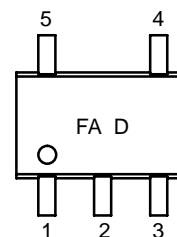
<http://onsemi.com>

### CIRCUIT DESCRIPTION



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

### MARKING DIAGRAM



FA = Specific Device Code  
D = Date Code

### ORDERING INFORMATION

Device	Package	Shipping
NZF220DFT1	SC-88A	3000/Tape & Reel

## 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

## Frequency Response Specification

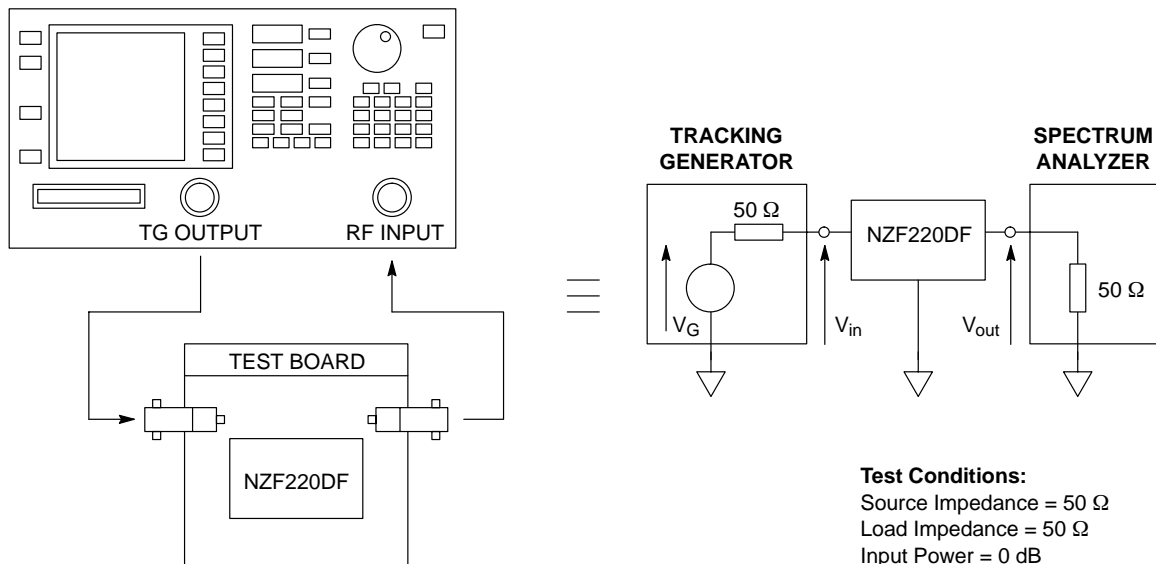
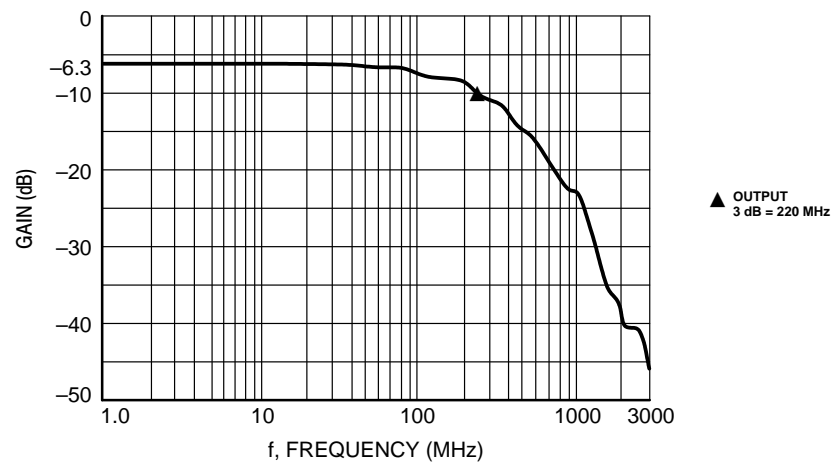


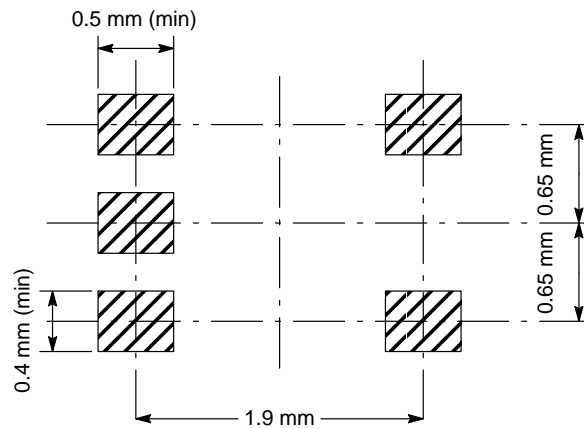
Figure 1. Measurement Conditions

## NZF220DFT1



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

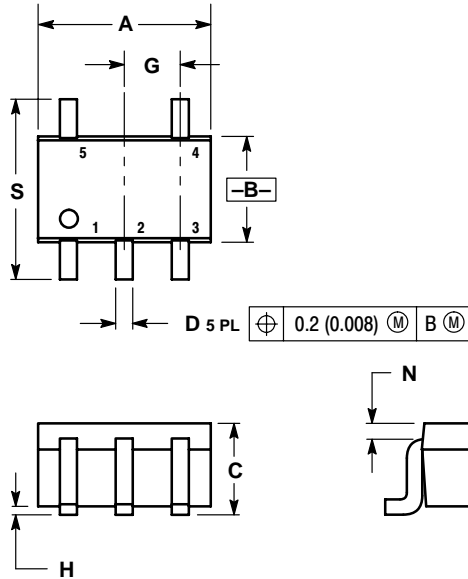
### Footprint



## OUTLINE DIMENSIONS

## EMI Filter with ESD Protection


SC-88A/SOT-323  
CASE 419A-02  
ISSUE F



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 419A-01 OBSOLETE. NEW STANDARD 419A-02.

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

- 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. BASE  
3. EMITTER  
4. COLLECTOR  
5. COLLECTOR
- STYLE 7: PIN 1. BASE  
2. EMITTER  
3. BASE  
4. COLLECTOR  
5. COLLECTOR

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