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# 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 ±20% pF
- Low Zener Diode Leakage: 1 µA Maximum
- Zener Breakdown Voltage; 6 – 8 V
- Pb-Free Package is Available

### 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 × 20 µs Pulse	P <sub>PK</sub>	14	W
Maximum Junction Temperature	T <sub>J</sub>	150	°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.

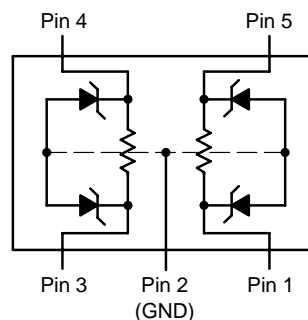
1. Between I/O Pins



**ON Semiconductor®**

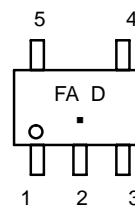
<http://onsemi.com>

### 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†
NZF220DFT1	SC-88A	3000/Tape & Reel
NZF220DFT1G	SC-88A (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.

## NZF220DFT1

### 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

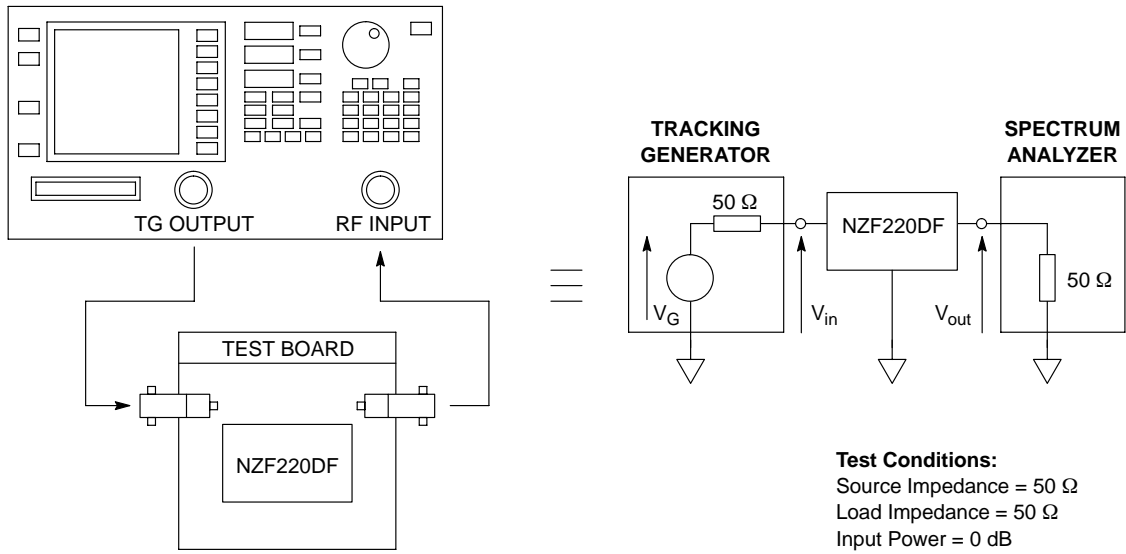
- Use multilayer PCBs to minimize power and ground inductance
- Keep clock circuits away from the I/O connector
- Ground planes should be used whenever possible
- Minimize the loop area for all high speed signals
- Provide for adequate power decoupling

#### ESD Protection

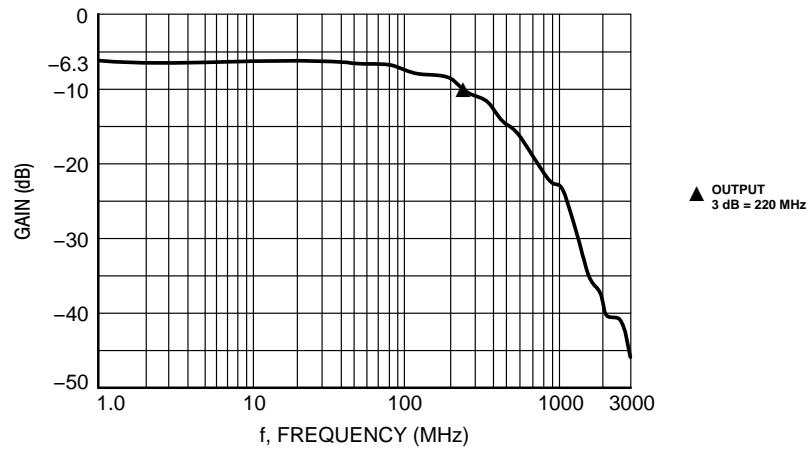
- Locate the suppression devices as close to the I/O connector as possible
- Minimize the PCB trace length to the suppression device
- Minimize the PCB trace length for the ground return for the suppression device

**NZF220DFT1**

**FREQUENCY RESPONSE SPECIFICATION**



**Figure 1. Measurement Conditions**



**Figure 2. Typical EMI Filter Response  
(50 Ω Source and 50 Ω Lead Termination)**

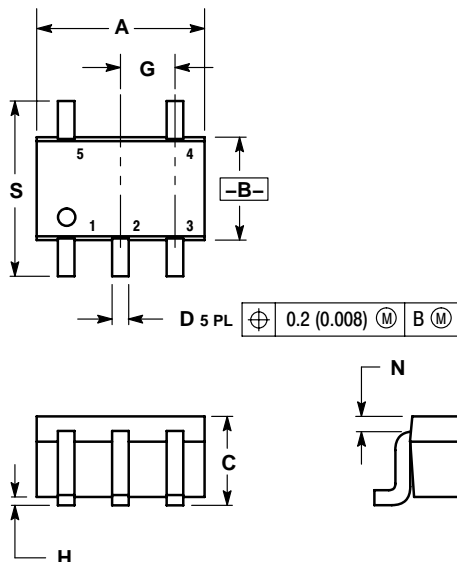
## NZF220DFT1

### OUTLINE DIMENSIONS

SC-88A/SOT-323

CASE 419A-02

ISSUE G

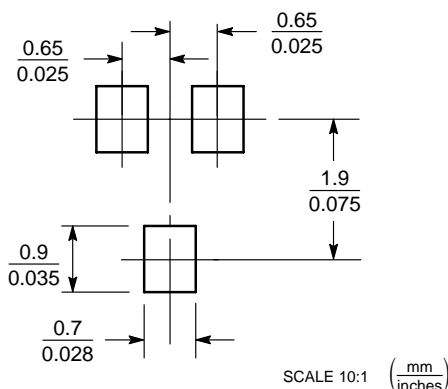


NOTES:

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

### SOLDERING FOOTPRINT\*



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

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