

# NZMM7V0T4

## EMI Filter with ESD Protection

### Features:

- 4 × 4 mm Lead Less MLF Surface Mount Package
- 9 EMI/RFI Bi-directional “Pi” Low-Pass Filters
- ESD Protection Meets IEC6000–4–2
- 50 Watt Peak Pulse Power, 8 × 20 μs (all diodes under power)
- Diode Capacitance: 7 – 10 pF
- “Pi” Filter Line Capacitance: 22 ±20% pF
- Low Zener Diode Leakage: 1 μA Maximum
- Zener Breakdown Voltage; 6 – 8 Volts
- Moisture Sensitivity Level 1

### Benefits:

- Suppresses EMI/RFI Noise in Systems Subjected to Electromagnetic Interference
- 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

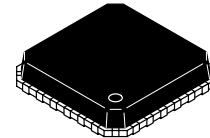
| Rating   | Symbol          | Value | Unit  |
|--|-----------------|-------|-------|
| Peak Power Dissipation (Note 1)<br>8 × 20 μs Pulse | P <sub>PK</sub> | 50    | Watts |
| Maximum Junction Temperature                       | T <sub>J</sub>  | 150   | °C    |

1. All diodes in parallel under power



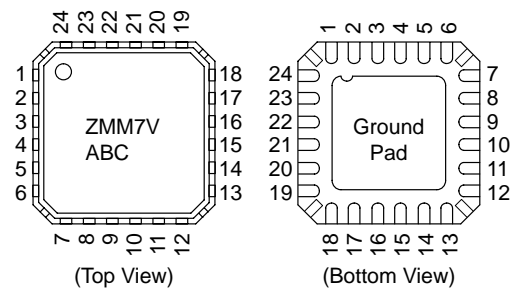
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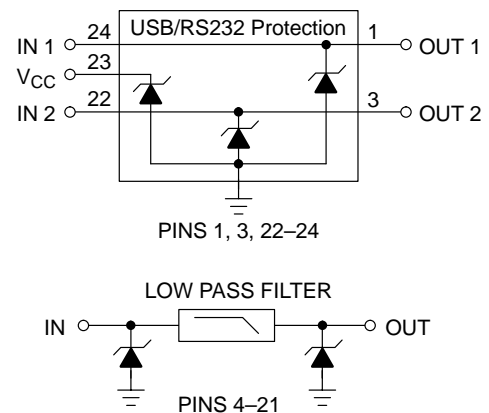
24 PIN MLF  
CASE 485F  
PLASTIC

### MARKING DIAGRAM



ZMM7V = Specific Device Code  
ABC = Date Code

### CIRCUIT DESCRIPTION



### ORDERING INFORMATION

| Device    | Package | Shipping         |
|-----------|---------|------------------|
| NZMM7V0T4 | 24 PIN  | 4000/Tape & Reel |

# NZMM7V0T4

## ELECTRICAL CHARACTERISTICS

| Symbol         | Characteristic                                     | Min  | Typ | Max  | Unit          |
|----------------|--|------|-----|------|---------------|
| $V_Z$          | Zener Breakdown Voltage, @ $I_{ZT} = 1 \text{ mA}$ | 6.0  | –   | 8.0  | V             |
| $I_F$          | 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  | –   | 1.25 | 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

## Frequency Response Specification

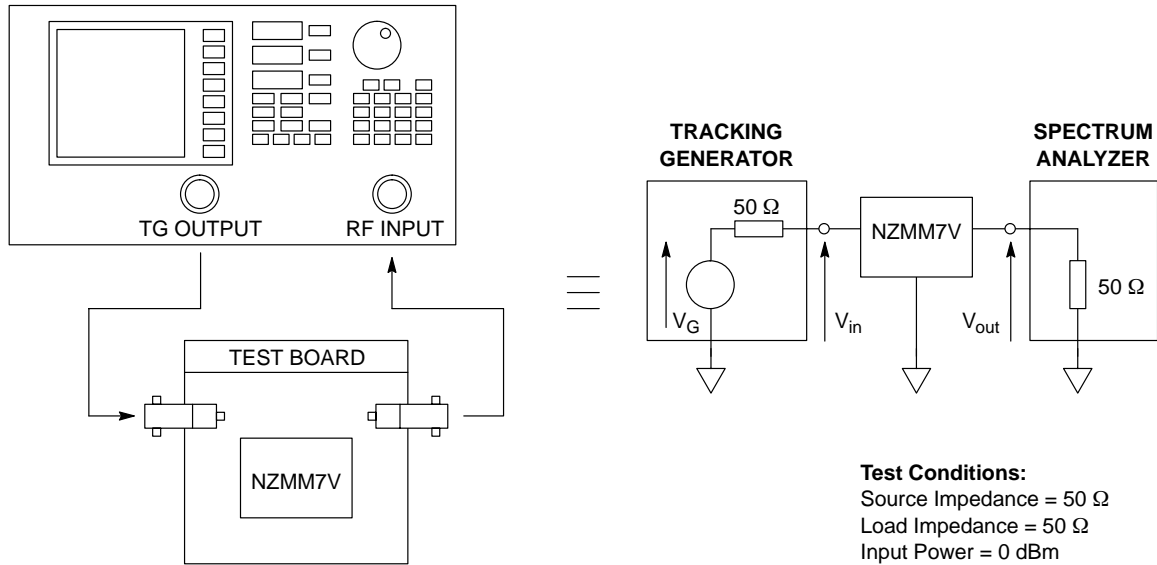


Figure 1. Measurement Conditions

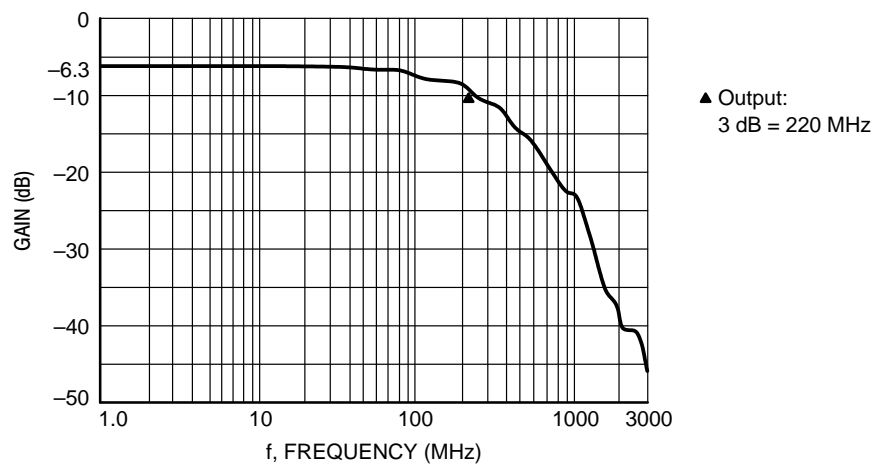
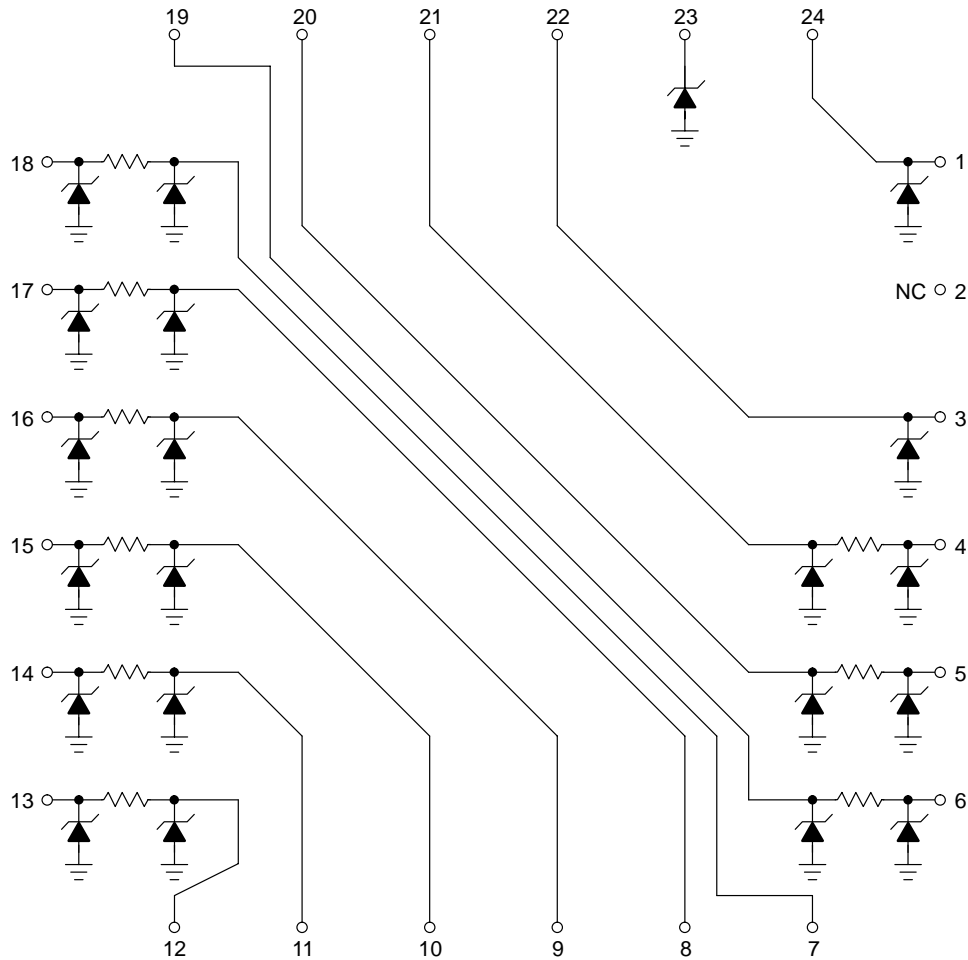


Figure 2. Typical EMI Filter Response  
(50  $\Omega$  Source and 50  $\Omega$  Lead Termination)

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## Detailed Device Schematic



## 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

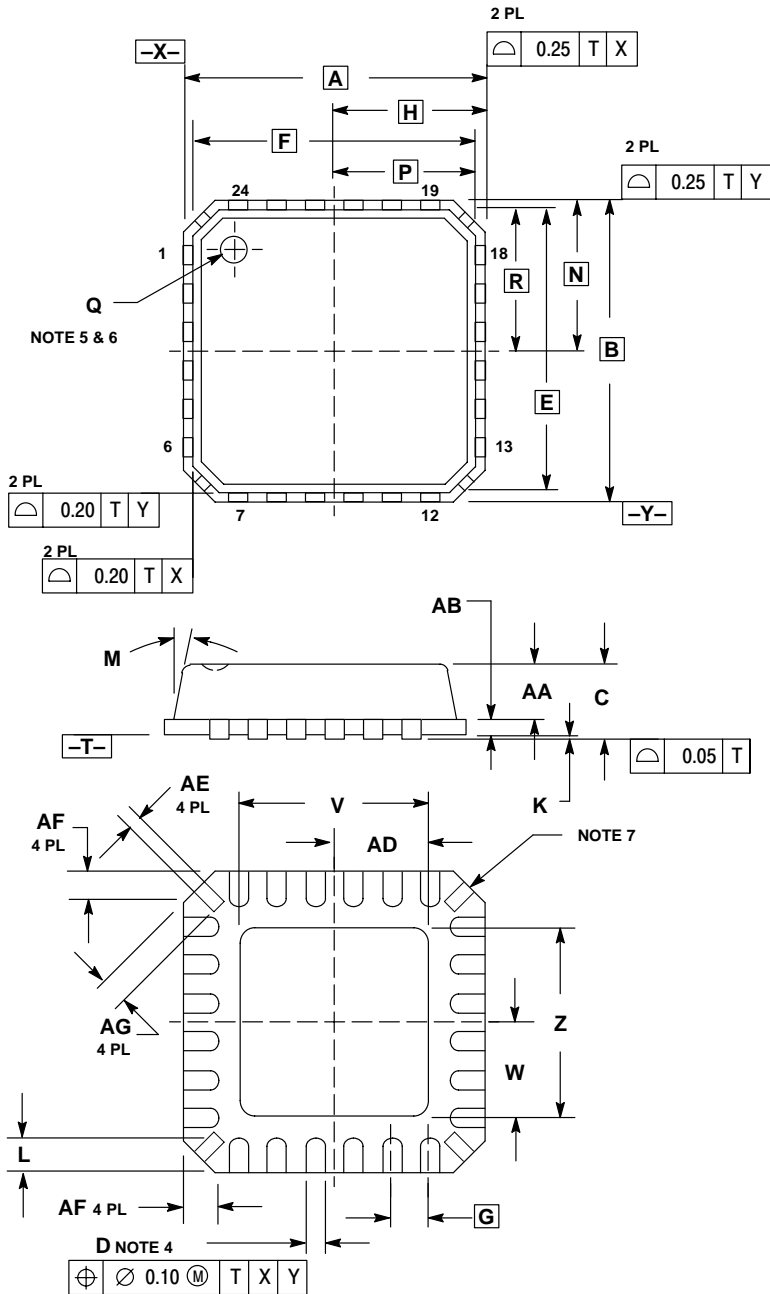
- Locate the suppression devices as close to the I/O connector as possible
- Minimize the PCB trace length to the suppression device
- Minimize the PCB trace length for the ground return for the suppression device

# NZMM7V0T4

## OUTLINE DIMENSIONS

# EMI Filter with ESD Protection

24 PIN MLF  
PLASTIC PACKAGE  
CASE 485F-01  
ISSUE O



**NOTES:**


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIE THICKNESS ALLOWABLE IS 0.305 MM MAXIMUM (0.012 INCHES MAXIMUM).
4. DIMENSION D APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.20 AND 0.25 MM FROM TERMINAL.
5. THE PIN #1 IDENTIFIER MUST BE ON THE TOP SURFACE OF THE PACKAGE BY USING IDENTIFICATION MARK OR OTHER FEATURE OF PACKAGE BODY.
6. EXACT SHAPE AND SIZE OF THIS FEATURE IS OPTIONAL.
7. THE SHAPE SHOWN ON FOUR CORNERS ARE NOT ACTUAL I/O.
8. PACKAGE WARPAGE MAX 0.05 MM.

| DIM | MILLIMETERS |      | INCHES |       |
|-----|-------------|------|--------|-------|
|     | MIN         | MAX  | MIN    | MAX   |
| A   | 4.00        | BSC  | 0.157  | BSC   |
| B   | 4.00        | BSC  | 0.157  | BSC   |
| C   | ---         | 1.00 | ---    | 0.039 |
| D   | 0.18        | 0.30 | 0.007  | 0.012 |
| E   | 3.75        | BSC  | 0.148  | BSC   |
| F   | 3.75        | BSC  | 0.148  | BSC   |
| G   | 0.50        | BSC  | 0.020  | BSC   |
| H   | 2.00        | BSC  | 0.79   | BSC   |
| K   | 0.01        | 0.05 | 0.000  | 0.002 |
| L   | 0.30        | 0.55 | 0.012  | 0.022 |
| M   | ---         | 12 ° | ---    | 12 °  |
| N   | 2.00        | BSC  | 0.079  | BSC   |
| P   | 1.88        | BSC  | 0.074  | BSC   |
| Q   | 0.50        | DIA  | 0.020  | DIA   |
| R   | 1.88        | BSC  | 0.079  | BSC   |
| V   | 2.50        | BSC  | 0.098  | BSC   |
| W   | 1.30        | BSC  | 0.051  | BSC   |
| Z   | 2.50        | BSC  | 0.098  | BSC   |
| AA  | 0.65        | 0.80 | 0.026  | 0.031 |
| AB  | 0.20        | REF  | 0.008  | REF   |
| AD  | 1.30        | BSC  | 0.051  | BSC   |
| AE  | 0.13        | 0.23 | 0.005  | 0.009 |
| AF  | 0.24        | 0.60 | 0.009  | 0.024 |
| AG  | 0.30        | 0.45 | 0.012  | 0.018 |

**Notes**

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