

DFNAK3 Series

Surface Mount - DFN10*8*3 - 3 kA



Maximum Ratings and Thermal Characteristics

($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|------------|--------------------|
| Operating Junction Temperature | T_J | -55 to 125 | $^\circ\text{C}$ |
| Storage Temperature | T_{STG} | -55 to 150 | $^\circ\text{C}$ |
| Current Rating ¹ | I_{PP} | 3 | kA |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 70 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction to Case | $R_{\theta JC}$ | 20 | $^\circ\text{C/W}$ |

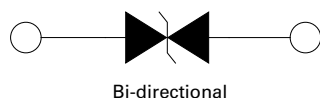
Note:

1. Rated I_{PP} measured with 8/20 μs pulse.

Agency Approvals

| Agency | Agency File Number |
|--------|--------------------|
| | E230531 |

Functional Diagram



Description

The DFNAK3 series offers a clamping voltage lower than alternative technologies such as MOVs and GDTs. Rated to 3 kA (8/20 μs) surge current, DFNAK3 series offers a high level of protection for mission critical and high reliability applications. It aids compliance to surge requirements such as IEC 61000-4-5 (Level 4). The compact surface mount DFN10*8*3 package is compatible with automated PCBA processes and enables high power density designs.

Features

- Compact surface mount DFN10*8*3 package
- Ideal for automated PCBA processes with reduced manufacturing cost and increased soldering quality as compared to axial leaded packages
- Foldback technology for superior clamping factor
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha_T \times (T_J - 25))$ (α_T : Temperature Coefficient, typical value is 0.1 %)
- Glass passivated chip junction
- ESD protection of data lines in accordance with IEC 61000-4-2, 30 kV(Air), 30 kV (Contact)
- Low dynamic resistance enabling superior low clamping voltage
- UL recognized compound meeting flammability rating UL94 V-0
- Meets MSL level 1, per J-STD-020, LF maximum peak of 250 $^\circ\text{C}$
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD-609A.01)

Applications


DFNAK3 series is ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in ICT, Industrial and Consumer electronic applications.

It aids compliance to surge requirements such as IEC 61000-4-5 (Level 4) for interfaces used in exposed PoE ports, Small Cells, Remote Radio Units (RRUs) and Baseband Units (BBUs), and other high power DC bus in harsh environments.

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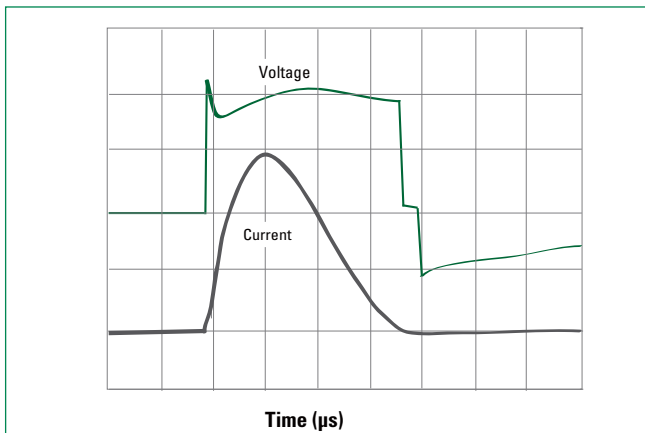
Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Part Numbers (Bi) | Marking | Standoff Voltage (V_R) (V) | Max Reverse Leakage (I_R) @ V_R (μA) | Reverse Breakdown Voltage (V_{BR}) @ I_T | | Test Current I_T (mA) | Max. Clamping Voltage V_C @ Peak Pulse Current (I_{PP}) (8/20 μs) | | Max. Capacitance 0 Bias 10 kHz (nF) | Agency Approval  |
|-------------------|---------|--------------------------------|---|--|---------|-------------------------|---|--------------|-------------------------------------|---|
| | | | | Min (V) | Max (V) | | V_{CL} (V) | I_{PP} (A) | | |
| DFNAK3-058C-D1 | 58C3K | 58 | 10 | 64 | 70 | 10 | 100 | 3000 | 3.1 | X |
| DFNAK3-066C-D1 | 66C3K | 66 | 10 | 72 | 80 | 10 | 110 | 3000 | 2.7 | X |
| DFNAK3-072C-D1 | 72C3K | 72 | 10 | 80 | 90 | 10 | 120 | 3000 | 2.4 | X |
| DFNAK3-076C-D1 | 76C3K | 76 | 10 | 85 | 95 | 10 | 125 | 3000 | 2.2 | X |
| DFNAK3-080C-D1 | 80C3K | 80 | 10 | 89 | 100 | 10 | 130 | 3000 | 2.1 | X |

Note: Using 8/20 μs wave shaped defined in IEC 61000-4-5.

Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

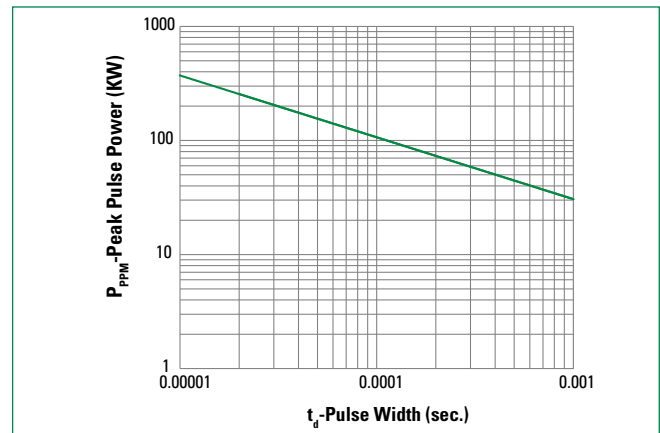
Figure 1 - Surge Response (8/20 Surge current waveform)



Note:

The power dissipation causes a change in avalanche voltage during the surge and the avalanche voltage eventually returns to the original value when the transient has passed.

Figure 2 - Typical Peak Pulse Power Rating



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Figure 3 - Pulse Waveform

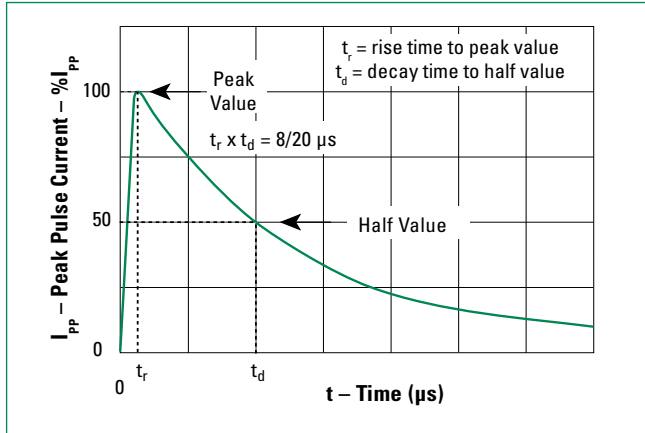
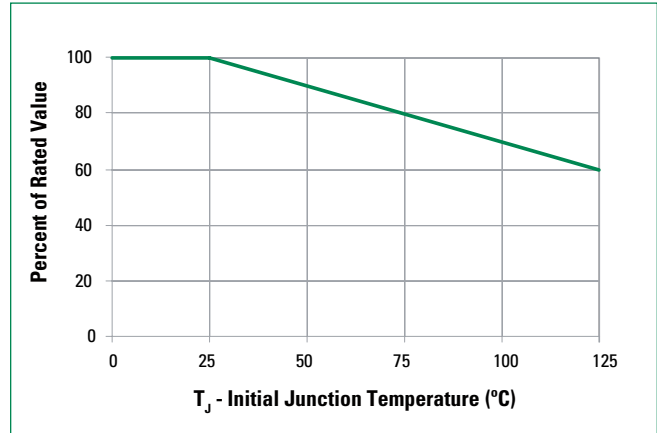


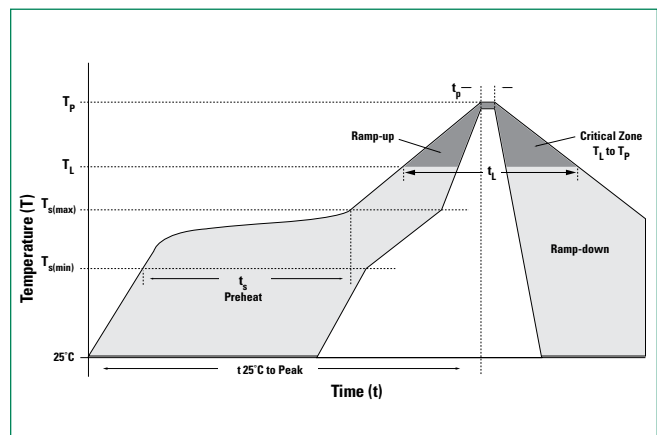
Figure 4 - Peak Power Derating



Please contact Littelfuse for reliability or FIT/MTBF data, the performance is subject to vary and depends on the end customers' application condition.

Soldering Parameters

| | | |
|---|------------------------------------|-------------------------|
| Reflow Condition | | Lead-free assembly |
| Pre Heat | - Temperature Min ($T_{s(min)}$) | 150 °C |
| | - Temperature Max ($T_{s(max)}$) | 200 °C |
| | - Time (min to max) (t_s) | 60 – 120 seconds |
| Average Ramp Up Rate (Liquidus Temp (T_L) to Peak | | 3 °C/second max |
| $T_{s(max)}$ to T_A - Ramp-up Rate | | 3 °C/second max |
| Reflow | - Temperature (T_L) (Liquidus) | 217 °C |
| | - Time (min to max) (t_s) | 60 – 150 seconds |
| Peak Temperature (T_p) | | 250 ^{+0/-5} °C |
| Time within 5 °C of Actual Peak Temperature (t_p) | | 30 seconds |
| Ramp-down Rate | | 6 °C/second max |
| Time 25 °C to Peak Temperature (T_p) | | 8 minutes max |
| Do Not Exceed | | 250 °C |



Physical Specifications

| | |
|-----------------|---|
| Weight | 0.0282 ounce, 0.7998 grams |
| Case | UL recognized compound meeting flammability rating UL94 V-0 |
| Terminal | Matte tin-plated leads, solderable per JESD22-B102 |

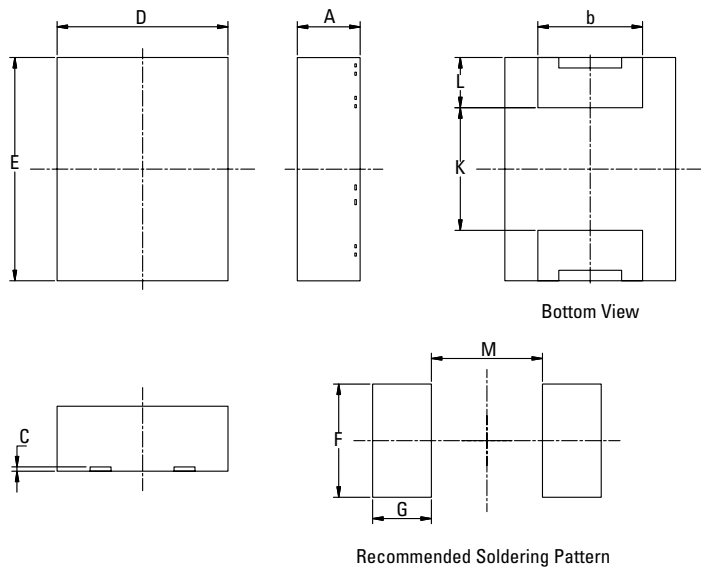
Environmental Specifications

| | |
|--|--|
| High Temp Voltage Blocking (HTRB) | 100 % DC reverse voltage rated 125 °C, 1008 hours JEDEC, JESD22-A-108 80 % breakdown voltage (+85 °C) |
| Biased Temp & Humidity (H3TRB) | 85 %RH, 1008 hours JEDEC, JESD22-A-101 |
| Unbiased Highly Accelerated Stress Test (UHAST) | 96 hours at $T_A = 130$ °C/85 %RH. JEDEC, JESD22-A-118 |
| Temp Cycling (TC) | -55 °C to +125 °C, 15 min. dwell, 1000 cycles. JEDEC, JESD22-A104 85 %RH, +85 °C, 168 hours, 3 reflow cycles (+250 °C Peak). JEDEC, JEDEC-J-STD-020, Level 1 |
| Moisture Sensitivity Level (MSL) | +260 °C, 30 seconds JEDEC, JEDEC JESD22-A-111 |
| Resistance to Solder Heat (RSH) | |

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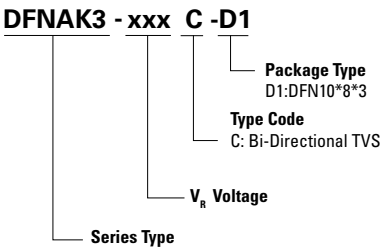
Dimensions - DFN10*8*3



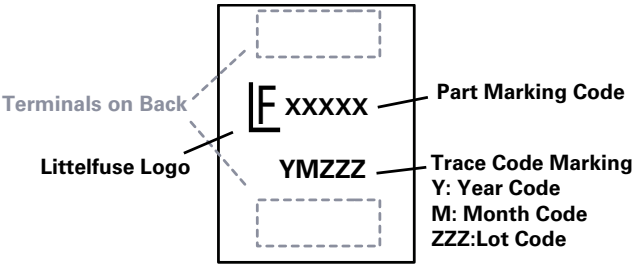
Dimensions are only for reference and might be changed later on. But the soldering pattern is fixed.

| Dimensions | Millimeters | | Inches | |
|------------|-------------|-------|-----------|-------|
| | Min | Max | Min | Max |
| A | 2.90 | 3.10 | 0.114 | 0.122 |
| b | 4.80 | 5.20 | 0.189 | 0.205 |
| C | 0.22 | 0.28 | 0.009 | 0.011 |
| D | 8.00 | 8.20 | 0.315 | 0.323 |
| E | 10.50 | 10.70 | 0.413 | 0.421 |
| F | 5.40 REF | | 0.213 REF | |
| G | 2.80 REF | | 0.110 REF | |
| K | 5.85 TYP | | 0.230 TYP | |
| L | 2.20 | 2.60 | 0.087 | 0.102 |
| M | 5.30 REF | | 0.209 REF | |

Part Numbering System



Part Marking System



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Packing Option

| Part Number | Component Package | Quantity | Packaging Option | Packaging Specification |
|----------------|-------------------|----------|----------------------------------|-------------------------|
| DFNAK3-xxxX-D1 | DFN10*8*3 | 1500 | Tape & Reel -24 mm tape/13" reel | EIA STD RS-481 |

Tape and Reel Specification

