

DMP21D0UFB4

20V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ | $I_D @ T_A = 25^\circ C$ |
|---------------|----------------------------------|--------------------------|
| -20V | 495m Ω @ $V_{GS} = -4.5V$ | -0.77A |
| | 690m Ω @ $V_{GS} = -2.5V$ | -0.67A |
| | 960m Ω @ $V_{GS} = -1.8V$ | -0.57A |

Description and Applications

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

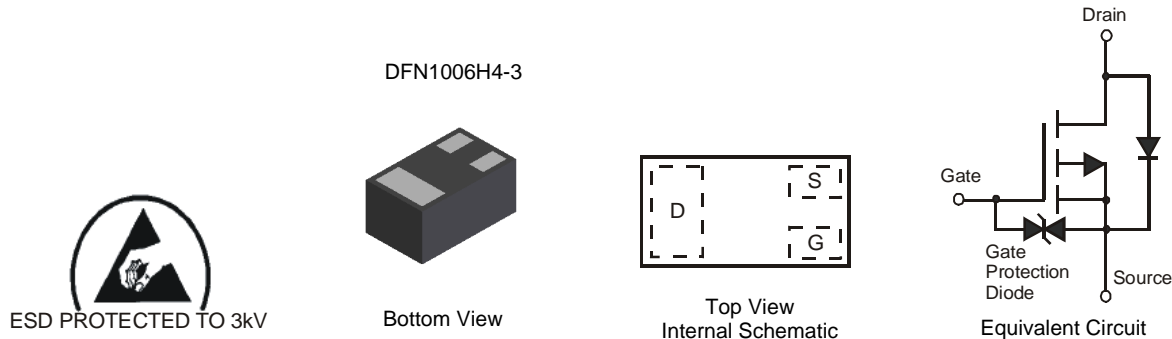
- Portable electronics

Features and Benefits

- Footprint of just 0.6mm² – thirteen times smaller than SOT23
- 0.4mm profile – ideal for low profile applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- “Lead Free”, RoHS Compliant (Note 1)
- Halogen and Antimony Free. “Green” Device (Note 2)
- ESD Protected Gate 3KV
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: DFN1006H4-3
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)



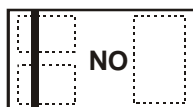
Ordering Information (Note 3)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|---------|--------------------|-----------------|-------------------|
| DMP21D0UFB4-7B | NO | 7 | 8 | 10,000 |

- Notes:
1. No purposefully added lead
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information

DMP21D0UFB4-7B



NO = Product Type Marking Code

Top View
Bar Denotes Gate and Source Side

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | | | Symbol | Value | Unit |
|-------------------------------|--------------|--------------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | -20 | V |
| Gate-Source Voltage | | | V _{GSS} | ±8 | V |
| Continuous Drain Current | Steady State | T _A = 25°C (Note 4) | I _D | -0.77 | A |
| | | T _A = 85°C (Note 4) | | -0.55 | |
| | | T _A = 25°C (Note 5) | | -1.17 | |
| Pulsed Drain Current (Note 6) | | | I _{DM} | -5.0 | A |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 4) | P _D | 0.43 | W |
| Power Dissipation (Note 5) | P _D | 0.99 | W |
| Thermal Resistance, Junction to Ambient (Note 4) | R _{θJA} | 293 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 126 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Thermal Characteristics

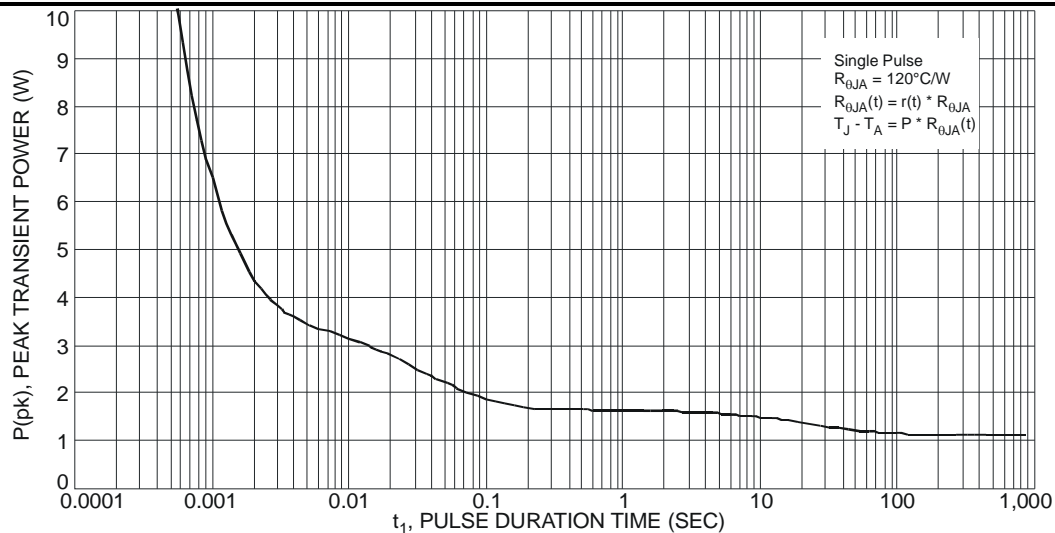


Fig. 1 Single Pulse Maximum Power Dissipation

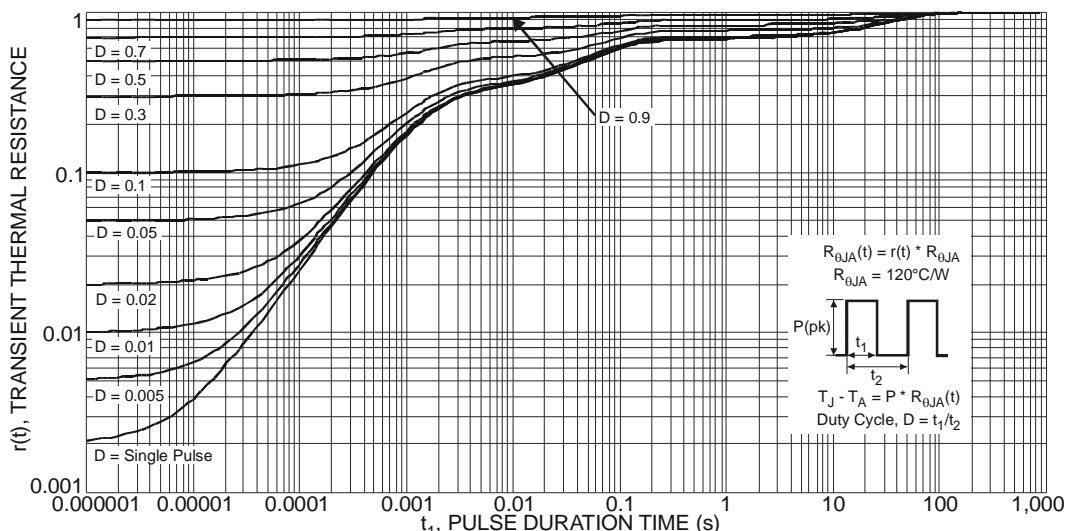


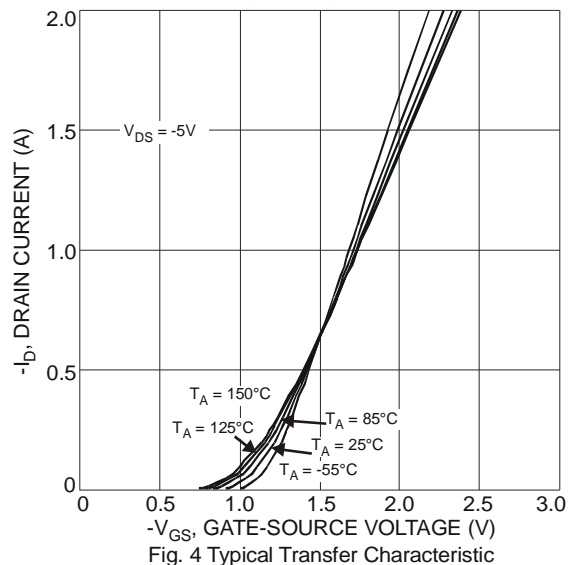
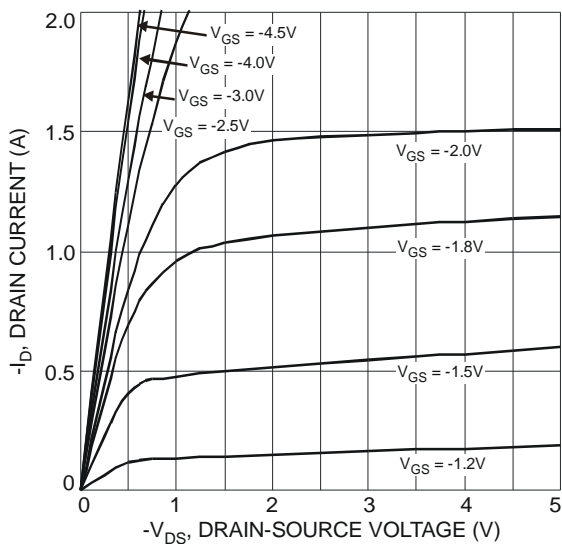
Fig. 2 Transient Thermal Response

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

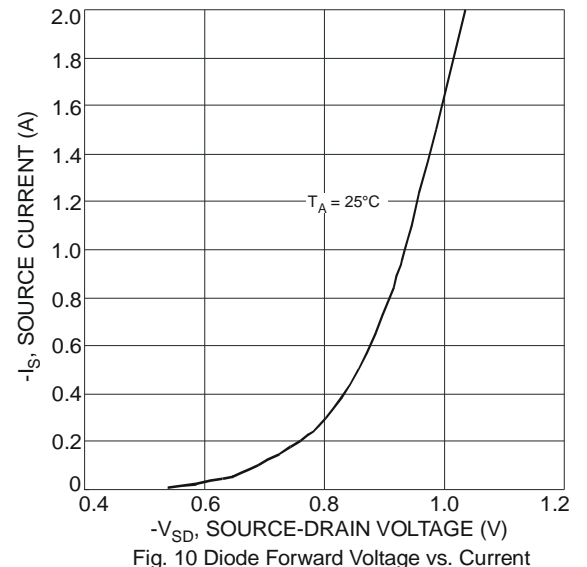
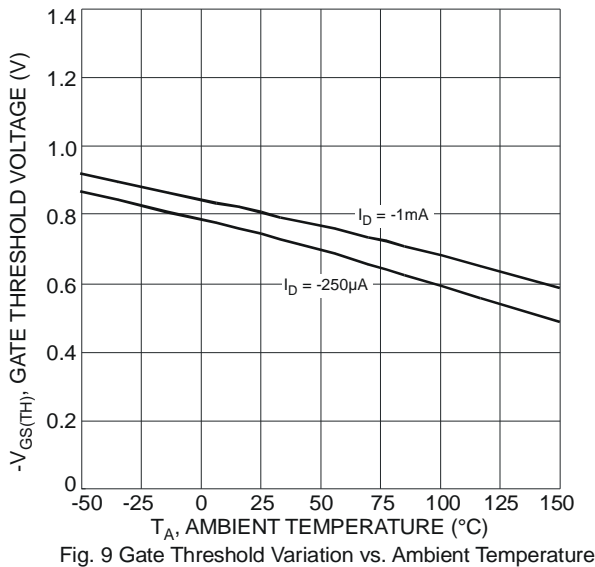
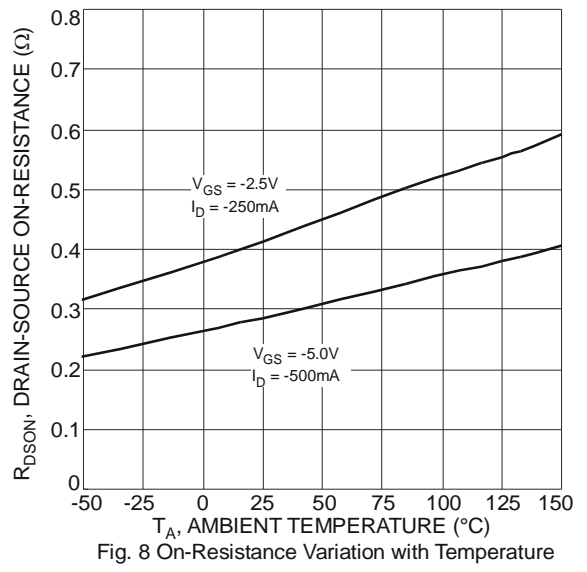
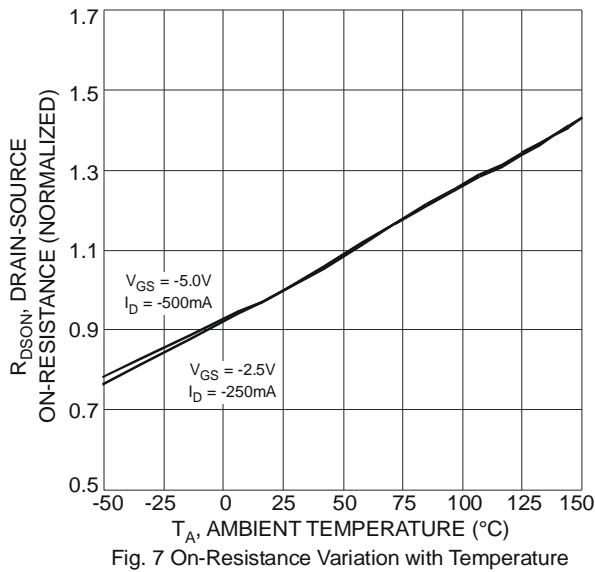
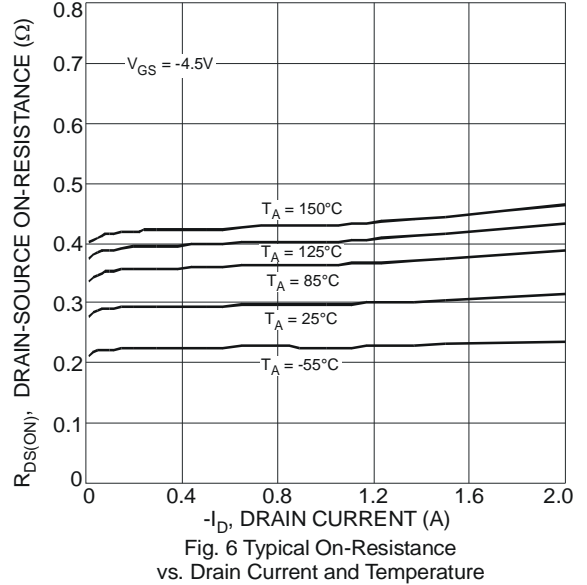
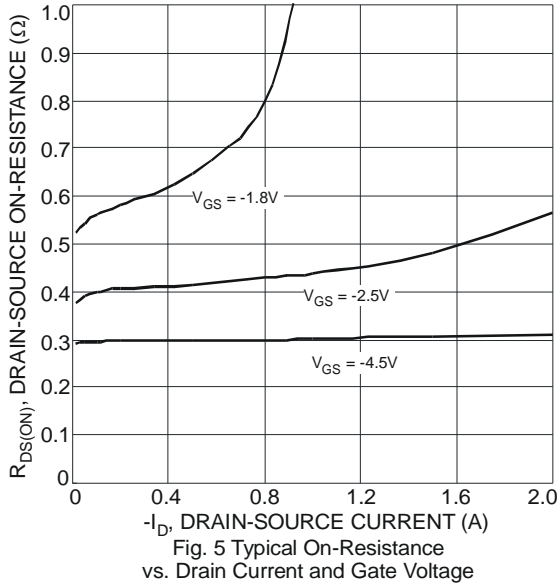
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|-----|-------|----------|------------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 20 | - | - | V | $V_{GS} = 0V, I_D = -250\mu A$ |
| Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$ | I_{DSS} | - | - | -1 | μA | $V_{DS} = -20V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 10 | μA | $V_{GS} = \pm 8V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | - | -0.7 | - | V | $V_{DS} = V_{GS}, I_D = -250\mu A$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | - | - | 495 | m Ω | $V_{GS} = -4.5V, I_D = -400mA$ |
| | | | | 690 | | $V_{GS} = -2.5V, I_D = -300mA$ |
| | | | | 960 | | $V_{GS} = -1.8V, I_D = -100mA$ |
| Forward Transfer Admittance | $ Y_{fs} $ | 50 | - | - | mS | $V_{DS} = -3V, I_D = -300mA$ |
| Diode Forward Voltage | V_{SD} | - | - | -1.2 | V | $V_{GS} = 0V, I_S = -300mA$ |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C_{iss} | - | 80 | - | pF | $V_{DS} = -10V, V_{GS} = 0V,$ $f = 1.0MHz$ |
| Output Capacitance | C_{oss} | - | 15.5 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 10.4 | - | pF | |
| Gate Resistance | R_g | - | 599.2 | - | Ω | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$ |
| Total Gate Charge | Q_g | - | 1.54 | - | nC | $V_{GS} = -8V, V_{DS} = -15V, I_D = -1A$ |
| Total Gate Charge | Q_g | - | 0.91 | - | nC | $V_{GS} = -4.5V, V_{DS} = -15V,$ $I_D = -1A$ |
| Gate-Source Charge | Q_{gs} | - | 0.14 | - | nC | |
| Gate-Drain Charge | Q_{gd} | - | 0.24 | - | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 6.7 | - | ns | $V_{DS} = -10V, -I_D = 1A$ $V_{GS} = -4.5V, R_G = 6\Omega$ |
| Turn-On Rise Time | t_r | - | 9.2 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 49.2 | - | ns | |
| Turn-Off Fall Time | t_f | - | 34.5 | - | ns | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
 - Device mounted on minimum recommended pad layout test board, 10 μs pulse duty cycle = 1%.
 - Short duration pulse test used to minimize self-heating effect.

Typical Characteristics



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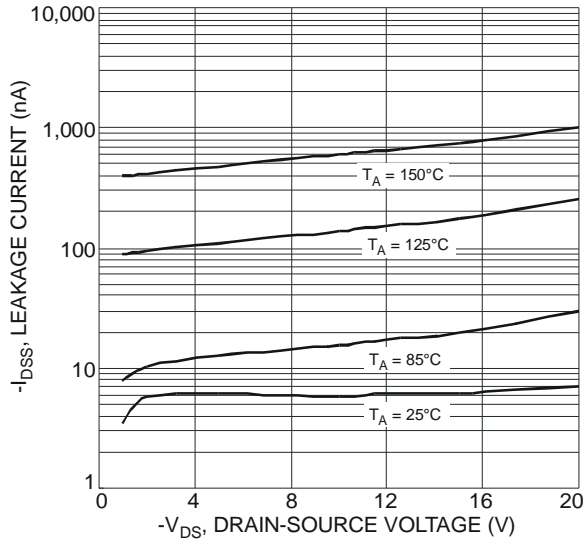


Fig. 11 Typical Leakage Current vs. Drain-Source Voltage

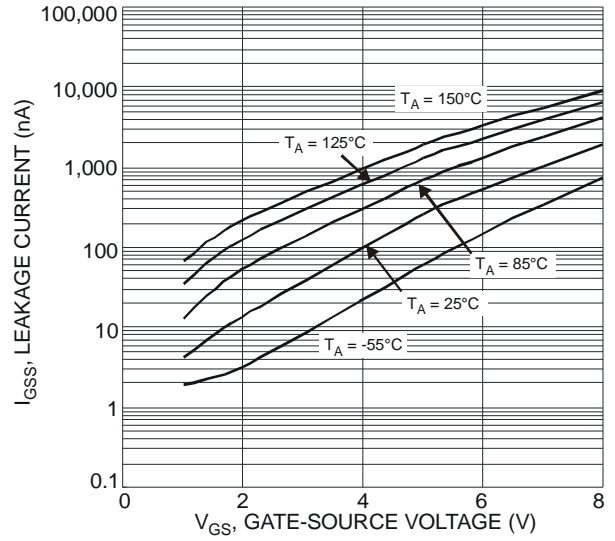


Fig. 12 Leakage Current vs. Gate-Source Voltage

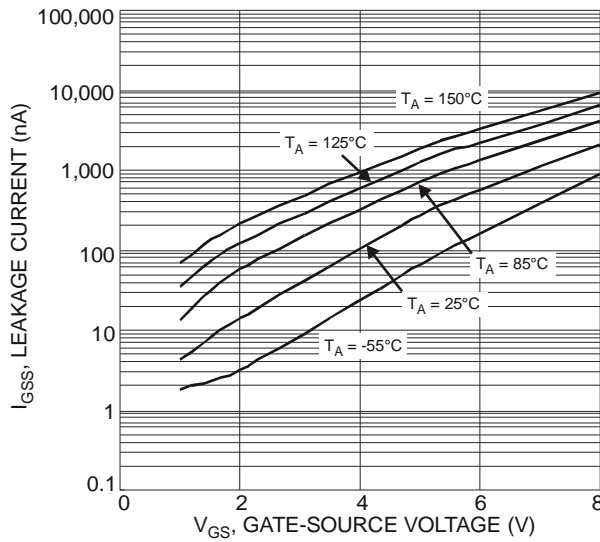
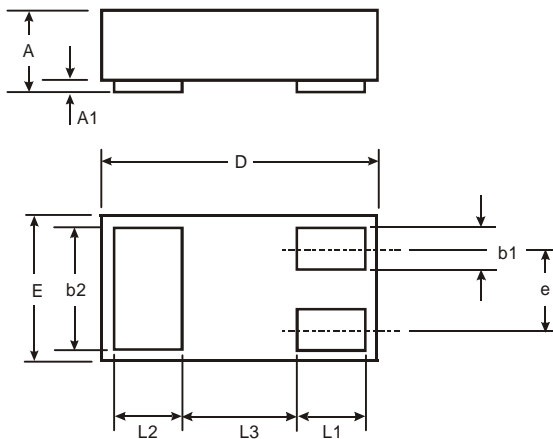


Fig. 13 Leakage Current vs. Gate-Source Voltage

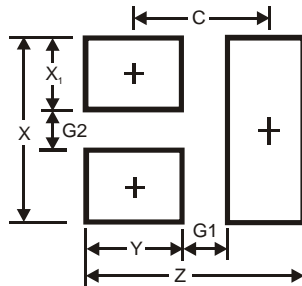
Package Outline Dimensions



| DFN1006H4-3 | | | |
|-------------|------|-------|------|
| Dim | Min | Max | Typ |
| A | — | 0.40 | — |
| A1 | 0 | 0.05 | 0.02 |
| b1 | 0.10 | 0.20 | 0.15 |
| b2 | 0.45 | 0.55 | 0.50 |
| D | 0.95 | 1.075 | 1.00 |
| E | 0.55 | 0.675 | 0.60 |
| e | — | — | 0.35 |
| L1 | 0.20 | 0.30 | 0.25 |
| L2 | 0.20 | 0.30 | 0.25 |
| L3 | — | — | 0.40 |

All Dimensions in mm

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 1.1 |
| G1 | 0.3 |
| G2 | 0.2 |
| X | 0.7 |
| X1 | 0.25 |
| Y | 0.4 |
| C | 0.7 |

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