

OBSOLETE - PART DISCONTINUED

Product Summary (Typ. @ $V_{GS} = -4.5V$, $T_A = +25^\circ C$)

| BV_{DSS} | $R_{DS(ON)}$ | Q_g | Q_{gd} | I_D |
|------------|--------------|-------|----------|-------|
| -12V | 85m Ω | 3.7nC | 0.6nC | -2.6A |

Description

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

Applications

- Battery managements
- Load switches
- Battery protections

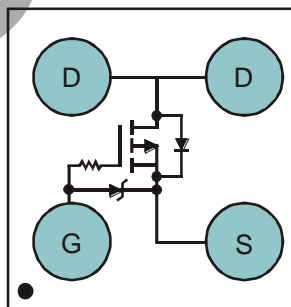
Features

- LD-MOS Technology with the Lowest Figure of Merit:
 - $R_{DS(ON)} = 85m\Omega$ to Minimize On-State Losses
 - $Q_g = 3.7nC$ for Ultra-Fast Switching
- $V_{GS(TH)} = -0.6V$ Typ. for a Low Turn-On Potential
- CSP with Footprint 1.0mm x 1.0mm
- Height = 0.62mm for Low Profile
- ESD = 3kV HBM Protection of Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: U-WLB1010-4
- Terminal Connections: See Diagram Below
- Weight: 0.005 grams (Approximate)

U-WLB1010-4



Top View
Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Package | Packing | |
|---------------|-------------|---------|-------------|
| | | Qty. | Carrier |
| DMP1096UCB4-7 | U-WLB1010-4 | 3000 | Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3).compliant.
 - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



1W = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: J = 2022)
M = Month (ex: 9 = September)



BW = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: J = 2022)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2010 | | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | X | | J | K | L | M | N | O | P | R | S | T |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|------------------|------------------------|------|
| Drain-Source Voltage | V _{DSS} | -12 | V |
| Gate-Source Voltage | V _{GSS} | -5 | V |
| Continuous Drain Current (Note 5) V _{GS} = -4.5V | I _D | T _A = +25°C | -2.6 |
| | | T _A = +70°C | -2.1 |
| Continuous Drain Current (Note 5) V _{GS} = -2.5V | I _D | T _A = +25°C | -2.4 |
| | | T _A = +70°C | -1.9 |
| Pulsed Drain Current (Note 6) | I _{DM} | -10 | A |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 0.82 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5) | R _{θJA} | 150 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Repetitive rating, pulse width limited by junction temperature.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|------|------|------|------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -12 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Gate-Source Breakdown Voltage | BV _{GSS} | -6.0 | — | — | V | V _{DS} = 0V, I _G = -250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | -1 | μA | V _{DS} = -9.6V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | -500 | nA | V _{GS} = -5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | -0.4 | -0.6 | -1.0 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 85 | 102 | mΩ | V _{GS} = -4.5V, I _D = -500mA |
| | | — | 97 | 116 | | V _{GS} = -2.5V, I _D = -500mA |
| | | — | 127 | 152 | | V _{GS} = -1.5V, I _D = -500mA |
| Forward Transfer Admittance | Y _{fs} | — | 4 | — | S | V _{DS} = -6V, I _D = -500mA |
| Diode Forward Voltage | V _{SD} | — | -0.6 | -1.0 | V | V _{GS} = 0V, I _S = -500mA |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 251 | — | pF | V _{DS} = -6V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 359 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 70 | — | | |
| Total Gate Charge | Q _g | — | 3.7 | — | nC | V _{GS} = -4.5V, V _{DS} = -6V I _D = -500mA |
| Gate-Source Charge | Q _{gs} | — | 0.4 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 0.6 | — | | |
| Gate Charge at V _{th} | Q _{g(th)} | — | 0.2 | — | | |
| Turn-On Delay Time | t _{D(ON)} | — | 17.6 | — | ns | V _{DS} = -6V, V _{GS} = -2.5V R _G = 20Ω, I _D = -500mA |
| Turn-On Rise Time | t _R | — | 26.9 | — | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 37.5 | — | | |
| Turn-Off Fall Time | t _F | — | 32.3 | — | | |

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

OBSOLETE

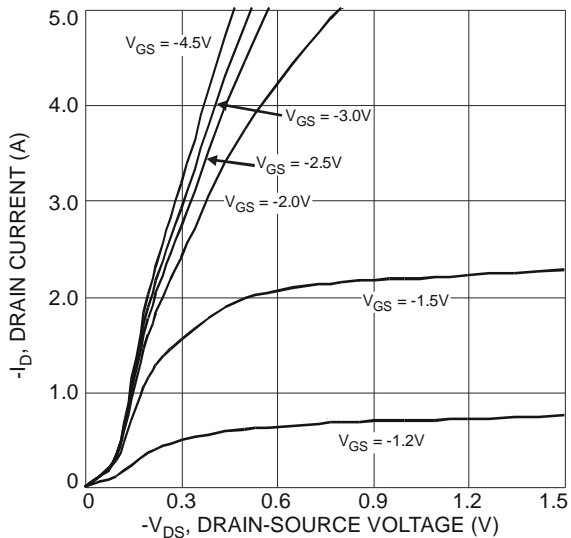


Fig. 1 Typical Output Characteristic

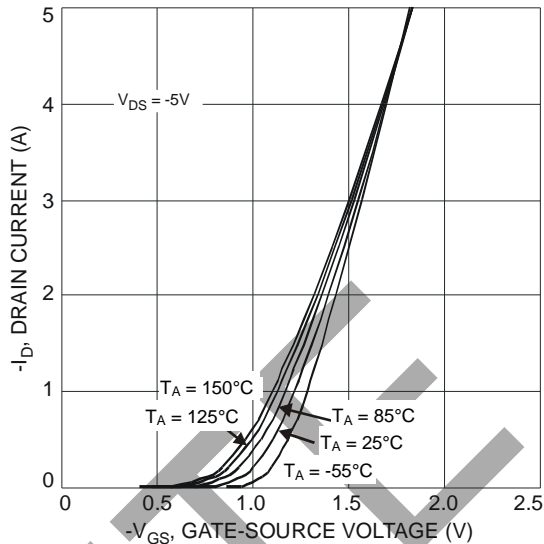


Fig. 2 Typical Transfer Characteristic

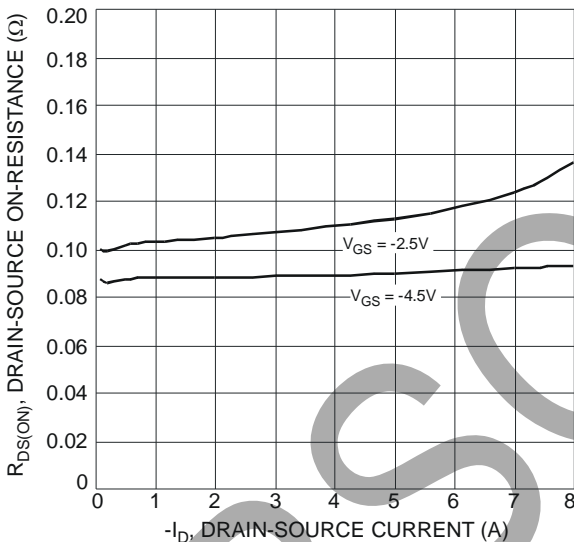


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

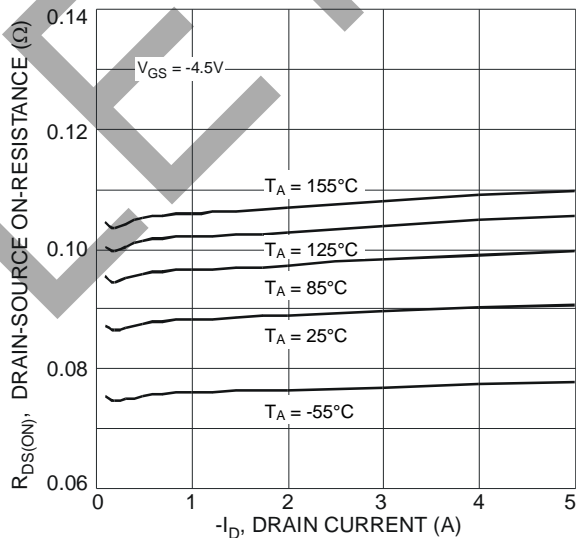


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

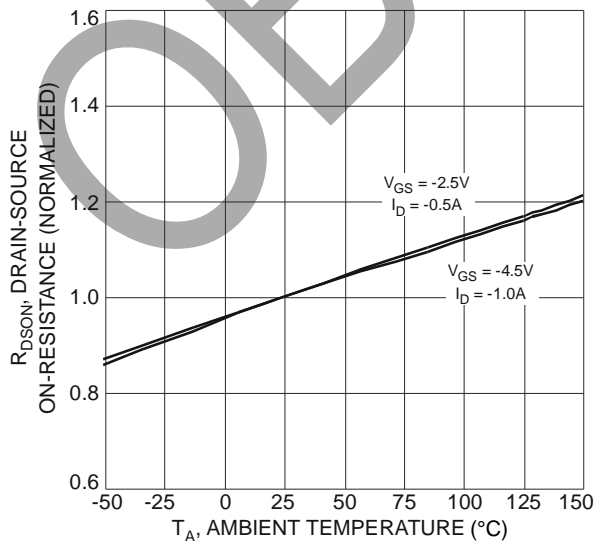


Fig. 5 On-Resistance Variation with Temperature

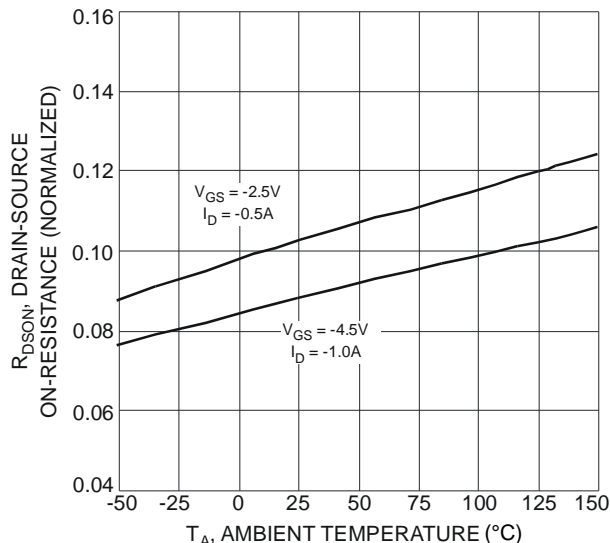


Fig. 6 On-Resistance Variation with Temperature

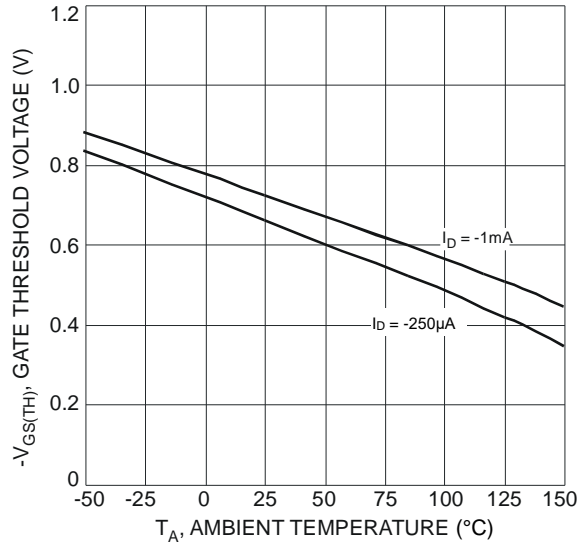


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

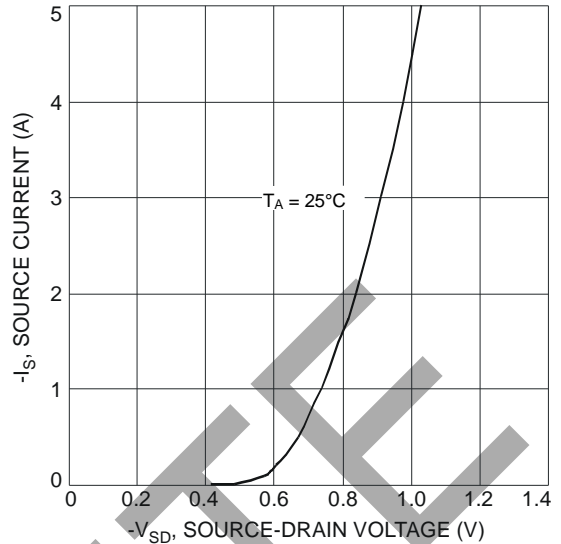


Fig. 8 Diode Forward Voltage vs. Current

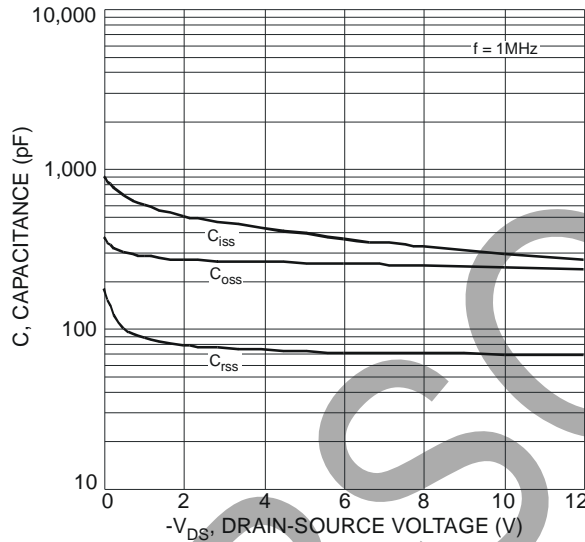


Fig. 9 Typical Total Capacitance

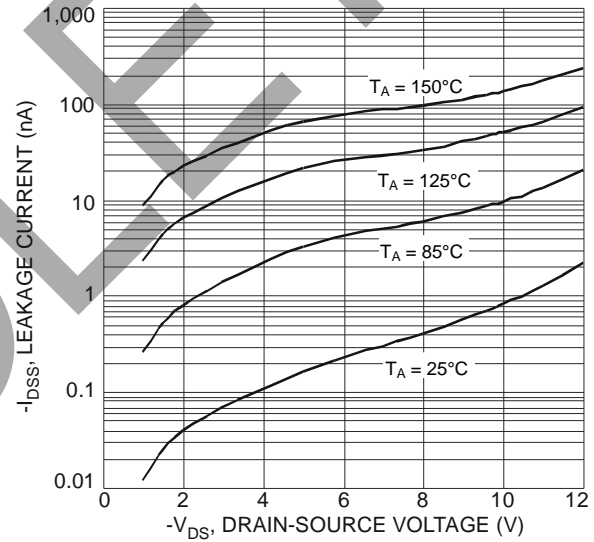


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

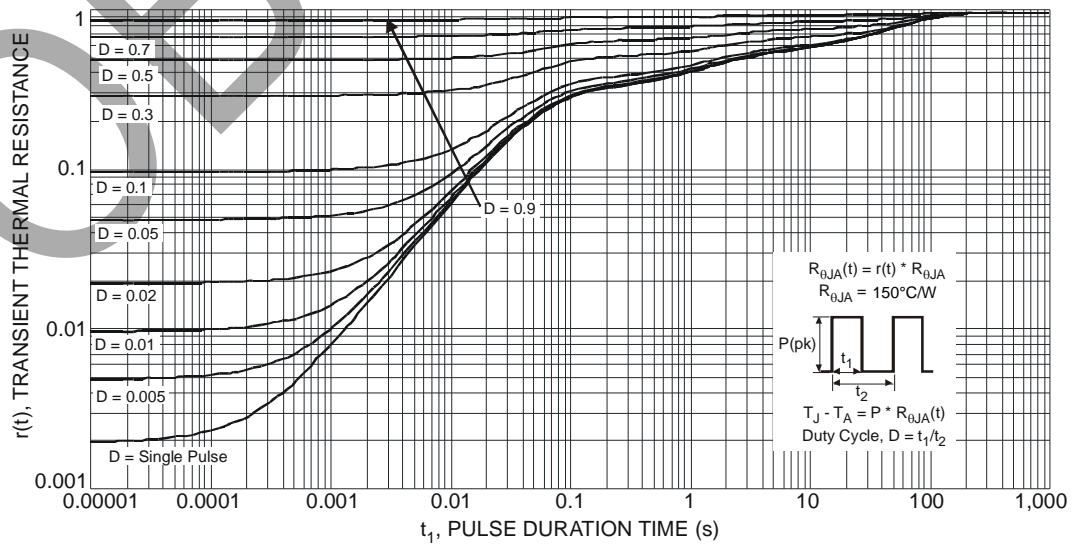
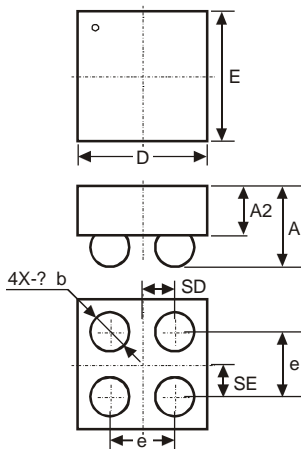


Fig. 11 Transient Thermal Response

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-WLB1010-4



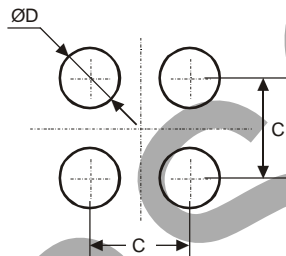
| U-WLB1010-4 | | | |
|-------------|------|------|------|
| Dim | Min | Max | Typ |
| D | 0.95 | 1.05 | 1.00 |
| E | 0.95 | 1.05 | 1.00 |
| A | - | 0.62 | - |
| A2 | - | - | 0.38 |
| b | 0.25 | 0.35 | 0.30 |
| e | - | - | 0.50 |
| SD | - | - | 0.25 |
| SE | - | - | 0.25 |

All Dimensions in mm

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-WLB1010-4



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.50 |
| D | 0.25 |

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