

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = +25^\circ C$ |
|---------------|-------------------------|------------------------------|
| -20V | 5.5Ω @ $V_{GS} = -4.5V$ | -200mA |
| | 7.5Ω @ $V_{GS} = -2.5V$ | -170mA |

Description

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

Applications

- DC-DC Converters
- Power Management Functions

Features

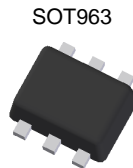
- Dual P-Channel MOSFET
- Low On-Resistance
 - 5.5Ω @ -4.5V
 - 7.5Ω @ -2.5V
 - 11.5Ω @ -1.8V
 - 17.5Ω @ -1.5V
- Very Low Gate Threshold Voltage $V_{GS(TH)} < 1.15V$
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

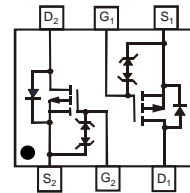
- Case: SOT963
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.0027 grams (Approximate)



ESD protected



Top View



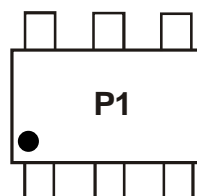
Internal Schematic

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|--------|--------------------|
| DMP210DUDJ-7 | SOT963 | 10,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. 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.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, see <http://www.diodes.com/products/packages.html>.

Marking Information (Note 5)



P1 = Product Type Marking Code

- Note: 5. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).

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

| Characteristic | Symbol | Value | Units |
|---|------------------|------------------------|-------|
| Drain-Source Voltage | V _{DSS} | -20 | V |
| Gate-Source Voltage | V _{GSS} | ±8 | V |
| Continuous Drain Current (Note 6) V _{GS} = -4.5V | I _D | T _A = +25°C | -200 |
| | | T _A = +70°C | -150 |
| Continuous Drain Current (Note 6) V _{GS} = -2.5V | I _D | T _A = +25°C | -170 |
| | | T _A = +70°C | -130 |
| Pulsed Drain Current | I _{DM} | -600 | mA |

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

| Characteristic | Symbol | Value | Units |
|--|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6) | P _D | 330 | mW |
| Thermal Resistance, Junction to Ambient (Note 6) | R _{θJA} | 377.16 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

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} | -20 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -100 | nA | V _{DS} = -16V, V _{GS} = 0V |
| | | — | — | -50 | nA | V _{DS} = -5.0V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±5.0V, V _{DS} = 0V |
| | | — | — | ±1 | μA | V _{GS} = ±8.0V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -0.45 | — | -1.15 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 5.5 | Ω | V _{GS} = -4.5V, I _D = -100mA |
| | | — | — | 7.5 | | V _{GS} = -2.5V, I _D = -50mA |
| | | — | — | 11.5 | | V _{GS} = -1.8V, I _D = -20mA |
| | | — | — | 17.5 | | V _{GS} = -1.5V, I _D = -10mA |
| | | — | 20 | — | | V _{GS} = -1.2V, I _D = -1mA |
| Forward Transfer Admittance | Y _{fs} | — | 200 | — | mS | V _{DS} = -10V, I _D = -0.2A |
| Diode Forward Voltage (Note 7) | V _{SD} | -0.5 | — | -1.2 | V | V _{GS} = 0V, I _S = -115mA |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 13.72 | 27.44 | pF | V _{DS} = -15V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 4.01 | 8.02 | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2.34 | 4.68 | pF | |
| SWITCHING CHARACTERISTICS (Note 8) | | | | | | |
| Turn-On Delay Time | t _{d(on)} | — | 7.7 | — | ns | V _{GS} = -4.5V, V _{DD} = -15V I _D = -180mA, R _G = 2.0Ω |
| Rise Time | t _r | — | 19.3 | — | | |
| Turn-Off Delay Time | t _{d(off)} | — | 25.9 | — | | |
| Fall Time | t _f | — | 31.5 | — | | |

- Notes:
6. Device mounted on 1" × 1" FR-4 substrate PCB, with minimum recommended pad layout, single sided.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.

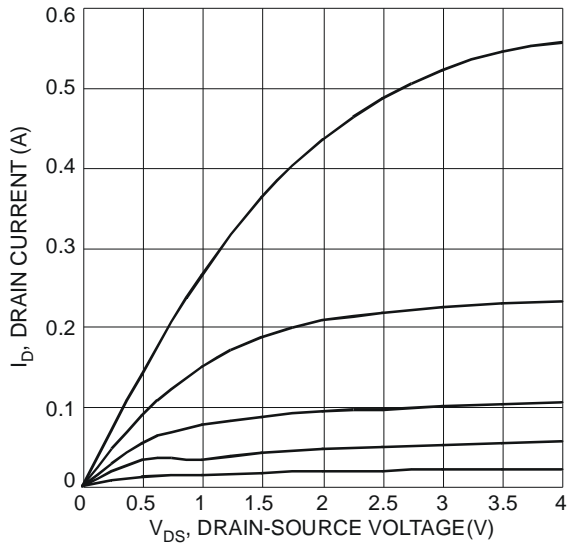


Fig. 1 Typical Output Characteristics

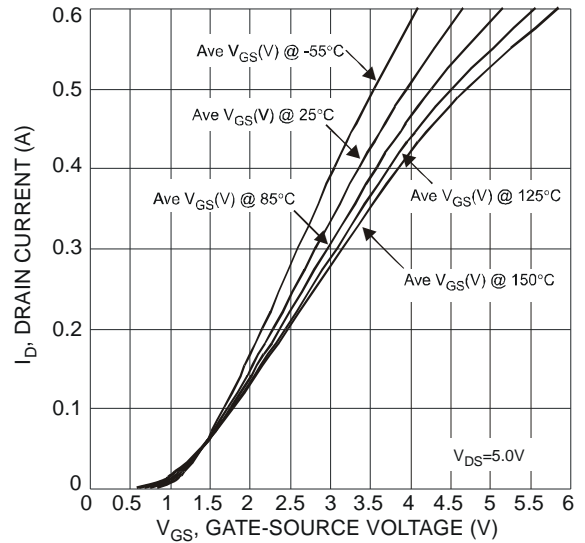


Fig. 2 Typical Transfer Characteristics

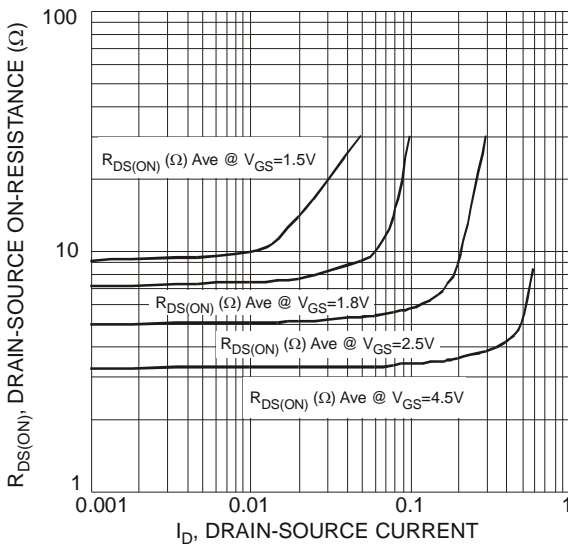


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

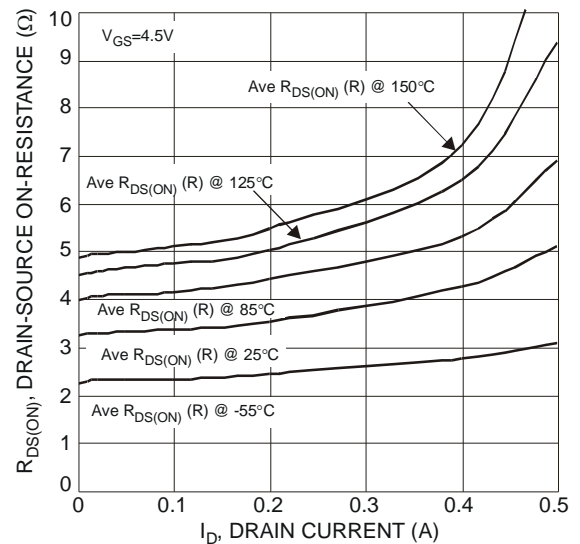


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

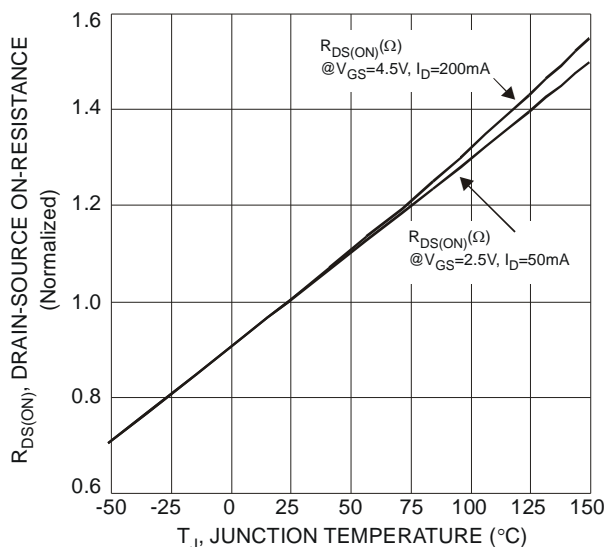


Fig. 5 On-Resistance Variation with Temperature

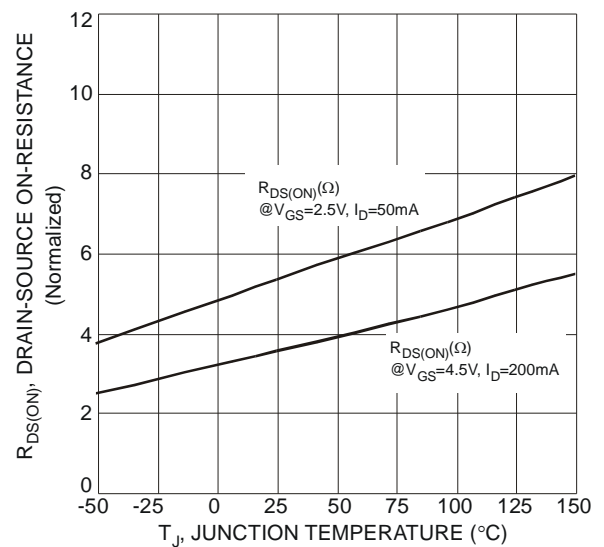


Fig. 6 On-Resistance vs. Temperature

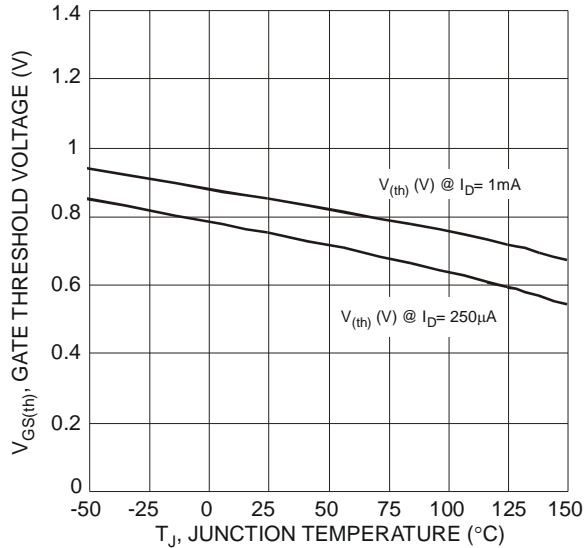


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

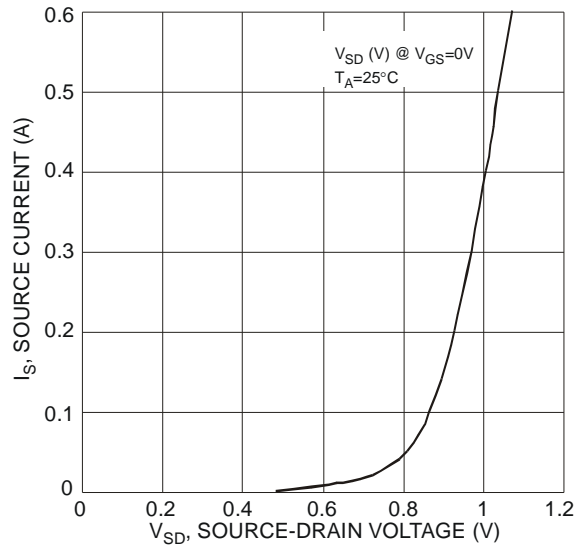


Fig. 8 Diode Forward Voltage vs. Current

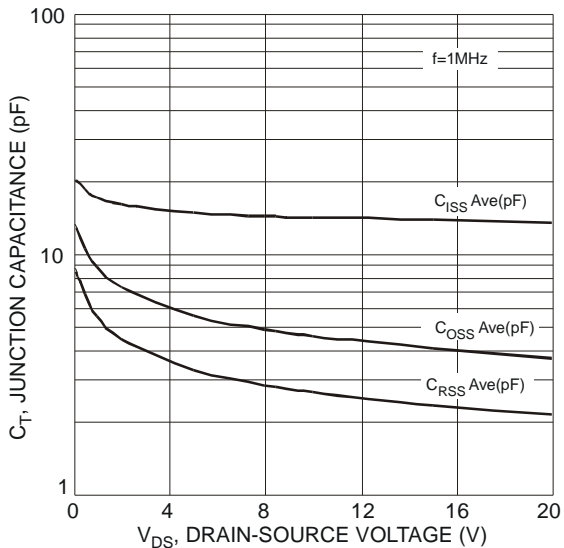


Fig. 9 Typical Junction Capacitance

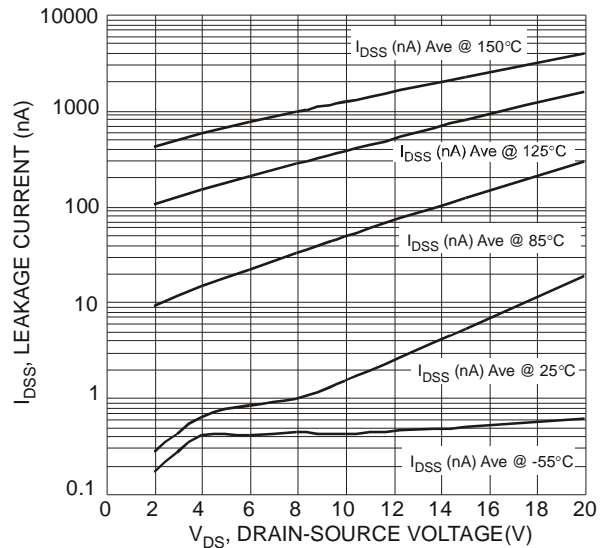


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

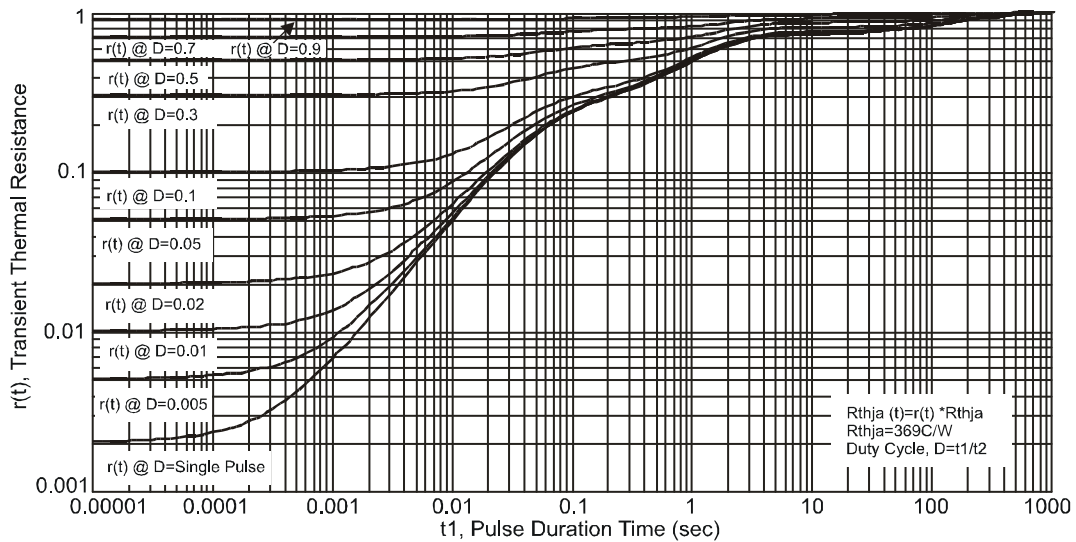
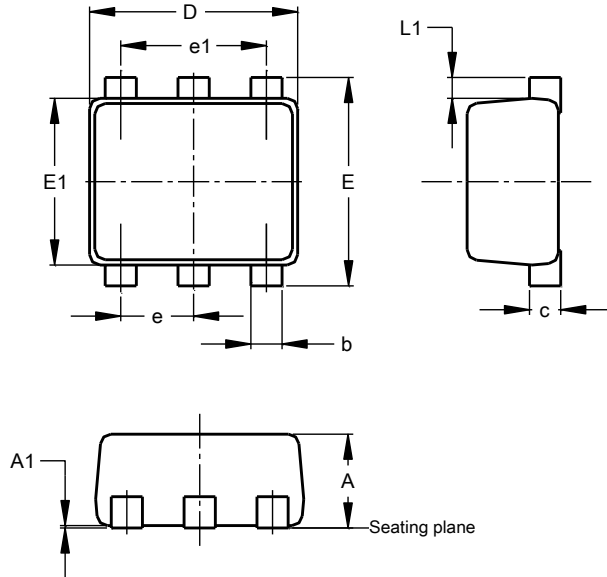


Fig. 11 Transient Thermal Resistance

Package Outline Dimensions

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

SOT963

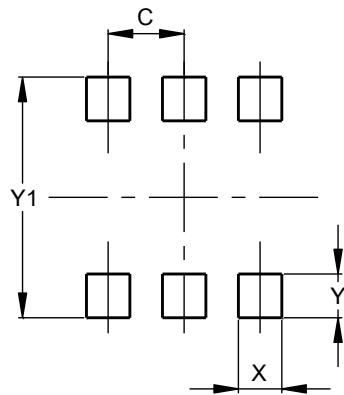


| SOT963 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.40 | 0.50 | 0.45 |
| A1 | 0.00 | 0.05 | — |
| b | 0.10 | 0.20 | 0.15 |
| c | 0.120 | 0.180 | 0.150 |
| D | 0.95 | 1.05 | 1.00 |
| E | 0.95 | 1.05 | 1.00 |
| E1 | 0.75 | 0.85 | 0.80 |
| e | — | — | 0.35 |
| e1 | — | — | 0.70 |
| L1 | 0.05 | 0.15 | 0.10 |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

SOT963



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.350 |
| X | 0.200 |
| Y | 0.200 |
| Y1 | 1.100 |

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