

30V COMPLEMENTARY ENHANCEMENT MODE MOSFET
Product Summary

| Device | $V_{(BR)DSS}$ | $R_{DS(ON) max}$ | Package | $I_{D MAX}$ $T_A = +25^{\circ}C$ |
|-----------|---------------|---------------------------------|---------|-------------------------------------|
| N-Channel | 30V | 20m Ω @ $V_{GS} = 10V$ | SO-8 | 8.5A |
| | | 32m Ω @ $V_{GS} = 4.5V$ | | 7.0A |
| P-Channel | -30V | 45m Ω @ $V_{GS} = -10V$ | | -5.5A |
| | | 85m Ω @ $V_{GS} = -4.5V$ | | -4.1A |

Description

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.

Applications

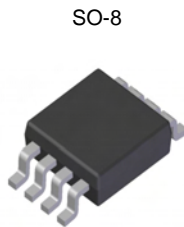
- DC Motor Control
- DC-AC Inverters

Features

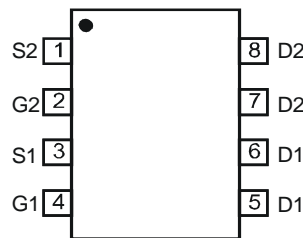
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

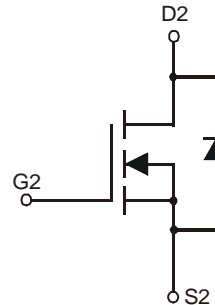
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.008 grams (approximate)



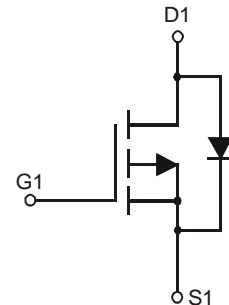
Top View



Pin Configuration



N-CHANNEL MOSFET



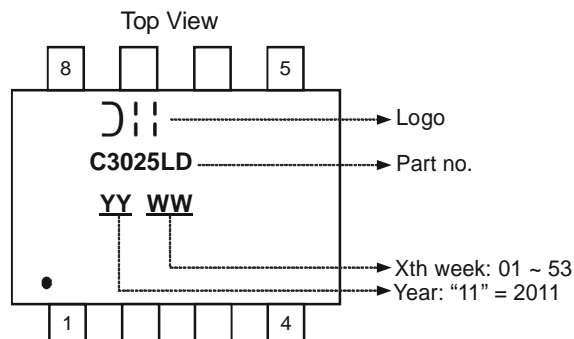
P-CHANNEL MOSFET

Equivalent Circuit

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|------|------------------|
| DMC3025LSD-13 | SO-8 | 2500/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See <http://www.diodes.com> 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, go to our website at <http://www.diodes.com>.

Marking Information


Maximum Ratings N-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|--|------------------|--|-----------|------------|-------|
| Drain-Source Voltage | | | V_{DSS} | 30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 6.5 5.1 | A |
| | $t < 10\text{s}$ | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 8.5 6.8 | A |
| Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 5.3 4.1 | A |
| | $t < 10\text{s}$ | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 7.0 5.5 | A |
| Maximum Continuous Body Diode Forward Current (Note 5) | | | I_S | 2 | A |
| Pulsed Drain Current (10 μs pulse, duty cycle = 1%) | | | I_{DM} | 60 | A |

Maximum Ratings P-CHANNEL (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|--|------------------|--|-----------|--------------|-------|
| Drain-Source Voltage | | | V_{DSS} | -30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 5) $V_{GS} = -10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | -4.2 -3.2 | A |
| | $t < 10\text{s}$ | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | -5.5 -4.3 | A |
| Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | -3.5 -2.3 | A |
| | $t < 10\text{s}$ | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | -4.1 -3.2 | A |
| Maximum Continuous Body Diode Forward Current (Note 5) | | | I_S | -2 | A |
| Pulsed Drain Current (10 μs pulse, duty cycle = 1%) | | | I_{DM} | -30 | A |

Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|--|---------------------------|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 6) | $T_A = +25^\circ\text{C}$ | P_D | 1.2 | W |
| | $T_A = +70^\circ\text{C}$ | | 0.77 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 104 | $^\circ\text{C/W}$ |
| | $t < 10\text{s}$ | | 62 | |
| Total Power Dissipation (Note 5) | $T_A = +25^\circ\text{C}$ | P_D | 1.5 | W |
| | $T_A = +70^\circ\text{C}$ | | 0.95 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | $R_{\theta JA}$ | 83 | $^\circ\text{C/W}$ |
| | $t < 10\text{s}$ | | 49 | |
| Thermal Resistance, Junction to Case (Note 5) | | $R_{\theta JC}$ | 15 | $^\circ\text{C}$ |
| Operating and Storage Temperature Range | | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Electrical Characteristics N-CHANNEL (@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} | 30 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | μA | V _{DS} = 30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±1 | μA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 2.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 15 | 20 | mΩ | V _{GS} = 10V, I _D = 7.4A |
| | | — | 23 | 32 | | V _{GS} = 4.5V, I _D = 6A |
| Forward Transfer Admittance | Y _{fs} | — | 8 | — | S | V _{DS} = 5V, I _D = 10A |
| Diode Forward Voltage | V _{SD} | — | 0.70 | 1.2 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 501 | — | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 72 | — | | |
| Reverse Transfer Capacitance | C _{rss} | — | 57 | — | | |
| Gate resistance | R _g | — | 1.84 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 4.6 | — | nC | V _{DS} = 15V, I _D = 10A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 9.8 | — | | |
| Gate-Source Charge | Q _{gs} | — | 1.6 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 2.0 | — | | |
| Turn-On Delay Time | t _{D(on)} | — | 3.9 | — | ns | V _{DD} = 15V, V _{GS} = 10V, R _G = 6Ω, I _D = 1A |
| Turn-On Rise Time | t _r | — | 4.2 | — | | |
| Turn-Off Delay Time | t _{D(off)} | — | 16.6 | — | | |
| Turn-Off Fall Time | t _f | — | 5.8 | — | | |
| Reverse Recovery Time | t _{rr} | — | 5.5 | — | ns | I _F = 12A, di/dt = 500A/μs |
| Reverse Recovery Charge | Q _{rr} | — | 2.6 | — | nC | |

Electrical Characteristics P-CHANNEL (@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} | -30 | — | — | V | V _{GS} = 0V, I _D = -250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1 | μA | V _{DS} = -30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -1.0 | — | -2.0 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 38 | 45 | mΩ | V _{GS} = -10V, I _D = -5.2A |
| | | — | 65 | 85 | | V _{GS} = -4.5V, I _D = -4A |
| Forward Transfer Admittance | Y _{fs} | — | 5 | — | S | V _{DS} = -5V, I _D = -5.2A |
| Diode Forward Voltage | V _{SD} | — | -0.7 | -1.2 | V | V _{GS} = 0V, I _S = -1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 590 | — | pF | V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 69 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 53 | — | pF | |
| Gate resistance | R _g | — | 11 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 5.1 | — | nC | V _{DS} = -15V, I _D = -6A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 10.5 | — | | |
| Gate-Source Charge | Q _{gs} | — | 1.8 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 1.9 | — | | |
| Turn-On Delay Time | t _{D(on)} | — | 6.8 | — | ns | V _{DD} = -15V, V _{GS} = -10V, R _G = 6Ω, I _D = -1A |
| Turn-On Rise Time | t _r | — | 4.9 | — | | |
| Turn-Off Delay Time | t _{D(off)} | — | 28.4 | — | | |
| Turn-Off Fall Time | t _f | — | 12.4 | — | | |
| Reverse Recovery Time | t _{rr} | — | 14 | — | ns | I _F = 12A, di/dt = 500A/μs |
| Reverse Recovery Charge | Q _{rr} | — | 11 | — | nC | |

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

N-CHANNEL

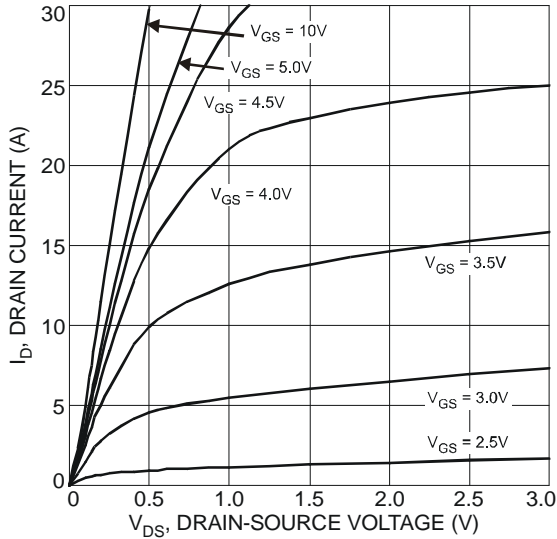


Figure 1. Typical Output Characteristic

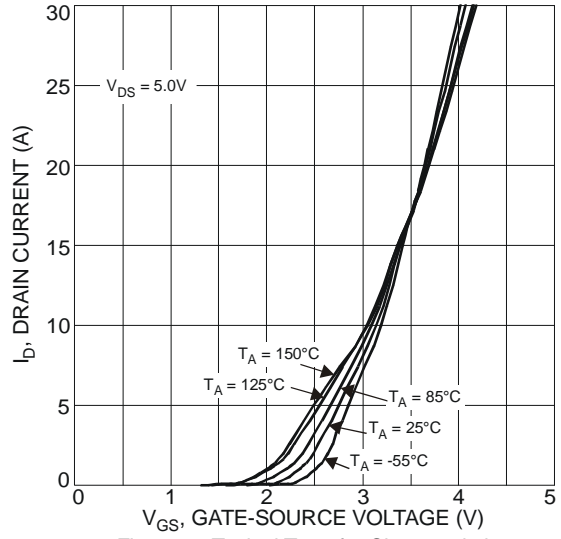


Figure 2. Typical Transfer Characteristics

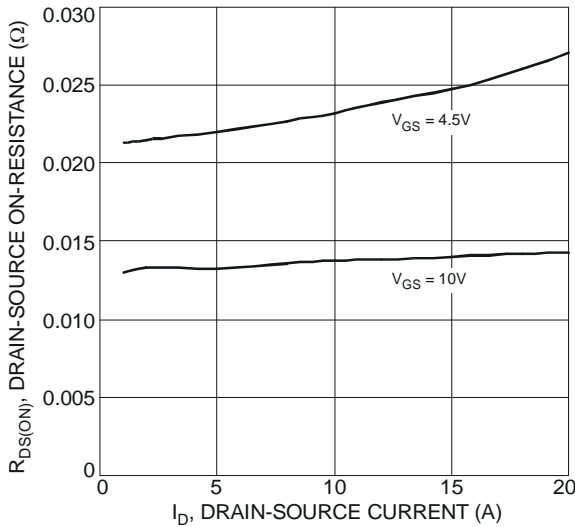


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

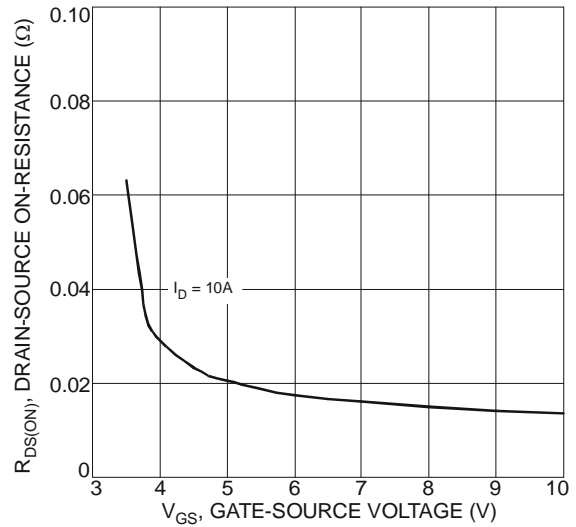


Figure 4. Typical On-Resistance vs. Drain Current and Gate Voltage

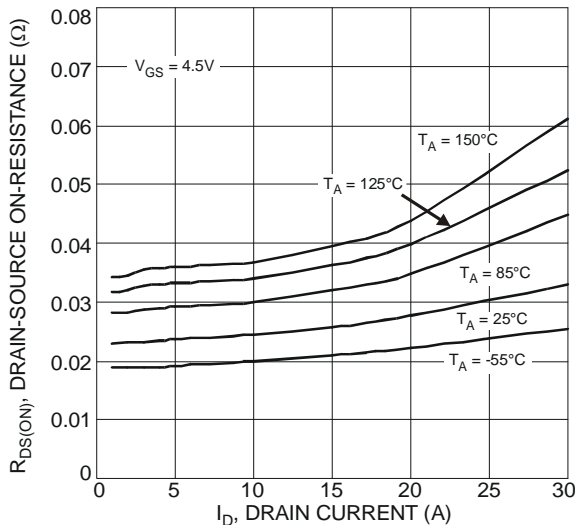


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

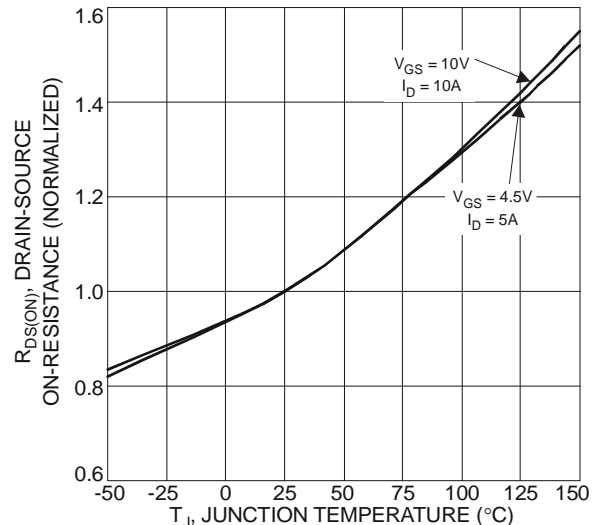


Figure 6. On-Resistance Variation with Temperature

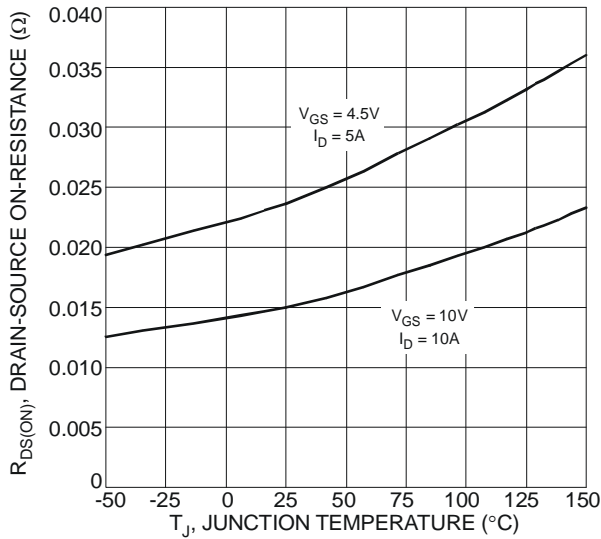


Figure 7. On-Resistance Variation with Temperature

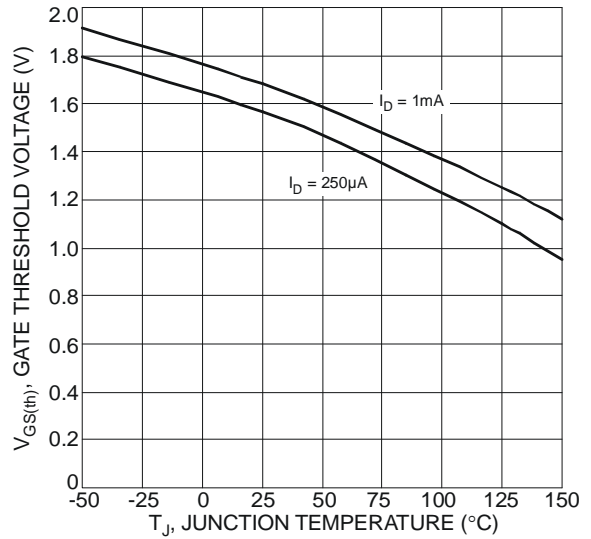


Figure 8 Gate Threshold Variation vs. Ambient Temperature

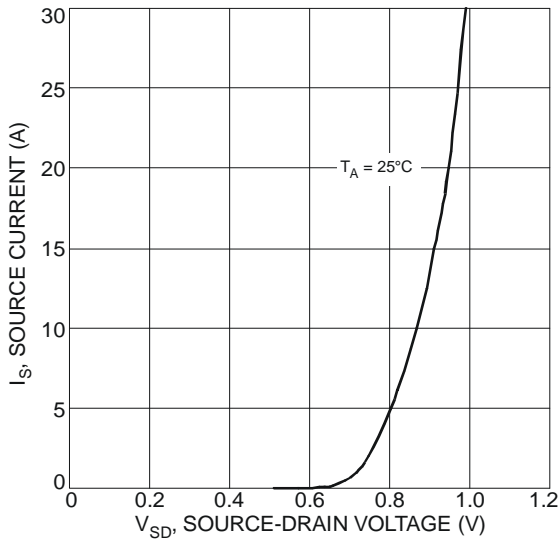


Figure 9. Diode Forward Voltage vs. Current

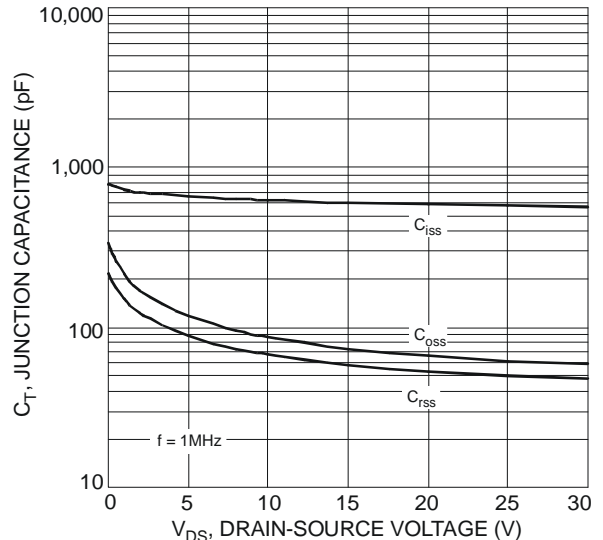


Figure 10. Typical Junction Capacitance

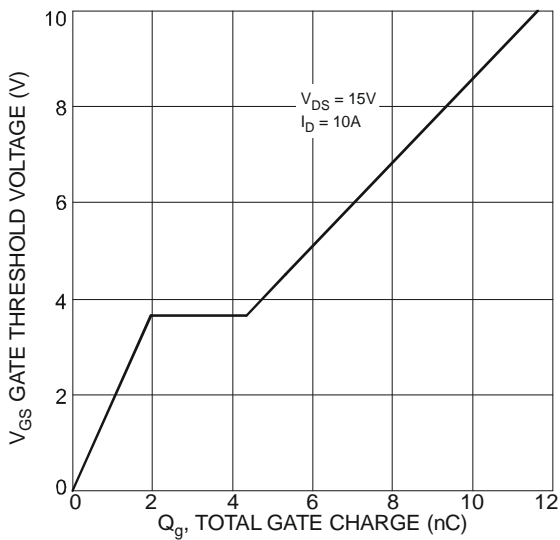


Figure 11. Gate Charge

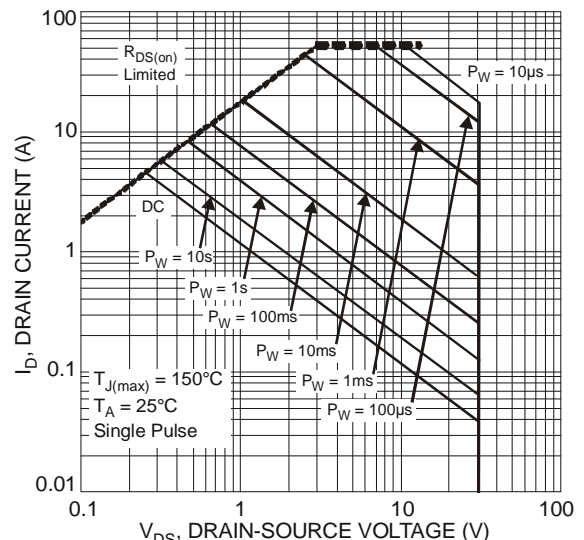


Figure 12. SOA, Safe Operation Area

P-CHANNEL

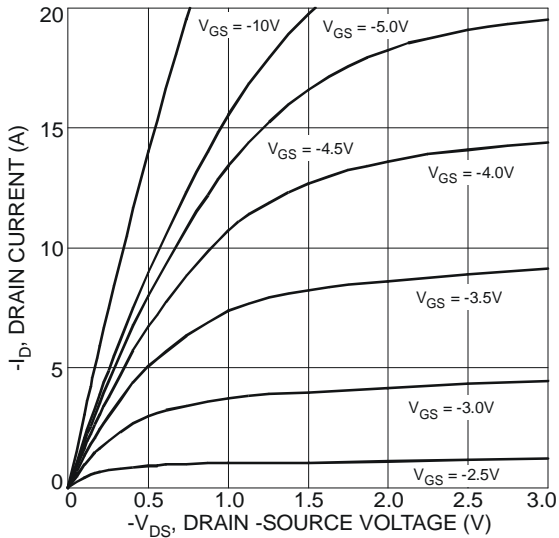


Figure 13. Typical Output Characteristics

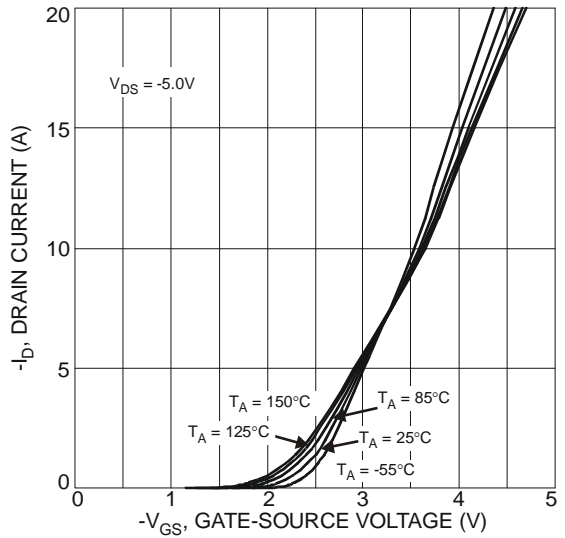


Figure 14. Typical Transfer Characteristics

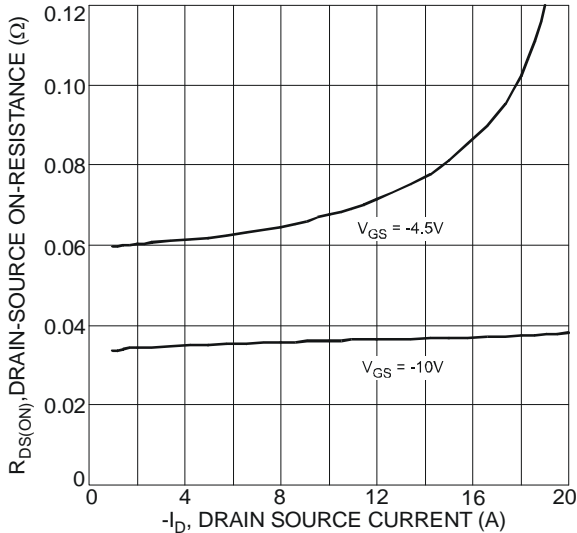


Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

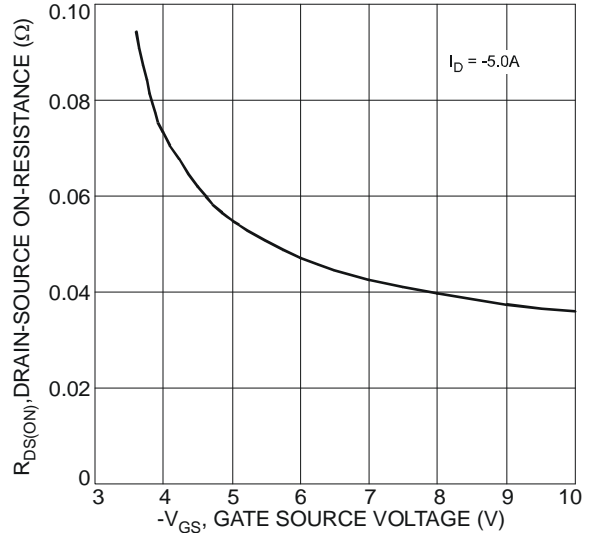


Figure 16. Typical On-Resistance vs. Drain Current and Gate Voltage

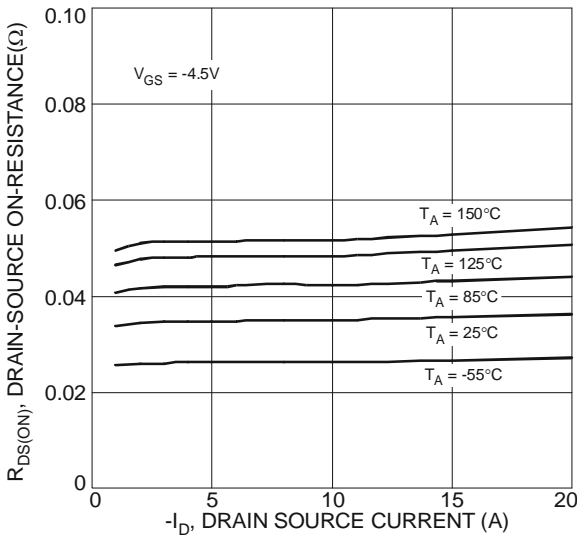


Figure 17. Typical On-Resistance vs. Drain Current and Temperature

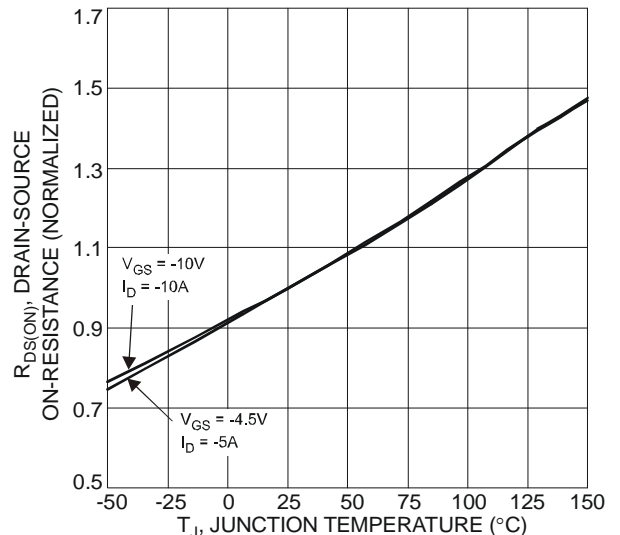


Figure 18. On-Resistance Variation with Temperature

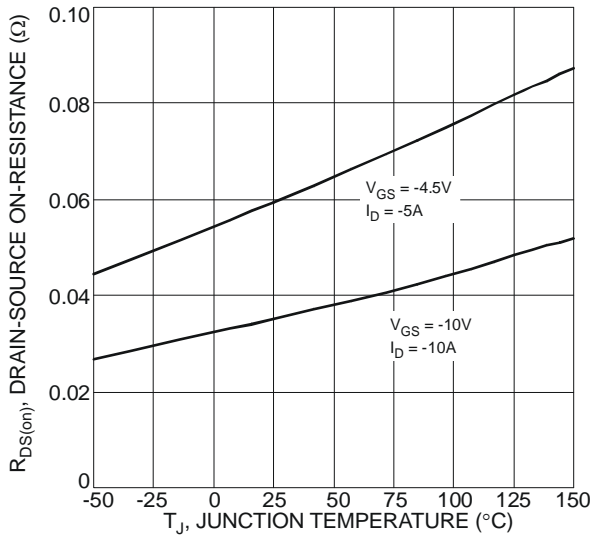


Figure 19. On-Resistance Variation with Temperature

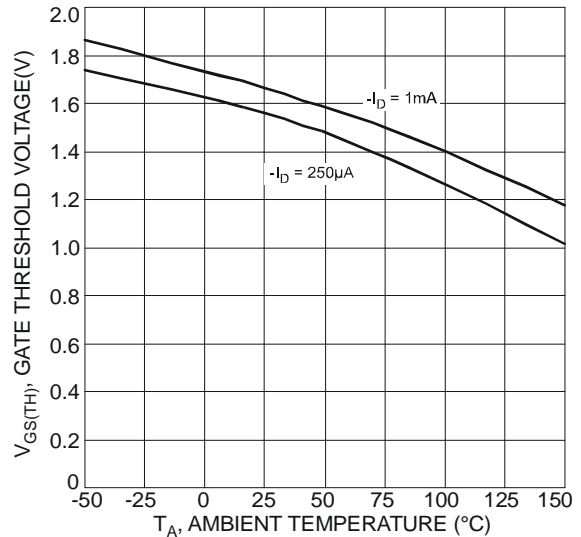


Figure 20. Gate Threshold Variation vs. Ambient Temperature

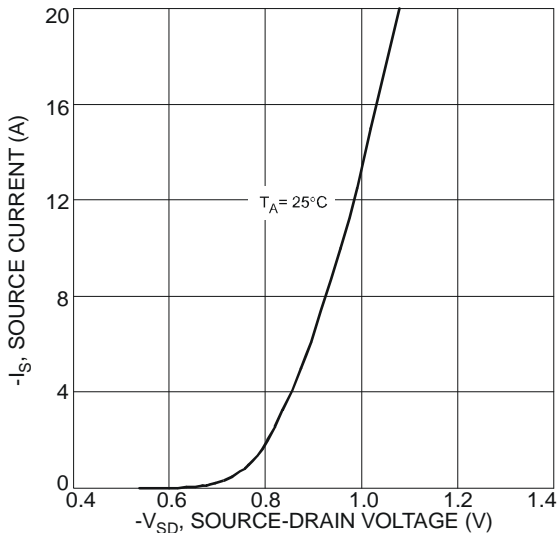


Figure 21. Diode Forward Voltage vs. Current

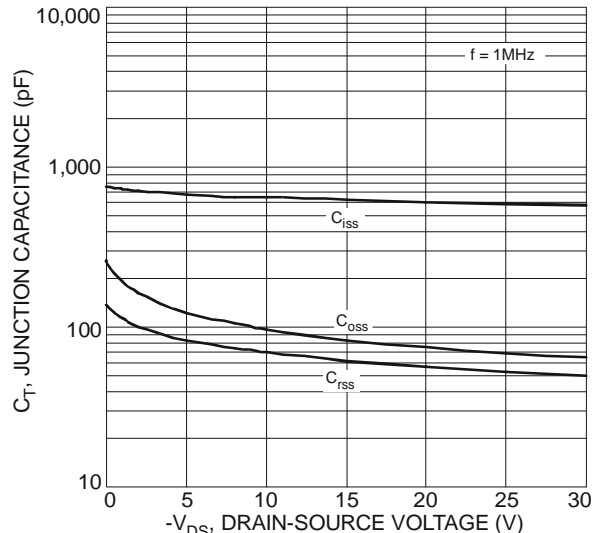


Figure 22. Typical Junction Capacitance

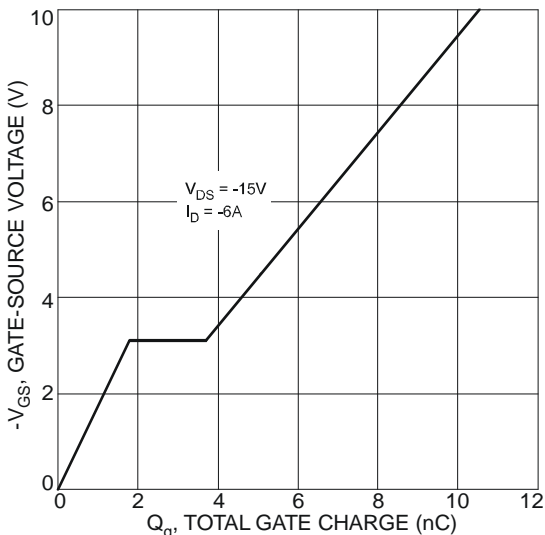


Figure 23. Gate-Charge Characteristics

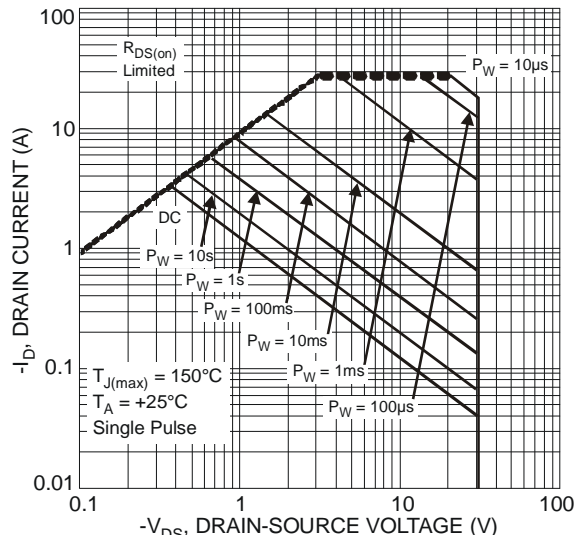
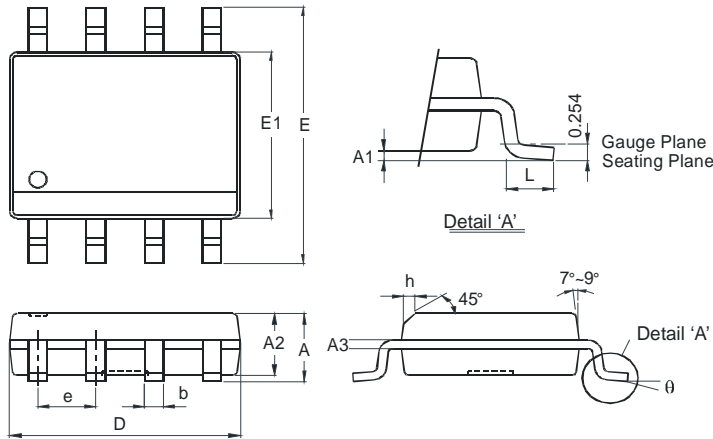


Figure 24. SOA, Safe Operation Area

Package Outline Dimensions

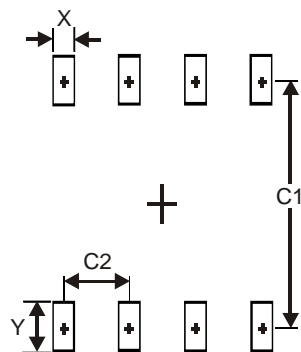
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SO-8 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | - | 1.75 |
| A1 | 0.10 | 0.20 |
| A2 | 1.30 | 1.50 |
| A3 | 0.15 | 0.25 |
| b | 0.3 | 0.5 |
| D | 4.85 | 4.95 |
| E | 5.90 | 6.10 |
| E1 | 3.85 | 3.95 |
| e | 1.27 Typ | |
| h | - | 0.35 |
| L | 0.62 | 0.82 |
| θ | 0° | 8° |
| All Dimensions in mm | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| X | 0.60 |
| Y | 1.55 |
| C1 | 5.4 |
| C2 | 1.27 |

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- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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