

20V COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

| Device | V _{(BR)DSS} | R _{DS(on)} max | I _D max T _A = 25°C (Notes 4) |
|--------|----------------------|--------------------------------|--|
| Q1 | 20V | 0.4Ω @ V _{GS} = 4.5V | 1.34 A |
| | | 0.5Ω @ V _{GS} = 2.5V | 1.65 A |
| Q2 | -20V | 0.7Ω @ V _{GS} = -4.5V | -1.14 A |
| | | 0.9Ω @ V _{GS} = -2.5V | -0.94 A |

Mechanical Data

- Case: SOT26
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.015 grams (approximate)

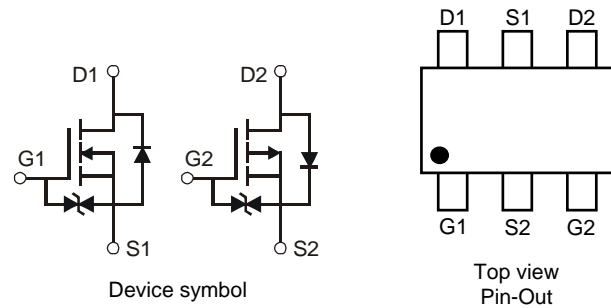
Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage V_{GS(th)} < 1V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- Ultra-Small Surface Mount Package
- **ESD Protected Gate to 2.5kV HBM**
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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

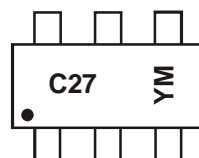


Ordering Information (Note 3)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|---------|--------------------|-----------------|-------------------|
| DMC2700UDM-7 | C27 | 7 | 8 | 3,000 |

- 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



C27 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: W = 2009)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | | | | | |
|-------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|
| Code | W | X | Y | Z | A | B | C | | | | | |
| 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 N-CHANNEL – Q₁ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------|------------------|-----------------------|------|
| Drain Source Voltage | V _{DSS} | 20 | V |
| Gate-Source Voltage | V _{GSS} | ±6 | V |
| Drain Current (Note 4) | I _D | T _A = 25°C | 1.34 |
| | | T _A = 85°C | 0.97 |

Maximum Ratings P-CHANNEL – Q₂ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|------------------------|------------------|-----------------------|-------|
| Drain Source Voltage | V _{DSS} | -20 | V |
| Gate-Source Voltage | V _{GSS} | ±6 | V |
| Drain Current (Note 4) | I _D | T _A = 25°C | -1.14 |
| | | T _A = 85°C | -1.07 |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 4) | P _D | 1.12 | W |
| Thermal Resistance, Junction to Ambient (Note 4) | R _{θJA} | 111 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Notes: 4. For a device mounted on 25mm X 25mm FR-4 PCB board with a high coverage of single sided 1oz copper, in still air conditions with two active die

Electrical Characteristics N-CHANNEL – Q₁ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|---------------------|-----|-------------------|-------------------|------|--|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| 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} = 20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ± 1.0 | μA | V _{GS} = ±4.5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | — | 1.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 0.3 0.4 0.5 | 0.4 0.5 0.7 | Ω | V _{GS} = 4.5V, I _D = 600mA V _{GS} = 2.5V, I _D = 500mA V _{GS} = 1.8V, I _D = 350mA |
| Forward Transfer Admittance | Y _{fs} | — | 1.4 | — | S | V _{DS} = 10V, I _D = 400mA |
| Diode Forward Voltage (Note 5) | V _{SD} | — | 0.7 | 1.2 | V | V _{GS} = 0V, I _S = 150mA |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | — | 60.67 | — | pF | V _{DS} = 16V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 9.68 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 5.37 | — | pF | |
| Total Gate Charge | Q _g | — | 736.6 | — | pC | V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA |
| Gate-Source Charge | Q _{gs} | — | 93.6 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 116.6 | — | | |
| Turn-On Delay Time | t _{d(on)} | — | 5.1 | — | ns | V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA |
| Turn-On Rise Time | t _r | — | 7.4 | — | | |
| Turn-Off Delay Time | t _{d(off)} | — | 26.7 | — | | |
| Turn-Off Fall Time | t _f | — | 12.3 | — | | |

Electrical Characteristics P-CHANNEL – Q₂ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-------------------------------------|---------------------|------|-------------------|-------------------|------|--|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| 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} = -20V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ± 1.0 | μA | V _{GS} = ±4.5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -0.5 | — | -1.0 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 0.5 0.7 1.0 | 0.7 0.9 1.3 | Ω | V _{GS} = -4.5V, I _D = -430mA V _{GS} = -2.5V, I _D = -300mA V _{GS} = -1.8V, I _D = -150mA |
| Forward Transfer Admittance | Y _{fs} | — | -0.9 | — | S | V _{DS} = 10V, I _D = -250mA |
| Diode Forward Voltage (Note 5) | V _{SD} | — | -0.8 | -1.2 | V | V _{GS} = 0V, I _S = -150mA |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C _{iss} | — | 59.76 | — | pF | V _{DS} = -16V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 12.07 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 6.36 | — | pF | |
| Total Gate Charge | Q _g | — | 622.4 | — | pC | V _{GS} = -4.5V, V _{DS} = -10V, I _D = -250mA |
| Gate-Source Charge | Q _{gs} | — | 100.3 | — | | |
| Gate-Drain Charge | Q _{gd} | — | 132.2 | — | | |
| Turn-On Delay Time | t _{d(on)} | — | 5.1 | — | ns | V _{DD} = -10V, V _{GS} = -4.5V, R _L = 47Ω, R _G = 10Ω, I _D = -200mA |
| Turn-On Rise Time | t _r | — | 8.1 | — | | |
| Turn-Off Delay Time | t _{d(off)} | — | 28.4 | — | | |
| Turn-Off Fall Time | t _f | — | 20.7 | — | | |

Notes: 5. Short duration pulse test used to minimize self-heating effect.

N-CHANNEL – Q₁

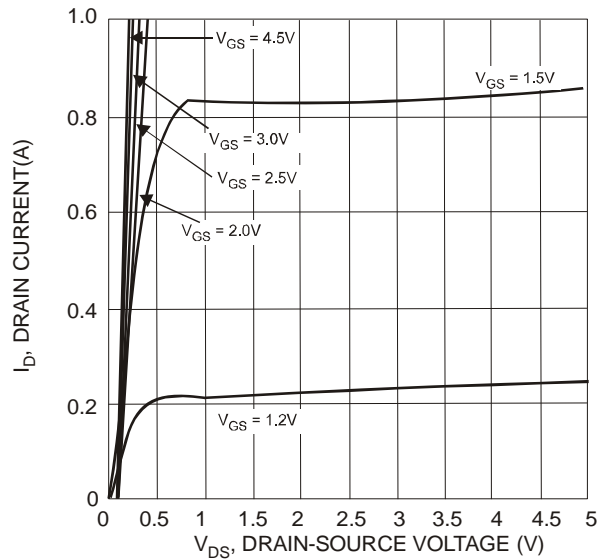


Fig. 1 Typical Output Characteristics

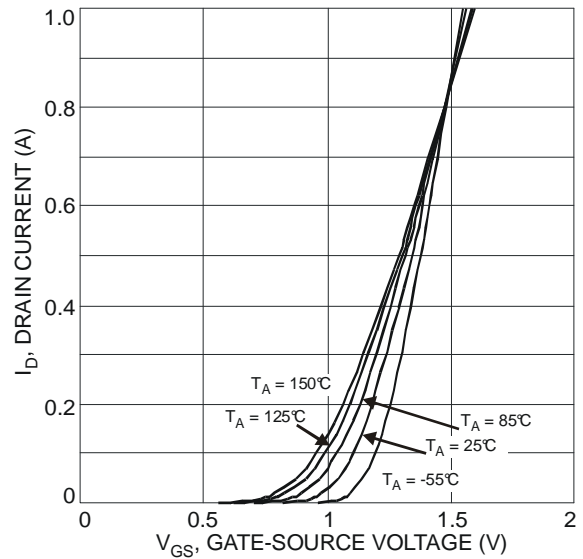


Fig. 2 Typical Transfer Characteristic

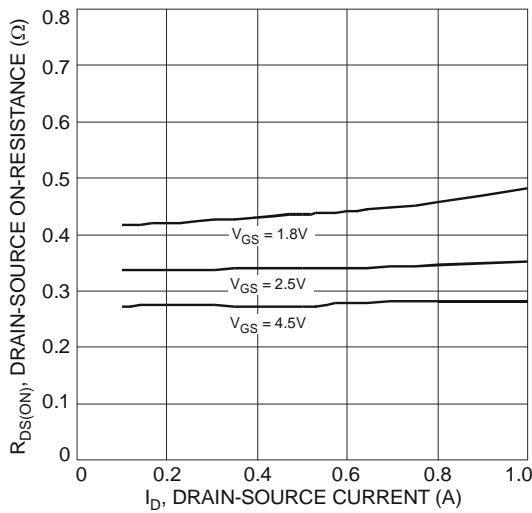


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

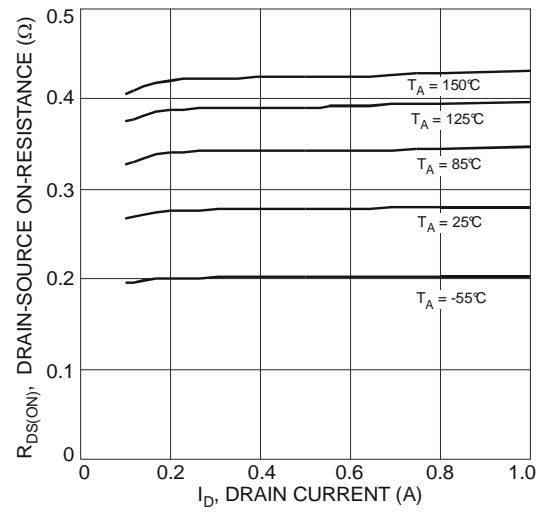


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

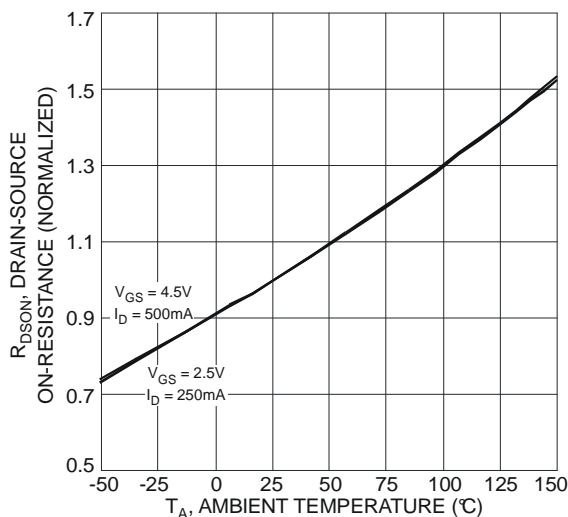


Fig. 5 On-Resistance Variation with Temperature

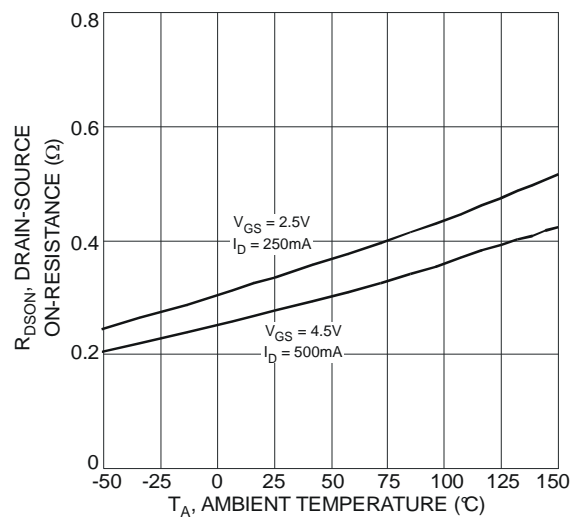


Fig. 6 On-Resistance Variation with Temperature

N-CHANNEL – Q₁ (continued)

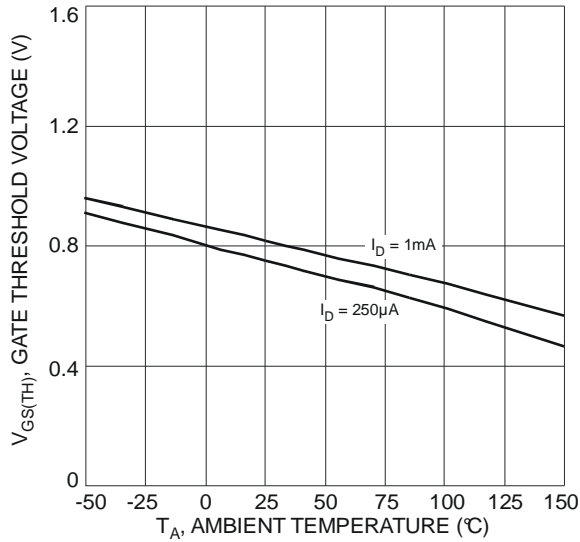


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

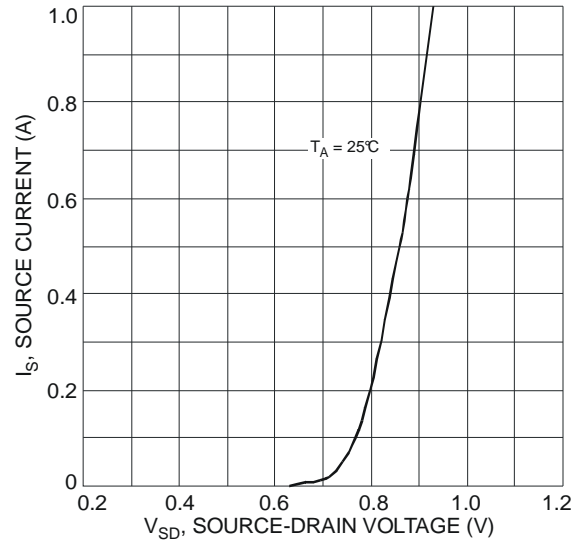


Fig. 8 Diode Forward Voltage vs. Current

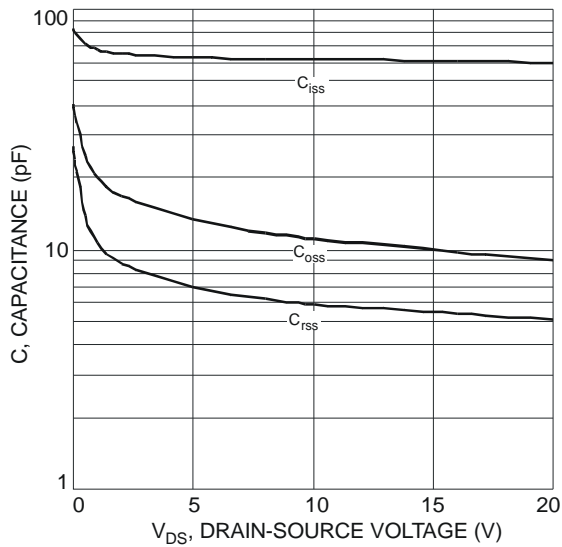


Fig. 9 Typical Total Capacitance

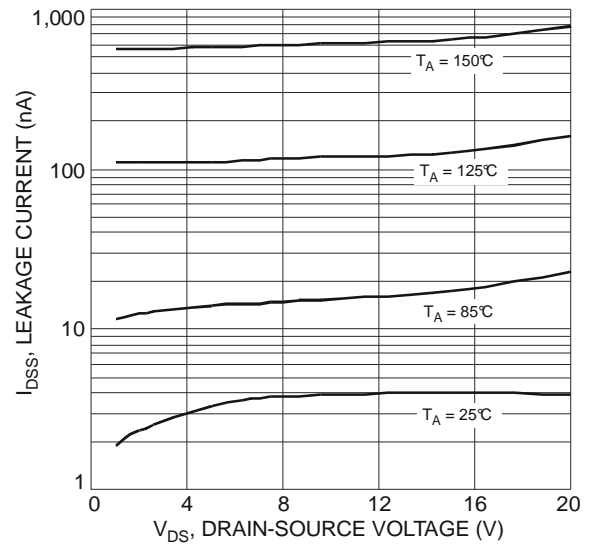


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

P-CHANNEL – Q₂

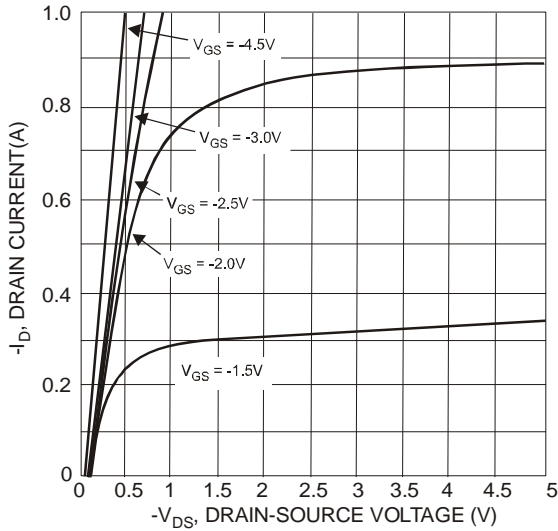


Fig. 11 Typical Output Characteristics

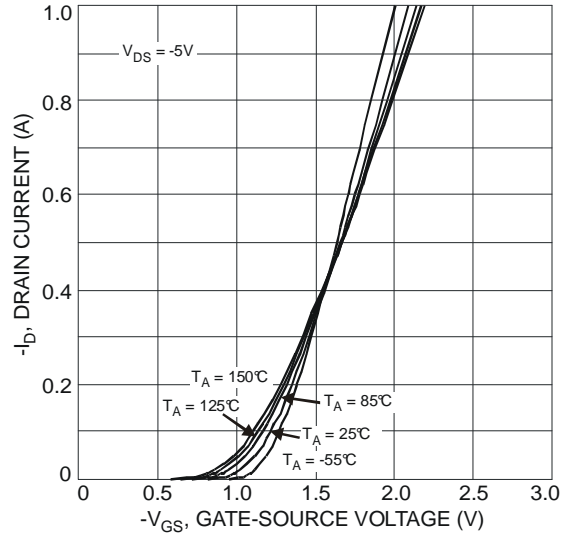


Fig. 12 Typical Transfer Characteristic

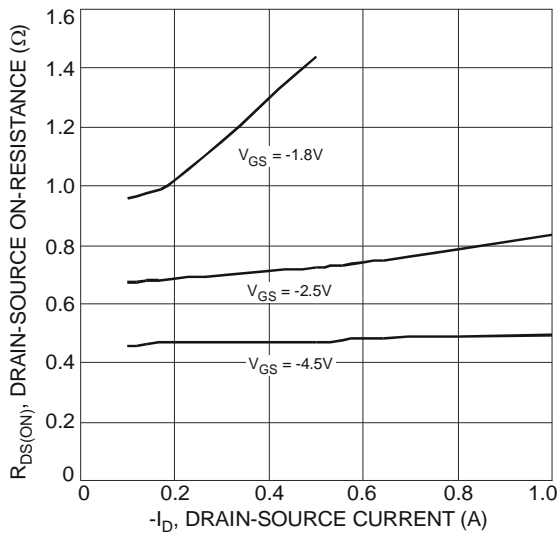


Fig. 13 Typical On-Resistance vs. Drain Current and Gate Voltage

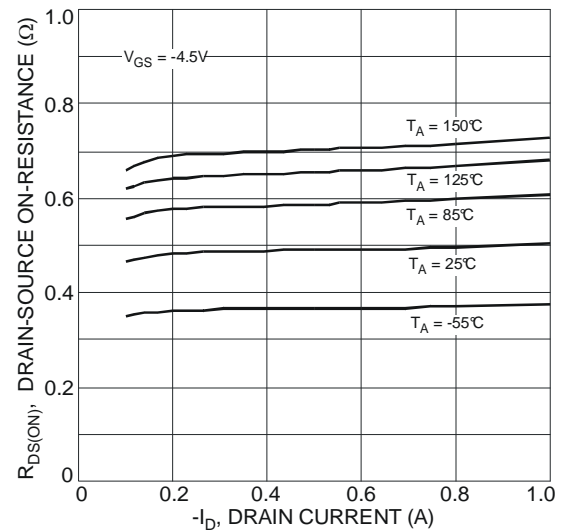


Fig. 14 Typical On-Resistance vs. Drain Current and Temperature

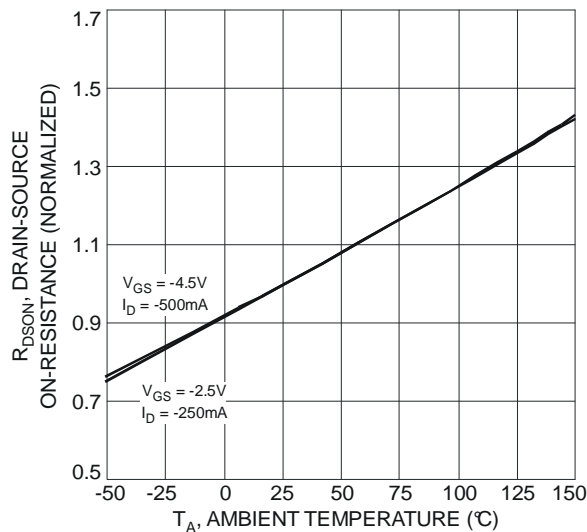


Fig. 15 On-Resistance Variation with Temperature

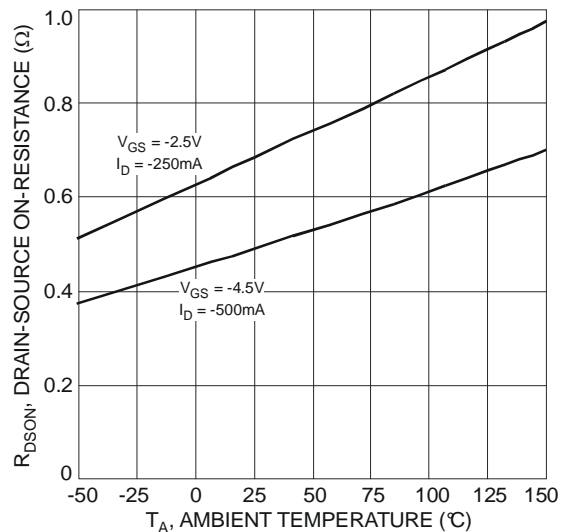


Fig. 16 On-Resistance Variation with Temperature

P-CHANNEL – Q₂ (continued)

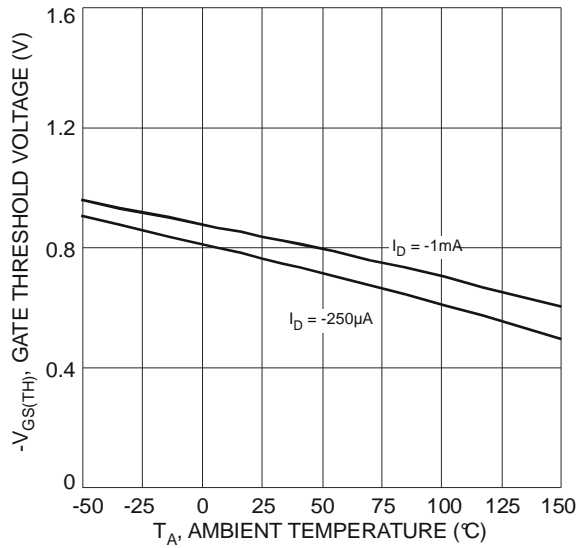


Fig. 17 Gate Threshold Variation vs. Ambient Temperature

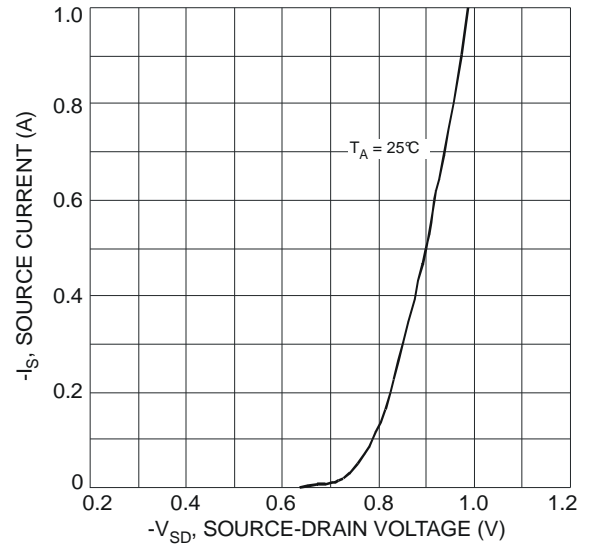


Fig. 18 Diode Forward Voltage vs. Current

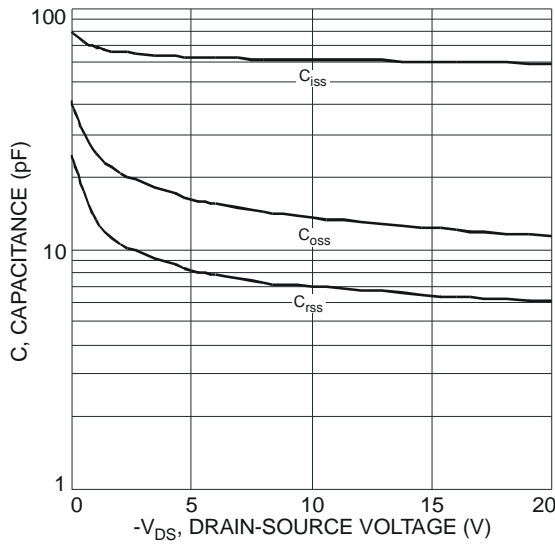


Fig. 19 Typical Total Capacitance

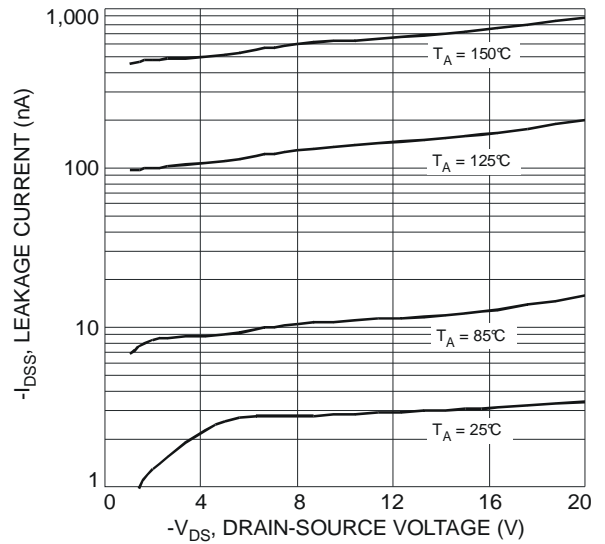
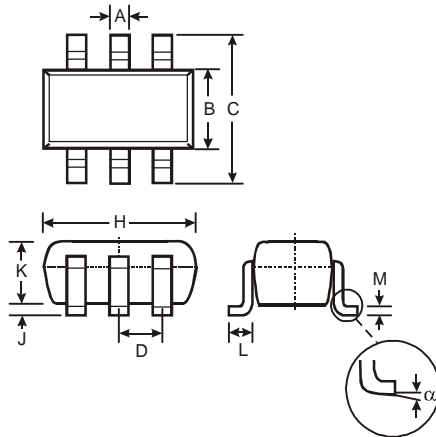


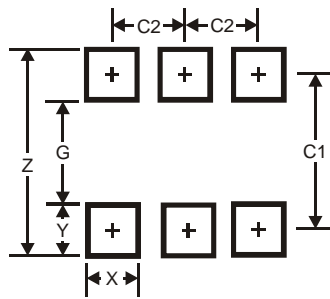
Fig. 20 Typical Leakage Current vs. Drain-Source Voltage

Package Outline Dimensions



| SOT26 | | | |
|----------------------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 0.35 | 0.50 | 0.38 |
| B | 1.50 | 1.70 | 1.60 |
| C | 2.70 | 3.00 | 2.80 |
| D | — | — | 0.95 |
| H | 2.90 | 3.10 | 3.00 |
| J | 0.013 | 0.10 | 0.05 |
| K | 1.00 | 1.30 | 1.10 |
| L | 0.35 | 0.55 | 0.40 |
| M | 0.10 | 0.20 | 0.15 |
| α | 0° | 8° | — |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 3.20 |
| G | 1.60 |
| X | 0.55 |
| Y | 0.80 |
| C1 | 2.40 |
| C2 | 0.95 |

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