

## Product Summary

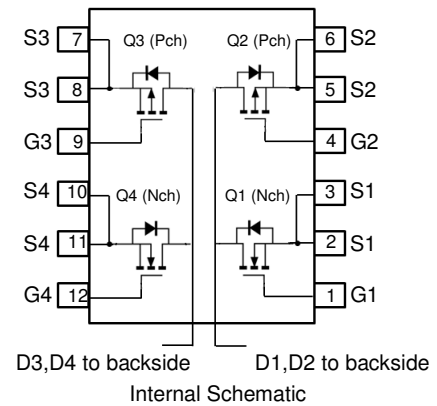
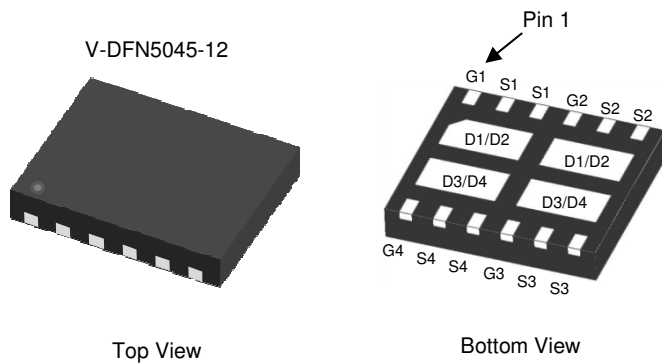
| Device  | V <sub>(BR)DSS</sub> | R <sub>DS(ON)MAX</sub>          | I <sub>D</sub><br>T <sub>A</sub> = +25°C |
|---------|----------------------|---------------------------------|------------------------------------------|
| Q1 & Q4 | 100V                 | 160mΩ @ V <sub>GS</sub> = 10V   | 2.9A                                     |
|         |                      | 200mΩ @ V <sub>GS</sub> = 4.5V  | 2.6A                                     |
| Q2 & Q3 | -100V                | 250mΩ @ V <sub>GS</sub> = -10V  | -2.3A                                    |
|         |                      | 300mΩ @ V <sub>GS</sub> = -4.5V | -2.1A                                    |

## Description

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

## Applications

- High-Efficiency Bridge Rectifiers

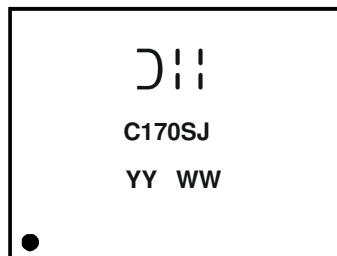


## Ordering Information (Note 4)

| Part Number      | Case         | Tape Width | Packaging         |
|------------------|--------------|------------|-------------------|
| DMHC10H170SFJ-13 | V-DFN5045-12 | 12mm       | 3,000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

## Marking Information



DII = Manufacturer's Marking  
 C170SJ = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 14 = 2014)  
 WW = Week Code (01 to 53)

**Maximum Ratings Q1 & Q4 N-Channel** (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                                          |                 |                        | Symbol           | Value | Unit |
|---------------------------------------------------------|-----------------|------------------------|------------------|-------|------|
| Drain-Source Voltage                                    |                 |                        | V <sub>DSS</sub> | 100   | V    |
| Gate-Source Voltage                                     |                 |                        | V <sub>GSS</sub> | ±20   | V    |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V | Steady<br>State | T <sub>C</sub> = +25°C | I <sub>D</sub>   | 9.3   | A    |
|                                                         |                 | T <sub>A</sub> = +25°C |                  | 2.9   |      |
| Maximum Body Diode Forward Current (Note 5)             |                 |                        | I <sub>S</sub>   | 2.5   | A    |
| Pulsed Drain Current (10μs pulse, Duty Cycle = 1%)      |                 |                        | I <sub>DM</sub>  | 10.1  | A    |

**Maximum Ratings Q2 & Q3 P-Channel** (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                                           |                 |                         | Symbol           | Value | Unit |  |
|----------------------------------------------------------|-----------------|-------------------------|------------------|-------|------|--|
| Drain-Source Voltage                                     |                 |                         | V <sub>DSS</sub> | -100  | V    |  |
| Gate-Source Voltage                                      |                 |                         | V <sub>GSS</sub> | ±20   | V    |  |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = -10V | Steady<br>State | T <sub>C</sub> = +25 °C | I <sub>D</sub>   | -7.4  | A    |  |
|                                                          |                 | T <sub>A</sub> = +25 °C |                  | -2.3  |      |  |
| Maximum Body Diode Forward Current (Note 5)              |                 |                         | I <sub>S</sub>   | -2.4  | A    |  |
| Pulsed Drain Current (10μs pulse, Duty Cycle = 1%)       |                 |                         | I <sub>DM</sub>  | -9.1  | A    |  |

**Thermal Characteristics** (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                                   |                         | Symbol                            | Value       | Unit |
|--------------------------------------------------|-------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)                 | T <sub>C</sub> = +25 °C | P <sub>D</sub>                    | 20          | W    |
|                                                  | T <sub>A</sub> = +25 °C |                                   | 2.1         |      |
| Thermal Resistance, Junction to Ambient (Note 5) |                         | R <sub>θJA</sub>                  | 60          | °C/W |
| Thermal Resistance, Junction to Case (Note 5)    |                         | R <sub>θJC</sub>                  | 6           |      |
| Operating and Storage Temperature Range          |                         | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

Note: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1 inch square copper pad layout.

**Electrical Characteristics Q1 & Q4 N-Channel** (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                             | Symbol              | Min | Typ   | Max  | Unit | Test Condition                                                      |
|--------------------------------------------|---------------------|-----|-------|------|------|---------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 6)</b>        |                     |     |       |      |      |                                                                     |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 100 | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                        |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —     | 1    | μA   | V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V                         |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                        |
| <b>ON CHARACTERISTICS (Note 6)</b>         |                     |     |       |      |      |                                                                     |
| Gate Threshold Voltage                     | V <sub>GS(TH)</sub> | 1.0 | 2.0   | 3.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA          |
| Static Drain-Source On-Resistance          | R <sub>DS(ON)</sub> | —   | 111   | 160  | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 5A                          |
|                                            |                     | —   | 121   | 200  |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A                         |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.9   | 1.0  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 10A                          |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>    |                     |     |       |      |      |                                                                     |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 1,167 | —    | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz             |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 36    | —    |      |                                                                     |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 25    | —    |      |                                                                     |
| Gate Resistance                            | R <sub>G</sub>      | —   | 1.3   | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz              |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 4.9   | —    | nC   | V <sub>DS</sub> = 80V, I <sub>D</sub> = 12.8A                       |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 9.7   | —    |      |                                                                     |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 2.0   | —    |      |                                                                     |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 2.0   | —    |      |                                                                     |
| Turn-On Delay Time                         | t <sub>D(ON)</sub>  | —   | 10.5  | —    | ns   | V <sub>DD</sub> = 50V, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 12.8A |
| Turn-On Rise Time                          | t <sub>R</sub>      | —   | 11.1  | —    |      |                                                                     |
| Turn-Off Delay Time                        | t <sub>D(OFF)</sub> | —   | 42.6  | —    |      |                                                                     |
| Turn-Off Fall Time                         | t <sub>F</sub>      | —   | 12.8  | —    |      |                                                                     |
| Body Diode Reverse Recovery Time           | t <sub>RR</sub>     | —   | 30.3  | —    | ns   | V <sub>GS</sub> = 0V, I <sub>S</sub> = 12.8A, dI/dt = 100A/μs       |
| Body Diode Reverse Recovery Charge         | Q <sub>RR</sub>     | —   | 35.2  | —    | nC   | V <sub>GS</sub> = 0V, I <sub>S</sub> = 12.8A, dI/dt = 100A/μs       |

**Electrical Characteristics Q2 & Q3 P-Channel** (@T<sub>A</sub> = +25 °C, unless otherwise specified.)

| Characteristic                              | Symbol              | Min  | Typ   | Max  | Unit | Test Condition                                                      |
|---------------------------------------------|---------------------|------|-------|------|------|---------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 6)</b>         |                     |      |       |      |      |                                                                     |
| Drain-Source Breakdown Voltage              | BV <sub>DSS</sub>   | -100 | —     | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                       |
| Zero Gate Voltage Drain Current             | I <sub>DSS</sub>    | —    | —     | 1    | μA   | V <sub>DS</sub> = -80V, V <sub>GS</sub> = 0V                        |
| Gate-Source Leakage                         | I <sub>GSS</sub>    | —    | —     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                        |
| <b>ON CHARACTERISTICS (Note 6)</b>          |                     |      |       |      |      |                                                                     |
| Gate Threshold Voltage                      | V <sub>GS(TH)</sub> | -1.0 | -1.6  | -3.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA         |
| Static Drain-Source On-Resistance           | R <sub>DS(ON)</sub> | —    | 191   | 250  | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -5A                        |
|                                             |                     | —    | 213   | 300  |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A                       |
| Diode Forward Voltage                       | V <sub>SD</sub>     | —    | -0.9  | -1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -5A                          |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>     |                     |      |       |      |      |                                                                     |
| Input Capacitance                           | C <sub>iss</sub>    | —    | 1,239 | —    | pF   | V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz            |
| Output Capacitance                          | C <sub>oss</sub>    | —    | 42    | —    |      |                                                                     |
| Reverse Transfer Capacitance                | C <sub>rss</sub>    | —    | 28    | —    |      |                                                                     |
| Gate Resistance                             | R <sub>G</sub>      | —    | 13    | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz              |
| Total Gate Charge (V <sub>GS</sub> = -4.5V) | Q <sub>g</sub>      | —    | 8.4   | —    | nC   | V <sub>DS</sub> = -60V, I <sub>D</sub> = -5A                        |
| Total Gate Charge (V <sub>GS</sub> = -10V)  | Q <sub>g</sub>      | —    | 17.5  | —    |      |                                                                     |
| Gate-Source Charge                          | Q <sub>gs</sub>     | —    | 2.8   | —    |      |                                                                     |
| Gate-Drain Charge                           | Q <sub>gd</sub>     | —    | 3.2   | —    |      |                                                                     |
| Turn-On Delay Time                          | t <sub>D(ON)</sub>  | —    | 9.1   | —    | ns   | V <sub>DD</sub> = -50V, R <sub>G</sub> = 9.1Ω, I <sub>D</sub> = -5A |
| Turn-On Rise Time                           | t <sub>R</sub>      | —    | 14.9  | —    |      |                                                                     |
| Turn-Off Delay Time                         | t <sub>D(OFF)</sub> | —    | 57.4  | —    |      |                                                                     |
| Turn-Off Fall Time                          | t <sub>F</sub>      | —    | 34.4  | —    |      |                                                                     |
| Body Diode Reverse Recovery Time            | t <sub>RR</sub>     | —    | 25.2  | —    | ns   | V <sub>GS</sub> = 0V, I <sub>S</sub> = -5A, dI/dt = 100A/μs         |
| Body Diode Reverse Recovery Charge          | Q <sub>RR</sub>     | —    | 24.5  | —    | nC   | V <sub>GS</sub> = 0V, I <sub>S</sub> = -5A, dI/dt = 100A/μs         |

Notes: 6. Short duration pulse test used to minimize self-heating effect.  
7. Guaranteed by design. Not subject to production testing.

## Typical Characteristics - N-CHANNEL

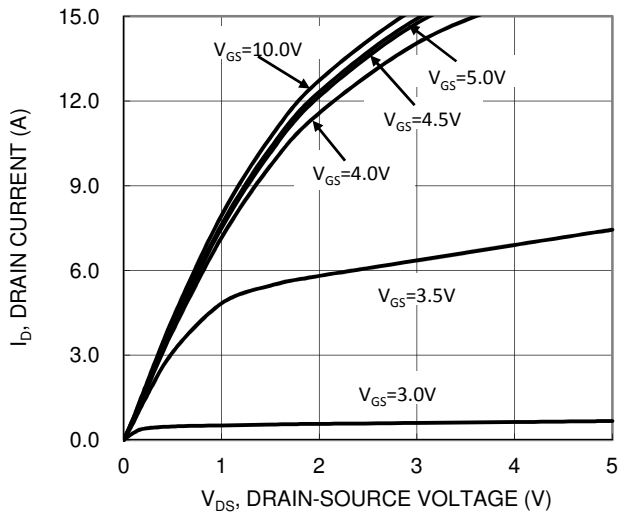


Figure 1. Typical Output Characteristic

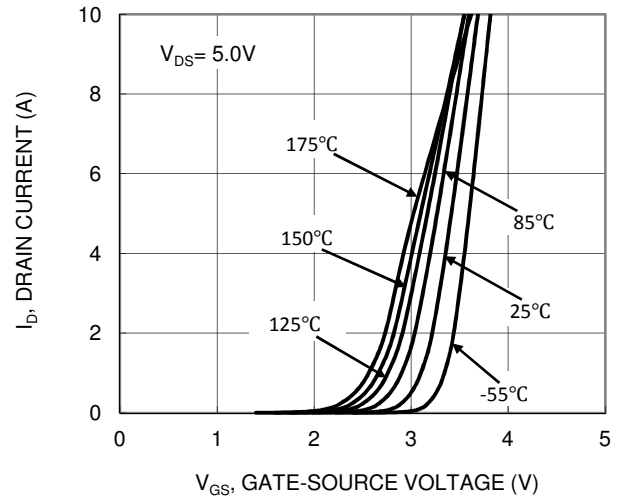


Figure 2 . Typical Transfer Characteristic

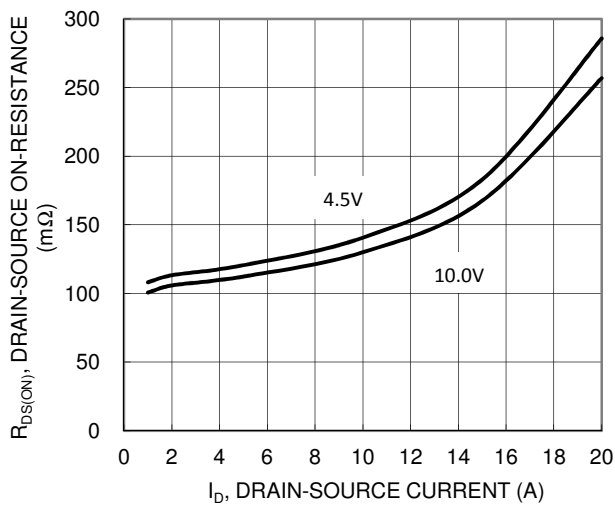


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

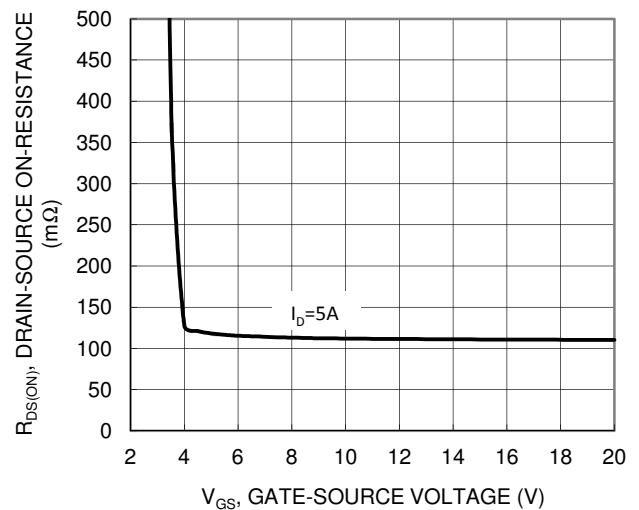


Figure 4. Typical Transfer Characteristic

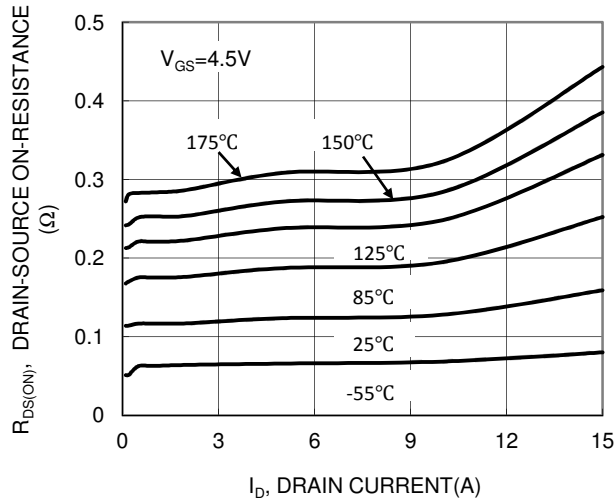


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

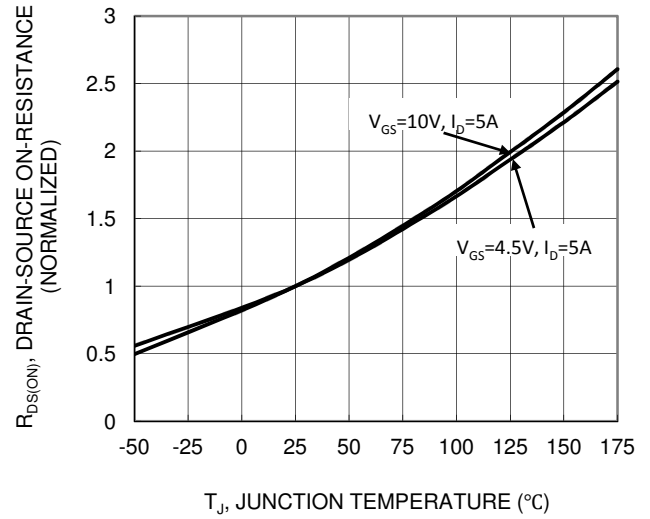


Figure 6. On-Resistance Variation with Temperature

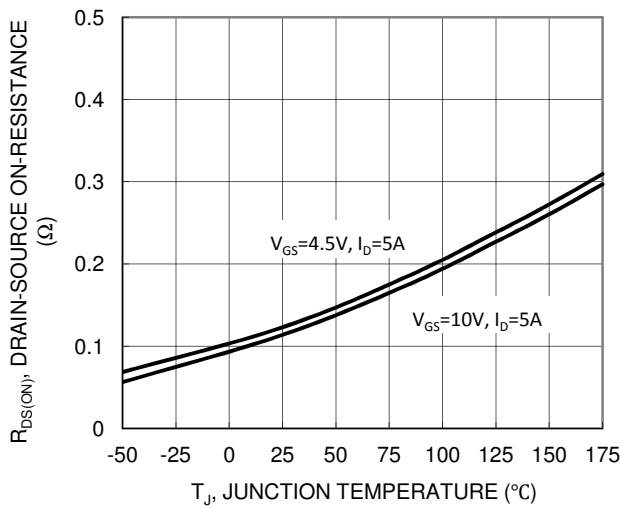


Figure 7. On-Resistance Variation with Temperature

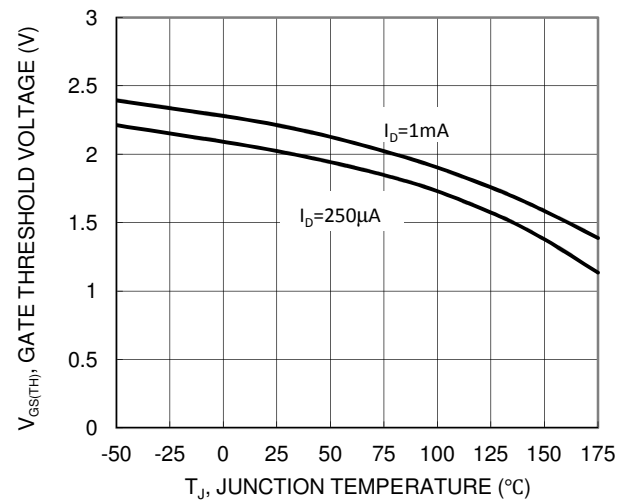


Figure 8. Gate Threshold Variation vs Ambient Temperature

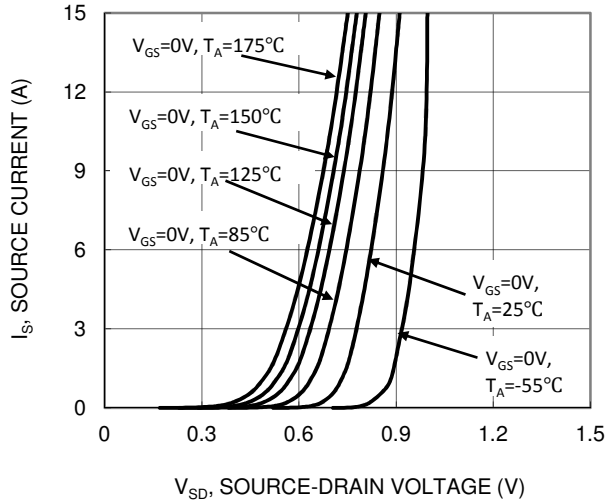


Figure 9. Diode Forward Voltage vs. Current

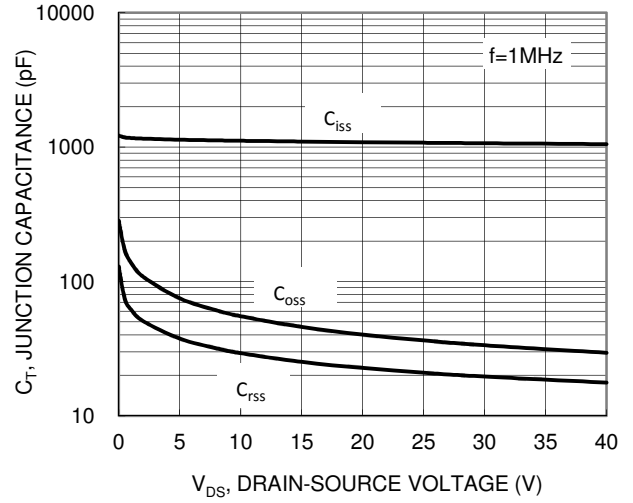


Figure 10. Typical Junction Capacitance

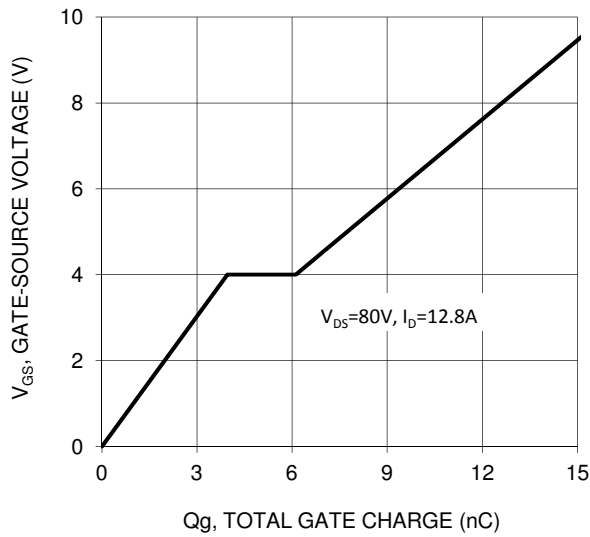


Figure 11. Gate Charge

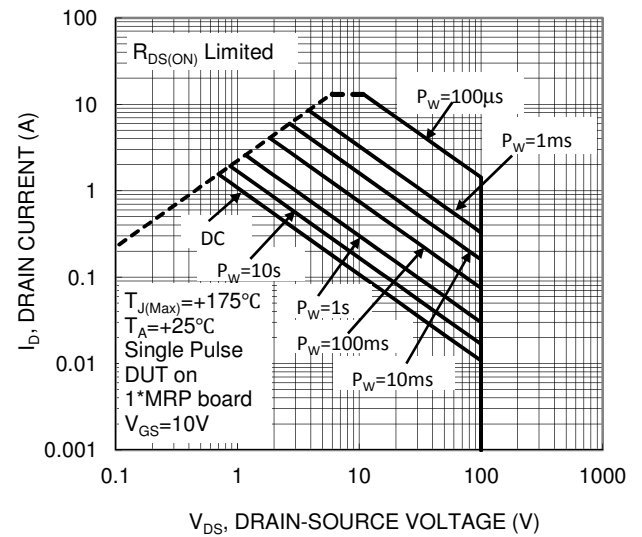
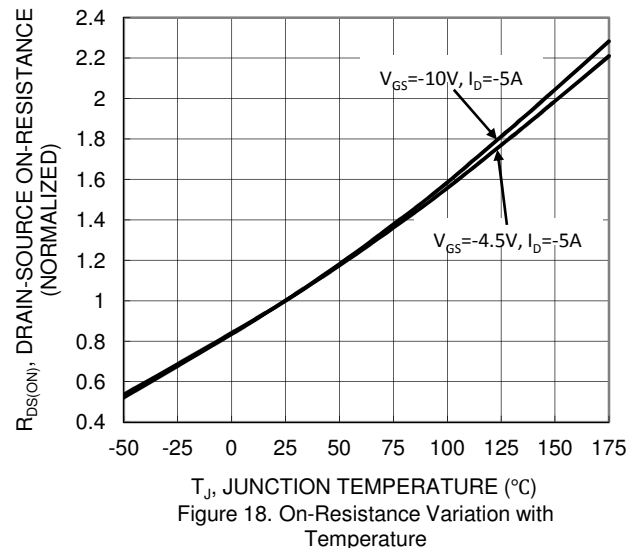
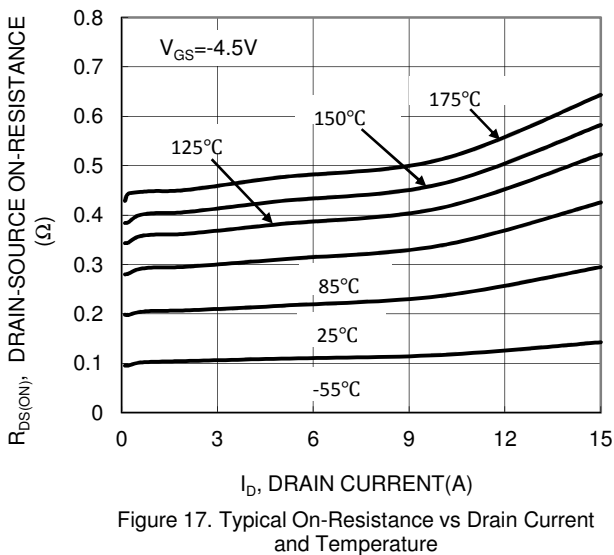
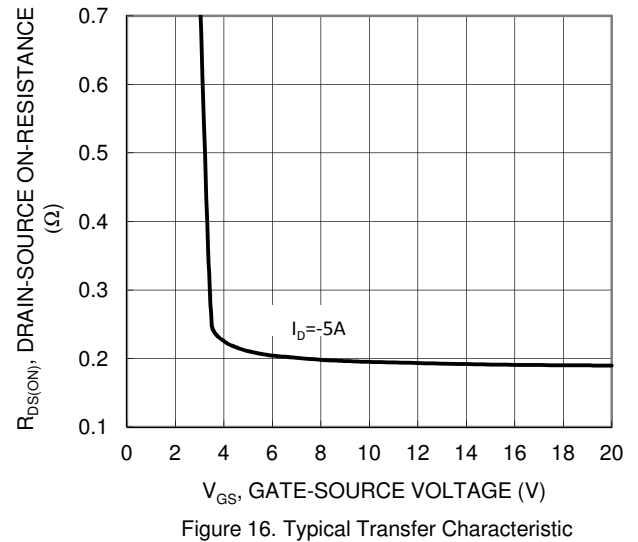
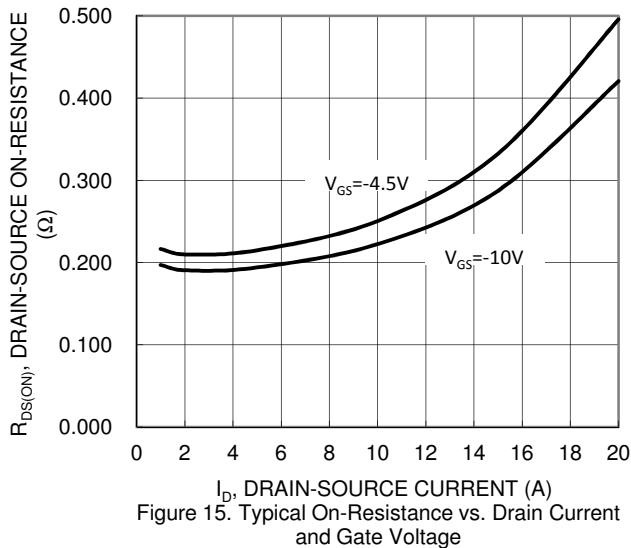
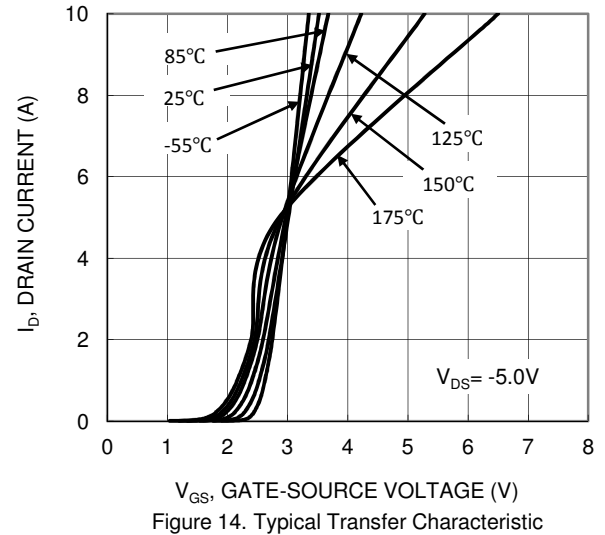
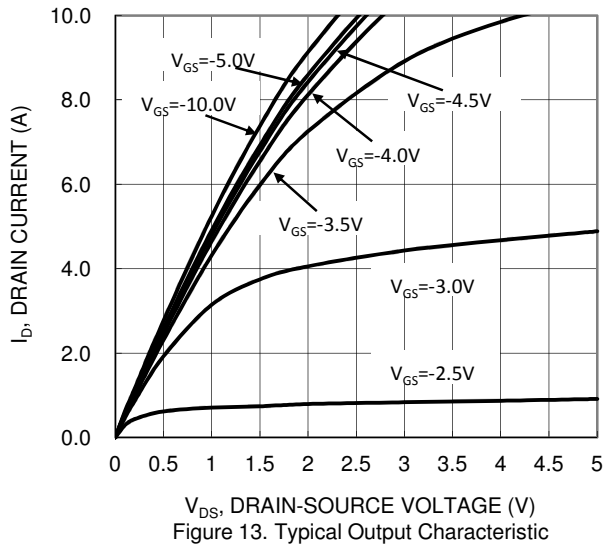
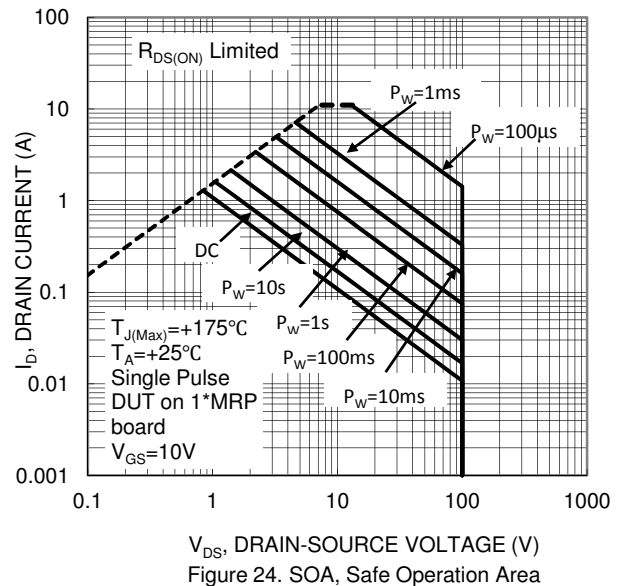
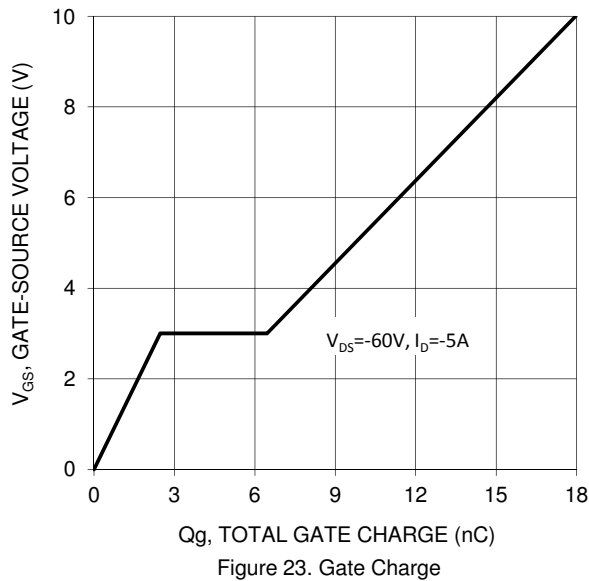
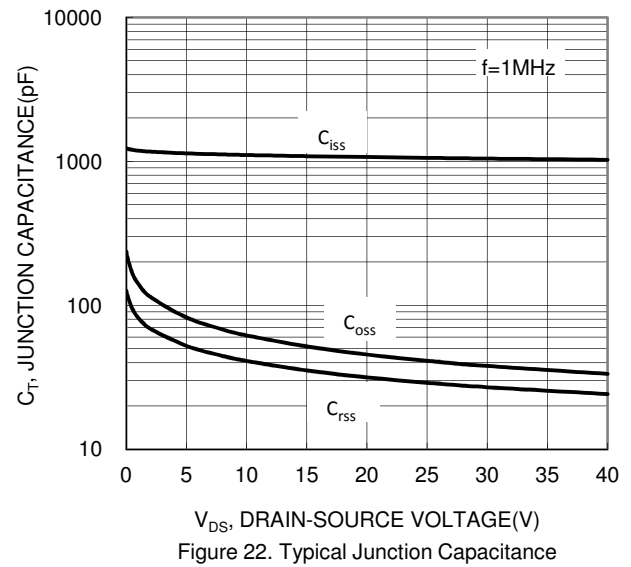
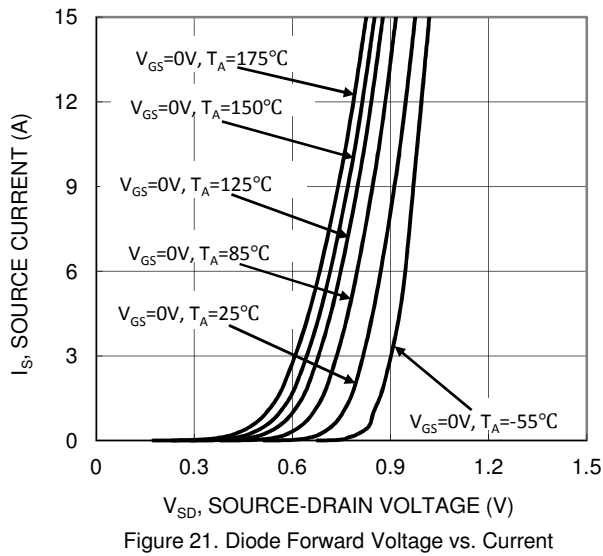
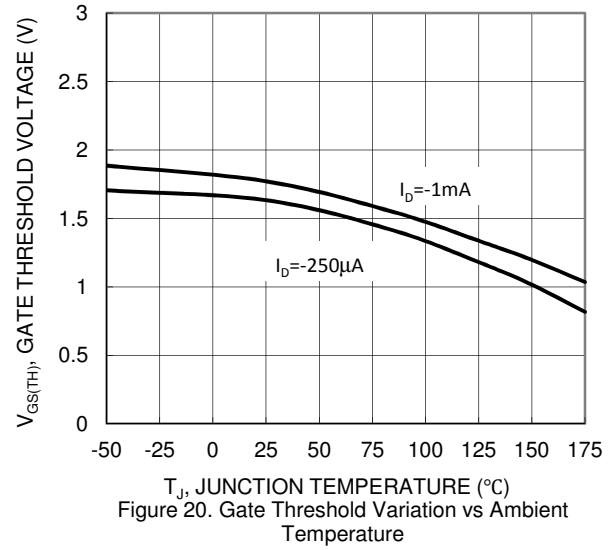
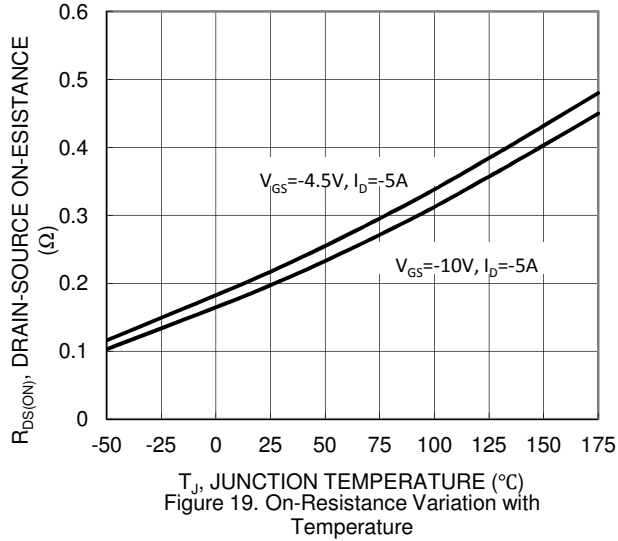


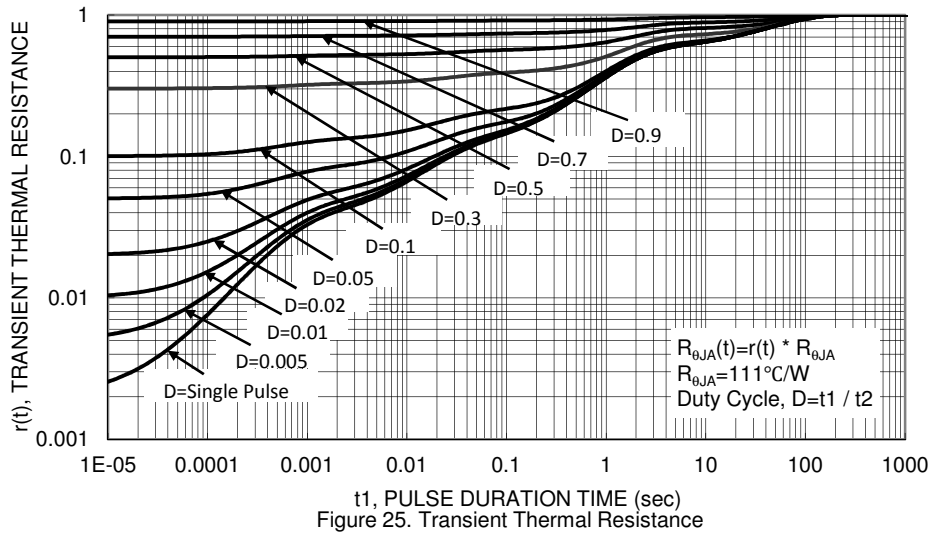
Figure 12. SOA, Safe Operation Area

# Typical Characteristics - P-CHANNEL



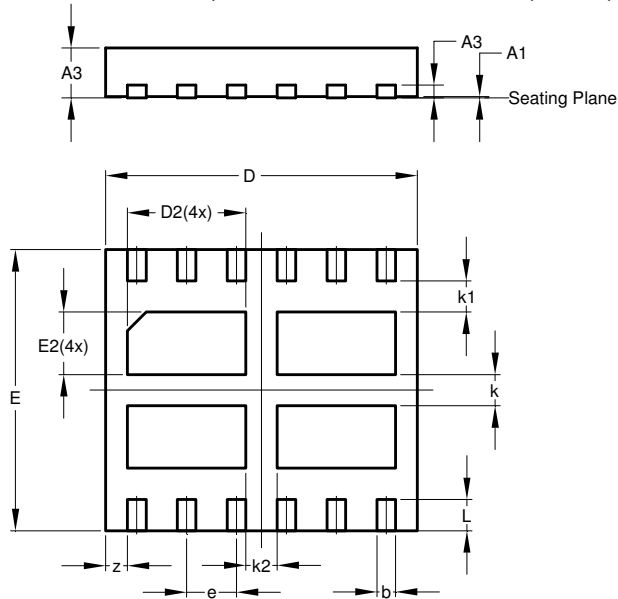






## Package Outline Dimensions

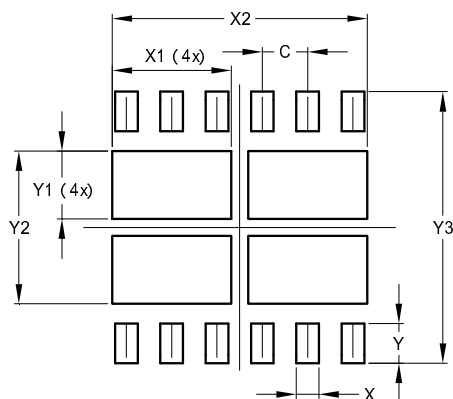
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| V-DFN5045-12         |      |      |       |
|----------------------|------|------|-------|
| Dim                  | Min  | Max  | Typ   |
| A                    | 0.75 | 0.85 | 0.80  |
| A1                   | 0.00 | 0.05 | 0.02  |
| A3                   | -    | -    | 0.203 |
| b                    | 0.25 | 0.35 | 0.30  |
| D                    | 4.95 | 5.05 | 5.00  |
| D2                   | 1.80 | 2.00 | 1.90  |
| E                    | 4.45 | 4.55 | 4.50  |
| E2                   | 0.90 | 1.10 | 1.00  |
| e                    | -    | -    | 0.80  |
| k                    | -    | -    | 0.50  |
| k1                   | -    | -    | 0.50  |
| k2                   | -    | -    | 0.50  |
| L                    | 0.45 | 0.55 | 0.50  |
| z                    | -    | -    | 0.35  |
| 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) |
|------------|---------------|
| C          | 0.800         |
| X          | 0.400         |
| X1         | 2.100         |
| X2         | 4.500         |
| Y          | 0.700         |
| Y1         | 1.200         |
| Y2         | 2.700         |
| Y3         | 4.800         |

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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## Данный компонент на территории Российской Федерации

**Вы можете приобрести в компании MosChip.**

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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