# 100V COMPLEMENTARY ENHANCEMENT MODE MOSFET H-BRIDGE

## Product Summary

| Device | $V_{(BR)DSS}$ | $R_{DS(ON)MAX}$ | $I_D$ $T_A$ = +25°C |
|---|---|---|---|
| Q1 & Q4 | 100V | 160mΩ @ $V_{GS}$ = 10V | 2.9A |
| | | 200mΩ @ $V_{GS}$ = 4.5V | 2.6A |
| Q2 & Q3 | -100V | 250mΩ @ $V_{GS}$ = -10V | -2.3A |
| | | 300mΩ @ $V_{GS}$ = -4.5V | -2.1A |

## Features

- Low On-Resistance
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: V-DFN5045-12
- 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: 0.097 grams (Approximate)

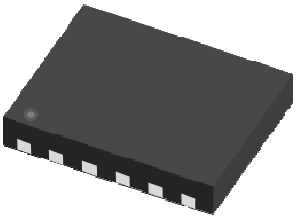
## Description

This new generation MOSFET is 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.

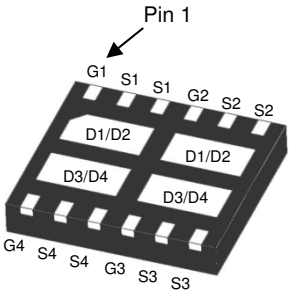
## Applications

- High-Efficiency Bridge Rectifiers

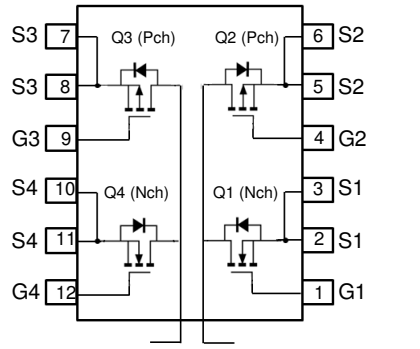
V-DFN5045-12



Top View




Bottom View



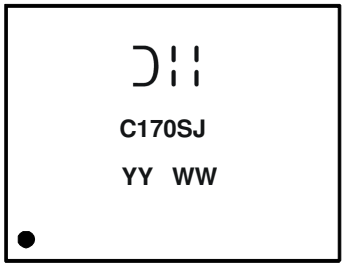

Internal Schematic

## Ordering Information (Note 4)

| Part Number | Case | Tape Width | Packaging |
|---|---|---|---|
| DMHC10H170SFJ-13 | V-DFN5045-12 | 12mm | 3,000/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/quality/lead_free.html 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/products/packages.html.

## Marking Information




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

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 100 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 5) $V_{GS}$ = 10V | Steady State | $T_C$ = +25°C<br>$T_A$ = +25°C | $I_D$ | 9.3<br>2.9 | A |
| Maximum Body Diode Forward Current (Note 5) | | | $I_S$ | 2.5 | A |
| Pulsed Drain Current (10µs pulse, Duty Cycle = 1%) | | | $I_{DM}$ | 10.1 | A |

## Maximum Ratings Q2 & Q3 P-Channel (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -100 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 5) $V_{GS}$ = -10V | Steady State | $T_C$ = +25°C<br>$T_A$ = +25°C | $I_D$ | -7.4<br>-2.3 | A |
| Maximum Body Diode Forward Current (Note 5) | | | $I_S$ | -2.4 | A |
| Pulsed Drain Current (10µs pulse, Duty Cycle = 1%) | | | $I_{DM}$ | -9.1 | A |

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

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Total Power Dissipation (Note 5) | $T_C$ = +25°C | $P_D$ | 20 | W |
| | $T_A$ = +25°C | | 2.1 | |
| Thermal Resistance, Junction to Ambient (Note 5) | | $R_{\theta JA}$ | 60 | °C/W |
| Thermal Resistance, Junction to Case (Note 5) | | $R_{\theta JC}$ | 6 | |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

## Electrical Characteristics Q1 & Q4 N-Channel (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 6)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 100 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = 80V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 6)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 1.0 | 2.0 | 3.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 111 | 160 | mΩ | $V_{GS}$ = 10V, $I_D$ = 5A |
| | | — | 121 | 200 | | $V_{GS}$ = 4.5V, $I_D$ = 5A |
| Diode Forward Voltage | $V_{SD}$ | — | 0.9 | 1.0 | V | $V_{GS}$ = 0V, $I_S$ = 10A |
| **DYNAMIC CHARACTERISTICS (Note 7)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 1,167 | — | pF | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 36 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 25 | — | | |
| Gate Resistance | $R_G$ | — | 1.3 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1.0MHz |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 4.9 | — | nC | $V_{DS}$ = 80V, $I_D$ = 12.8A |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 9.7 | — | | |
| Gate-Source Charge | $Q_{gs}$ | — | 2.0 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 2.0 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 10.5 | — | ns | $V_{DD}$ = 50V, $R_G$ = 25Ω, $I_D$ = 12.8A |
| Turn-On Rise Time | $t_R$ | — | 11.1 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 42.6 | — | | |
| Turn-Off Fall Time | $t_F$ | — | 12.8 | — | | |
| Body Diode Reverse Recovery Time | $t_{RR}$ | — | 30.3 | — | ns | $V_{GS}$ = 0V, $I_S$ = 12.8A, dI/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | $Q_{RR}$ | — | 35.2 | — | nC | $V_{GS}$ = 0V, $I_S$ = 12.8A, dI/dt = 100A/µs |

## Electrical Characteristics Q2 & Q3 P-Channel (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 6)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -100 | — | — | V | $V_{GS}$ = 0V, $I_D$ = -250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = -80V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 6)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -1.0 | -1.6 | -3.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 191 | 250 | mΩ | $V_{GS}$ = -10V, $I_D$ = -5A |
| | | — | 213 | 300 | | $V_{GS}$ = -4.5V, $I_D$ =-5A |
| Diode Forward Voltage | $V_{SD}$ | — | -0.9 | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -5A |
| **DYNAMIC CHARACTERISTICS (Note 7)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 1,239 | — | pF | $V_{DS}$ = -25V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 42 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 28 | — | | |
| Gate Resistance | $R_G$ | — | 13 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1.0MHz |
| Total Gate Charge ($V_{GS}$ = -4.5V) | $Q_g$ | — | 8.4 | — | nC | $V_{DS}$ = -60V, $I_D$ = -5A |
| Total Gate Charge ($V_{GS}$ = -10V) | $Q_g$ | — | 17.5 | — | | |
| Gate-Source Charge | $Q_{gs}$ | — | 2.8 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 3.2 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 9.1 | — | ns | $V_{DD}$ = -50V, $R_G$ = 9.1Ω, $I_D$ = -5A |
| Turn-On Rise Time | $t_R$ | — | 14.9 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 57.4 | — | | |
| Turn-Off Fall Time | $t_F$ | — | 34.4 | — | | |
| Body Diode Reverse Recovery Time | $t_{RR}$ | — | 25.2 | — | ns | $V_{GS}$ = 0V, $I_S$ = -5A, dI/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | $Q_{RR}$ | — | 24.5 | — | nC | $V_{GS}$ = 0V, $I_S$ = -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

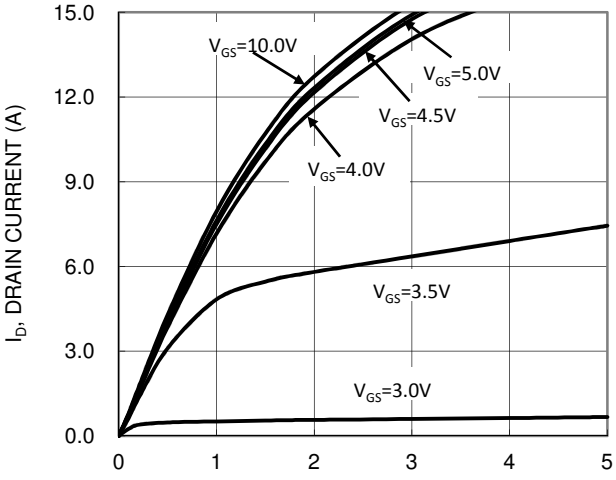



Figure 1. Typical Output Characteristic

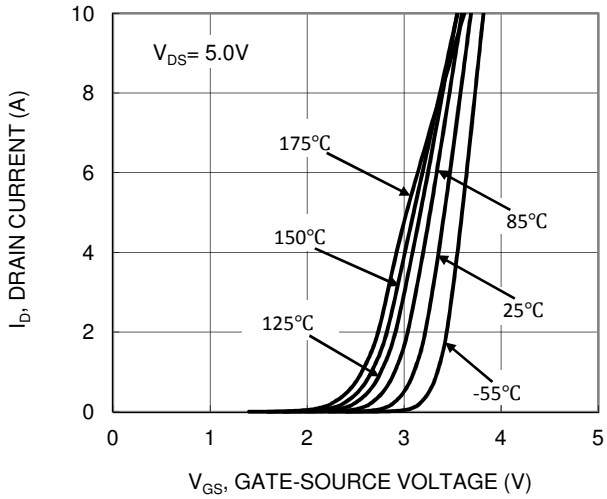



Figure 2 . Typical Transfer Characteristic

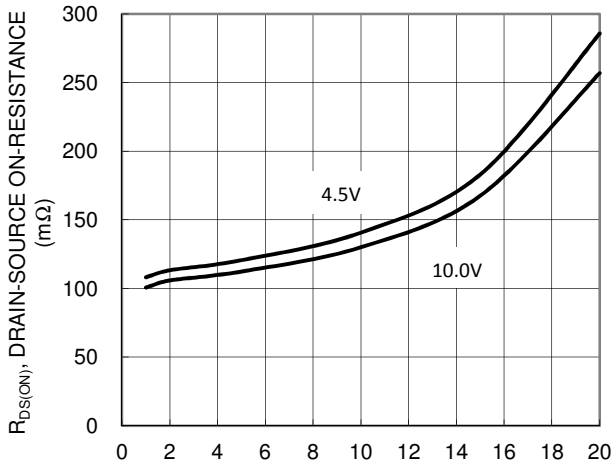



Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

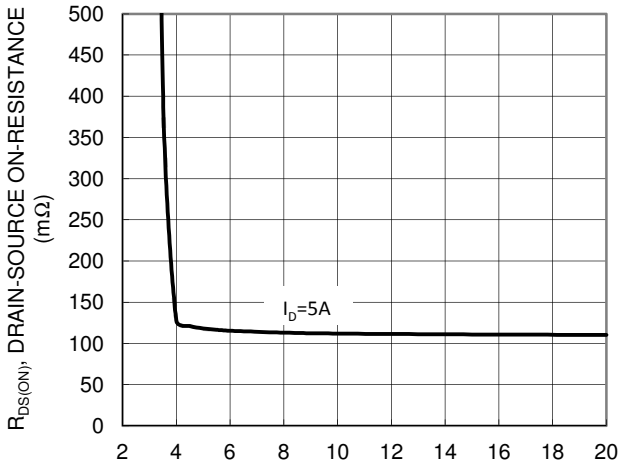



Figure 4. Typical Transfer Characteristic

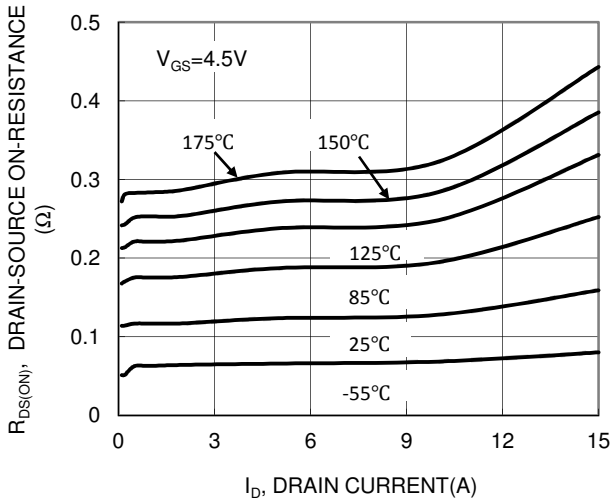



Figure 5. Typical On-Resistance vs. Drain Current and Temperature

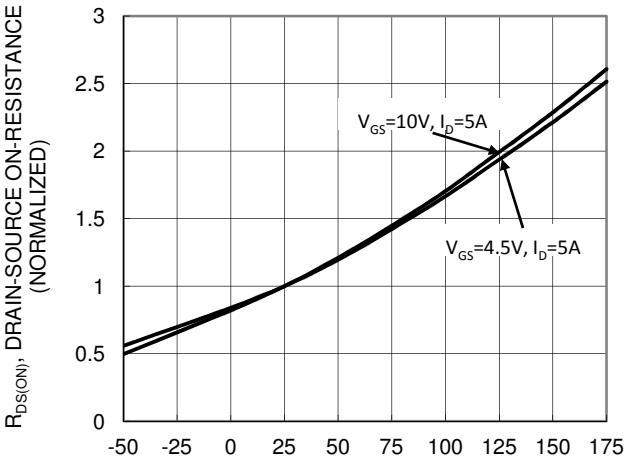



Figure 6. On-Resistance Variation with Temperature

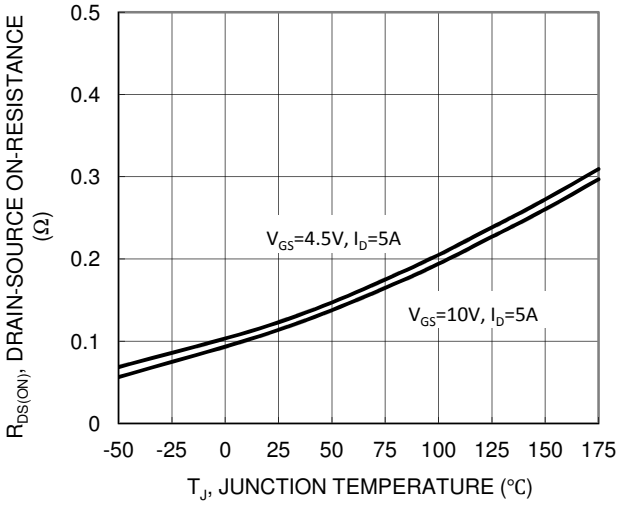



Figure 7. On-Resistance Variation with Temperature

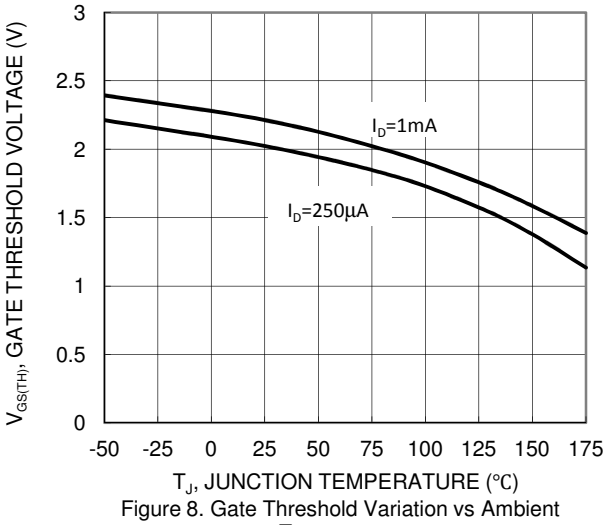



Figure 8. Gate Threshold Variation vs Ambient Temperature

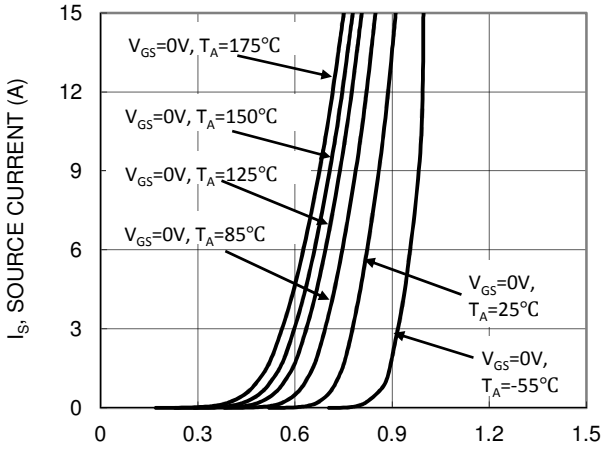



Figure 9. Diode Forward Voltage vs. Current

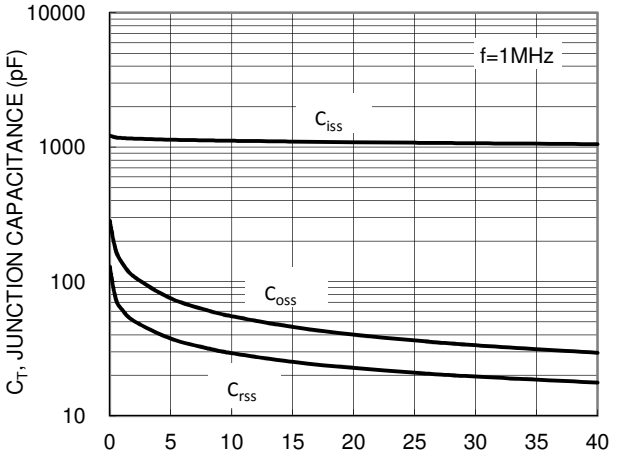



Figure 10. Typical Junction Capacitance

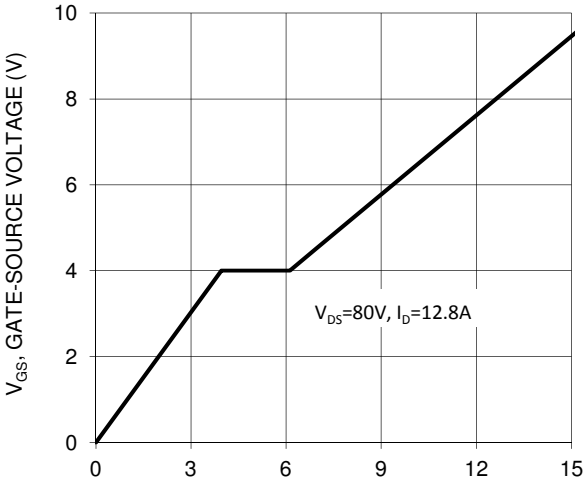



Figure 11. Gate Charge

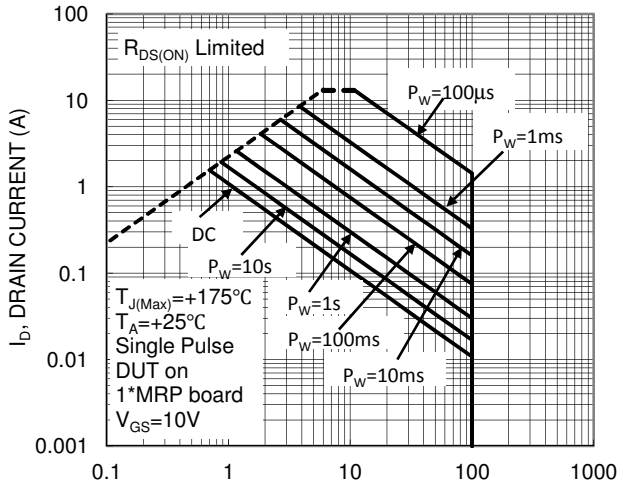



Figure 12. SOA, Safe Operation Area

## Typical Characteristics - P-CHANNEL

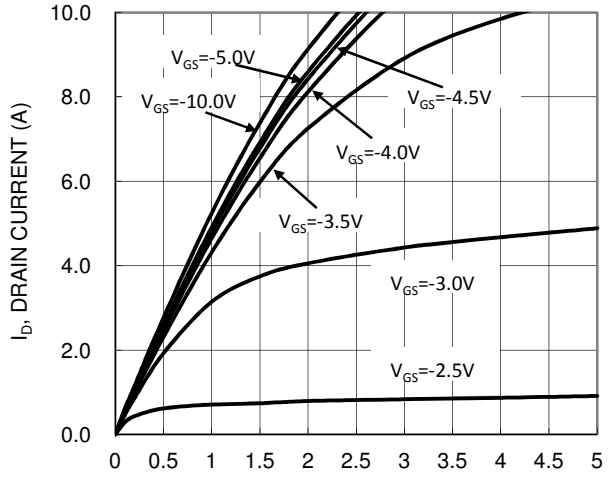



Figure 13. Typical Output Characteristic

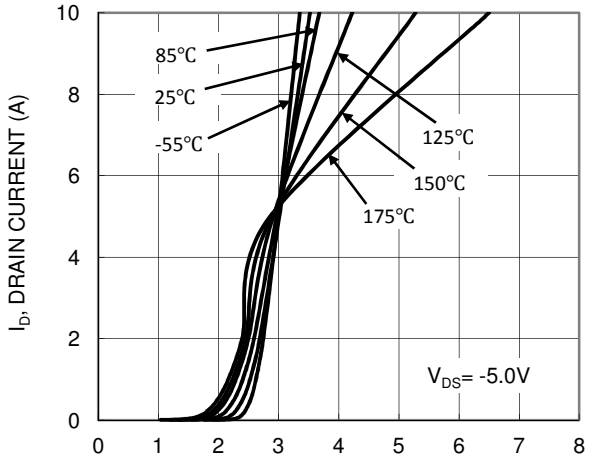



Figure 14. Typical Transfer Characteristic

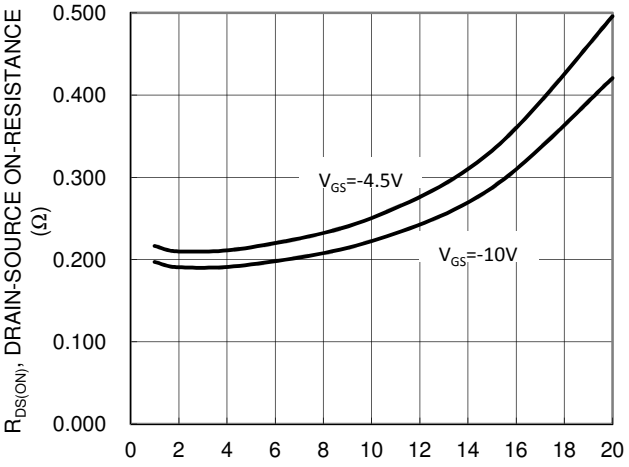



Figure 15. Typical On-Resistance vs. Drain Current and Gate Voltage

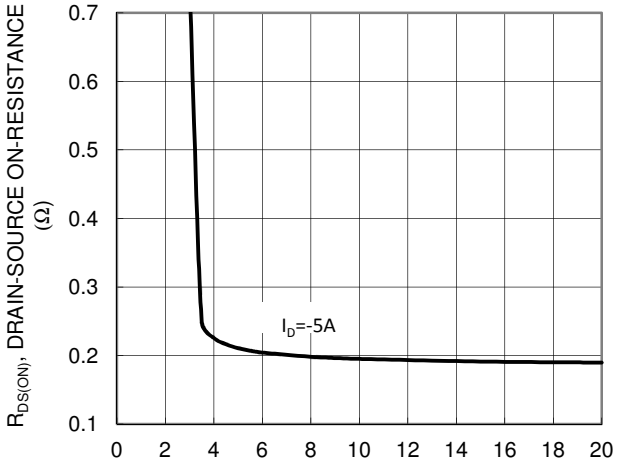



Figure 16. Typical Transfer Characteristic

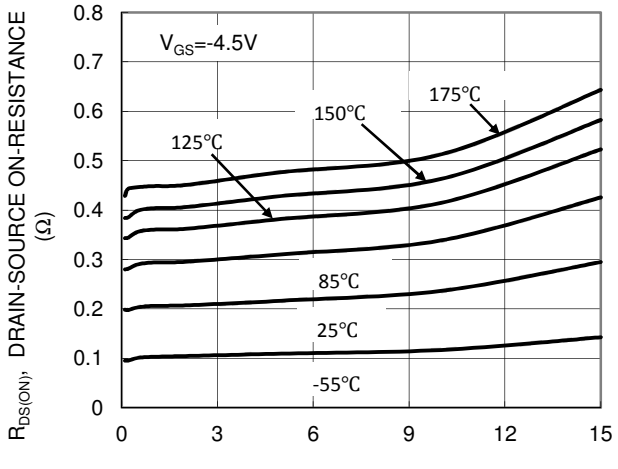



Figure 17. Typical On-Resistance vs Drain Current and Temperature

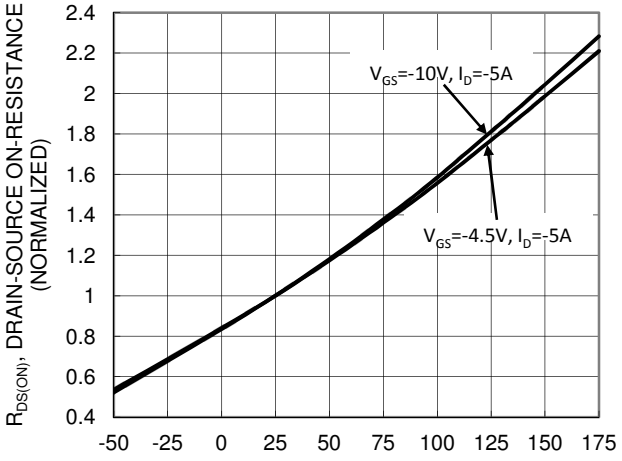



Figure 18. On-Resistance Variation with Temperature

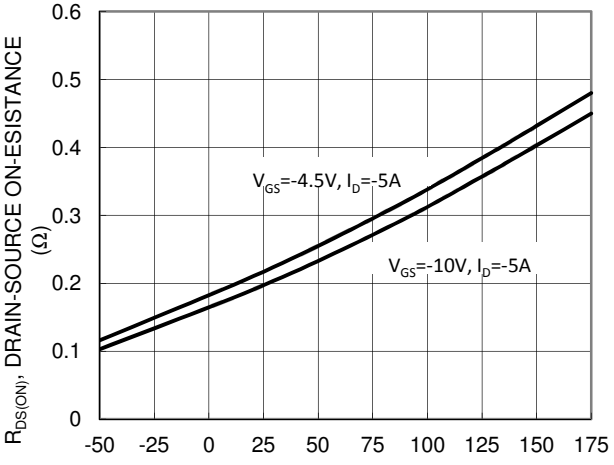



Figure 19. On-Resistance Variation with Temperature

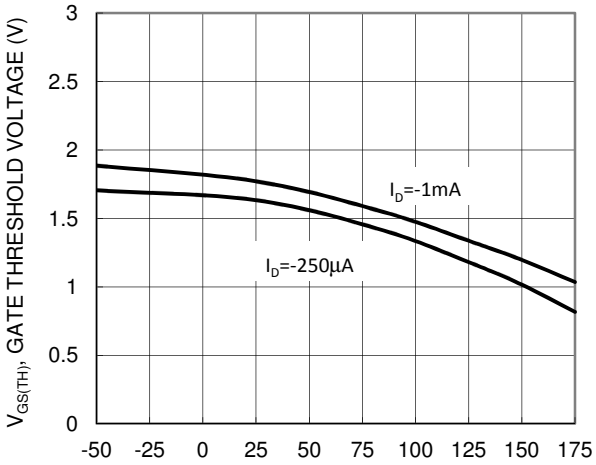



Figure 20. Gate Threshold Variation vs Ambient Temperature

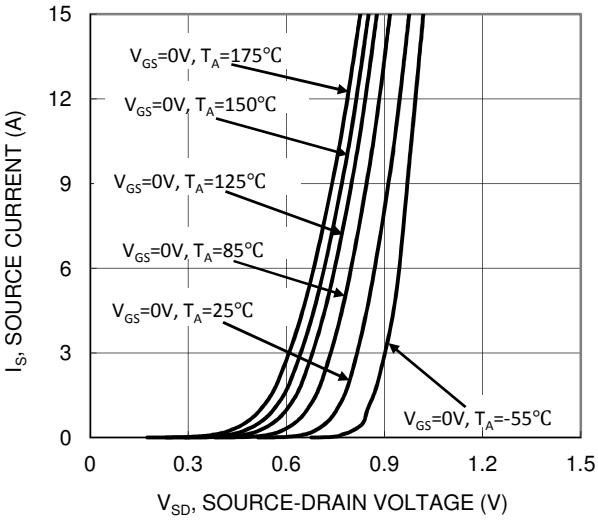



Figure 21. Diode Forward Voltage vs. Current

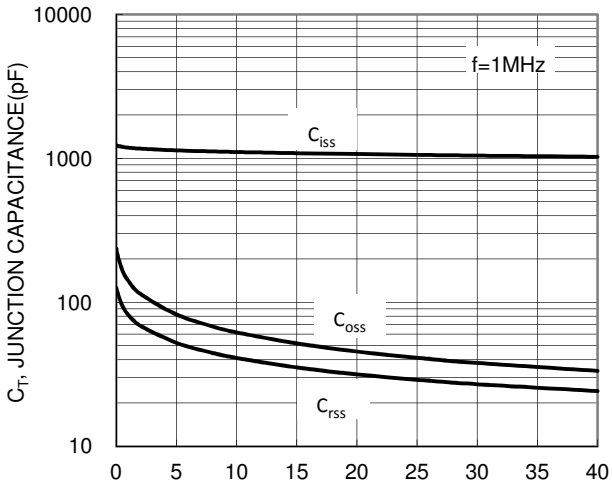



Figure 22. Typical Junction Capacitance

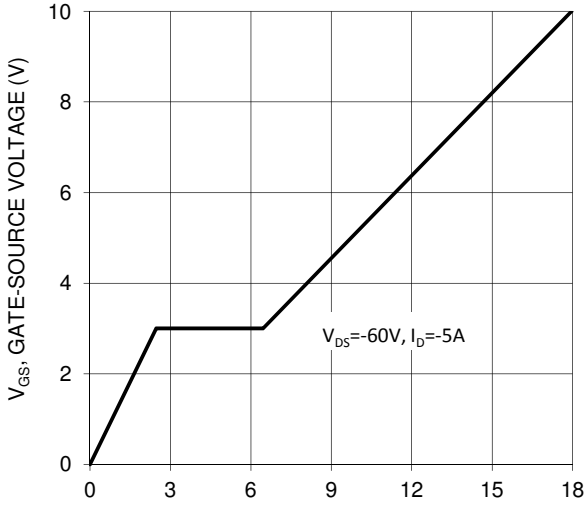



Figure 23. Gate Charge

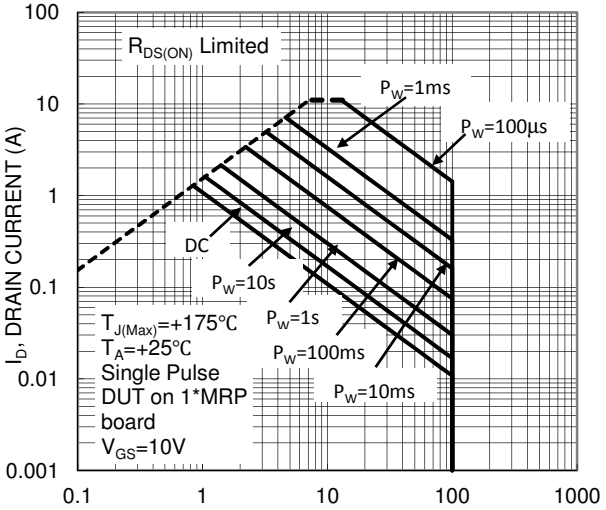



Figure 24. SOA, Safe Operation Area

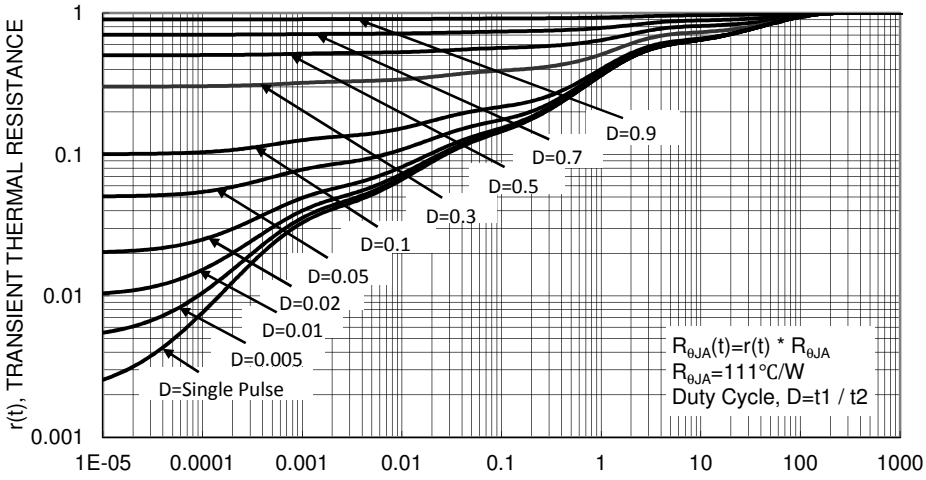
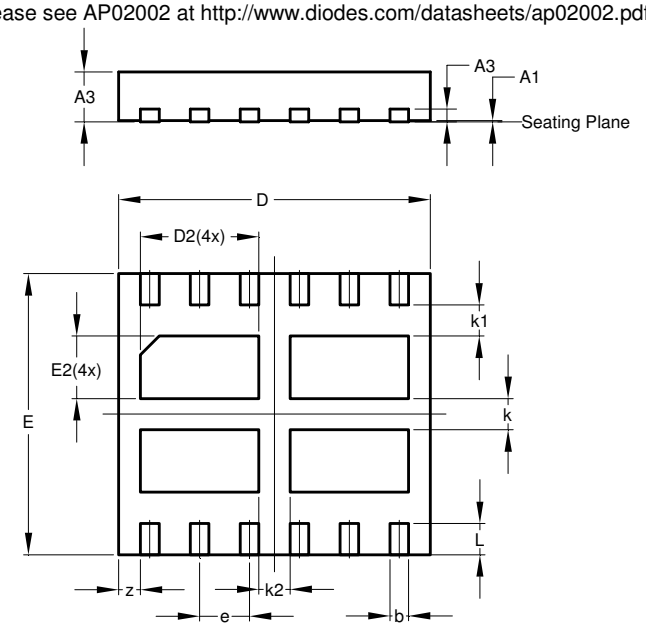



Figure 25. Transient Thermal Resistance

## Package Outline Dimensions

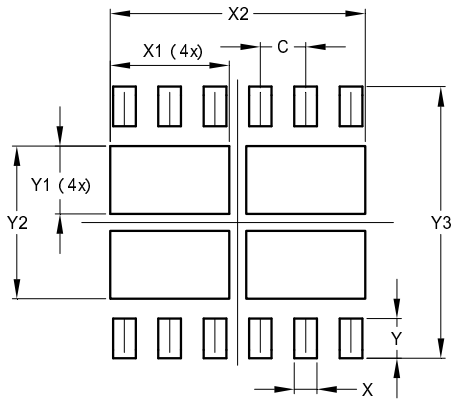
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.




| 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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# OCEAN CHIPS
## Океан Электроники
## Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

**«JONHON»** (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

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ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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