## Marking Information

Site 1

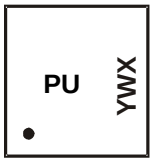

PU = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2013 | … | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | A | … | H | I | J | K | L | M | N | O | P | R |

| 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 |

Site 2




PU = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 0 = 2020)
W = Week (ex: a = Week 27; z Represents Week 52 and 53)
X = Internal Code (ex: U = Monday)

Date Code Key

| Year | 2013 | … | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | 3 | … | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

| Week | 1-26 | 27-52 | 53 |
|---|---|---|---|
| Code | A-Z | a-z | z |

| Internal Code | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|---|
| Code | T | U | V | W | X | Y | Z |

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

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -12 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±8 | V |
| Continuous Drain Current (Note 6) $V_{GS}$ = -4.5V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -9.5<br>-7.6 | A |
| | t<5s | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -11.0<br>-8.8 | A |
| Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) | | | $I_{DM}$ | -90 | A |
| Continuous Source-Drain Diode Current | | $T_A$ = +25°C<br>$T_C$ = +25°C | $I_S$ | -2.5<br>-7.1 | A |
| Pulsed Source-Drain Diode Current (10µs Pulse, Duty Cycle = 1%) | | | $I_{SM}$ | -50 | A |

## Thermal Characteristics

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Total Power Dissipation (Note 5) | $T_A$ = +25°C | $P_D$ | 0.73 | W |
| | $T_A$ = +70°C | | 0.47 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | $R_{\theta JA}$ | 172 | °C/W |
| | t<5s | | 128 | |
| Total Power Dissipation (Note 6) | $T_A$ = +25°C | $P_D$ | 2.1 | W |
| | $T_A$ = +70°C | | 1.3 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 59 | °C/W |
| | t<5s | | 45 | |
| Thermal Resistance, Junction to Case (Note 6) | Steady State | $R_{\theta JC}$ | 5.1 | |
| 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 | $BV_{DSS}$ | -12 | — | — | V | $V_{GS}$ = 0V, $I_D$ = -250µA |
| Zero Gate Voltage Drain Current $T_J$ = +25°C | $I_{DSS}$ | — | — | -200 | nA | $V_{DS}$ = -12V, $V_{GS}$ = 0V |
| Zero Gate Voltage Drain Current $T_J$ = +55°C (Note 8) | $I_{DSS}$ | — | — | -2 | µA | $V_{DS}$ = -12V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±10 | µA | $V_{GS}$ = ±8V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 7)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -0.35 | — | -0.8 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 12 | 14.8 | mΩ | $V_{GS}$ = -4.5V, $I_D$ = -4A |
| | | | 15 | 19 | | $V_{GS}$ = -2.5V, $I_D$ = -4A |
| | | | 20 | 26 | | $V_{GS}$ = -1.8V, $I_D$ = -4A |
| | | | 23 | 32 | | $V_{GS}$ = -1.5V, $I_D$ = -2A |
| Diode Forward Voltage | $V_{SD}$ | — | -0.8 | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -8A |
| **DYNAMIC CHARACTERISTICS (Note 8)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 2,712 | — | pF | $V_{DS}$ = -10V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 514 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 467 | — | | |
| Gate Resistance | $R_g$ | — | 8.6 | 18 | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge | $Q_g$ | — | 48.3 | — | nC | $V_{GS}$ = -8V, $V_{DS}$ = -6V, $I_D$ = -10A |
| Total Gate Charge | $Q_g$ | — | 28.6 | — | | $V_{GS}$ = -4.5V, $V_{DS}$ = -6V, $I_D$ = -10A |
| Gate-Source Charge | $Q_{gs}$ | — | 4.2 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 7.0 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 25.1 | — | ns | $V_{DS}$ = -6V, $V_{GS}$ = -4.5V, $R_G$ = 1Ω, $I_D$ = -8A |
| Turn-On Rise Time | $t_R$ | — | 39.8 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 141 | — | | |
| Turn-Off Fall Time | $t_F$ | — | 147 | — | | |

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

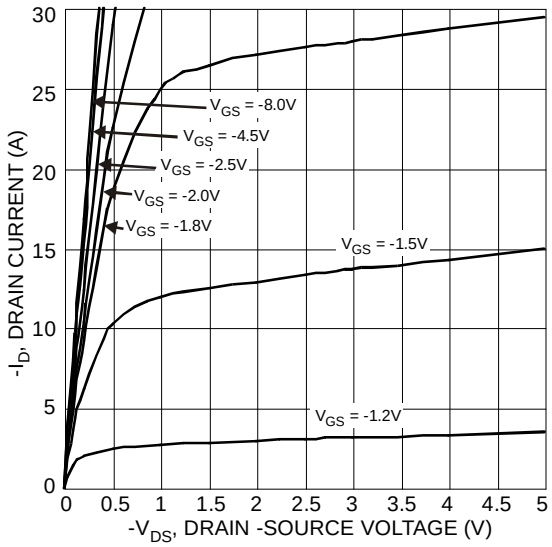



Figure 1 Typical Output Characteristics

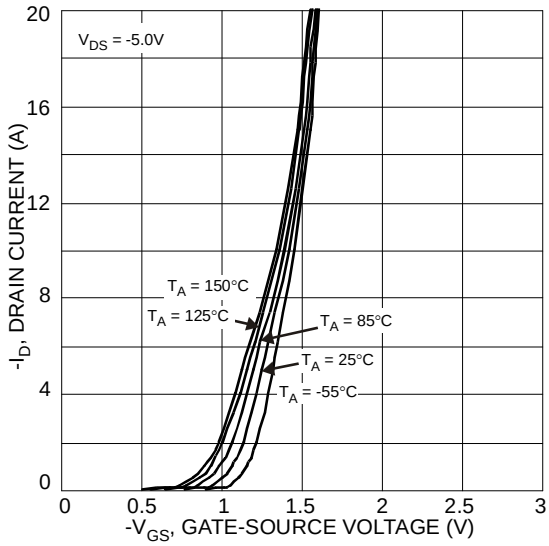



Figure 2 Typical Transfer Characteristics

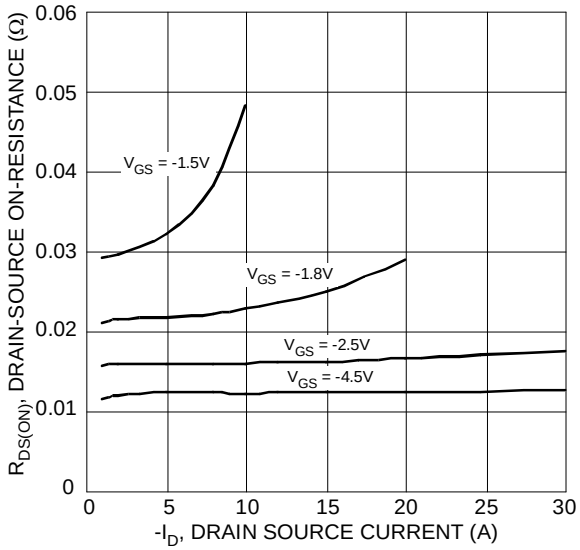



Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

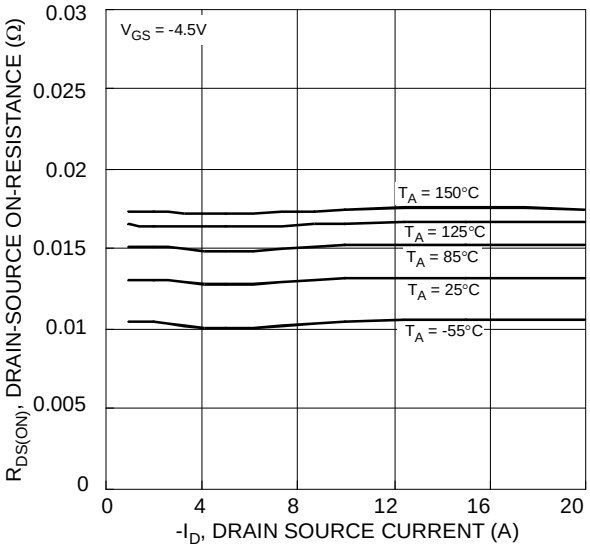



Figure 4 Typical On-Resistance vs. Drain Current and Temperature

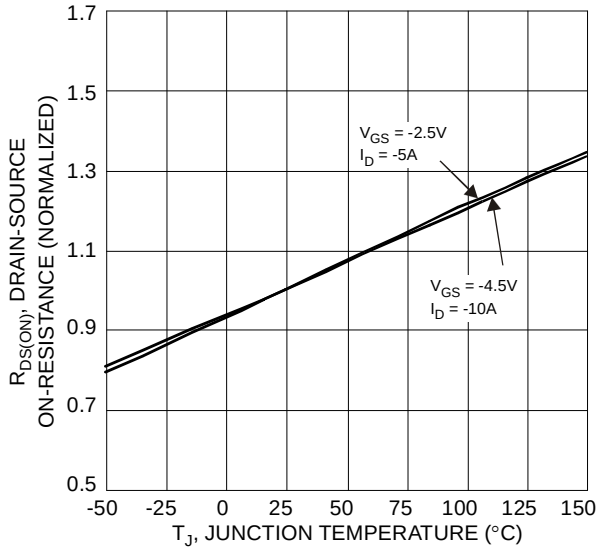



Figure 5 On-Resistance Variation with Temperature

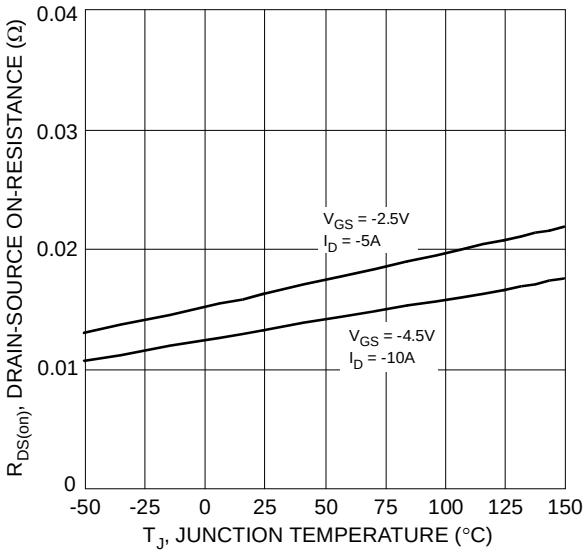



Figure 6 On-Resistance Variation with Temperature

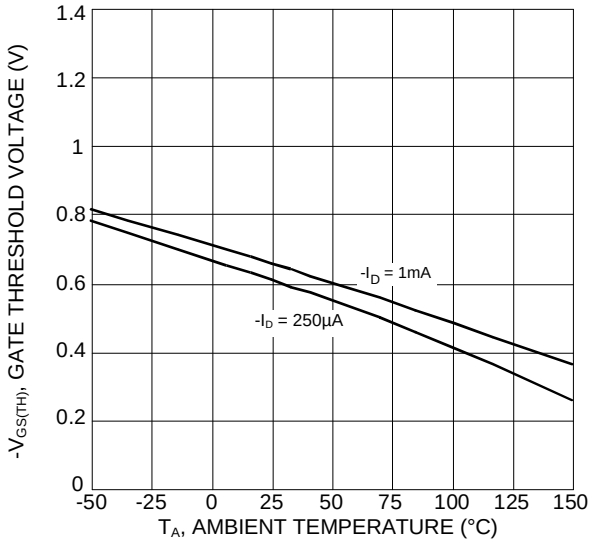



Figure 7 Gate Threshold Variation vs. Ambient Temperature

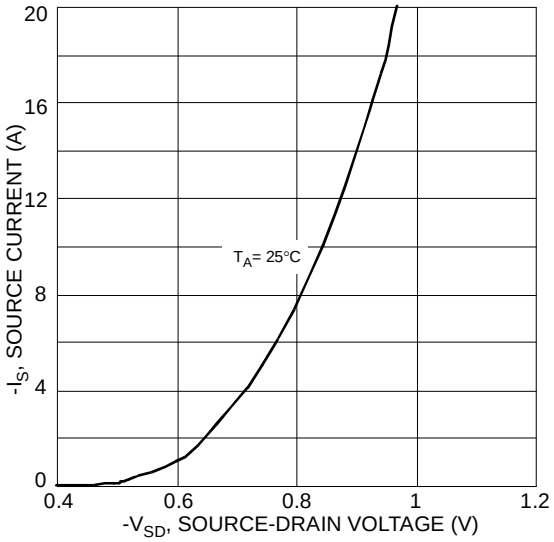



Figure 8 Diode Forward Voltage vs. Current

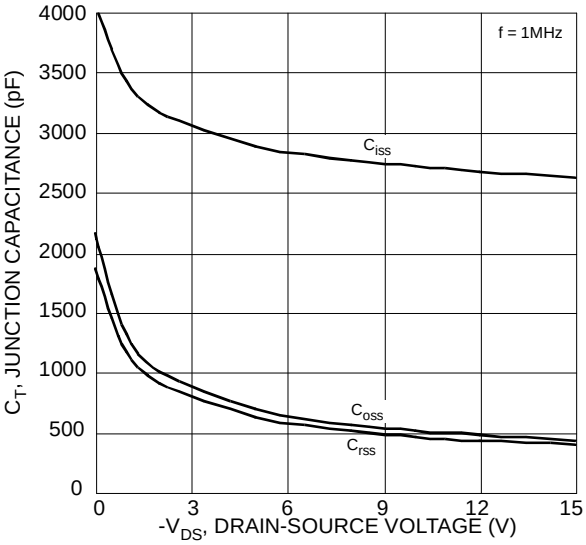



Figure 9 Typical Junction Capacitance

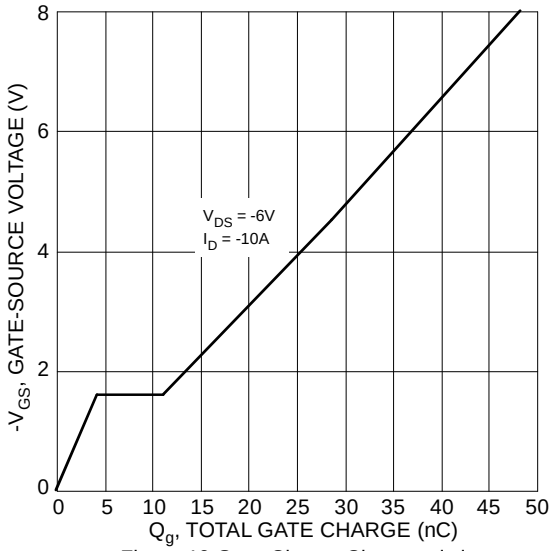



Figure 10 Gate-Charge Characteristics

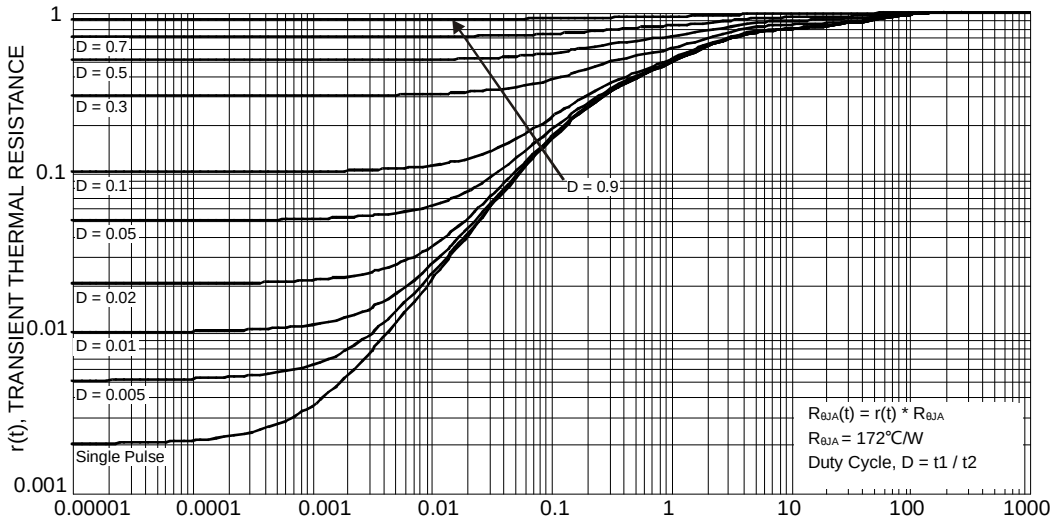
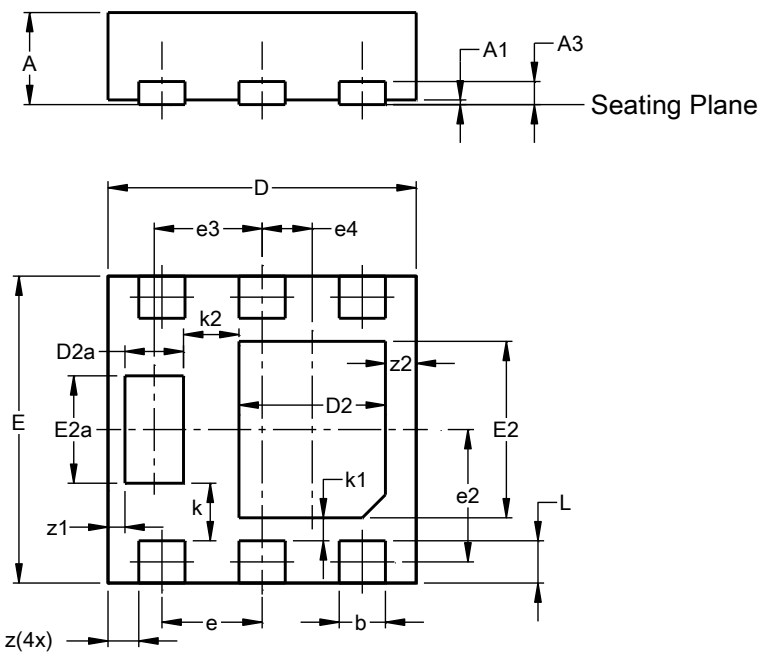



Figure 11 Transient Thermal Resistance

## Package Outline Dimensions

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

**U-DFN2020-6 (Type F)**

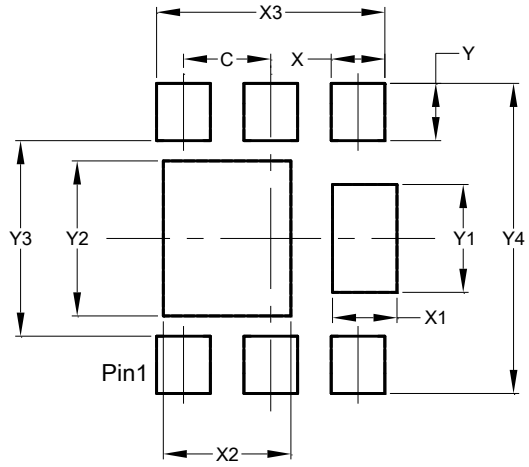



| U-DFN2020-6 (Type F) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.57 | 0.63 | 0.60 |
| **A1** | 0.00 | 0.05 | 0.03 |
| **A3** | - | - | 0.15 |
| **b** | 0.25 | 0.35 | 0.30 |
| **D** | 1.95 | 2.05 | 2.00 |
| **D2** | 0.85 | 1.05 | 0.95 |
| **D2a** | 0.33 | 0.43 | 0.38 |
| **E** | 1.95 | 2.05 | 2.00 |
| **E2** | 1.05 | 1.25 | 1.15 |
| **E2a** | 0.65 | 0.75 | 0.70 |
| **e** | 0.65 BSC | | |
| **e2** | 0.863 BSC | | |
| **e3** | 0.70 BSC | | |
| **e4** | 0.325 BSC | | |
| **k** | 0.37 BSC | | |
| **k1** | 0.15 BSC | | |
| **k2** | 0.36 BSC | | |
| **L** | 0.225 | 0.325 | 0.275 |
| **z** | 0.20 BSC | | |
| **z1** | 0.110 BSC | | |
| **z2** | 0.20 BSC | | |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**U-DFN2020-6 (Type F)**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 0.650 |
| **X** | 0.400 |
| **X1** | 0.480 |
| **X2** | 0.950 |
| **X3** | 1.700 |
| **Y** | 0.425 |
| **Y1** | 0.800 |
| **Y2** | 1.150 |
| **Y3** | 1.450 |
| **Y4** | 2.300 |

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