# MOSFET – Power

## -60 V, -20 A, 52 mΩ

# NTTFS5116PL

| $V_{(BR)DSS}$ | $R_{DS(on)}$ MAX | $I_D$ MAX |
|---|---|---|
| −60 V | 52 mΩ @ −10 V | −20 A |
| | 72 mΩ @ −4.5 V | |

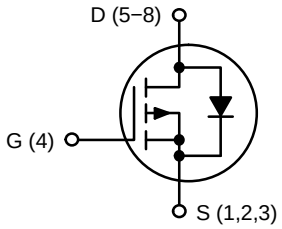
### Features

- Low $R_{DS(on)}$
- Fast Switching
- These Devices are Pb-Free and are RoHS Compliant

### Applications

- Load Switches
- DC Motor Control
- DC-DC Conversion

P-Channel MOSFET




### MAXIMUM RATINGS ($T_J$ = 25 °C unless otherwise stated)

| Parameter | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-to-Source Voltage | | | $V_{DSS}$ | −60 | V |
| Gate-to-Source Voltage | | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current $R_{\theta JA}$ (Note 1) | Steady State | $T_A$ = 25 °C | $I_D$ | −5.7 | A |
| | | $T_A$ = 100 °C | | −4.0 | |
| Power Dissipation $R_{\theta JA}$ (Note 1) | | $T_A$ = 25 °C | $P_D$ | 3.2 | W |
| | | $T_A$ = 100 °C | | 1.6 | |
| Continuous Drain Current $R_{\theta JC}$ (Note 1) | | $T_C$ = 25 °C | $I_D$ | −20 | A |
| | | $T_C$ = 100 °C | | −14 | |
| Power Dissipation $R_{\theta JC}$ (Note 1) | | $T_C$ = 25 °C | $P_D$ | 40 | W |
| | | $T_C$ = 100 °C | | 20 | |
| Pulsed Drain Current | $t_p$ = 10 μs | | $I_{DM}$ | −76 | A |
| Operating Junction and Storage Temperature | | | $T_J$, $T_{stg}$ | −55 to +175 | °C |
| Source Current (Body Diode) | | | $I_S$ | −20 | A |
| Single Pulse Drain-to-Source Avalanche Energy | L = 0.1 mH | | $E_{AS}$ | 45 | mJ |
| | | | $I_{AS}$ | 30 | A |
| Lead Temperature for Soldering Purposes (1/8" from case for 10 s) | | | $T_L$ | 260 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL RESISTANCE MAXIMUM RATINGS

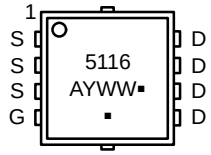
| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction-to-Case − Steady State (Note 1) | $R_{\theta JC}$ | 3.8 | °C/W |
| Junction-to-Ambient − Steady State (Note 1) | $R_{\theta JA}$ | 47 | |

1. Surface-mounted on FR4 board using 1 in sq pad size (Cu area = 1.127 in sq [2 oz] including traces.




**WDFN8**
**(μ8FL)**
**CASE 511AB**

### MARKING DIAGRAM




| | |
|---|---|
| 5116 | = Specific Device Code |
| A | = Assembly Location |
| Y | = Year |
| WW | = Work Week |
| ▪ | = Pb-Free Package |

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| NTTFS5116PLTAG | WDFN8 (Pb-Free) | 1500/Tape & Reel |
| NTTFS5116PLTWG | WDFN8 (Pb-Free) | 5000/Tape & Reel |

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

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**ELECTRICAL CHARACTERISTICS** ($T_J$ = 25 °C unless otherwise specified)

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0 V, $I_D$ = −250 μA | | −60 | | | V |
| Drain-to-Source Breakdown Voltage Temperature Coefficient | $V_{(BR)DSS}/T_J$ | | | | 69.7 | | mV/°C |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$ = 0 V, $V_{DS}$ = −60 V | $T_J$ = 25 °C | | | −1.0 | μA |
| | | | $T_J$ = 125 °C | | | −100 | |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V | | | | ±100 | nA |
| **ON CHARACTERISTICS** (Note 2) | | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = −250 μA | | −1 | | −3 | V |
| Negative Threshold Temperature Coefficient | $V_{GS(TH)}/T_J$ | | | | −6.2 | | mV/°C |
| Drain-to-Source On Resistance | $R_{DS(on)}$ | $V_{GS}$ = −10 V | $I_D$ = −6 A | | 37 | 52 | mΩ |
| | | $V_{GS}$ = −4.5 V | $I_D$ = −4.4 A | | 51 | 72 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$ = −15 V, $I_D$ = −6 A | | | 11 | | S |
| **CHARGES, CAPACITANCES AND GATE RESISTANCE** | | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, f = 1.0 MHz, $V_{DS}$ = −30 V | | | 1258 | | pF |
| Output Capacitance | $C_{oss}$ | | | | 127 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | | 84 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS}$ = −10 V, $V_{DS}$ = −48 V, $I_D$ = −5 A | | | 25 | | nC |
| | | $V_{GS}$ = −4.5 V, $V_{DS}$ = −48 V, $I_D$ = −5 A | | | 14 | | |
| Threshold Gate Charge | $Q_{G(TH)}$ | $V_{GS}$ = −4.5 V, $V_{DS}$ = −48 V, $I_D$ = −5 A | | | 1 | | nC |
| Gate-to-Source Charge | $Q_{GS}$ | | | | 4 | | |
| Gate-to-Drain Charge | $Q_{GD}$ | | | | 7 | | |
| Plateau Voltage | $V_{GP}$ | | | | 3.1 | | V |
| Gate Resistance | $R_G$ | | | | 5.3 | | Ω |
| **SWITCHING CHARACTERISTICS** (Note 3) | | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{GS}$ = −4.5 V, $V_{DS}$ = −48 V, $I_D$ = −5 A, $R_G$ = 6 Ω | | | 15 | | ns |
| Rise Time | $t_r$ | | | | 58 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | | 30 | | |
| Fall Time | $t_f$ | | | | 37 | | |
| **DRAIN-SOURCE DIODE CHARACTERISTICS** | | | | | | | |
| Forward Diode Voltage | $V_{SD}$ | $V_{GS}$ = 0 V, $I_S$ = −5 A | $T_J$ = 25 °C | | −0.79 | −1.2 | V |
| | | | $T_J$ = 125 °C | | −0.64 | | |
| Reverse Recovery Time | $t_{RR}$ | $V_{GS}$ = 0 V, $d_{IS}/d_t$ = −100 A/μs, $I_S$ = −5 A | | | 20 | | ns |
| Charge Time | $t_a$ | | | | 15 | | |
| Discharge Time | $t_b$ | | | | 5 | | |
| Reverse Recovery Charge | $Q_{RR}$ | | | | 19 | | nC |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
3. Switching characteristics are independent of operating junction temperatures.



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## TYPICAL CHARACTERISTICS

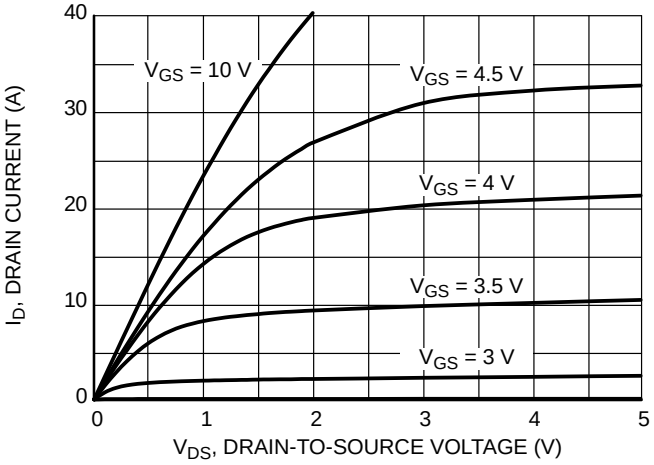



**Figure 1. On-Region Characteristics**

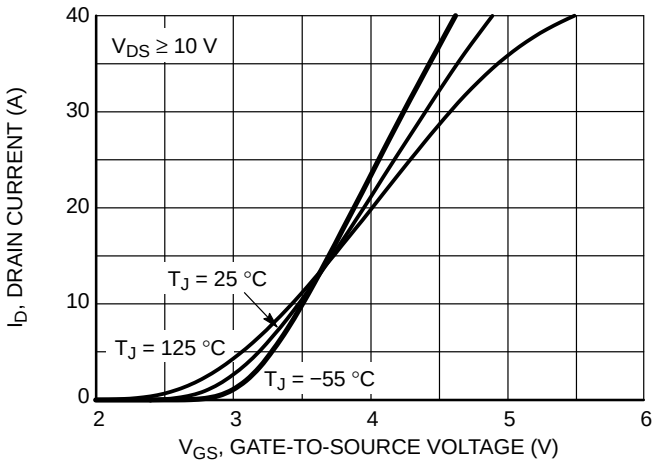



**Figure 2. Transfer Characteristics**

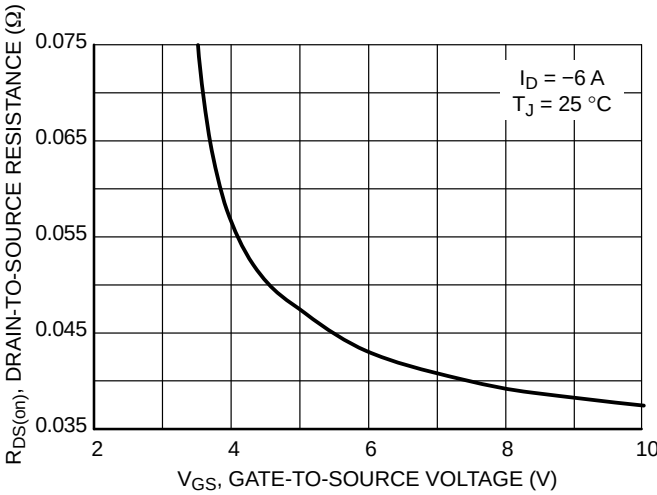



**Figure 3. On-Resistance vs. Gate-to-Source Voltage**

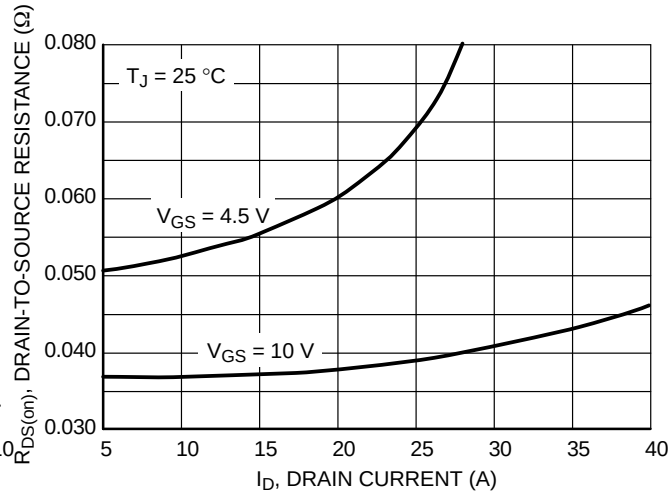



**Figure 4. On-Resistance vs. Drain Current and Gate Voltage**

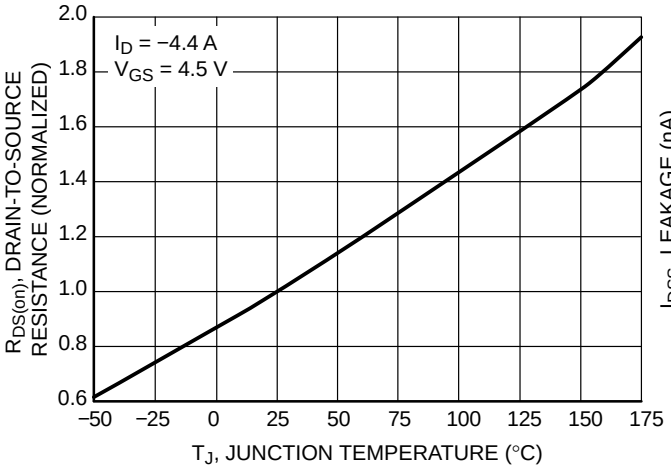



**Figure 5. On-Resistance Variation with Temperature**

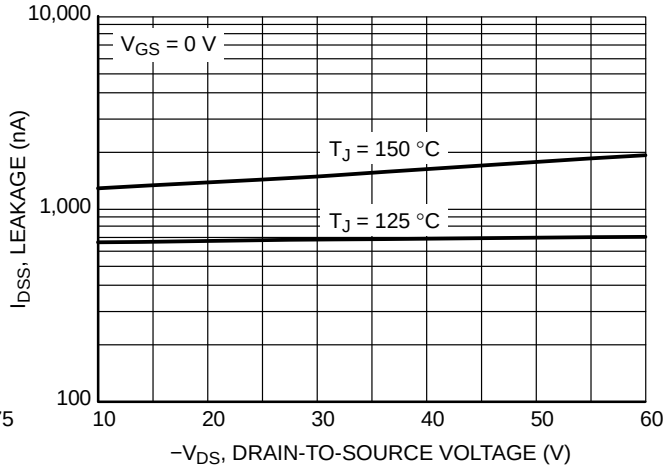



**Figure 6. Drain-to-Source Leakage Current vs. Voltage**



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## TYPICAL CHARACTERISTICS

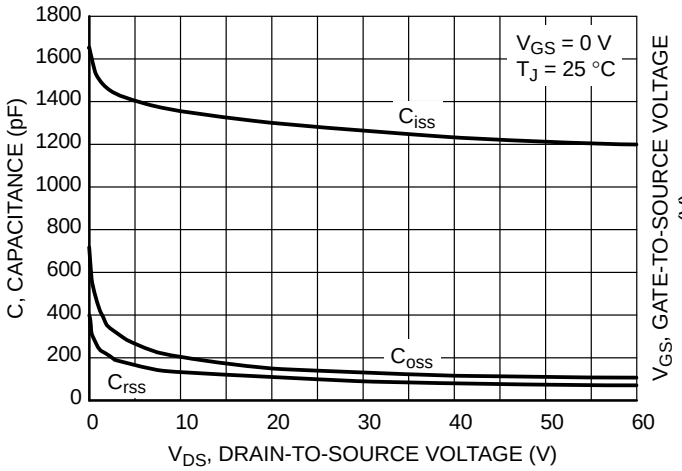



**Figure 7. Capacitance Variation**

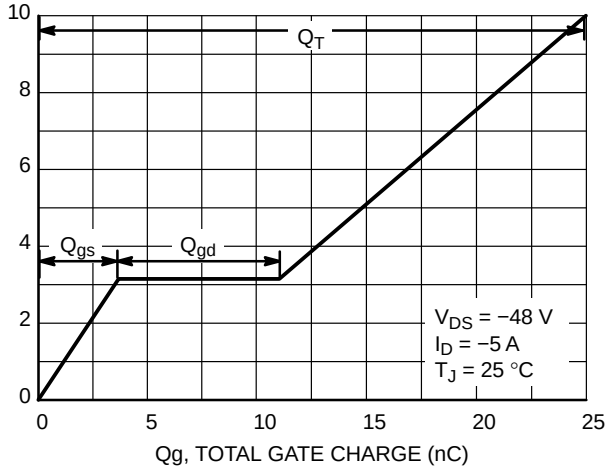



**Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge**

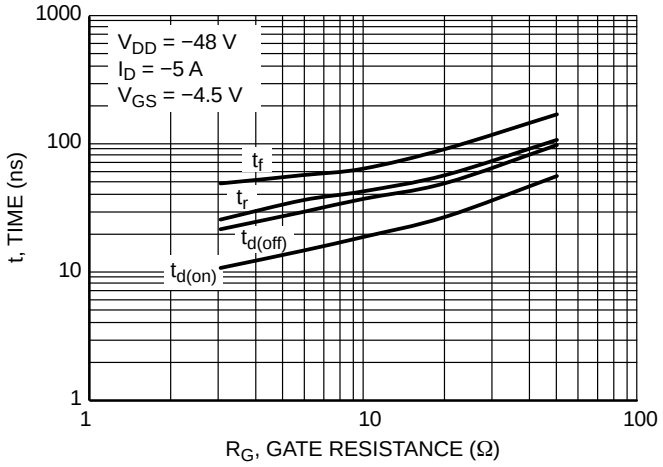



**Figure 9. Resistive Switching Time Variation vs. Gate Resistance**

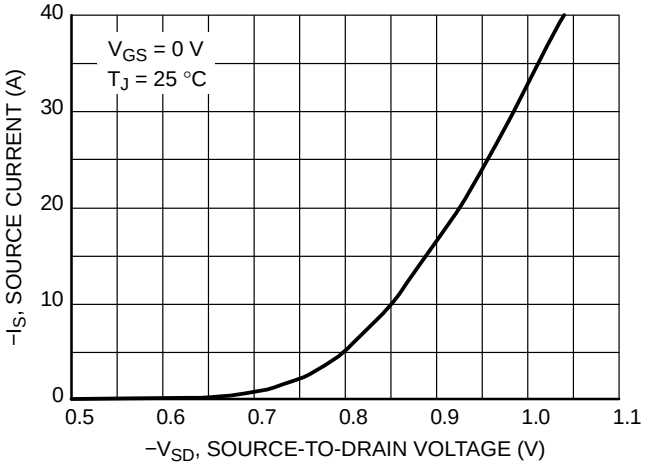



**Figure 10. Diode Forward Voltage vs. Current**

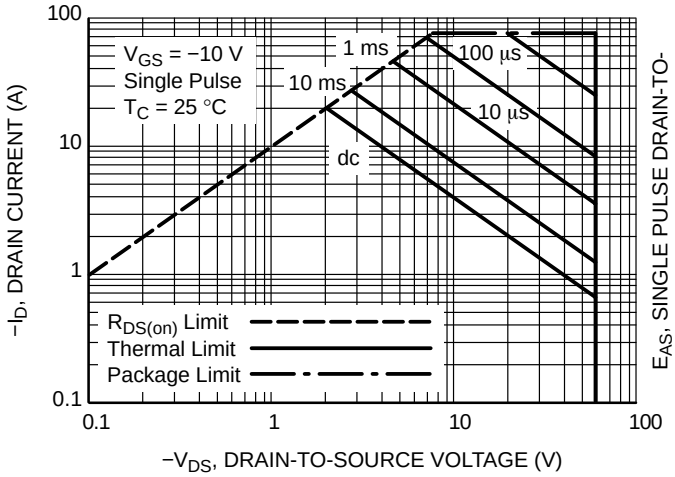



**Figure 11. Maximum Rated Forward Biased Safe Operating Area**

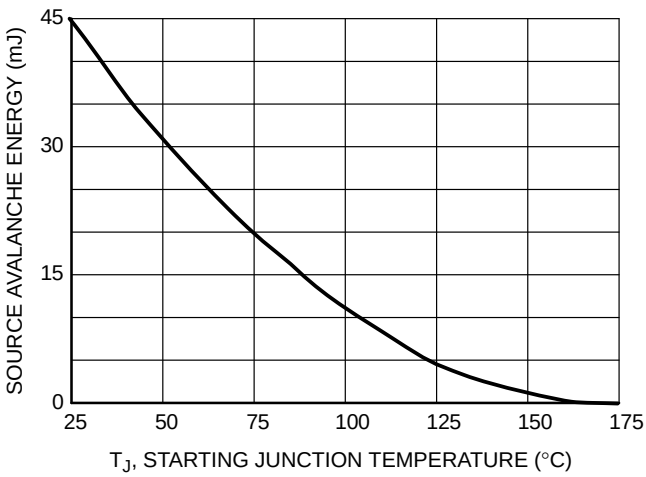



**Figure 12. Maximum Avalanche Energy vs. Starting Junction Temperature**



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## TYPICAL CHARACTERISTICS

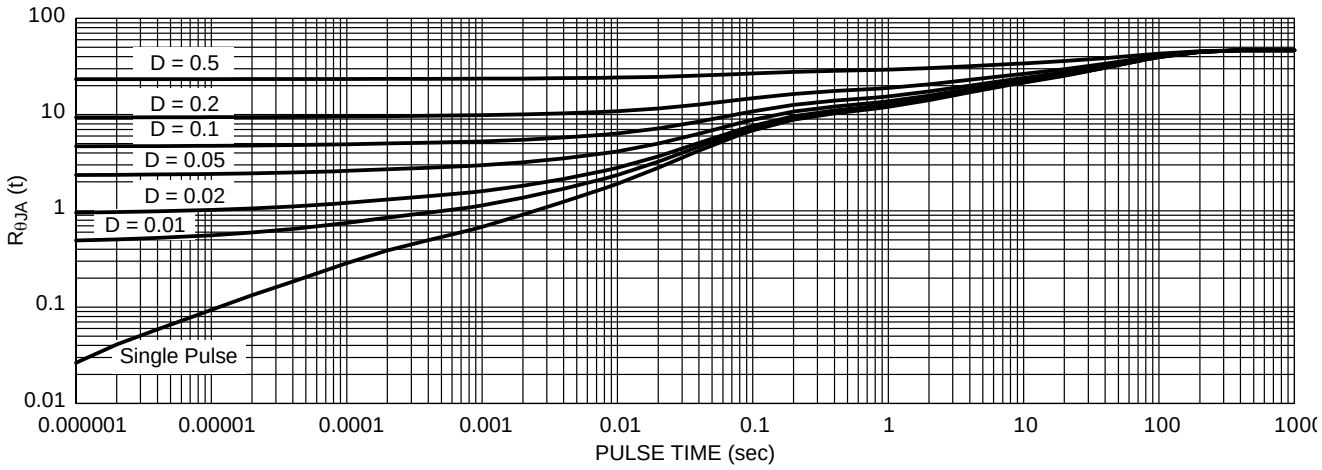



**Figure 13. Thermal Response**



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## REVISION HISTORY

| Revision | Description of Changes | Date |
|---|---|---|
| 3 | Rebranded the Data Sheet to **onsemi** format. | 10/17/2025 |

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.



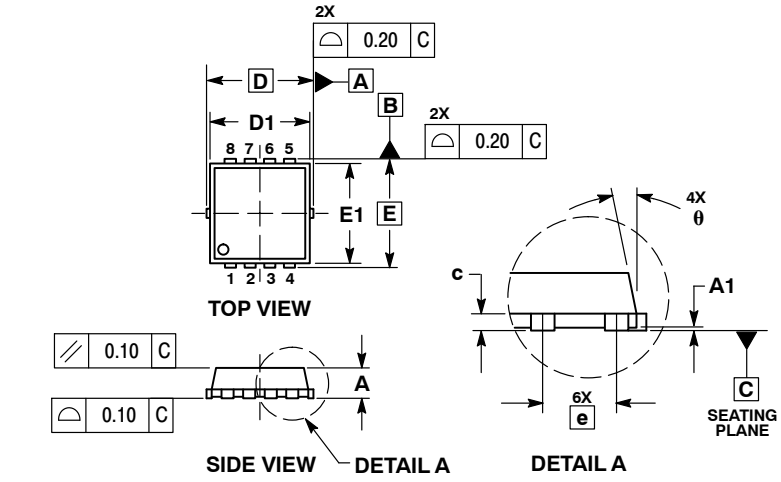
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**SCALE 2:1**

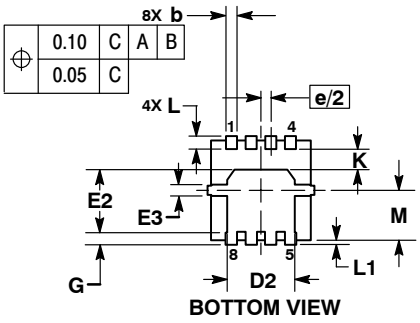
**WDFN8 3.3x3.3, 0.65P**
CASE 511AB
ISSUE D

DATE 23 APR 2012




NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 | 0.028 | 0.030 | 0.031 |
| A1 | 0.00 | --- | 0.05 | 0.000 | --- | 0.002 |
| b | 0.23 | 0.30 | 0.40 | 0.009 | 0.012 | 0.016 |
| c | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| D | 3.30 BSC | | | 0.130 BSC | | |
| D1 | 2.95 | 3.05 | 3.15 | 0.116 | 0.120 | 0.124 |
| D2 | 1.98 | 2.11 | 2.24 | 0.078 | 0.083 | 0.088 |
| E | 3.30 BSC | | | 0.130 BSC | | |
| E1 | 2.95 | 3.05 | 3.15 | 0.116 | 0.120 | 0.124 |
| E2 | 1.47 | 1.60 | 1.73 | 0.058 | 0.063 | 0.068 |
| E3 | 0.23 | 0.30 | 0.40 | 0.009 | 0.012 | 0.016 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| G | 0.30 | 0.41 | 0.51 | 0.012 | 0.016 | 0.020 |
| K | 0.65 | 0.80 | 0.95 | 0.026 | 0.032 | 0.037 |
| L | 0.30 | 0.43 | 0.56 | 0.012 | 0.017 | 0.022 |
| L1 | 0.06 | 0.13 | 0.20 | 0.002 | 0.005 | 0.008 |
| M | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| θ | 0 ° | --- | 12 ° | 0 ° | --- | 12 ° |



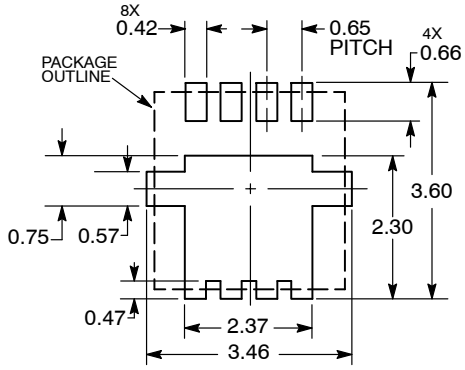

## GENERIC MARKING DIAGRAM*




XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

## SOLDERING FOOTPRINT*




DIMENSION: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

| | | |
|---|---|---|
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| **DESCRIPTION:** | **WDFN8 3.3X3.3, 0.65P** | **PAGE 1 OF 1** |

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Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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Entegreden kapasitöre tüm elektronik komponent kategorileri.

**Kategorilere göz atın**

### Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

**Üreticileri görün**

### Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

**Teklif isteyin**

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