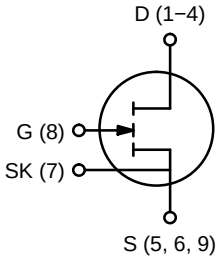
# Enhancement Mode Gallium Nitride (GaN) HEMT

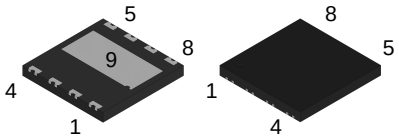
## 700 V, 100 mΩ, 16 A, PTFP-N9 (DFN)

*Preliminary Document*

# NTMT130N70GN1

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ TYP | $I_D$ MAX |
|---|---|---|
| 700 V | 100 mΩ | 16 A |




**PTFP-N9 8.00x8.00x0.90, 2.00P**
**(DFN)**
**CASE 522AG**

### Features

- Low $R_{DS(ON)}$ to Minimize Conduction Losses
- Ultra Low Gate Charge for High Speed Switching
- FOM-$Q_G$ = 270 nC*mΩ
- Small Footprint for High Density PCB Design
- This Device is Halide Free and RoHS Compliant with Exemption 7a, Pb-Free 2LI (on second level interconnection)

### Typical Applications

- High Density Power Modules
- High Frequency AC-DC and DC-DC Converters
- High Performance PSU for Consumer and Industrial
- Resonant Conversion

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

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-to-Source Voltage | $V_{DSS}$ | 700 | V |
| Drain-to-Source Transient Voltage, $t_P$ < 200 μs | $V_{DS(TRAN)}$ | 800 | V |
| Pulsed Drain-to-Source Voltage, $T_J$ = 25 °C ($t_{TOTAL}$ < 10h) / $T_J$ = 125 °C ($t_{TOTAL}$ < 1h) | $V_{DS(PULSE)}$ | 750 | V |
| Gate-to-Source Voltage | $V_{GS}$ | −6 to 7 | V |
| Gate-to-Source Transient Voltage, $t_P$ = 50 ns, $f_P$ = 100 kHz, Open Drain | $V_{GS(PULSE)}$ | −20 to 10 | V |
| Continuous Drain Current, $T_{CASE}$ = 25 °C | $I_{DS}$ | 16 | A |
| Pulsed Drain Current, $t_P$ < 10 μs, $T_C$ = 25 °C<br>$T_C$ = 125 °C | $I_{DS(PULSE)}$ | 32<br>18 | A |
| Power Dissipation, $V_{GS}$ = 6 V, $T_{CASE}$ = 25 °C | $P_{TOT}$ | 84 | W |
| Operating Junction Temperature | $T_J$ | −55 to 150 | °C |
| Storage Temperature | $T_{STG}$ | −55 to 150 | °C |

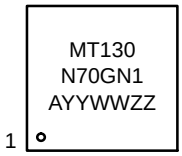
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction-to-Case | $R_{\theta JC}$ | 1.46 | °C/W |
| Junction-to-Ambient | $R_{\theta JA}$ | 63.4 | °C/W |
| Maximum Soldering Temperature (MSL3) | $T_{SLD}$ | 260 | °C |

1. Device on 1 $in^2$, 2 oz copper pad on single layer FR-4 PCB

### MARKING DIAGRAM




MT130N70GN1 = Specific Device Code
A = Assembly Location
YY = Year
WW = Work Week
ZZ = Assembly Lot Code

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| NTMT130N70GN1TXG | PTFP-N9 (DFN) | 2500 / 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.

This Preliminary document is for informational purposes only. **onsemi** may update or withdraw it without notice. Content and referenced products are under development and subject to change.

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

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0 V | 700 | | | V |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 700 V | | 0.6 | 38 | μA |
| | | $V_{GS}$ = 0 V, $V_{DS}$ = 700 V, $T_J$ = 125 °C | | 4 | | |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$ = 6 V, $V_{DS}$ = 0 V | | 40 | | μA |
| **ON CHARACTERISTICS** | | | | | | |
| Drain-to-Source On Resistance | $R_{DS(ON)}$ | $V_{GS}$ = 6 V, $I_{DS}$ = 0.5 A | | 100 | 130 | mΩ |
| | | $V_{GS}$ = 6 V, $I_{DS}$ = 5 A | | 100 | | |
| | | $V_{GS}$ = 6 V, $I_{DS}$ = 5 A, $T_J$ = 125 °C | | 203 | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS}$ = $V_{GS}$, $I_{DS}$ = 14.3 mA, $T_J$ = 25 °C | 1.2 | 1.6 | 2.5 | V |
| | | $V_{DS}$ = $V_{GS}$, $I_{DS}$ = 14.3 mA, $T_J$ = 125 °C | | 1.5 | | |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$ = 400 V, $V_{GS}$ = 0 V, f = 100 kHz | | 101 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 37 | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 0.4 | | |
| Output Capacitance, Energy Related | $C_{OSS(ER)}$ | $V_{DS}$ = 0 V to 400 V, $V_{GS}$ = 0 V | | 49 | | pF |
| Output Capacitance, Time Related | $C_{OSS(TR)}$ | | | 65 | | |
| Output Charge | $Q_{OSS}$ | | | 25.5 | | nC |
| Output Capacitance Stored Energy | $E_{OSS}$ | | | 3.9 | | μJ |
| Gate Resistance | $R_G$ | f = 5 MHz | | 7 | | Ω |
| Gate Charge | $Q_G$ | $V_{DS}$ = 400 V, $I_{DS}$ = 5 A, $V_{GS}$ = 0/6 V | | 2.65 | | nC |
| Gate-to-Source Charge | $Q_{GS}$ | | | 0.22 | | |
| Gate-to-Drain Charge | $Q_{GD}$ | | | 1.02 | | |
| Gate Plateau Voltage | $V_{PLAT}$ | | | 2.1 | | V |
| **REVERSE CONDUCTION CHARACTERISTICS** | | | | | | |
| Source-to-Drain Reverse Voltage | $V_{SD}$ | $V_{GS}$ = 0 V, $I_{SD}$ = 5 A | | 2.4 | | V |
| Pulsed Reverse Current | $I_{SD(PULSE)}$ | $V_{GS}$ = 6 V, $t_{PULSE}$ = 10 μs | | | 32 | A |

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.

## TYPICAL CHARACTERISTICS ($T_J$ = 25 °C UNLESS OTHERWISE SPECIFIED)

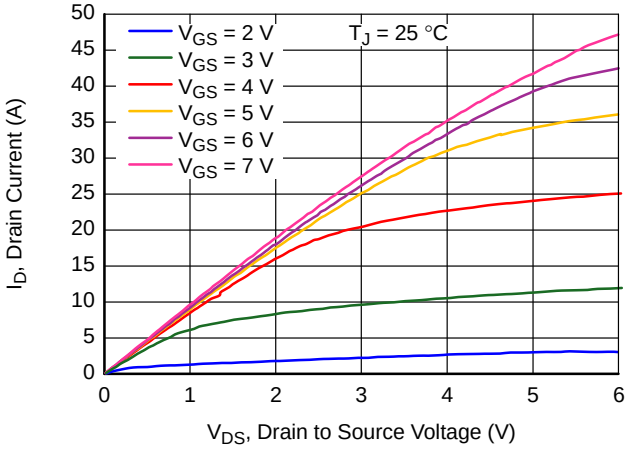



**Figure 1. Output Characteristics at $T_J$ = 25 °C**

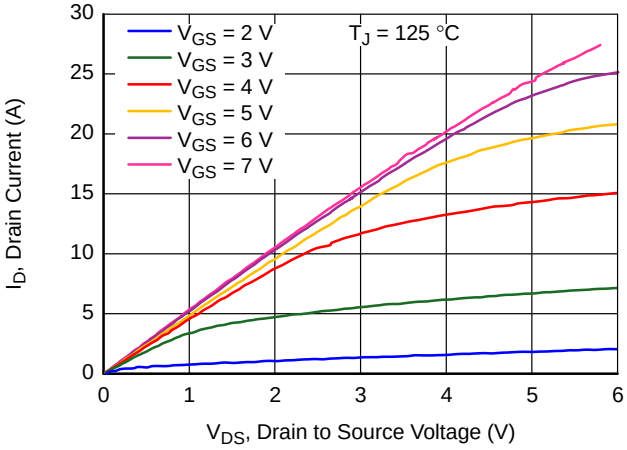



**Figure 2. Output Characteristics at $T_J$ = 125 °C**

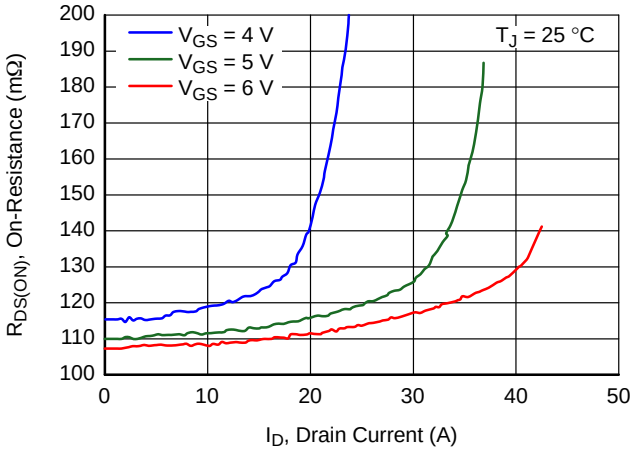



**Figure 3. On-Resistance vs. Drain Current at $T_J$ = 25 °C**

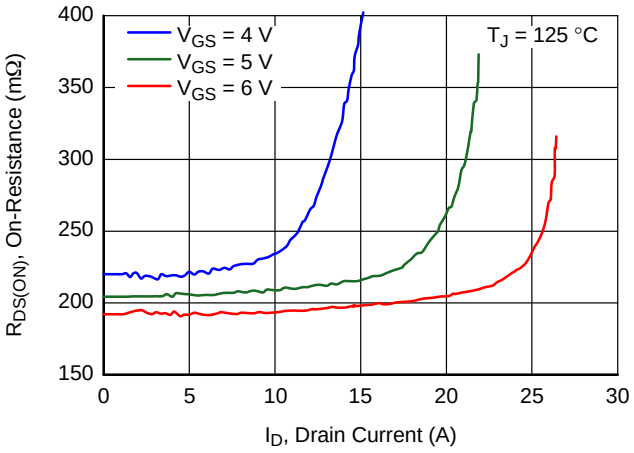



**Figure 4. On-Resistance vs. Drain Current at $T_J$ = 125 °C**

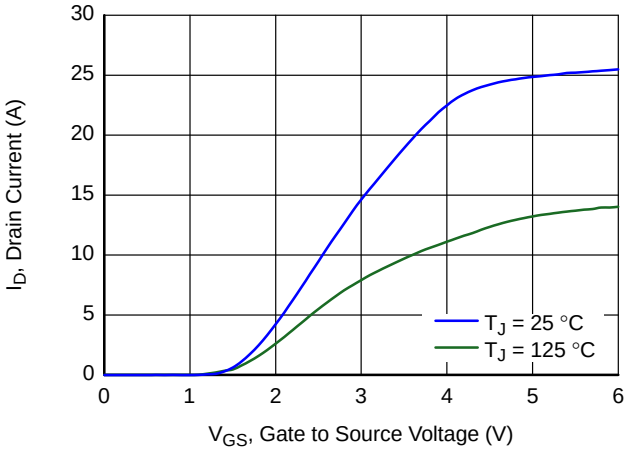



**Figure 5. Transfer Characteristics at $V_{DS}$ = 3 V**

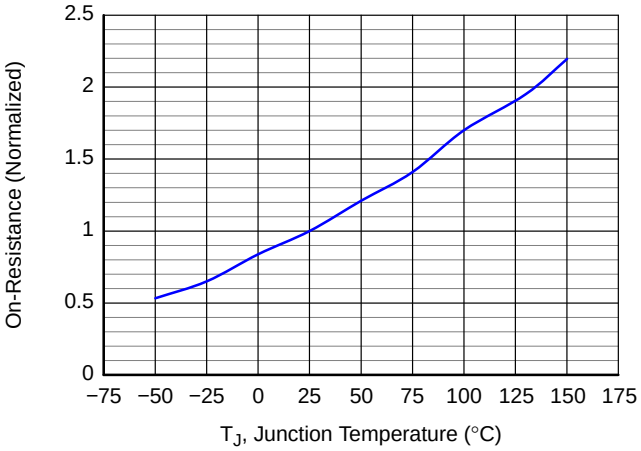



**Figure 6. Normalized On-Resistance vs. Temperature at $V_{GS}$ = 6 V**

## TYPICAL CHARACTERISTICS ($T_J$ = 25 °C UNLESS OTHERWISE SPECIFIED) (CONTINUED)

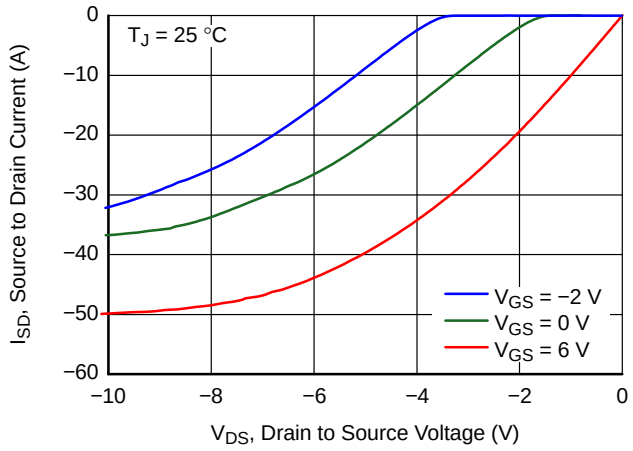



**Figure 7. Reverse Conduction Characteristics at $T_J$ = 25 °C**

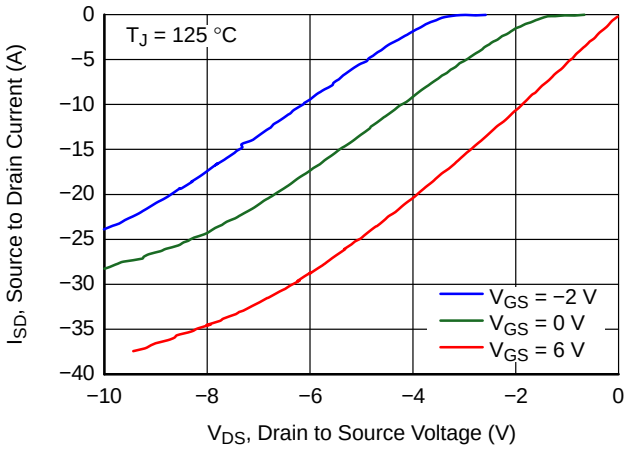



**Figure 8. Reverse Conduction Characteristics at $T_J$ = 125 °C**

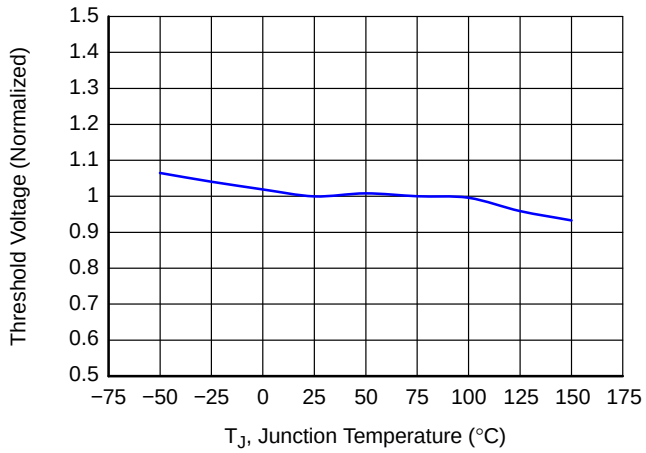



**Figure 9. Normalized Threshold Voltage vs. Temperature**

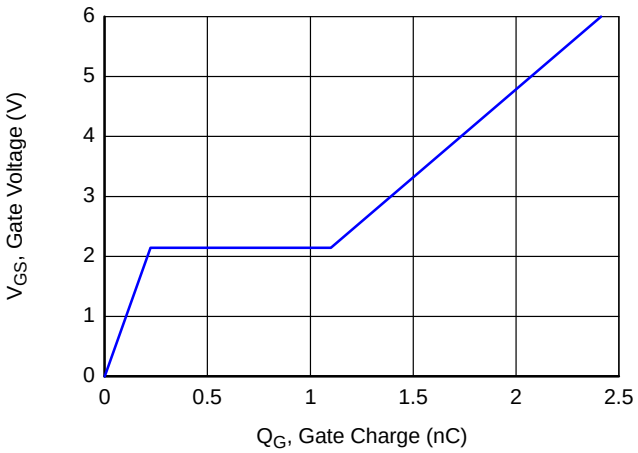



**Figure 10. Gate Charge Characteristics at $I_{DS}$ = 20 A**

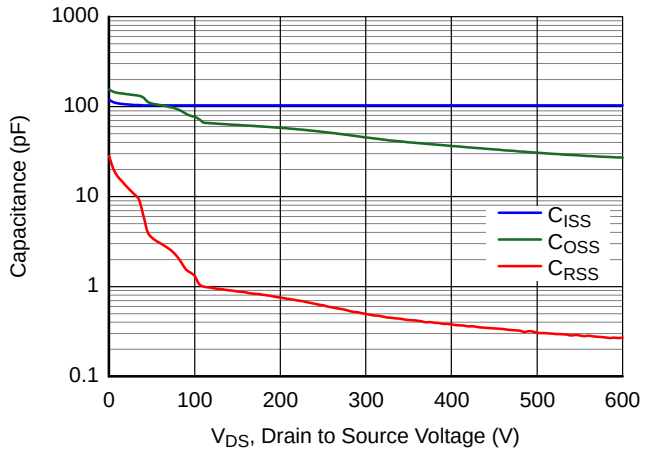



**Figure 11. Capacitance Characteristics**

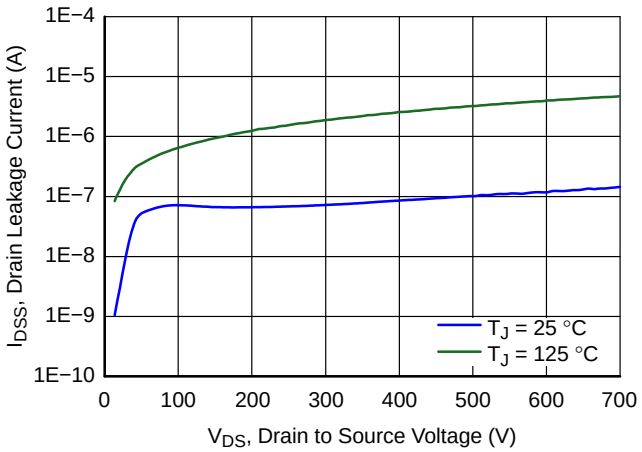



**Figure 12. Drain Leakage Characteristics**

## TYPICAL CHARACTERISTICS ($T_J$ = 25 °C UNLESS OTHERWISE SPECIFIED) (CONTINUED)

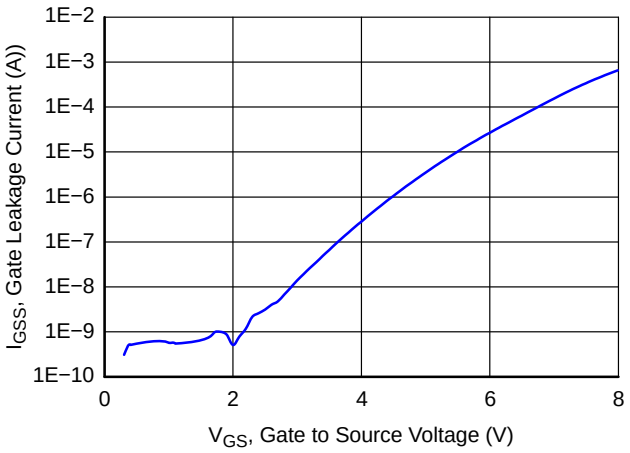



**Figure 13. Gate Leakage Characteristics**

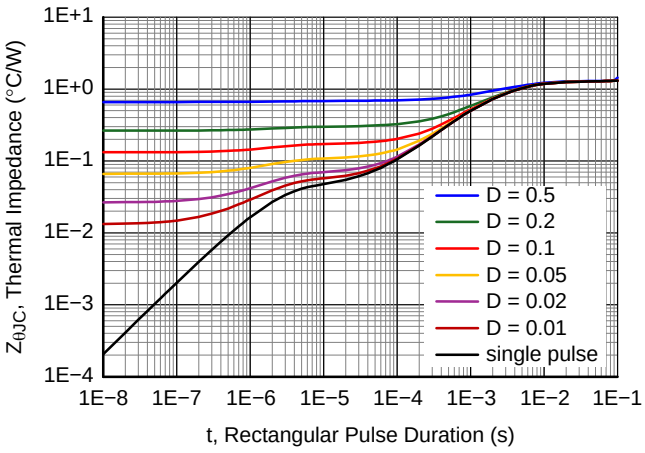



**Figure 14. Transient Thermal Impedance**

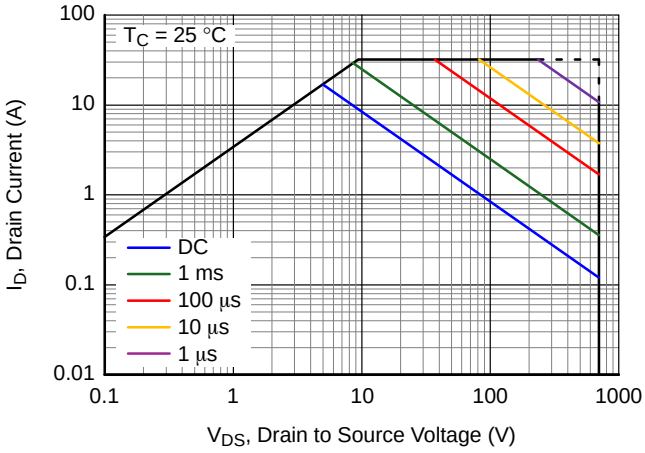



**Figure 15. Safe Operating Area at $T_C$ = 25 °C**

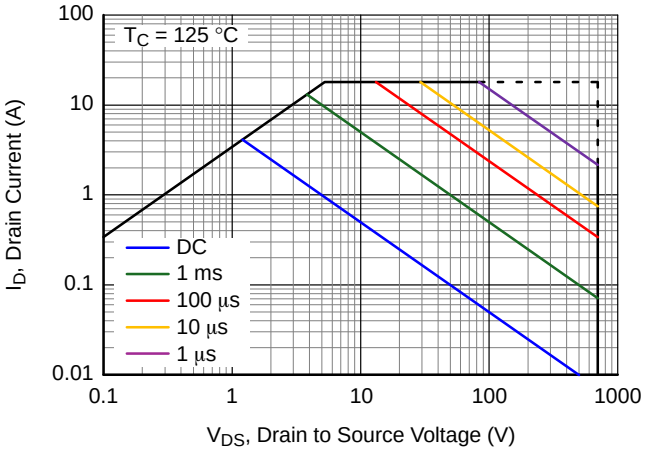


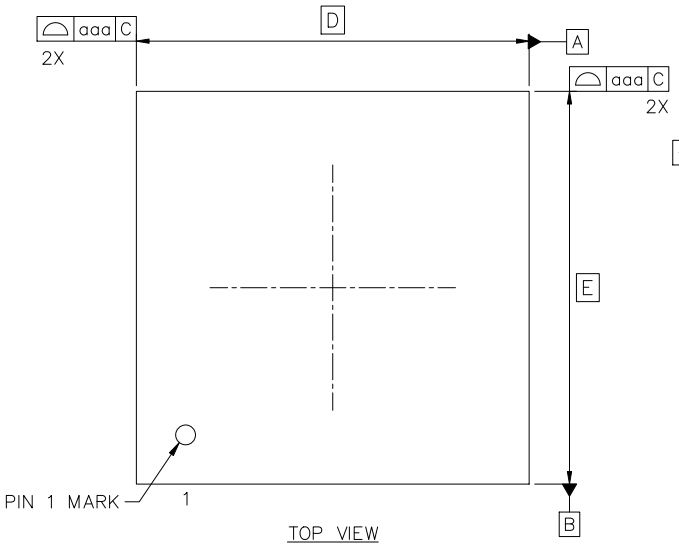

**Figure 16. Safe Operating Area at $T_C$ = 125 °C**

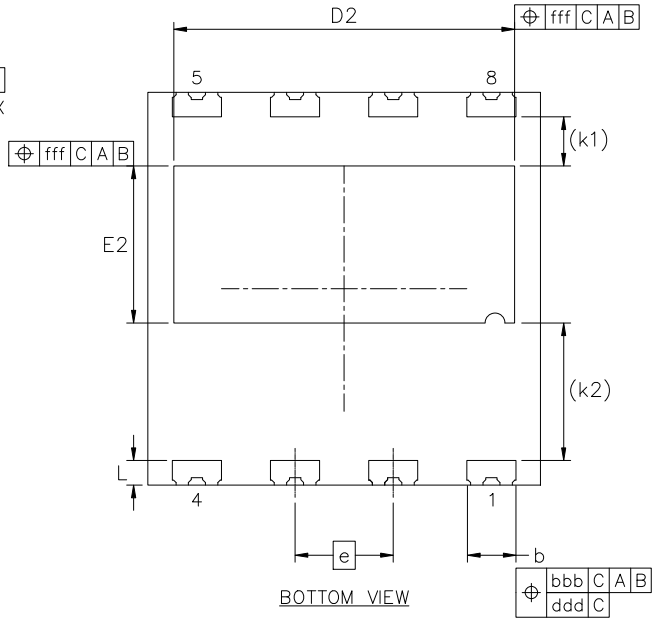
**REVISION HISTORY**

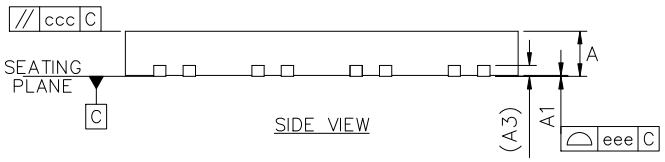
| Revision | Description of Changes | Date |
|---|---|---|
| P0 | Initial Preliminary document release. | 5/29/2026 |

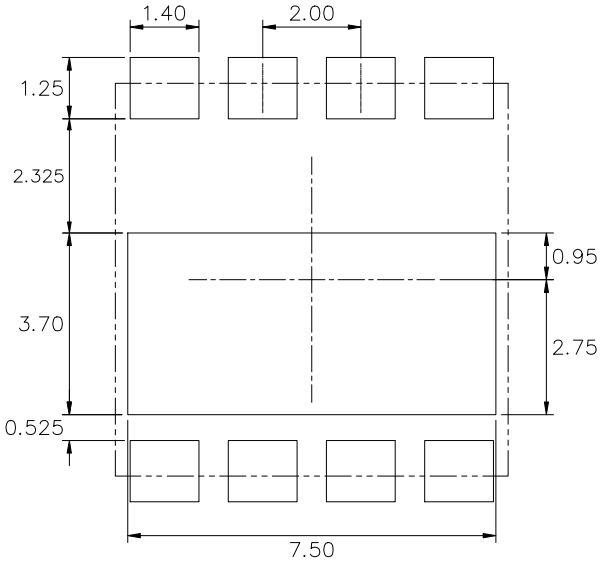
## PACKAGE DIMENSIONS

**PTFP−N9 8.00x8.00x0.90, 2.00P**
CASE 522AG
ISSUE O




RECOMMENDED MOUNTING FOOTPRINT

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

NOTES:
1. ALL DIMENSION AND TOLERANCE CONFORM TO ASME Y14.5−2018.
2. ALL DIMENSION ARE IN MILLIMETERS
3. DRAWING NOT TO SCALE.
4. DIMENSION DO NOT INCLUDE MOLD PROTRUSION.
5. PACKAGE OUTLINE EXCLUSIVE OF METAL BURR DIMENSIONS.

| MILLIMETER | | | |
|---|---|---|---|
| SYMBOL | MIN. | NOM. | MAX. |
| A | 0.80 | 0.90 | 1.00 |
| A1 | 0.00 | 0.02 | 0.05 |
| A3 | 0.203 REF. | | |
| b | 0.95 | 1.00 | 1.05 |
| D | 8.00 BSC | | |
| D2 | 6.84 | 6.94 | 7.04 |
| E | 8.00 BSC | | |
| E2 | 3.10 | 3.20 | 3.30 |
| e | 2.00 BSC | | |
| k1 | 1.00 REF. | | |
| k2 | 2.80 REF. | | |
| L | 0.40 | 0.50 | 0.60 |
| TOLERANCE FORM & POSITION | | | |
| aaa | 0.10 | | |
| bbb | 0.10 | | |
| ccc | 0.10 | | |
| ddd | 0.05 | | |
| eee | 0.10 | | |
| fff | 0.10 | | |

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

**ONLINE SUPPORT**: www.onsemi.com/support
**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales