# AOTF2916L-VB Datasheet

## N-Channel 100-V (D-S) MOSFET

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{(BR)DSS}$ (V) | $r_{DS(on)}$ (Ω) | $I_D$ (A) |
| 100 | 0.034 at $V_{GS}$ = 10 V | 50[a] |

### FEATURES

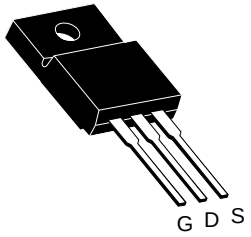
- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 % $R_g$ Tested

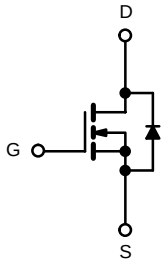
RoHS COMPLIANT

### APPLICATIONS

- Isolated DC/DC Converters

**TO-220 FULLPAK**




N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS $T_C$ = 25 °C, unless otherwise noted | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Limit** | **Unit** |
| Drain-Source Voltage | | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GS}$ | ± 20 | |
| Continuous Drain Current ($T_J$ = 175 °C) | $T_C$ = 25 °C | $I_D$ | 50[a] | A |
| | $T_C$ = 125 °C | | 28[a] | |
| Pulsed Drain Current | | $I_{DM}$ | 120 | |
| Avalanche Current | L = 0.1 mH | $I_{AS}$ | 31 | |
| Single Pulse Avalanche Energy[b] | | $E_{AS}$ | 61 | mJ |
| Maximum Power Dissipation[b] | $T_C$ = 25 °C | $P_D$ | 360[c] | W |
| | $T_A$ = 25 °C[d] | | 3.70 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | - 55 to 175 | °C |

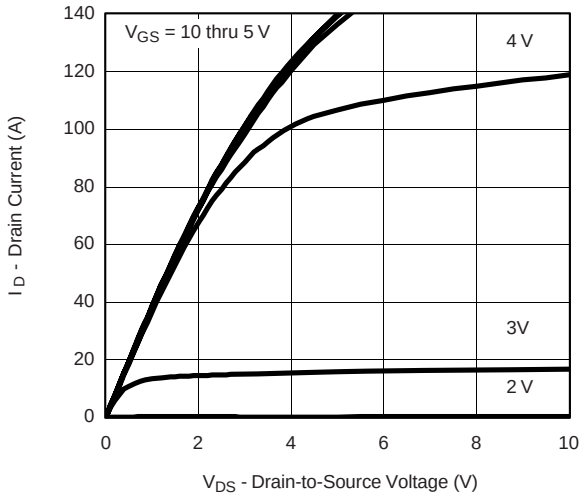
| THERMAL RESISTANCE RATINGS | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Limit** | **Unit** |
| Junction-to-Ambient | PCB Mount (TO-263)[d] | $R_{thJA}$ | 40 | °C/W |
| Junction-to-Case (Drain) | | $R_{thJC}$ | 0.4 | |

Notes:
a. Package limited.
b. Duty cycle ≤ 1 %.
c. See SOA curve for voltage derating.
d. When Mounted on 1" square PCB (FR-4 material).

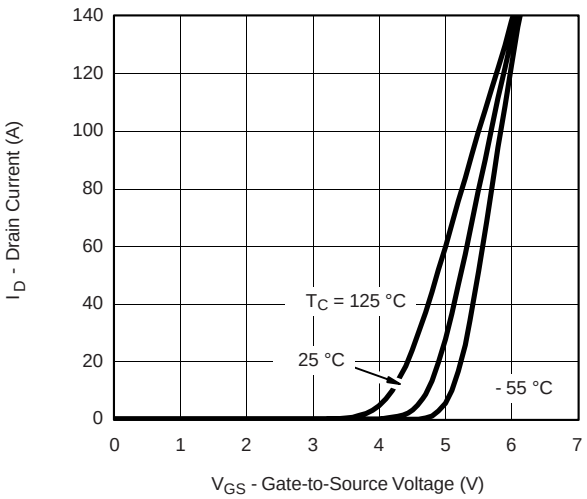
| **SPECIFICATIONS** $T_J$ = 25 °C, unless otherwise noted | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Min.** | **Typ.** | **Max.** | **Unit** |
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{DS}$ = 0 V, $I_D$ = 250 µA | 100 | | | V |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | 1.5 | | 2.5 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 100 V, $V_{GS}$ = 0 V | | | 1 | µA |
| | | $V_{DS}$ = 100 V, $V_{GS}$ = 0 V, $T_J$ = 125 °C | | | 50 | |
| | | $V_{DS}$ = 100 V, $V_{GS}$ = 0 V, $T_J$ = 175 °C | | | 250 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS}$ ≥ 5 V, $V_{GS}$ = 10 V | 120 | | | A |
| Drain-Source On-State Resistance[a] | $r_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 30 A | | 0.034 | | Ω |
| | | $V_{GS}$ = 10 V, $I_D$ = 30 A, $T_J$ = 125 °C | | 0.063 | | |
| | | $V_{GS}$ = 10 V, $I_D$ = 30 A, $T_J$ = 175 °C | | 0.084 | | |
| Forward Transconductance[a] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 30 A | 25 | | | S |
| **Dynamic[b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 5100 | | pF |
| Output Capacitance | $C_{oss}$ | | | 480 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 210 | | |
| Total Gate Charge[c] | $Q_g$ | $V_{DS}$ = 100 V, $V_{GS}$ = 10 V, $I_D$ = 65 A | | 90 | 130 | nC |
| Gate-Source Charge[c] | $Q_{gs}$ | | | 23 | | |
| Gate-Drain Charge[c] | $Q_{gd}$ | | | 34 | | |
| Gate Resistance | $R_g$ | | 0.5 | 1.7 | 3.3 | Ω |
| Turn-On Delay Time[c] | $t_{d(on)}$ | $V_{DD}$ = 100 V, $R_L$ = 1.5 Ω<br>$I_D$ ≅ 65 A, $V_{GEN}$ = 10 V, $R_g$ = 2.5 Ω | | 24 | 35 | ns |
| Rise Time[c] | $t_r$ | | | 220 | 330 | |
| Turn-Off Delay Time[c] | $t_{d(off)}$ | | | 45 | 70 | |
| Fall Time[c] | $t_f$ | | | 200 | 300 | |
| **Source-Drain Diode Ratings and Characteristics** $T_C$ = 25 °C[b] | | | | | | |
| Continuous Current | $I_S$ | | | 50 | | A |
| Pulsed Current | $I_{SM}$ | | | 120 | | |
| Forward Voltage[a] | $V_{SD}$ | $I_F$ = 65 A, $V_{GS}$ = 0 V | | 1.0 | 1.5 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 50 A, di/dt = 100 A/µs | | 130 | 200 | ns |
| Peak Reverse Recovery Current | $I_{RM(REC)}$ | | | 8 | 12 | A |
| Reverse Recovery Charge | $Q_{rr}$ | | | 0.52 | 1.2 | µC |

Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

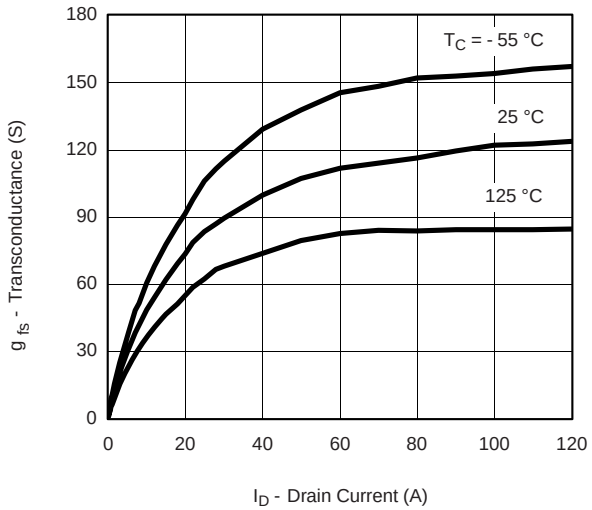
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



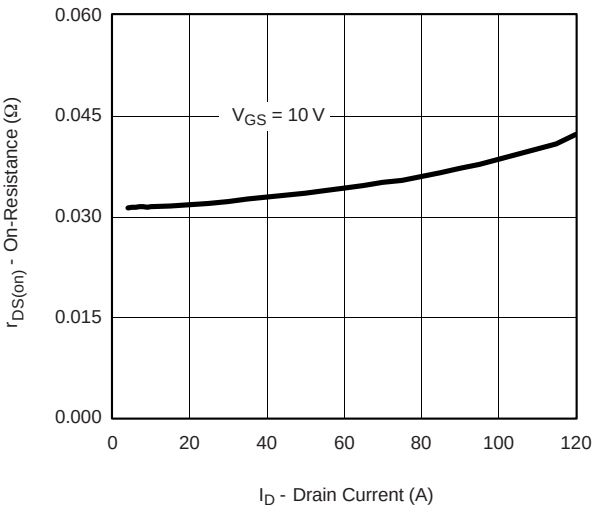

**Output Characteristics**



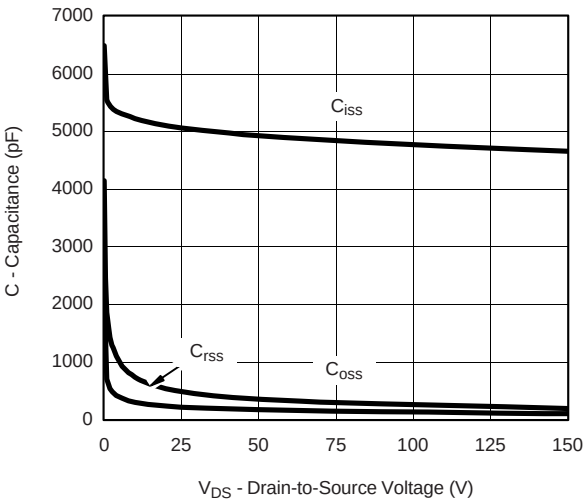

**Transfer Characteristics**



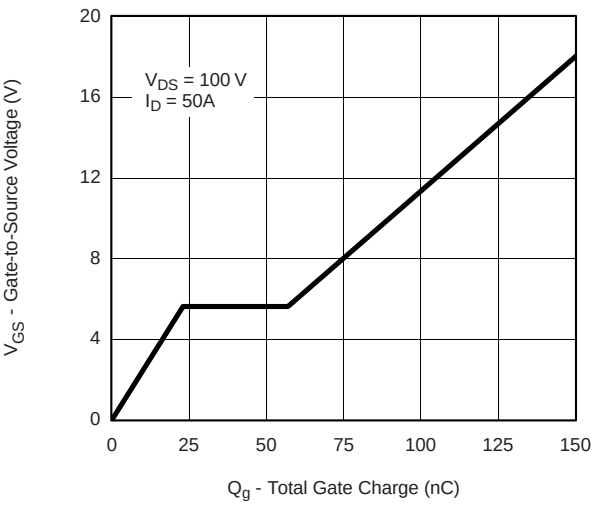

**Transconductance**




**On-Resistance vs. Drain Current**

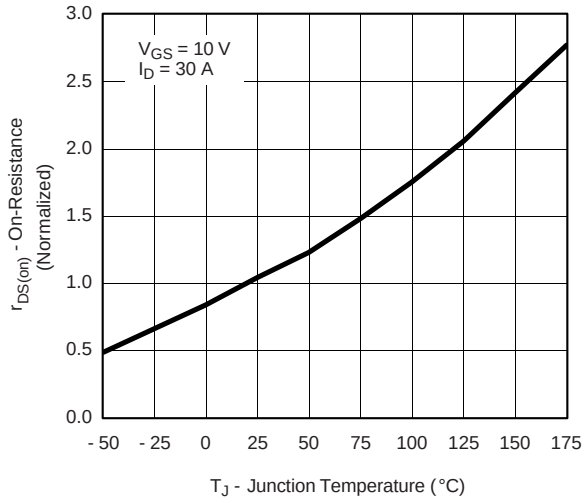



**Capacitance**

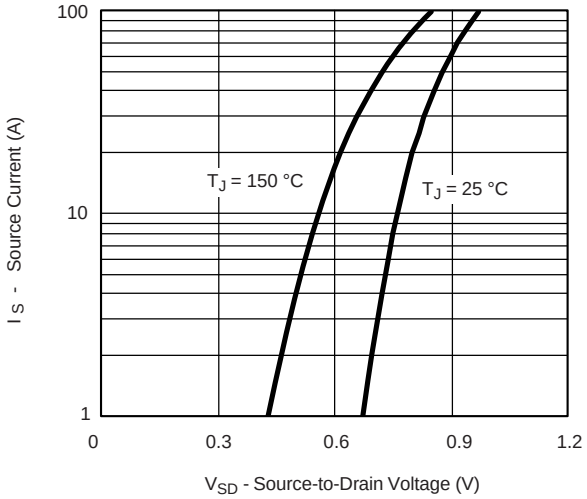



**Gate Charge**

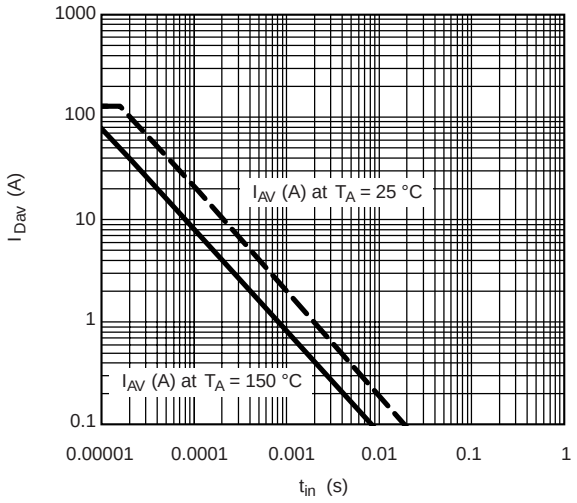
## TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



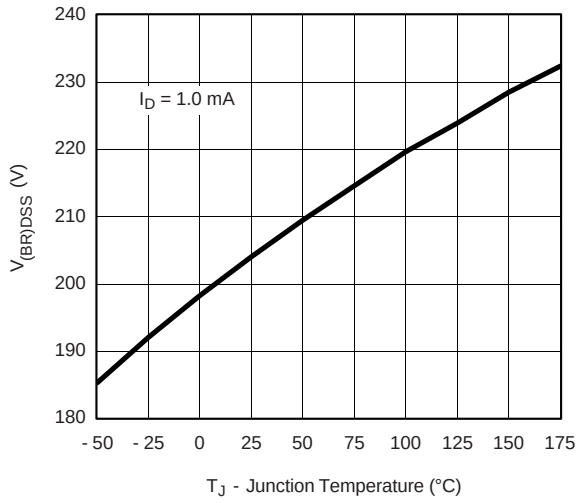

**On-Resistance vs. Junction Temperature**




**Source-Drain Diode Forward Voltage**

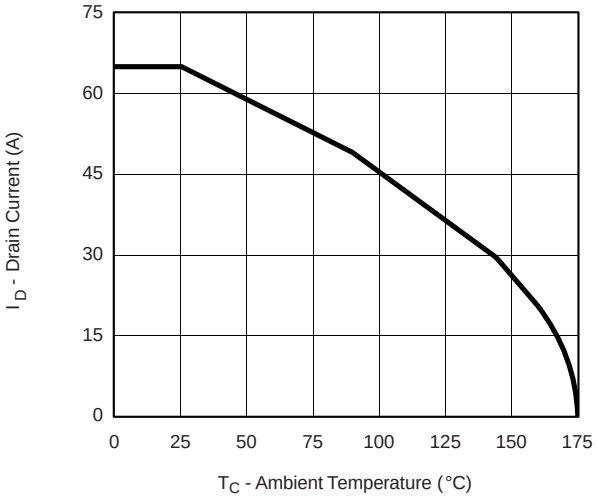



**Avalanche Current vs. Time**

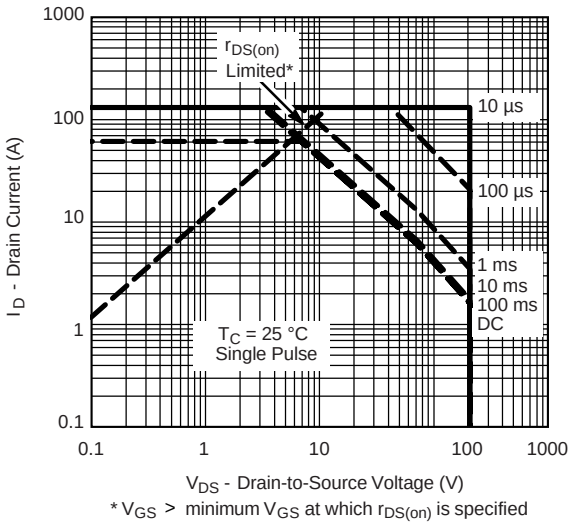



**Drain Source Breakdown vs. Junction Temperature**

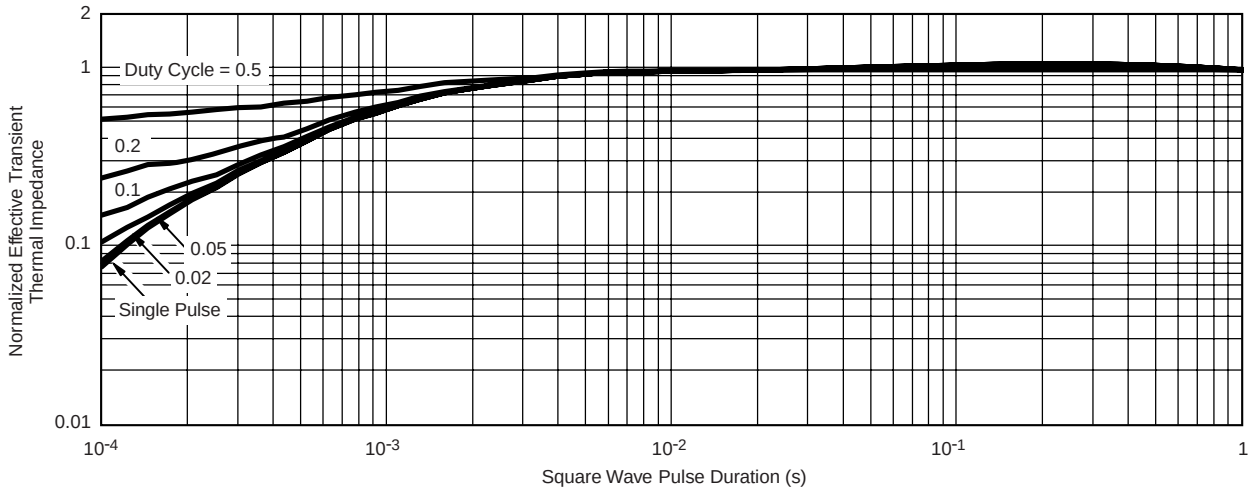
## THERMAL RATINGS




**Maximum Avalanche and Drain Current vs. Case Temperature**

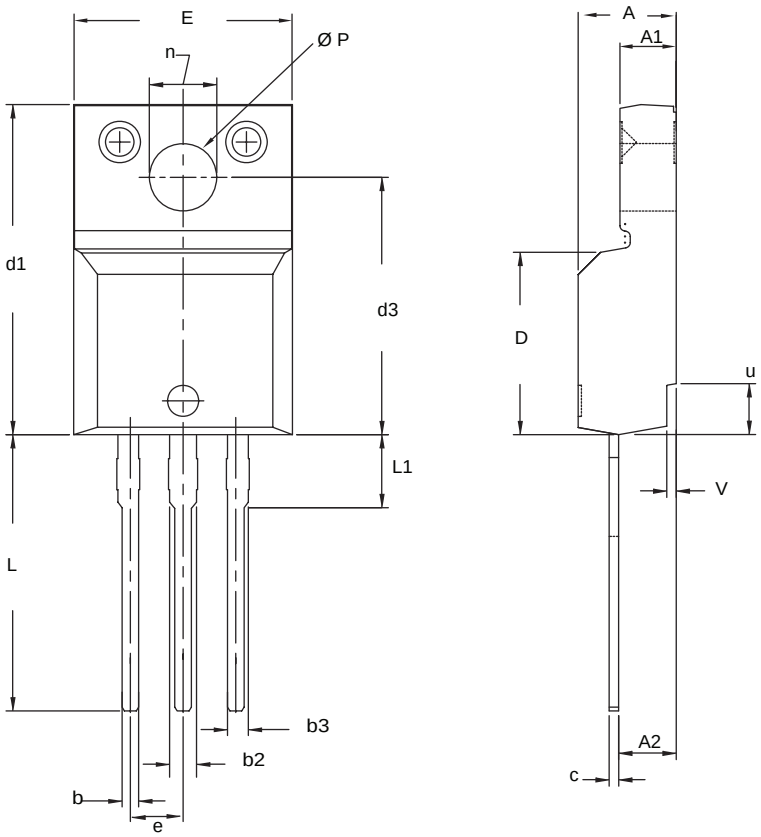



**Safe Operating Area**




**Normalized Thermal Transient Impedance, Junction-to-Case**

## TO-220 FULLPAK (HIGH VOLTAGE)




| | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| **DIM.** | **MIN.** | **MAX.** | **MIN.** | **MAX.** |
| A | 4.570 | 4.830 | 0.180 | 0.190 |
| A1 | 2.570 | 2.830 | 0.101 | 0.111 |
| A2 | 2.510 | 2.850 | 0.099 | 0.112 |
| b | 0.622 | 0.890 | 0.024 | 0.035 |
| b2 | 1.229 | 1.400 | 0.048 | 0.055 |
| b3 | 1.229 | 1.400 | 0.048 | 0.055 |
| c | 0.440 | 0.629 | 0.017 | 0.025 |
| D | 8.650 | 9.800 | 0.341 | 0.386 |
| d1 | 15.88 | 16.120 | 0.622 | 0.635 |
| d3 | 12.300 | 12.920 | 0.484 | 0.509 |
| E | 10.360 | 10.630 | 0.408 | 0.419 |
| e | 2.54 BSC | | 0.100 BSC | |
| L | 13.200 | 13.730 | 0.520 | 0.541 |
| L1 | 3.100 | 3.500 | 0.122 | 0.138 |
| n | 6.050 | 6.150 | 0.238 | 0.242 |
| Ø P | 3.050 | 3.450 | 0.120 | 0.136 |
| u | 2.400 | 2.500 | 0.094 | 0.098 |
| v | 0.400 | 0.500 | 0.016 | 0.020 |
| ECN: X09-0126-Rev. B, 26-Oct-09<br>DWG: 5972 | | | | |

**Notes**

1. To be used only for process drawing.
2. These dimensions apply to all TO-220, FULLPAK leadframe versions 3 leads.
3. All critical dimensions should C meet $C_{pk}$ > 1.33.
4. All dimensions include burrs and plating thickness.
5. No chipping or package damage.

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