# FDMD8430

# Dual N-Channel PowerTrench® MOSFET

## 30 V, 28 A, 2.12 mΩ

### General Description

This package integrates two N−Channel devices connected internally in common−source configuration. This enables very low package parasitics and optimized thermal path to the common source pad on the bottom. Provides a very small footprint (3.3 x 5 mm) for higher power density.

### Features

- Max $r_{DS(on)}$ = 2.12 mΩ at $V_{GS}$ = 10 V, $I_D$ = 28 A
- Max $r_{DS(on)}$ = 2.95 mΩ at $V_{GS}$ = 4.5 V, $I_D$ = 24 A
- Ideal for Flexible Layout in Secondary Side Synchronous Rectification
- 100% UIL Tested
- Termination is Lead−free and RoHS Compliant

### Applications

- Isolated DC−DC Synchronous Rectifiers
- Common Ground Load Switches

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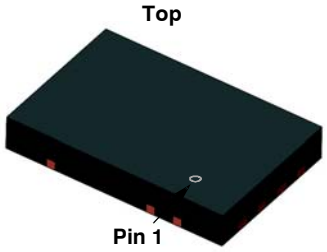
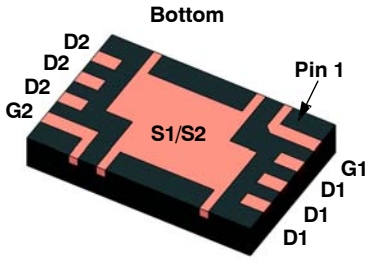
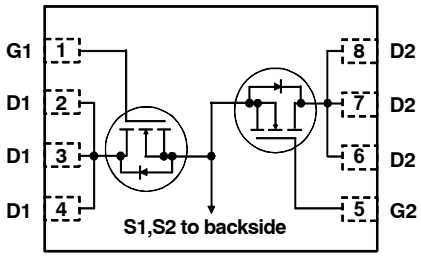



**PQFN8**
**PowerTrench**
**CASE 483AU**




### ORDERING INFORMATION

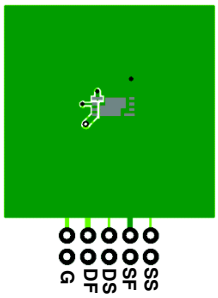
See detailed ordering and shipping information on page 2 of this data sheet.

**Table 1. MOSFET MAXIMUM RATINGS** $T_A$ = 25°C unless otherwise noted.

| Symbol | Parameter | | Rating | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain to Source Voltage | | 30 | V |
| $V_{GS}$ | Gate to Source Voltage | | ±20 | V |
| $I_D$ | Drain Current –Continuous | $T_C$ = 25°C (Note 1) | 95 | A |
| | – Continuous | $T_C$ = 100°C (Note 1) | 60 | |
| | – Continuous | $T_A$ = 25°C (Figure 1) | 28 | |
| | – Pulsed | (Note 2) | 562 | |
| $E_{AS}$ | Single Pulse Avalanche Energy | (Note 3) | 96 | mJ |
| $P_D$ | Power Dissipation | $T_C$ = 25°C | 29 | W |
| | Power Dissipation | $T_A$ = 25°C (Figure 1) | 2.1 | |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | | –55 to +150 | °C |

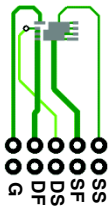
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro–mechanical application board design.
2. Pulse Id refers to Figure 13 Forward Bias Safe Operating Area.
3. $E_{AS}$ of 96 mJ is based on starting $T_J$ = 25°C; L = 0.3 mH, $I_{AS}$ = 31.7 A, $V_{DD}$ = 27 V.




a. 60 °C/W when mounted on a $1^2$in pad of 2 oz copper

**Figure 1.**




b.160 °C/W when mounted on a minimum pad of 2 oz copper

**Figure 2.**

**Table 2. THERMAL CHARACTERISTICS**

| | | | | |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | | 4.7 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | (Figure 1) | 60 | |

4. $R_{\theta JA}$ is determined with the device mounted on a 1 $in^2$ pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR–4 material, $R_{\theta CA}$ is determined by the user's board design.

**Table 3. PACKAGE MARKING AND ORDERING INFORMATION**

| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|
| FDMD8430 | FDMD8430 | Power 3.3 x 5 | 13″ | 12 mm | 3000 units |

**Table 4. ELECTRICAL CHARACTERISTICS** $T_J$ = 25°C unless otherwise noted.

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| $BV_{DSS}$ | Drain to Source Breakdown Voltage | $I_D$ = 250 μA, $V_{GS}$ = 0 V | 30 | | | V |
| $\Delta BV_{DSS}$ / $\Delta T_J$ | Breakdown Voltage Temperature Coefficient | $I_D$ = 250 μA, referenced to 25°C | | 17 | | mV/°C |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 24 V, $V_{GS}$ = 0 V | | | 1 | μA |
| $I_{GSS}$ | Gate to Source Leakage Current | $V_{GS}$ = ±20 V, $V_{DS}$ = 0 V | | | ±100 | nA |
| **ON CHARACTERISTICS** | | | | | | |
| $V_{GS(th)}$ | Gate to Source Threshold Voltage | $V_{GS}$ = $V_{DS}$, $I_D$ = 250 μA | 1.0 | 1.6 | 3.0 | V |
| $\Delta V_{GS(th)}$ / $\Delta T_J$ | Gate to Source Threshold Voltage Temperature Coefficient | $I_D$ = 250 μA, referenced to 25°C | | −5 | | mV/°C |
| $r_{DS(on)}$ | Static Drain to Source On Resistance | $V_{GS}$ = 10 V, $I_D$ = 28 A | | 1.5 | 2.12 | mΩ |
| | | $V_{GS}$ = 4.5 V, $I_D$ = 24 A | | 2.0 | 2.95 | |
| | | $V_{GS}$ = 10 V, $I_D$ = 28 A, $T_J$ = 125°C | | 1.7 | 2.4 | |
| $g_{FS}$ | Forward Transconductance | $V_{DD}$ = 5 V, $I_D$ = 28 A | | | 250 | S |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 15 V, $V_{GS}$ = 0 V, f = 1 MHZ | | 3595 | 5035 | pF |
| $C_{oss}$ | Output Capacitance | | | 1150 | 1610 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 112 | 160 | pF |
| $R_g$ | Gate Resistance | | | 2.3 | 4.5 | Ω |
| **SWITCHING CHARACTERISTICS** | | | | | | |
| $t_{d(on)}$ | Turn−On Delay Time | $V_{DD}$ = 15 V, $I_D$ = 28 A, $V_{GS}$ = 10 V, $R_{GEN}$ = 6 Ω | | 11 | 20 | ns |
| $t_r$ | Rise Time | | | 8 | 16 | ns |
| $t_{d(off)}$ | Turn−Off Delay Time | | | 71 | 114 | ns |
| $t_f$ | Fall Time | | | 20 | 36 | ns |
| $Q_{g(tot)}$ | Total Gate Charge | $V_{GS}$ = 0 V to 10 V; $V_{DD}$ = 15 V, $I_D$ = 28 A | | 52 | 90 | nC |
| | Total Gate Charge | $V_{GS}$ = 0 V to 4.5 V; $V_{DD}$ = 15 V, $I_D$ = 28 A | | 25 | 45 | nC |
| $Q_{gs}$ | Gate to Source Charge | | | 10 | | nC |
| $Q_{gd}$ | Gate to Drain “Miller” Charge | | | 7 | | nC |
| **DRAIN−SOURCE DIODE CHARACTERISTICS** | | | | | | |
| $V_{SD}$ | Source to Drain Diode Forward Voltage | $V_{GS}$ = 0 V, $I_S$ = 28 A (Note 5) | | 0.8 | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 28 A, di/dt = 100 A/μs | | 40 | 64 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 22 | 36 | 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.

5. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%.

**TYPICAL CHARACTERISTICS** $T_J$ = 25°C unless otherwise noted.

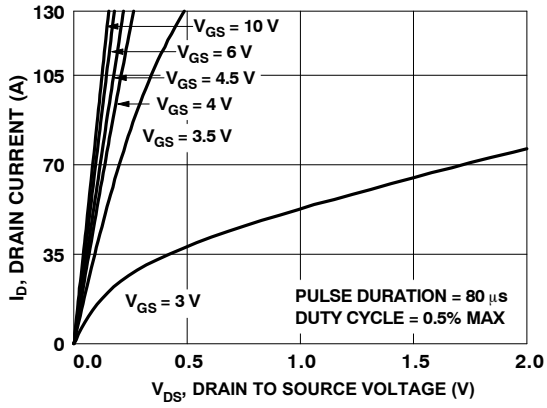



**Figure 3. On Region Characteristics**

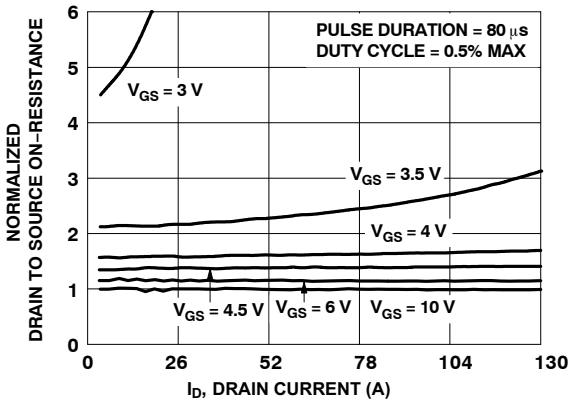



**Figure 4. Normalized On−Resistance vs. Drain Current and Gate Voltage**

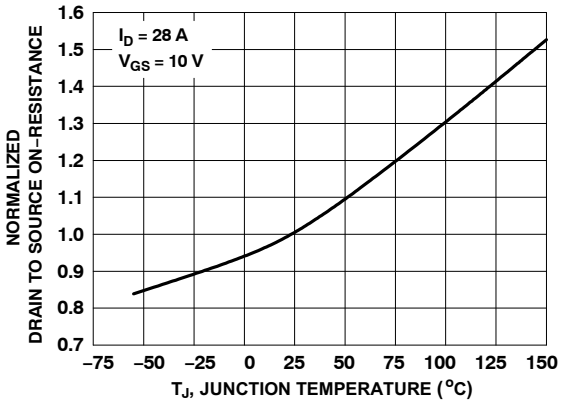



**Figure 5. Normalized On−Resistance vs. Junction Temperature**

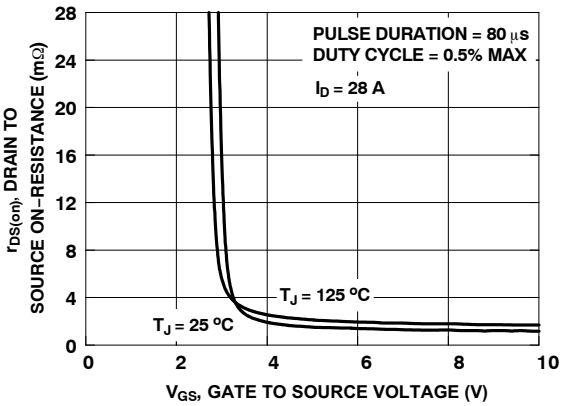



**Figure 6. On−Resistance vs. Gate to Source Voltage**

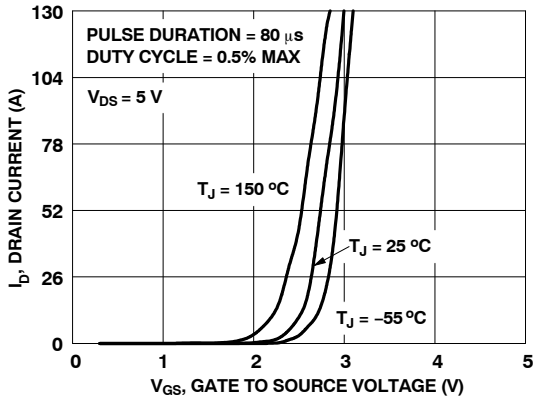



**Figure 7. Transfer Characteristics**

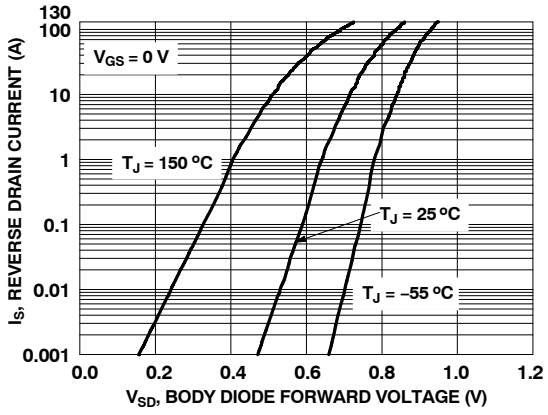



**Figure 8. Source to Drain Diode Forward Voltage vs. Source Current**

**TYPICAL CHARACTERISTICS** $T_J$ = 25°C unless otherwise noted.

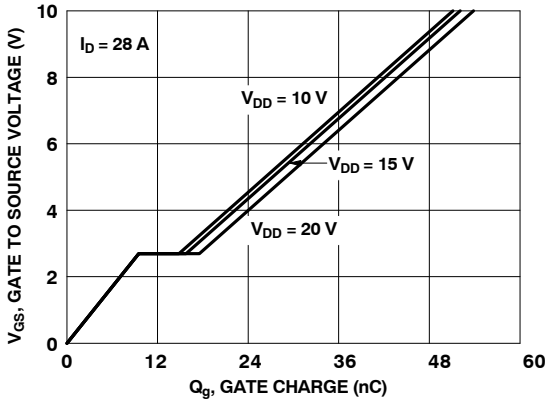



**Figure 9. Gate Charge Characteristics**

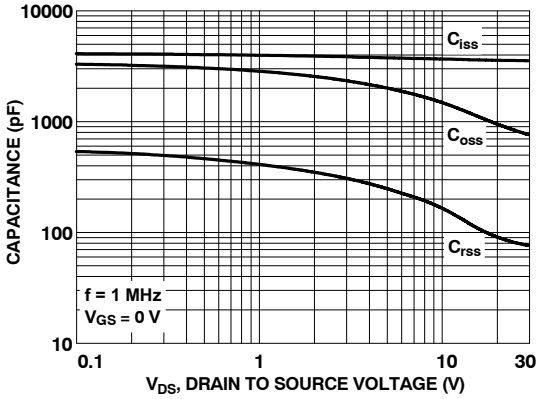



**Figure 10. Capacitance vs. Drain to Source Voltage**

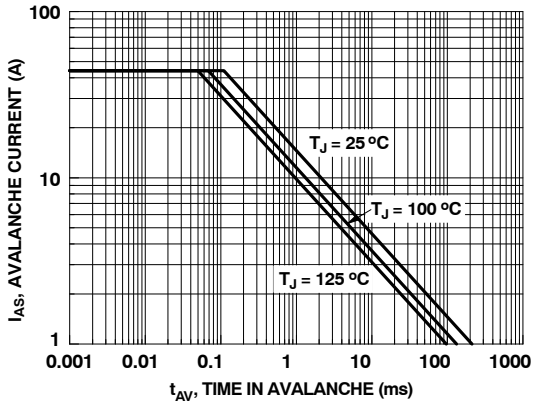



**Figure 11. Unclamped Inductive Switching Capability**

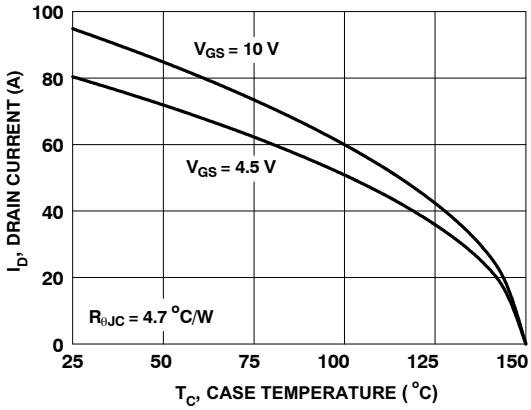



**Figure 12. Maximum Continuous Drain Current vs. Case Temperature**

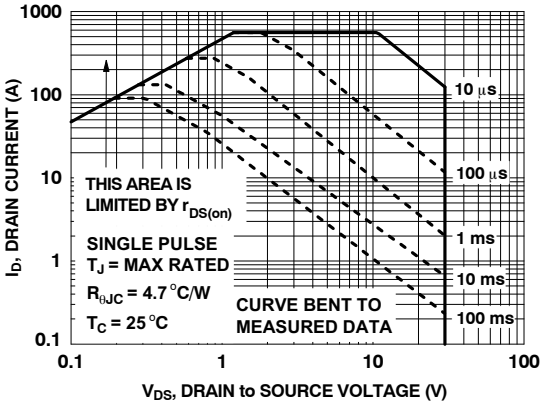



**Figure 13. Forward Bias Safe Operating Area**

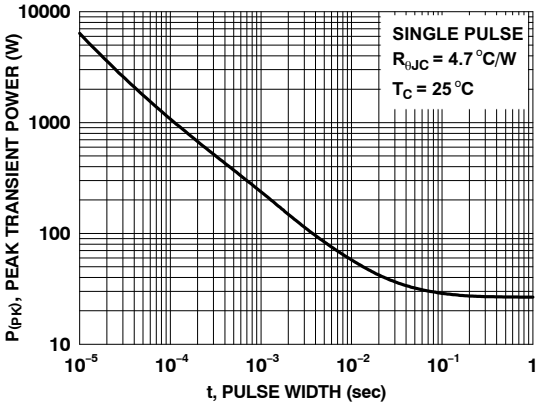



**Figure 14. Single Pulse Maximum Power Dissipation**

**TYPICAL CHARACTERISTICS** $T_J$ = 25°C unless otherwise noted.

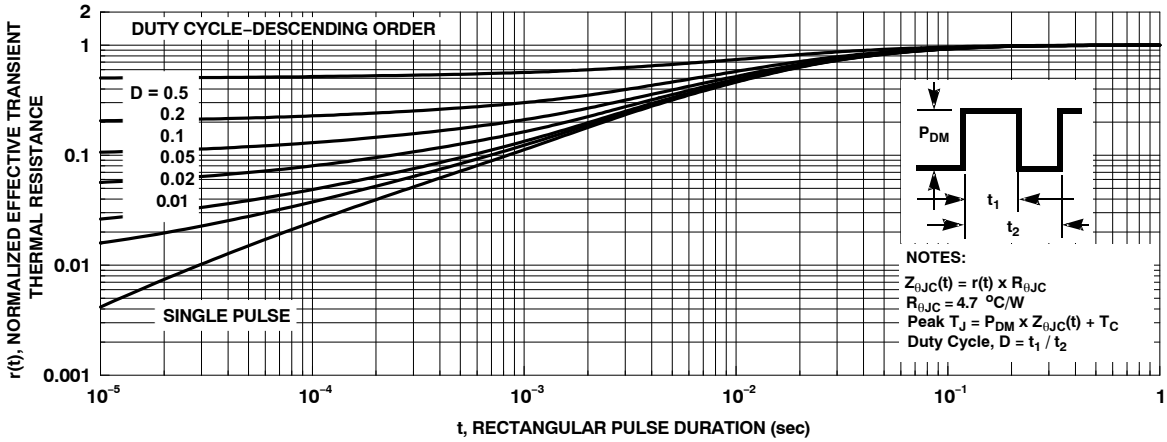



**Figure 15. Junction−to−Case Transient Thermal Response Curve**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

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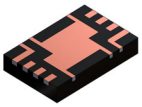
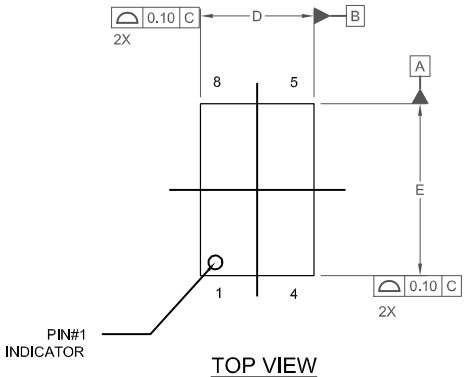
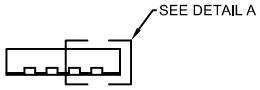


**PQFN8 3.3X5, 0.65P**
CASE 483AU
ISSUE A

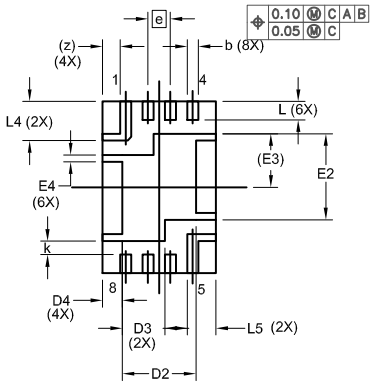
DATE 06 MAY 2021



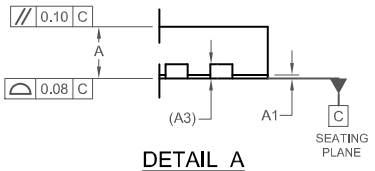

TOP VIEW



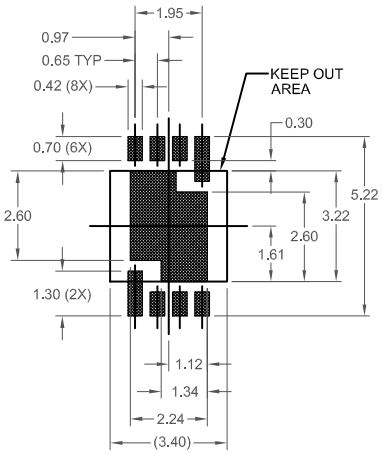

FRONT VIEW




BOTTOM VIEW




DETAIL A
SCALE: 2X




LAND PATTERN
RECOMMENDATION

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

NOTES: UNLESS OTHERWISE SPECIFIED
A) DOES NOT FULLY CONFORM TO JEDEC REGISTRATION, MO229 DATED 8/2012.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
E) IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.

| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.70 | 0.75 | 0.80 |
| A1 | 0.00 | - | 0.05 |
| A3 | 0.20 REF | | |
| b | 0.27 | 0.32 | 0.37 |
| D | 3.20 | 3.30 | 3.40 |
| D2 | 2.04 | 2.14 | 2.24 |
| D3 | 1.13 | 1.23 | 1.33 |
| D4 | 0.48 | 0.58 | 0.68 |
| E | 4.90 | 5.00 | 5.10 |
| E2 | 2.40 | 2.50 | 2.60 |
| E3 | 1.56 REF | | |
| E4 | 0.10 | 0.20 | 0.30 |
| e | 0.65 BSC | | |
| k | 0.30 | 0.40 | 0.50 |
| L | 0.44 | 0.54 | 0.64 |
| L4 | 1.04 | 1.14 | 1.24 |
| L5 | 0.75 | 0.85 | 0.95 |
| z | 0.51 REF | | |

| | | |
|---|---|---|
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| **DESCRIPTION:** | **PQFN8 3.3X5, 0.65P** | **PAGE 1 OF 1** |

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