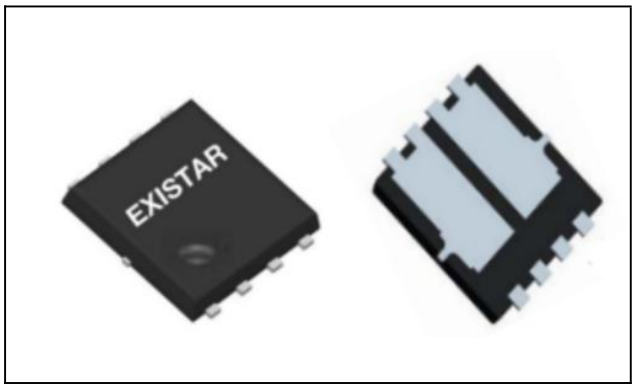
# N-Channel 30V MOSFET

**PDFN5*6D**

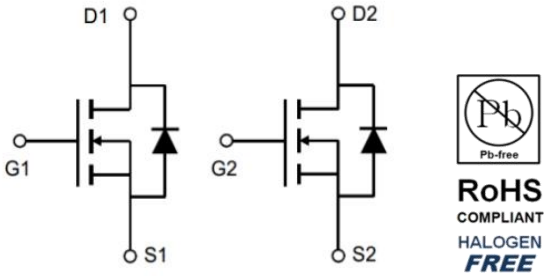



**E030N8P0KL1**

| | $V_{DS}$ (V) | $R_{DS(on),max}$ (mΩ) | $I_D$ (A) |
|---|---|---|---|
| N1 | 30V | 8.0 @ $V_{GS}$ = 10V | 45 |
| N2 | 30V | 8.0 @ $V_{GS}$ = 10V | 45 |

## Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested




## Applications

- DC/DC conversion
- Power switch
- Moto driver

## Package And Ordering Information

| Ordering code | Package | Marking |
|---|---|---|
| E030N8P0KL1 | PDFN5*6D | E030N8P0KL1 |

## Ordering Information

| Package | Units/ Reel | Reels/ Inner Box | Units/ Inner Box |
|---|---|---|---|
| PDFN5*6D | 5000 | 1 | 5000 |

## Key Performance Parameters

| Parameter | Value | Unit |
|---|---|---|
| VDS, min @ Tj(max) | 30 | V |
| ID, pulse | 146 | A |
| RDS(ON), max @ VGS=10V | 8.0 | mΩ |
| Qg | 21.6 | nC |

## Absolute Maximum Ratings at Tj=25°C Unless Otherwise Noted

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DS}$ | 30 | V |
| Gate-source voltage | | $V_{GS}$ | ±20 | |
| Continuous drain current | $T_A$=25°C | $I_D$ | 45 | A |
| | $T_A$=100°C | | 32 | |
| Pulsed drain current | | $I_{D,pulse}$ | 146 | |
| Avalanche energy, single pulse | | $E_{AS}$ | 38 | mJ |
| Power dissipation | $T_A$=25°C | $P_D$ | 42 | W |
| | $T_A$=100°C | | 3.2 | |
| Operating junction and storage temperature range | | $T_J$, $T_{stg}$ | -55 To 175 | ℃ |

## Thermal Characteristics

| Parameter | | Symbol | Max. | Unit |
|---|---|---|---|---|
| Thermal resistance, junction-to-case | Steady state | $R_{\theta JC}$ | 2.6 | °C/W |
| Thermal resistance, junction-to-ambient | Steady state | $R_{\theta JA}$ | 60 | |

## Electrical Characteristics at Tj=25°C unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test conditions |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain to source breakdown voltage | $V_{(BR)DSS}$ | 30 | | | V | $V_{GS}$ = 0, $I_D$ = 250 μA |
| Gate-source threshold voltage | $V_{GS(th)}$ | 1 | | 2.5 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 μA |
| Gate-body leakage | $I_{GSS}$ | | | ±100 | nA | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V |
| Zero gate voltage drain current | $I_{DSS}$ | | | 1 | μA | $V_{DS}$ = 30 V, $V_{GS}$ = 0 V |
| Drain-source on-resistance | $R_{DS(on)}$ | | 6.8 | 8 | mΩ | $V_{GS}$ = 10 V, $I_D$ = 20 A |
| Drain-source on-resistance | $R_{DS(on)}$ | | 9.8 | 12 | mΩ | $V_{GS}$ = 4.5 V, $I_D$ = 15 A |
| Forward transconductance | gfs | | 18 | | S | $V_{DS}$ = 5 V, $I_D$ = 20 A |

| | | | | | | |
|---|---|---|---|---|---|---|
| Gate resistance | Rg | | 1.8 | | Ω | f=1MHz |
| **Gate Charge** | | | | | | |
| Total gate charge | Qg | | 21.6 | | nC | $V_{DS}$ = 15 V, $I_D$ = 20 A, $V_{GS}$ = 10 V |
| Gate-source charge | Qgs | | 2.7 | | | |
| Gate-drain charge | Qgd | | 4.7 | | | |
| **Dynamic** | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | | 12 | | ns | $V_{DS}$ = 15 V, $V_{GS}$ = 10 V, $R_L$ = 0.75 Ω, $R_{GEN}$ = 3 Ω |
| Rise time | $t_r$ | | 2.4 | | | |
| Turn-off delay time | $t_{d(off)}$ | | 30.4 | | | |
| Fall time | $t_f$ | | 4 | | | |
| Input capacitance | $C_{iss}$ | | 1082 | | pF | $V_{DS}$ =15 V, $V_{GS}$ = 0 V, f = 1.0MHz |
| Output capacitance | $C_{oss}$ | | 147 | | | |
| Reverse transfer capacitance | $C_{rss}$ | | 121 | | | |
| **Body Diode** | | | | | | |
| Diode forward voltage | $V_{SD}$ | | | 1.2 | V | $V_{GS}$ = 0 V, $I_S$ = 20 A |
| Reverse recovery time | $t_{rr}$ | | 19.4 | | ns | $I_F$ =20 A, di/dt = 500 A/μs |
| Reverse recovery charge | $Q_{rr}$ | | 11.6 | | nC | |

## Electrical Characteristics Diagrams

**Figure 1. Output Characteristics**

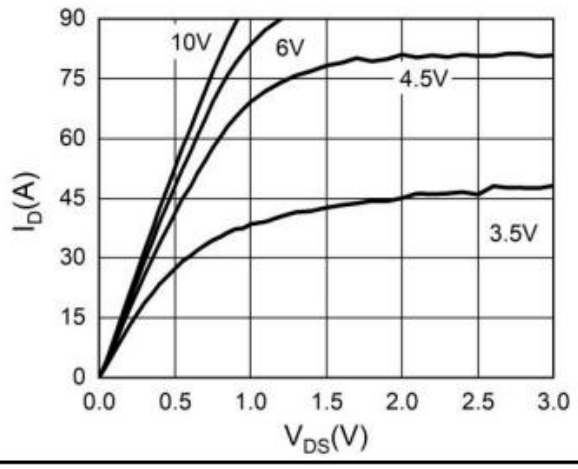



**Figure 2. Transfer Characteristics**

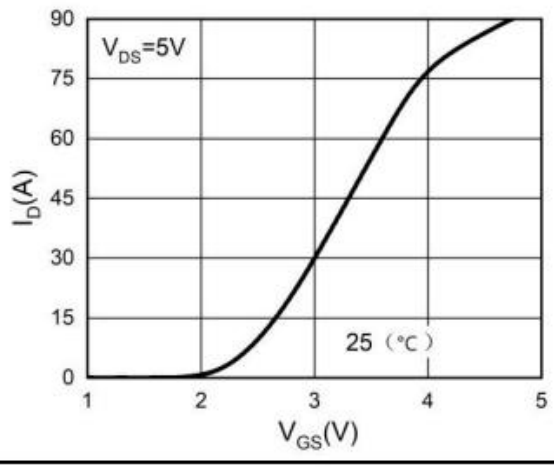


**Figure 3. Power Dissipation**

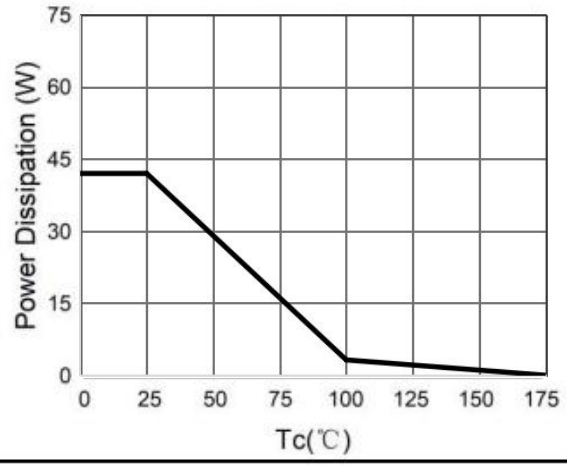



**Figure 4. Drain Current**

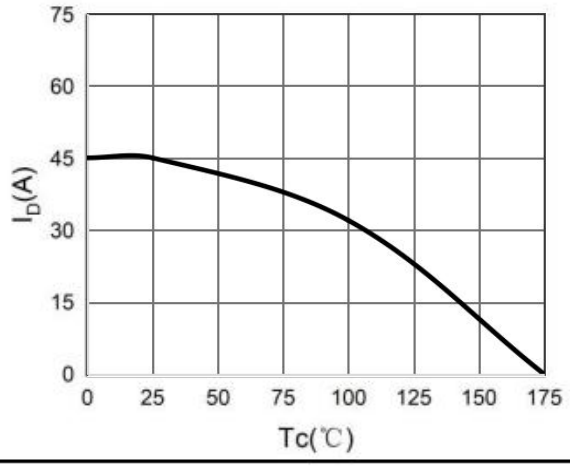



**Figure 5. $BV_{DSS}$ vs Junction Temperature**

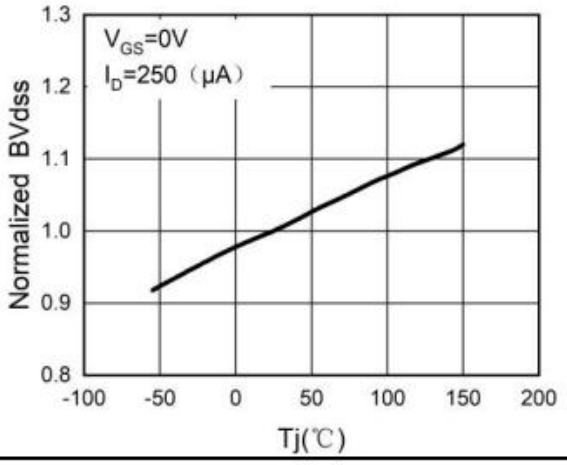



**Figure 6. $R_{DS(ON)}$ vs Junction Temperature**

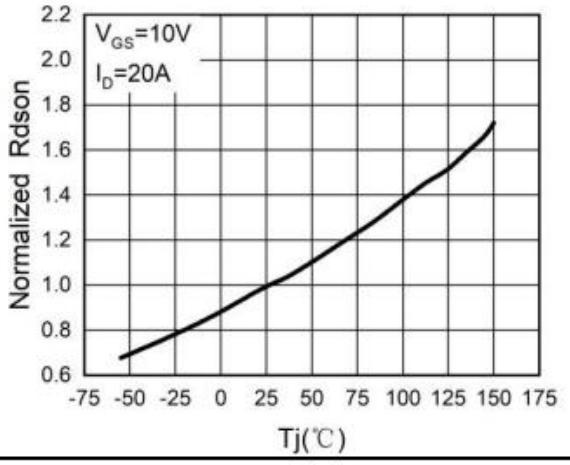


**Figure 7. Gate Charge Waveforms**

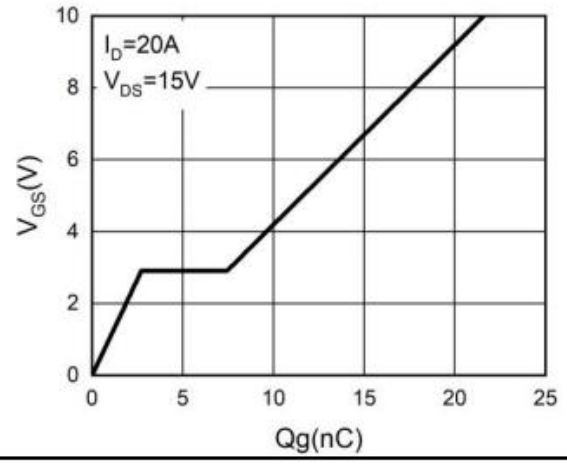



**Figure 8. Capacitance**

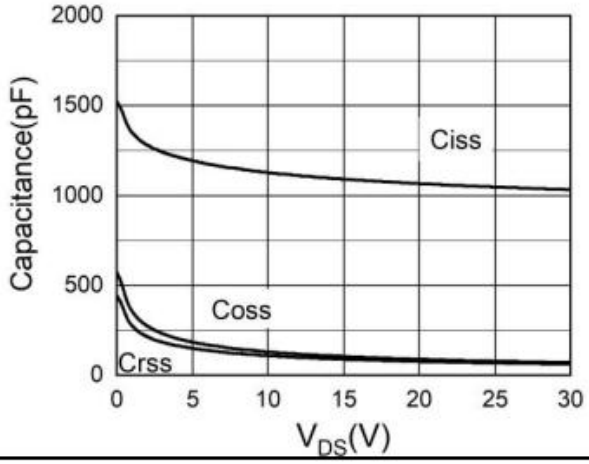



**Figure 9. Body-Diode Characteristics**

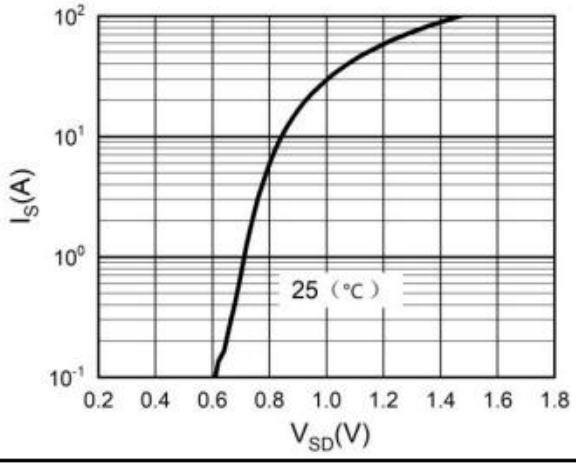
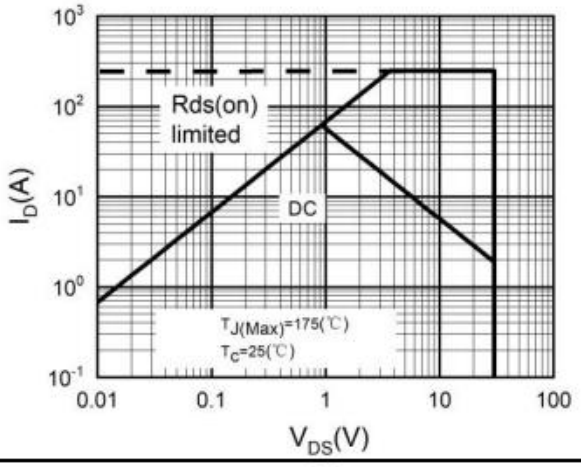
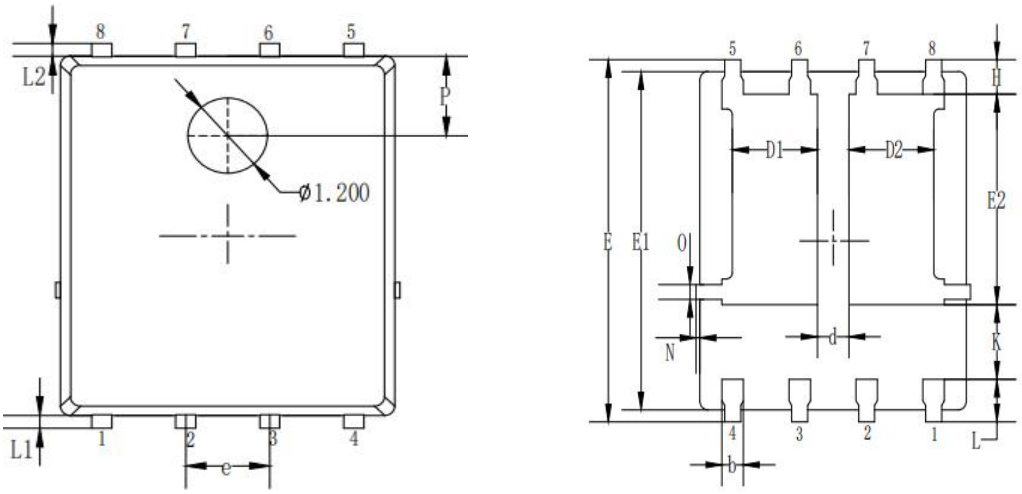



**Figure 10. Maximum Safe Operating Area**



## Package Outline Dimensions




| Symbols | Millimeters | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 1.05 | 1.20 |
| b | 0.35 | 0.40 | 0.50 |
| C | 0.20 | 0.25 | 0.35 |
| D | 4.90 | 5.05 | 5.20 |
| D1/D2 | 1.51 | 1.61 | 1.71 |
| d | 0.50 | 0.60 | 0.70 |
| E | 6.00 | 6.15 | 6.30 |
| E1 | 5.60 | 5.75 | 5.90 |
| E2 | 3.47 | 3.57 | 3.67 |
| e | 1.27 BSC. | | |
| H | 0.48 | 0.58 | 0.68 |
| K | 1.17 | 1.27 | 1.37 |
| L | 0.64 | 0.74 | 0.84 |
| L1/L2 | 0.20 REF. | | |
| θ | 8° | 10° | 12° |
| M | 0.08 REF. | | |
| N | 0 | - | 0.15 |
| O | 0.25 REF. | | |
| P | 1.28 REF. | | |

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