- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

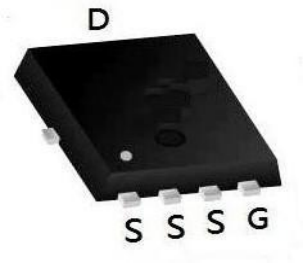
## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| 60V | 24mΩ | 30A |

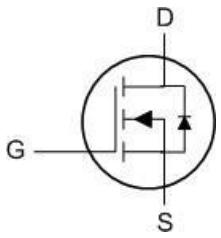
## Description

The ZX 30N06 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The ZX 30N06 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

## PDFN3X3 Pin Configuration




pin assignment




Schematic diagram

## Package Marking and Ordering

| Product | Package | Marking | Packing | Min Unit Quantity |
|---|---|---|---|---|
| ZX 30N06 | PDFN3*3 | * | 5000PCS/Reel | 5000PCS |

## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 60 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$@ 10V[1] | 30 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$@ 10V[1] | 15 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 60 | A |
| EAS | Single Pulse Avalanche Energy[3] | 50 | mJ |
| $I_{AS}$ | Avalanche Current | 30 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation[4] | 20 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | --- | 62 | ℃/W |

## Electrical Characteristics ($T_J$=25℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 60 | --- | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.063 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=15A | --- | 24 | 30 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=10A | --- | 25 | 38 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.2 | --- | 2.5 | V |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -5.24 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=48V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=48V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=15A | --- | 17 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 3.2 | --- | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=48V , $V_{GS}$=4.5V , $I_D$=12A | --- | 12.6 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 3.2 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 6.3 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=30V , $V_{GS}$=10V , $R_G$=3.3Ω, $I_D$=10A | --- | 8 | --- | ns |
| $T_r$ | Rise Time | | --- | 14.2 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 24.4 | --- | |
| $T_f$ | Fall Time | | --- | 4.6 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 1378 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 86 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 64 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 30 | A |
| $I_{SM}$ | Pulsed Source Current[2,5] | | --- | --- | 60 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |

Note :
1. The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=22.6A
4. The power dissipation is limited by 150℃ junction temperature
5. The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

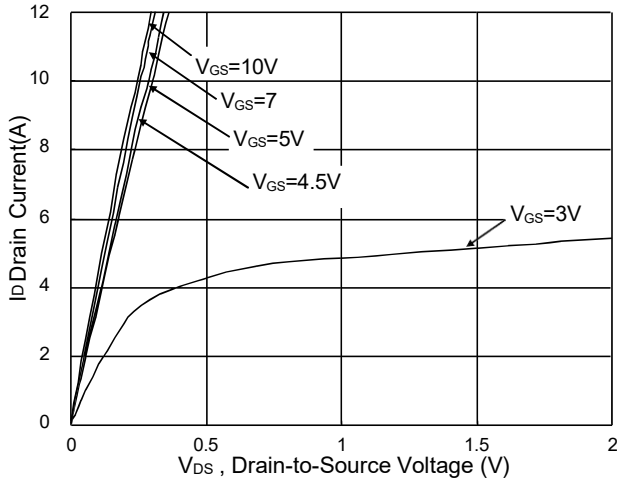



Fig.1 Typical Output Characteristics

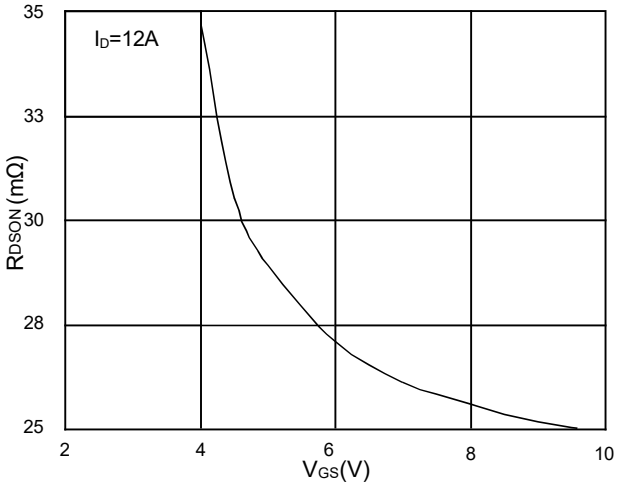



Fig.2 On-Resistance v.s Gate-Source

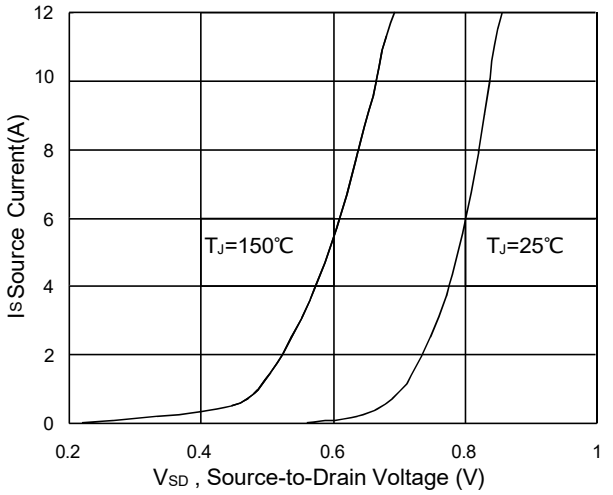



Fig.3 Forward Characteristics of Reverse

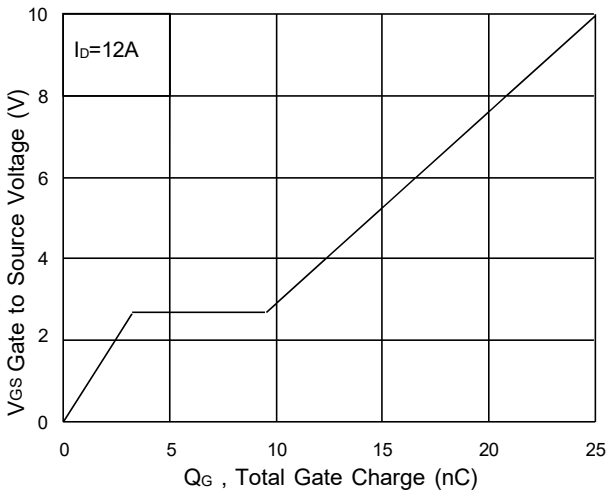



Fig.4 Gate-Charge Characteristics

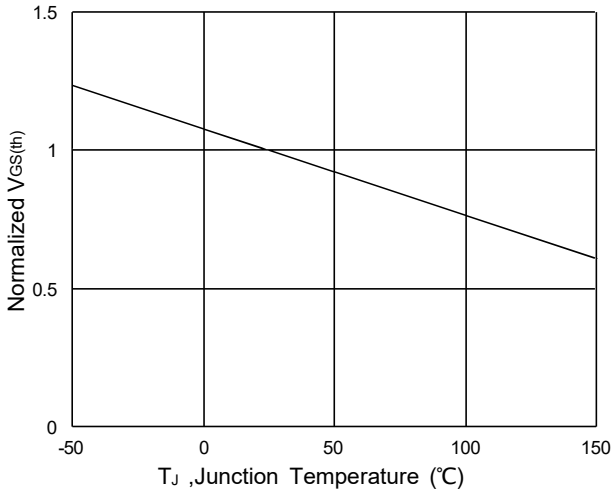



Fig.5 Normalized $V_{GS(th)}$ v.s $T_J$

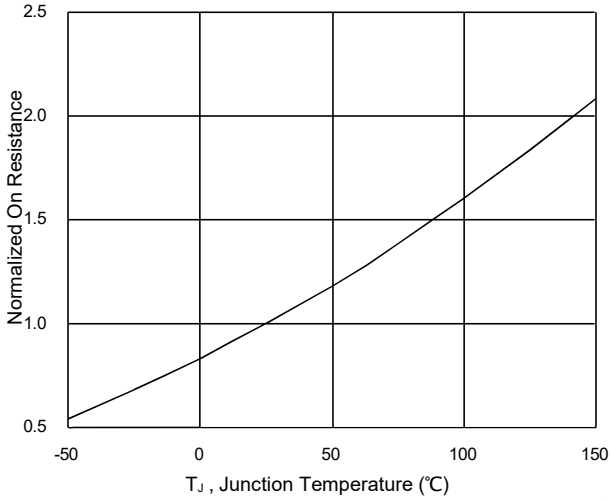



Fig.6 Normalized $R_{DSON}$ v.s $T_J$

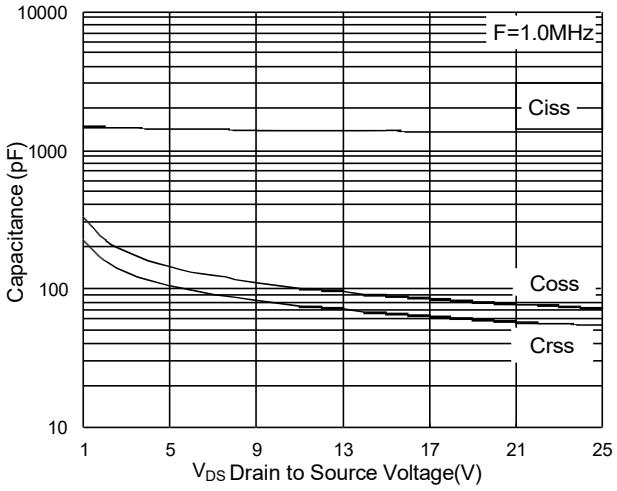



Fig.7 Capacitance

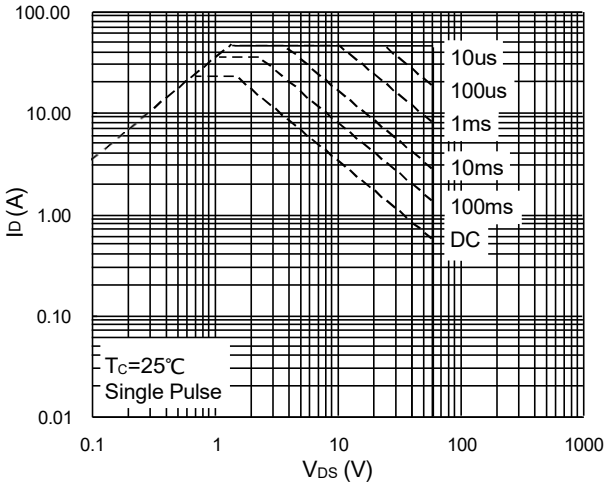



Fig.8 Safe Operating Area

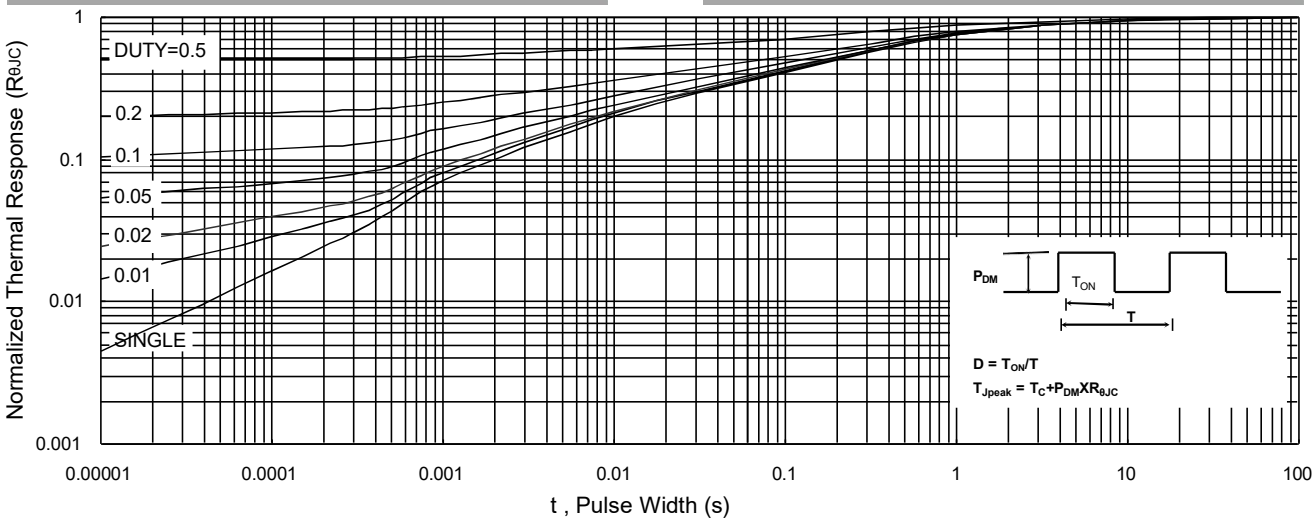



Fig.9 Normalized Maximum Transient Thermal Impedance

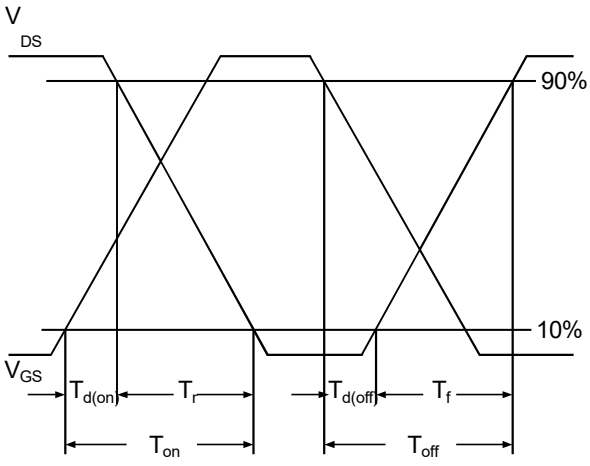



Fig.10 Switching Time Waveform

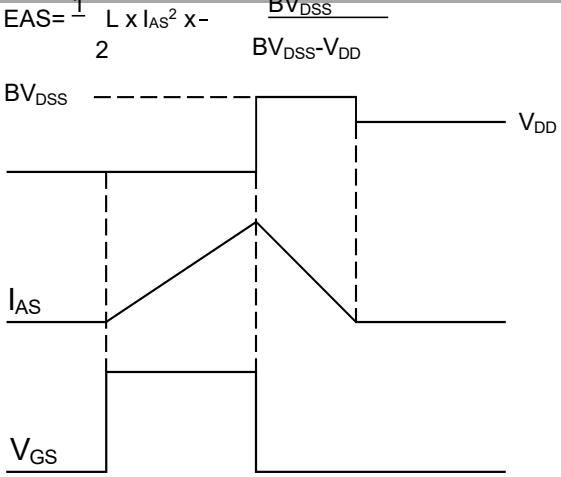
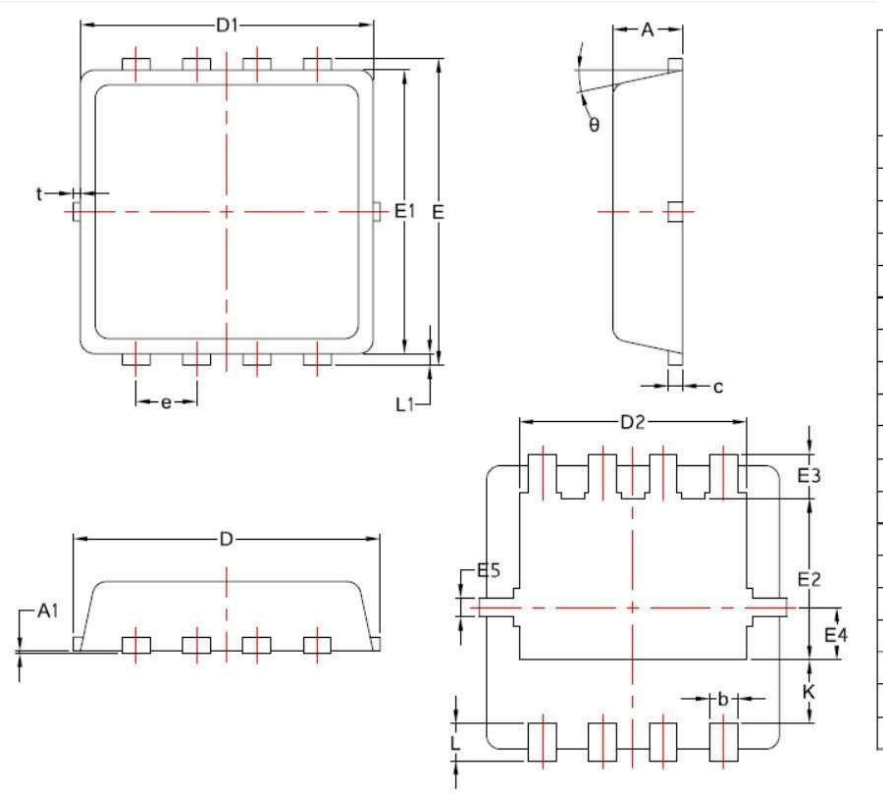



Fig.11 Unclamped Inductive Waveform

## Package Mechanical Data- PDFN3.3X3.3




| SYMBOL | COMMON MM | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.85 |
| A1 | / | / | 0.05 |
| b | 0.20 | 0.30 | 0.40 |
| c | 0.10 | 0.152 | 0.25 |
| D | 3.15 | 3.30 | 3.45 |
| D1 | 3.00 | 3.15 | 3.25 |
| D2 | 2.29 | 2.45 | 2.65 |
| E | 3.15 | 3.30 | 3.45 |
| E1 | 2.90 | 3.05 | 3.20 |
| E2 | 1.54 | 1.74 | 1.94 |
| E3 | 0.28 | 0.48 | 0.65 |
| E4 | 0.37 | 0.57 | 0.77 |
| E5 | 0.10 | 0.20 | 0.30 |
| e | 0.60 | 0.65 | 0.70 |
| K | 0.59 | 0.69 | 0.89 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | 0.06 | 0.125 | 0.20 |
| t | 0 | 0.075 | 0.13 |
| θ | 10° | 12° | 14° |