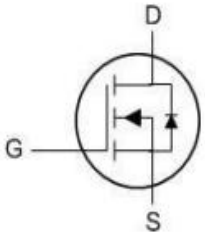
## Features

The TW30N06EF is the high cell deysity trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications. The TW30N06EF Feet the RoHS and Green Product requirement, 100%EAS guaranteed with full function reliability approved.

## Product Summary

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


PDFN5X6




## Maximum Ratings(Ta=25℃ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | |
| Continuous Drain Current, VGS @ 10V[1.6] | ID@TC =25℃ | 30 | A |
| Continuous Drain Current, VGS @ 10V[1.6] | ID@TC=100℃ | 15 | |
| Pulsed Drain Current ① | $I_{DM}$ | 60 | |
| Single Pulse Avalanche Energy3 | EAS | 50 | mj |
| Avalanche Current | $I_{AS}$ | 30 | A |
| Power Dissipation ② | PD@TC=25℃ | 20 | W |
| Storage Temperature | $T_{STG}$ | -55 to 150 | ℃ |
| Operating Junction | $T_J$ | -55 to 150 | |

**Thermal Data**

| Parameter | Symbol | Typ. | Max. | Unit |
|---|---|---|---|---|
| Thermal Resistance Junction-Ambient | RθJA | | 62 | ℃/W |

## Electrical Characteristics(TJ=25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Parameters** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | VGS = 0V, ID = 250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | VDS = 48V, VGS =0V | | | 1 | μA |
| Gate-Body leakage Current | $I_{GSS}$ | VDS =0V, VGS = ±20V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | VDS =VGS, ID = 250μA | 1.2 | 1.5 | 2.5 | V |
| Static Drain-Source On-Resistance | RDS(on) | VGS = 10V, ID = 15A | | 24 | 30 | mΩ |
| | | VGS = 5V, ID = 10A | | 25 | 38 | mΩ |
| **Dynamic Parameters** | | | | | | |
| Input Capacitance | $C_{iss}$ | VDS=15V , VGS=0V , f=1MH | | 1378 | | pF |
| Output Capacitance | $C_{oss}$ | | | 86 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 64 | | pF |
| Total Gate Charge | $Q_g$ | VDS=48V , VGS=4.5V , ID=12A | | 12.6 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 3.2 | | nC |
| Gate Drain Charge | $Q_{gd}$ | | | 6.3 | | nC |
| **Switching Parameters** | | | | | | |
| Turn-On DelayTime | td(on) | VDD=30V , VGS=10V , RG=3.3Ω, ID=10A | | 8 | | ns |
| Turn-On Rise Time | tr | | | 14.2 | | ns |
| Turn-Off DelayTime | td(off) | | | 24.2 | | ns |
| Turn-Off Fall Time | tf | | | 4.6 | | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| Diode forward voltage drop. | $V_{SD}$ | VGS=0V , IS=1A , TJ=25℃ | | | 1.2 | V |
| Continuous source current | $I_S$ | VG=VD=0V , Force Current | | | 30 | A |
| Pulsed source current | $I_{SM}$ | | | | 60 | |

**Note :**

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

## Typical Electrical and Thermal Characteristics

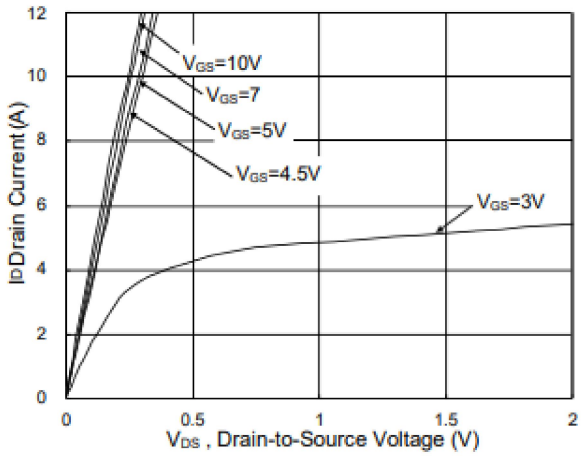



Fig.1 Typical Output Characteristics

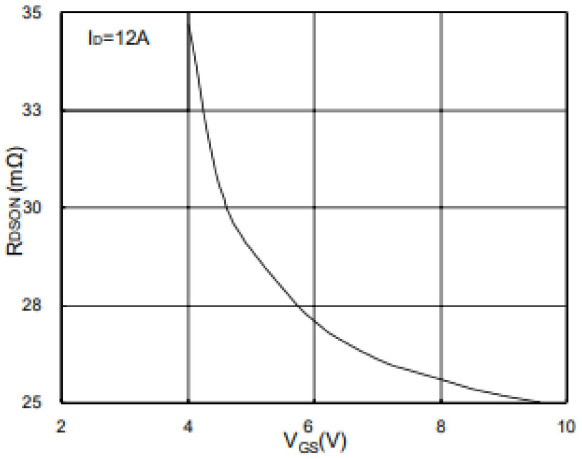



Fig.2 On-Resistance v.s Gate-Source

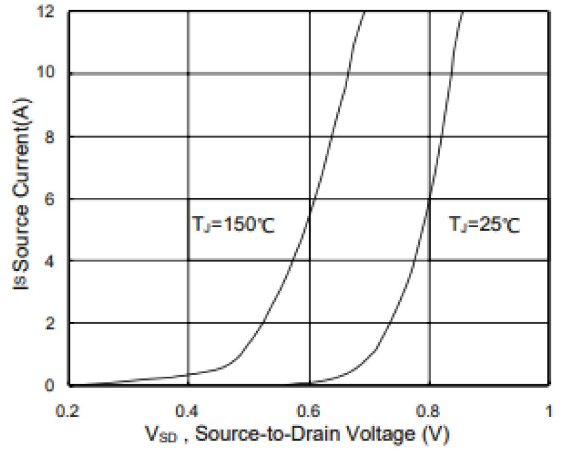



Fig.3 Forward Characteristics of Reverse

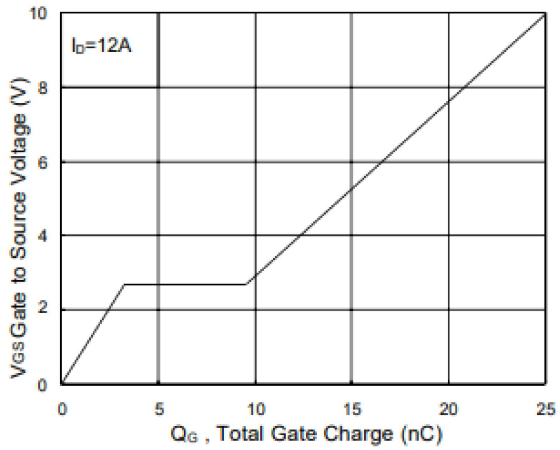



Fig.4 Gate-Charge Characteristics

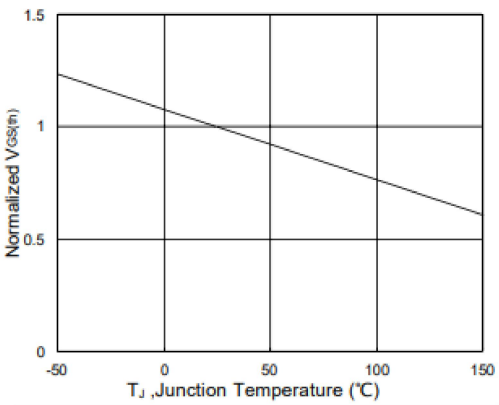



Fig.5 Normalized $V_{GS(th)}$ v.s $T_J$

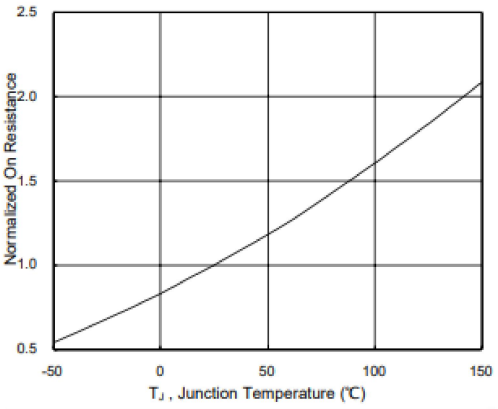



Fig.6 Normalized $R_{DSON}$ v.s $T_J$

## Typical Electrical and Thermal Characteristics

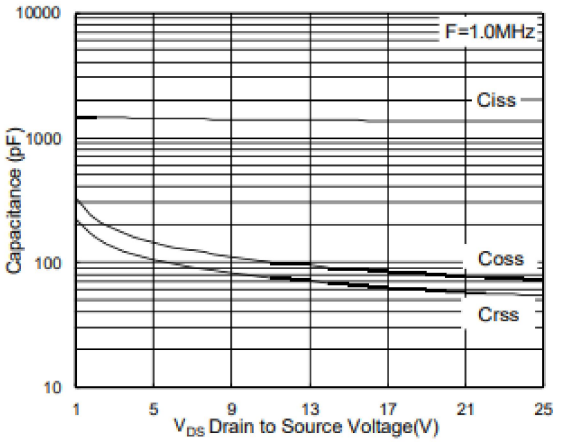



Fig.7 Capacitance

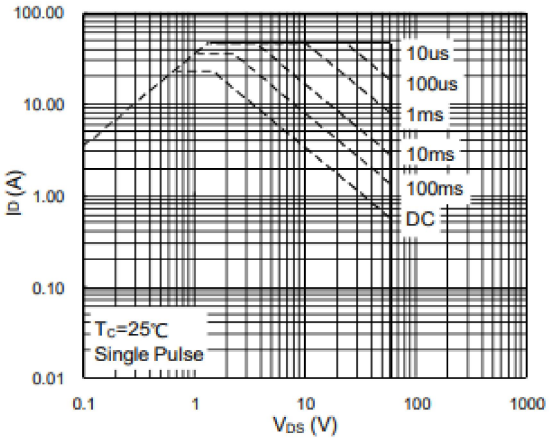



Fig.8 Safe Operating Area

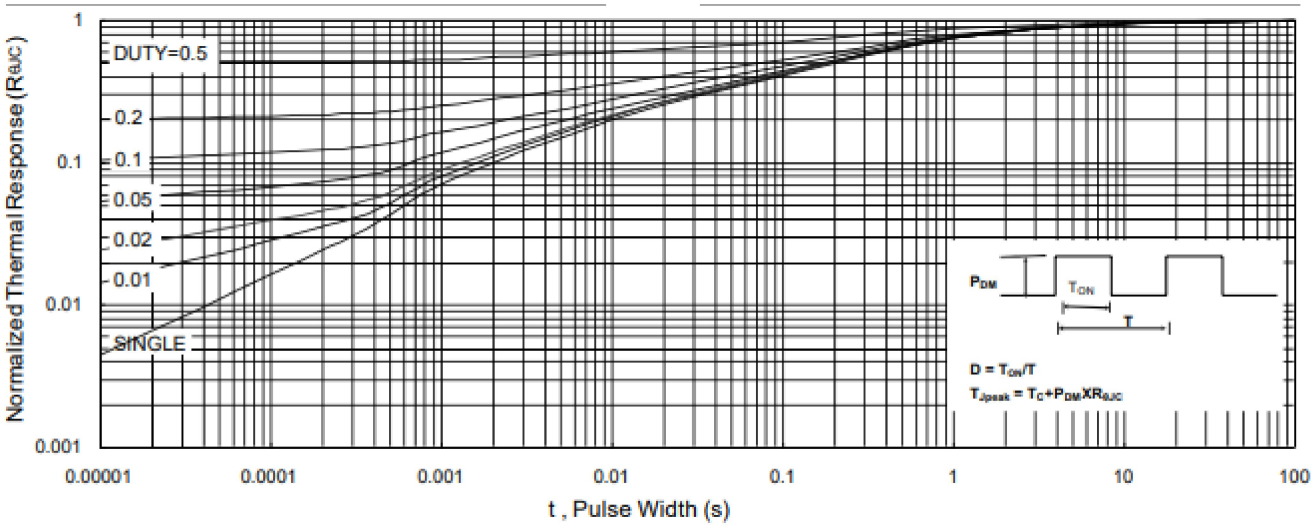



Fig.9 Normalized Maximum Transient Thermal Impedance

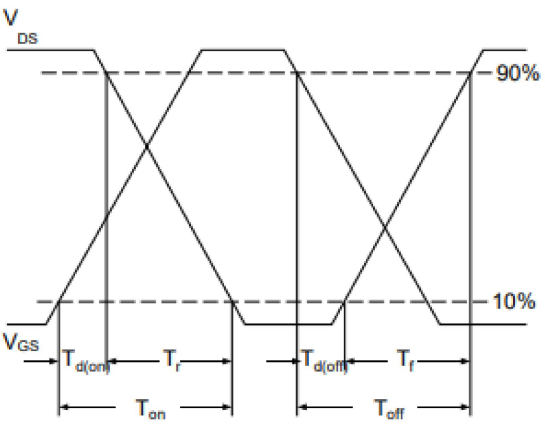



Fig.10 Switching Time Waveform

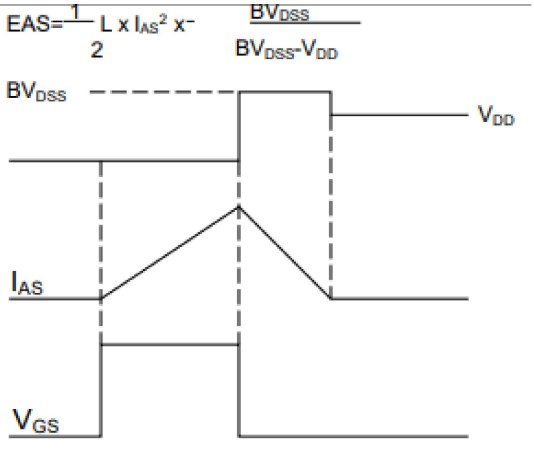
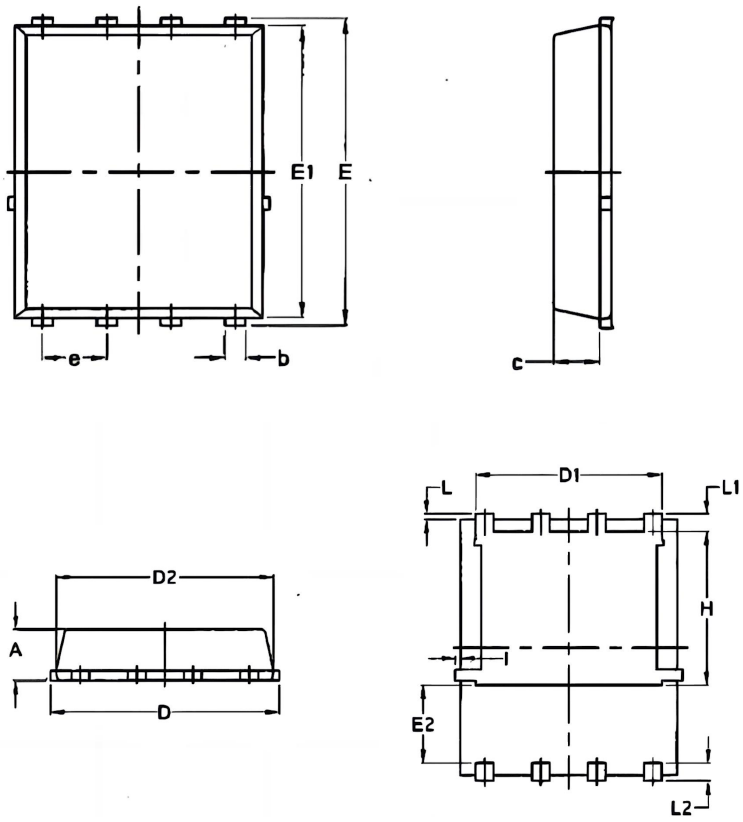



Fig.11 Unclamped Inductive Waveform

## PDFN5X6 Package Outline Dimesions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Mim | Max | Min | Max |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.0970 | 0.0324 | 0.082 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | / | 0.0630 | / |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | / | 0.18 | / | 0.0070 |
| I | / | 0.18 | / | 0.0070 |