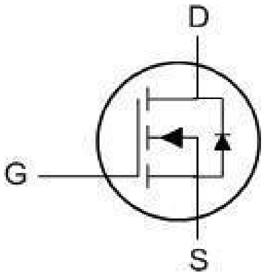
## N-Ch 30V Fast Switching MOSFETs

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

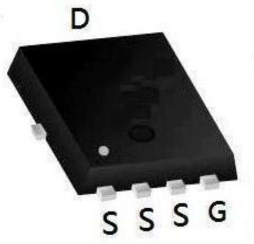


### Description

The WLQ90N03D 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 WLQ90N03D meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

**PDFN3333-8L Pin Configuration**



### Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| 30V | 5.2mΩ | 90 A |

### Absolute Maximum Ratings

| Symbol | Parameter | Rating 10s | Rating Steady State | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | | V |
| $I_D$@$T_C$=25˚C | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 90 | | A |
| $I_D$@$T_C$=100˚C | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 50 | | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 192 | | A |
| EAS | Single Pulse Avalanche Energy[3] | 306 | | mJ |
| $I_{AS}$ | Avalanche Current | 53.8 | | A |
| $P_D$@$T_C$=25˚C | Total Power Dissipation[4] | 82.5 | | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 175 | | ˚C |
| $T_J$ | Operating Junction Temperature Range | -55 to 175 | | ˚C |

### Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{θJC}$ | Thermal Resistance Junction-Case[1] | --- | 0.56 | ˚C/W |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Case(Note 2) | $R_{\theta JC}$ | 1.8 | ℃/W |

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

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 30 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=30V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1 | 1.6 | 3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=30A | - | 5.2 | 6.5 | mΩ |
| | | $V_{GS}$=5V, $I_D$=24A | - | 7.5 | 10 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V,$I_D$=24A | 20 | - | - | S |
| **Dynamic Characteristics** (Note4) | | | | | | |
| Input Capacitance | $C_{Iss}$ | $V_{DS}$=15V,$V_{GS}$=0V,<br>F=1.0MHz | - | 2016 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 251 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 230 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=10V,$I_D$=30A<br>$V_{GS}$=10V,$R_{GEN}$=2.7Ω | - | 20 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 15 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 60 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 10 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=10V,$I_D$=30A,<br>$V_{GS}$=10V | - | 60.5 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 8.1 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 7.8 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=24A | - | - | 1.2 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | 80 | A |
| Reverse Recovery Time | $t_{rr}$ | TJ = 25°C, IF = 80A<br>di/dt = 100A/μs(Note3) | - | 32 | 50 | nS |
| Reverse Recovery Charge | Qrr | | - | 12 | 20 | nC |
| Forward Turn-On Time | $t_{on}$ | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

**Notes:**

**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
**5.** EAS condition：Tj=25℃,$V_{DD}$=15V,$V_G$=10V,L=0.5mH,Rg=25Ω，$I_{AS}$=35A

## Typical Electrical and Thermal Characteristics (Curves)

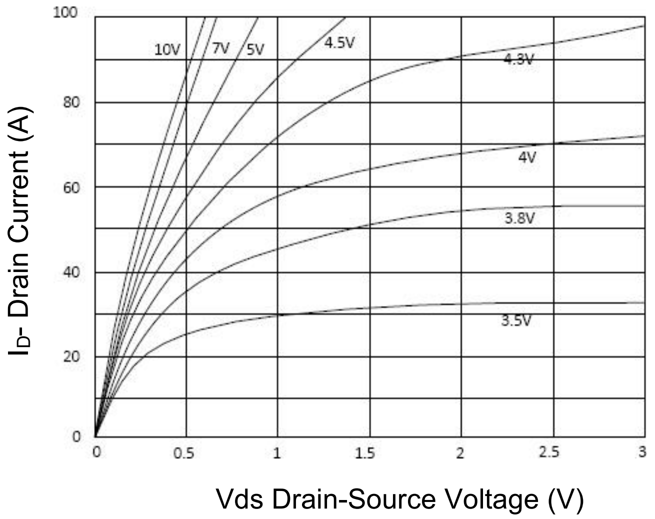


**Figure 1 Output Characteristics**

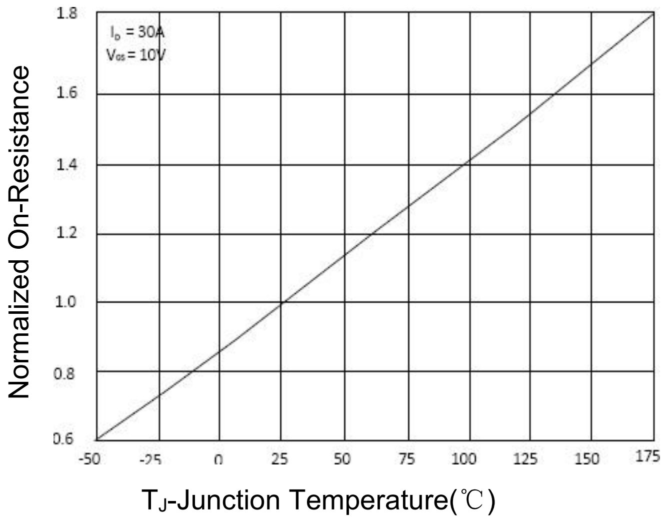


**Figure 4 Rdson-JunctionTemperature**

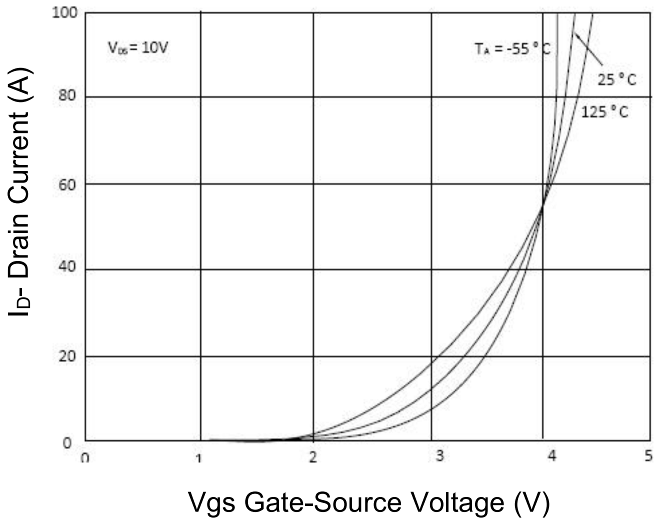


**Figure 2 Transfer Characteristics**

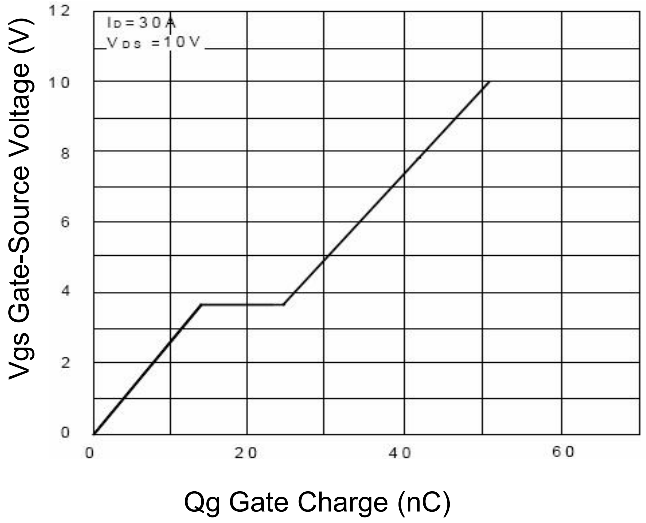


**Figure 5 Gate Charge**

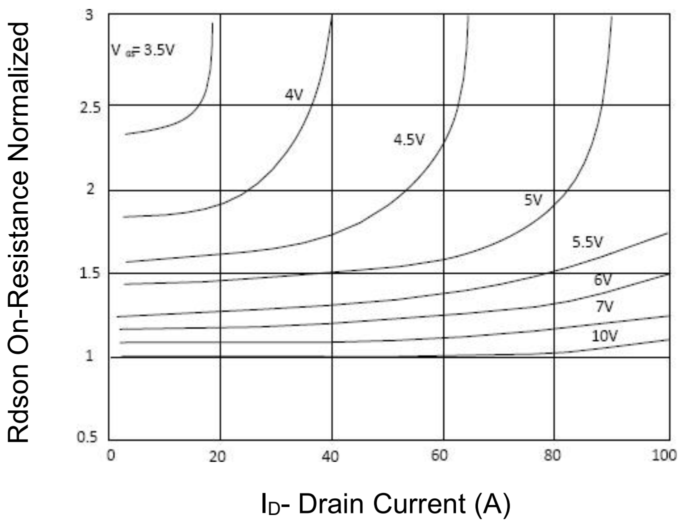


**Figure 3 Rdson- Drain Current**

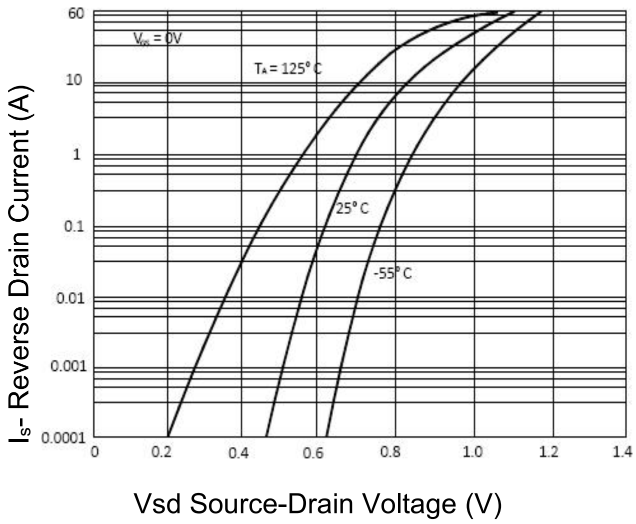


**Figure 6 Source- Drain Diode Forward**

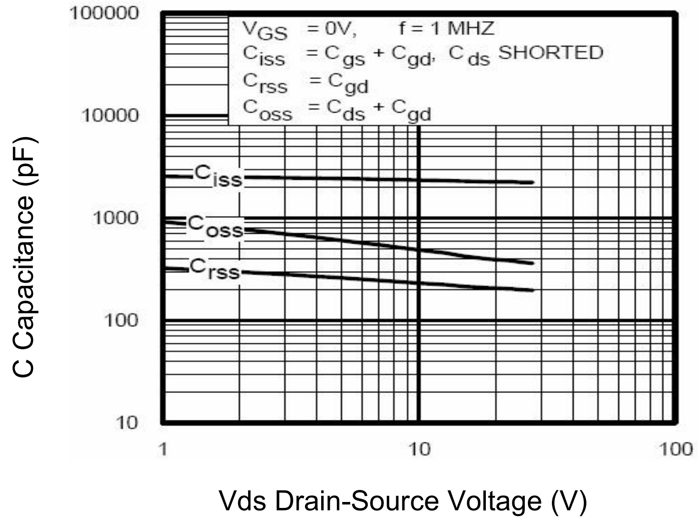


**Figure 7 Capacitance vs Vds**

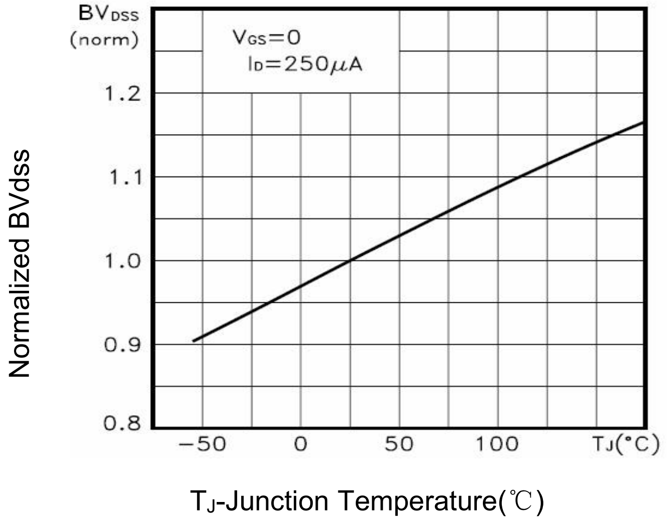


**Figure 9 BV$_{DSS}$ vs Junction Temperature**

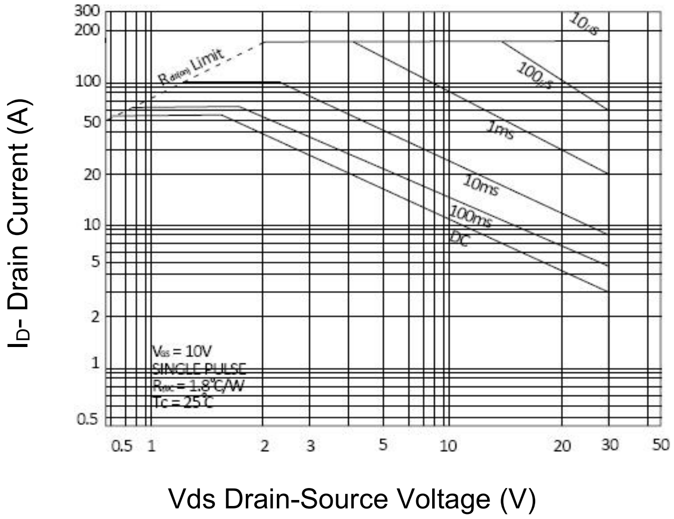


**Figure 8 Safe Operation Area**

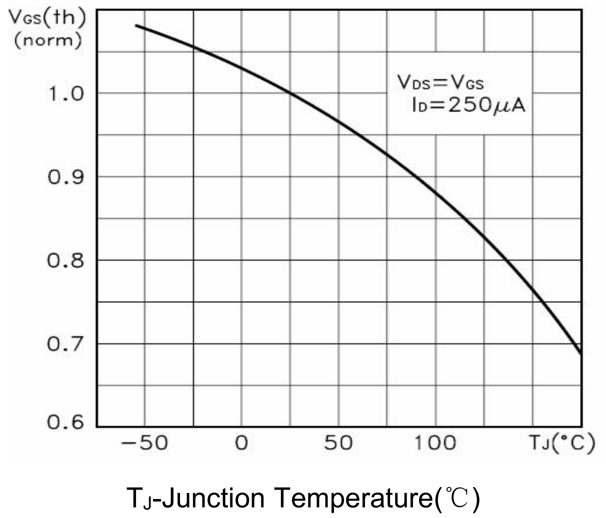


**Figure 10 V$_{GS(th)}$ vs Junction Temperature**

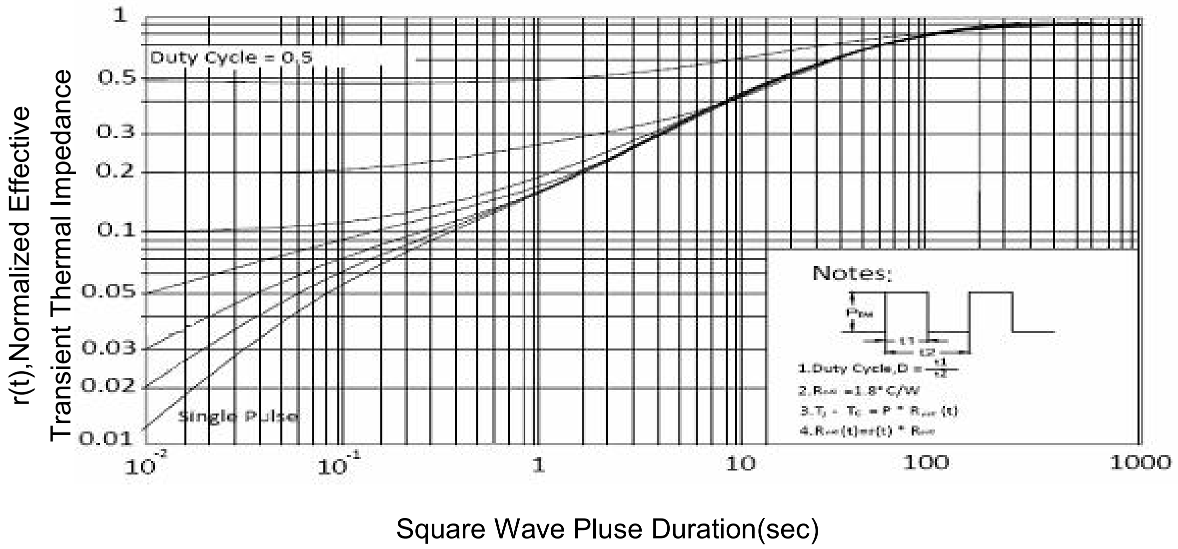
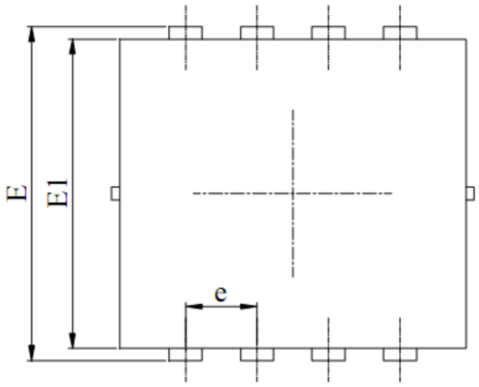
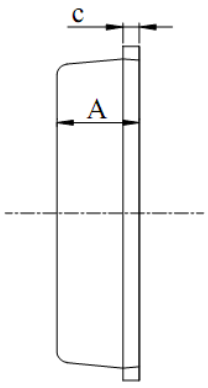


**Figure 11 Normalized Maximum Transient Thermal Impedance**

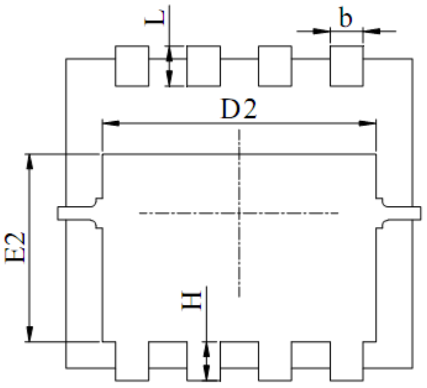
## Package Mechanical Data-PDFN3333-8L-Single



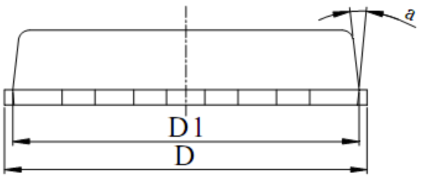
Top View



Side View



Bottom View

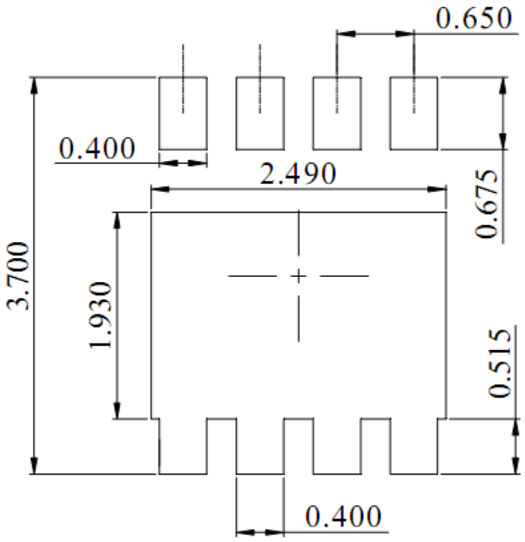


Front View

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMNESIONS IN MILLIMETER (ANNGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| DIM. | MILLIMETER | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.20 | 0.25 |
| D | 3.00 | 3.15 | 3.25 |
| D1 | 2.95 | 3.05 | 3.15 |
| D2 | 2.39 | 2.49 | 2.59 |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 2.95 | 3.05 | 3.15 |
| E2 | 1.70 | 1.80 | 1.90 |
| e | 0.65 BSC | | |
| H | 0.30 | 0.40 | 0.50 |
| L | 0.25 | 0.40 | 0.50 |
| a | --- | --- | 15° |



DIMENSIONS:MILLIMETERS

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