

N-Channel 40V(D-S) MOSFET

| Product summary | | |
|---------------------------------------|-----|------------|
| V_{DS} | 40 | V |
| $R_{DS(ON)}$ (at $V_{GS}=10V$) Typ. | 6.5 | m Ω |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$) Typ. | 8.7 | m Ω |
| I_D ($T_A=25^\circ C$) | 35 | A |

Features

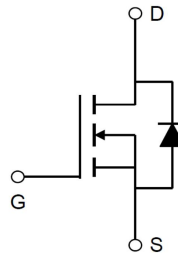
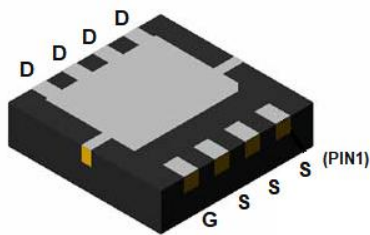
- High density cell design for low $R_{DS(ON)}$
- Trench Power LV MOSFET technology

Applications

- Load switching
- High current load applications
- Uninterruptible power supply

Pin Configuration

DFN3.3X3.3-8L



Packing Information

| Device | Package | Reel Size | Quantity(Min. Package) |
|------------|---------------|-----------|------------------------|
| ECAL35N04A | DFN3.3X3.3-8L | 13" | 3000pcs/5000pcs |

Absolute Maximum Ratings (at $T_A=25^\circ C$ Unless Otherwise Noted)

| Symbol | Parameter | Rating | Units |
|----------------|--|-------------------|------------|
| V_{DS} | Drain-Source Voltage | 40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current at $V_{GS}=10V$ | $T_A=25^\circ C$ | 35 |
| | | $T_A=100^\circ C$ | 22 |
| I_{DM} | Pulse Drain Current Tested ^A | 160 | A |
| E_{AS} | Single Pulse Avalanche Energy ^B | 120 | mJ |
| P_D | Power Dissipation | $T_C=25^\circ C$ | 40 |
| | Power Dissipation | $T_A=25^\circ C$ | 4.1 |
| T_J, T_{STG} | Junction and Storage Temperature Range | -55 to +150 | $^\circ C$ |

Thermal Characteristics

| Symbol | Parameter | Typical | Units |
|-----------------|---|---------|--------------|
| $R_{\theta JA}$ | Thermal Resistance-Junction to ambient ^C | 30 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case ^C | 3.1 | $^\circ C/W$ |

Electrical Characteristics (at $T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Units |
|-----------------------------|---------------------------------------|---|------|------|-----------|------------|
| Static Parameters | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 40 | -- | -- | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=40V, V_{GS}=0V$ | -- | -- | 1 | μA |
| I_{GSS} | Gate-Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 20V$ | -- | -- | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.5 | 2.5 | V |
| $R_{DS(on)}$ | Drain-Source On-State Resistance | $V_{GS}=10V, I_D=20A$ | -- | 6.5 | 8.0 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | -- | 8.7 | 13 | m Ω |
| V_{SD} | Forward Voltage | $I_S=20A, V_{GS}=0V$ | -- | -- | 1.2 | V |
| I_S | Maximum Body-Diode Continuous Current | | -- | -- | 35 | A |
| Dynamic Parameters | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS}=0V, V_{DS}=20V$ $f=1\text{MHz}$ | -- | 1500 | -- | pF |
| C_{oss} | Output Capacitance | | -- | 224 | -- | pF |
| C_{rss} | Reverse Transfer Capacitance | | -- | 152 | -- | pF |
| Switching Parameters | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=20V, I_D=20A$ $V_{GS}=10V$ | -- | 29 | -- | nC |
| Q_{gs} | Gate-Source Charge | | -- | 6 | -- | nC |
| Q_{gd} | Gate-Drain Charge | | -- | 7 | -- | nC |
| $t_{D(on)}$ | Turn-on Delay Time | $V_{DD}=20V$ $I_D=2A, R_L=1\Omega,$ $V_{GS}=10V, R_{GEN}=3\Omega$ | -- | 6 | -- | nS |
| t_r | Turn-on Rise Time | | -- | 17.5 | -- | nS |
| $t_{D(off)}$ | Turn-off Delay Time | | -- | 31 | -- | nS |
| t_f | Turn-off Fall Time | | -- | 17 | -- | nS |
| t_{rr} | Reverse recovery time | $I_F=20A,$ $di/dt=100\text{ A/uS}$ | -- | 29 | -- | ns |
| Q_{rr} | Reverse recovery charge | | -- | 26 | -- | nC |

A. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

B. $T_J=25^\circ\text{C}$, $V_{DD}=20V$, $V_G=10V$, $L=0.5\text{mH}$, $R_g=25\Omega$.

C. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in² pad of 2oz copper.

Typical Characteristics

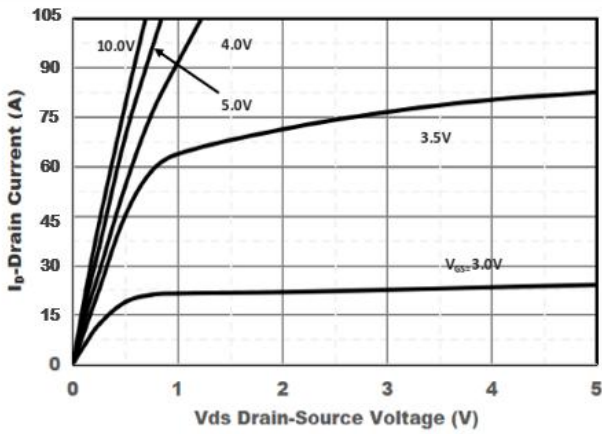


Figure1. Output Characteristics

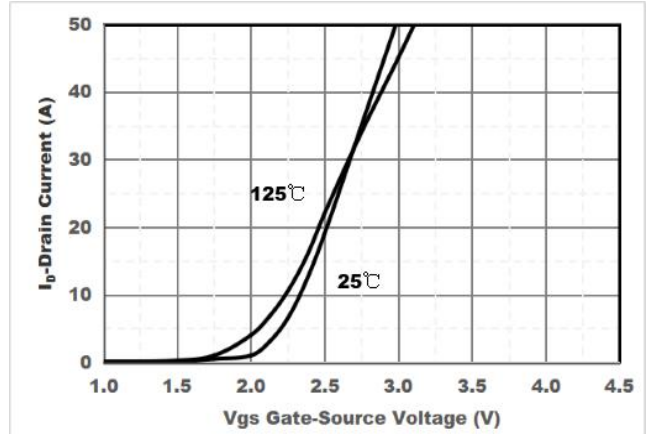


Figure2. Transfer Characteristics

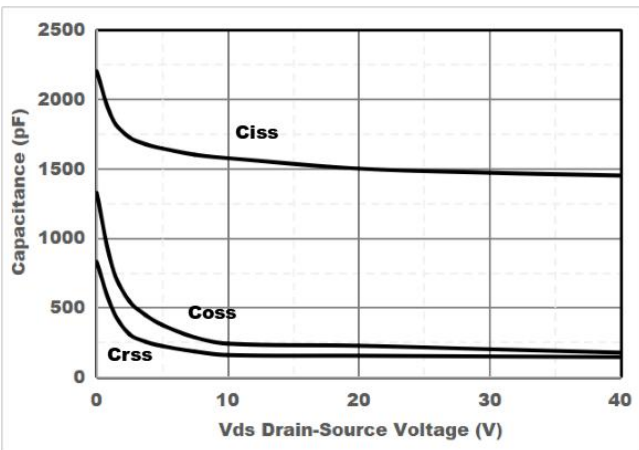


Figure3. Capacitance Characteristics

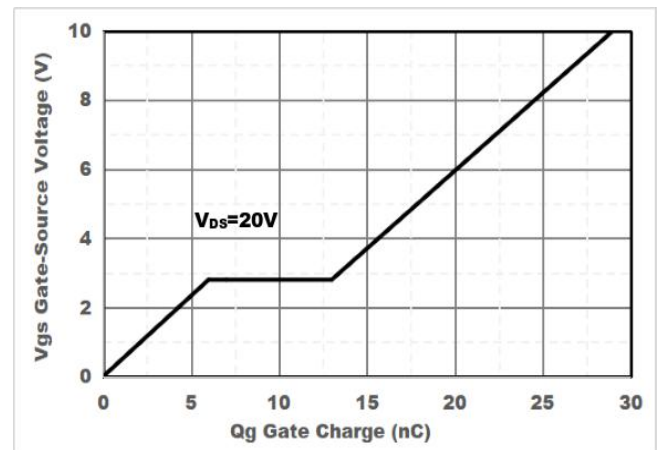


Figure4. Gate Charge

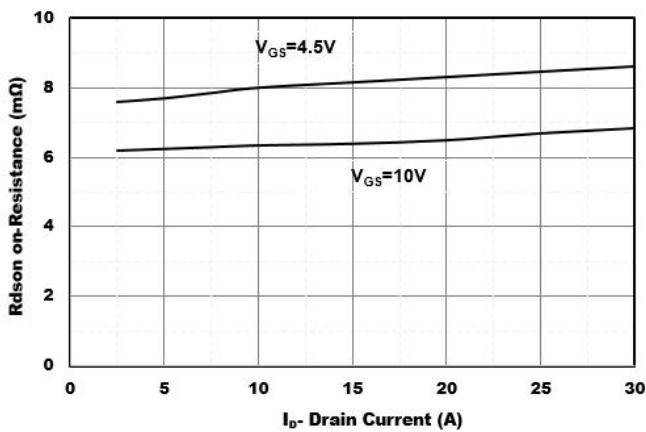


Figure5. Drain-Source on Resistance

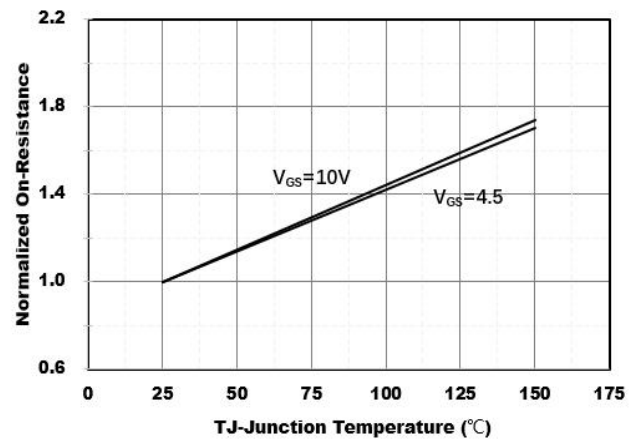


Figure6. Drain-Source on Resistance

Typical Characteristics

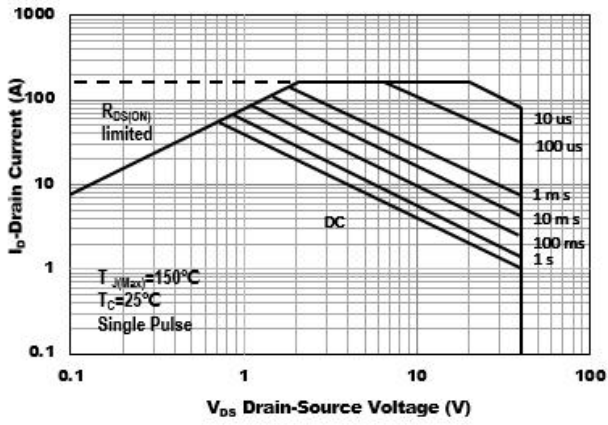


Figure7. Safe Operation Area

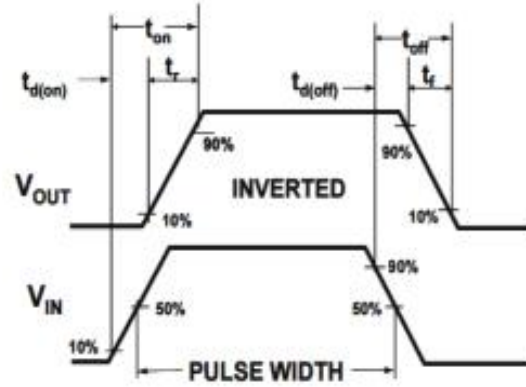
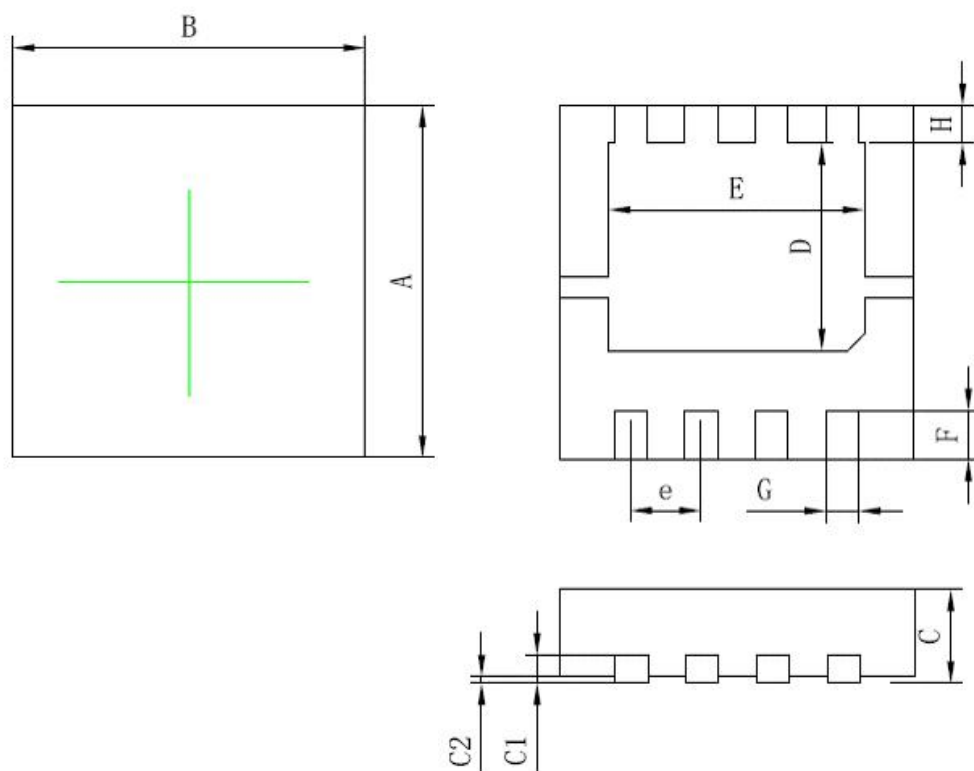


Figure8. Switching wave

DFN3.3X3.3-8L Package Information



| | | | |
|-----------|-----------|-----------|-----------|
| A | B | C | C1 |
| 3.25±0.05 | 3.25±0.05 | 0.8±0.05 | 0.2±0.02 |
| C2 | D | E | F |
| 0.05Max | 1.9±0.1 | 2.35±0.15 | 0.45±0.05 |
| G | H | e | |
| 0.3±0.05 | 0.35±0.05 | 0.65±0.05 | |
| 单位: mm | | | |