



N-Channel Enhancement Mode Power MOSFET **MXN3342**

DESCRIPTION

The MXN3342 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

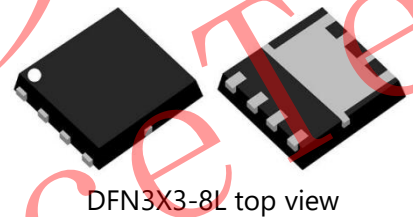
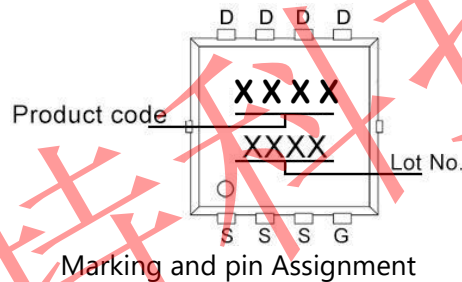
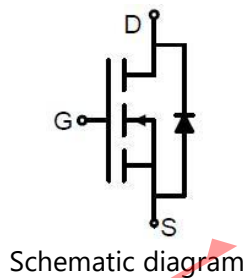
GENERAL FEATURES

- $V_{DS}=30V$, $I_D=35A$
 $R_{DS(ON)}(Typ.)=10m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)}(Typ.)=6.5m\Omega @ V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

APPLICATION

- PWM applications
- Load switch
- Power management
- Battery

PINOUT



ORDERING INFORMATION

| Part Number | Storage Temperature | Package | Devices Per Reel |
|-------------|---------------------|-----------|------------------|
| MXN3342 | -55°C to 150°C | DFN3X3-8L | 5000 |

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|----------------|------------|------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous | I_D | 35 | A |
| Drain Current-Continuous ($T_C=100^\circ C$) | I_D | 25 | A |
| Pulsed Drain Current ^(Note1) | I_{DM} | 100 | A |
| Maximum Power Dissipation | P_D | 25 | W |
| Avalanche Current | I_{AS} | 37 | A |
| Avalanche Energy (L=0.1mH) | E_{AS} | 68 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ C$ |

THERMAL RESISTANCE

| | | | |
|---|-----------------|---|--------------|
| Thermal Resistance, Junction-to-Case ^(Note2) | $R_{\theta JC}$ | 5 | $^\circ C/W$ |
|---|-----------------|---|--------------|

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. Surface Mounted on FR4 Board, $t \leq 10$ sec.



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ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|-----------|--------|------------|-----|-----|-----|------|
|-----------|--------|------------|-----|-----|-----|------|

Off Characteristics

| | | | | | | |
|---------------------------------|------------|-----------------------------|----|---|-----------|---------|
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=30V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |

On Characteristics (Note 3)

| | | | | | | |
|----------------------------------|--------------|-------------------------------|---|-----|-----|-----------|
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1 | 1.6 | 2.2 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=4.5V, I_D=16A$ | - | 10 | 13 | $m\Omega$ |
| | | $V_{GS}=10V, I_D=20A$ | - | 6.2 | 7.5 | $m\Omega$ |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=10A$ | - | 32 | - | S |

Dynamic Characteristics (Note4)

| | | | | | | |
|--------------------------------------|-----------|-----------------------------------|---|------|---|----|
| Input Capacitance | C_{iss} | $V_{DS}=15V, V_{GS}=0V, F=1.0MHz$ | - | 1300 | - | pF |
| Output Capacitance | C_{oss} | | - | 175 | - | pF |
| Reverse Transfer Capacitance (Note4) | C_{rss} | | - | 121 | - | pF |

Switching Characteristics

| | | | | | | |
|---------------------|--------------|--|---|-----|---|----|
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=15V, R_L=1\Omega, V_{GS}=10V, R_G=3\Omega$ | - | 4.2 | - | nS |
| Turn-on Rise Time | t_r | | - | 8.2 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 31 | - | nS |
| Turn-Off Fall Time | t_f | | - | 4 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=15V, I_D=10A, V_{GS}=10V$ | - | 28 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 3.5 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 7 | - | nC |

Drain-Source Diode Characteristics

| | | | | | | |
|--------------------------------|----------|----------------------|---|---|------|---|
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-1A$ | - | - | -1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | 25 | A |

Note 2. Surface Mounted on FR4 Board, $t \leq 10$ sec.

Note 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 4. Guaranteed by design, not subject to product.



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

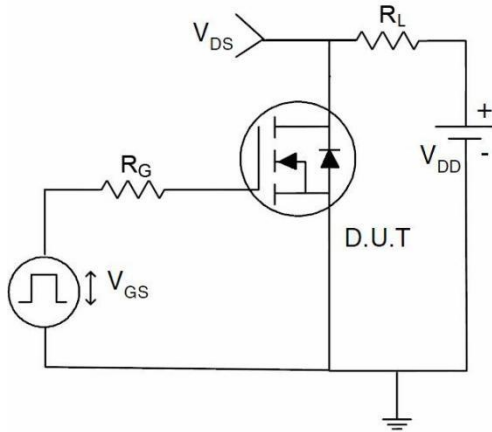


Figure 2. Switching Waveform

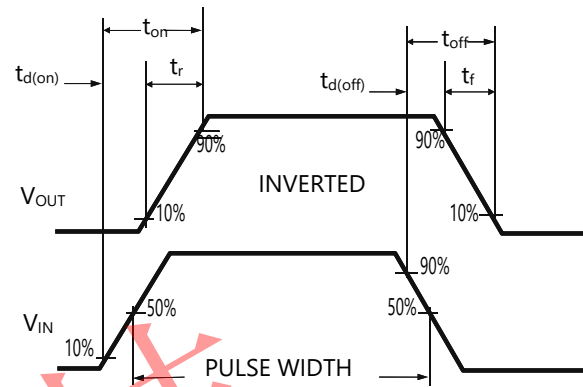


Figure 3. Power De-rating

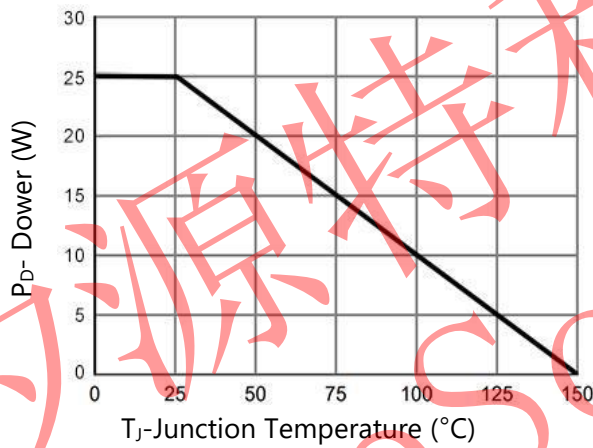


Figure 4. Drain Current

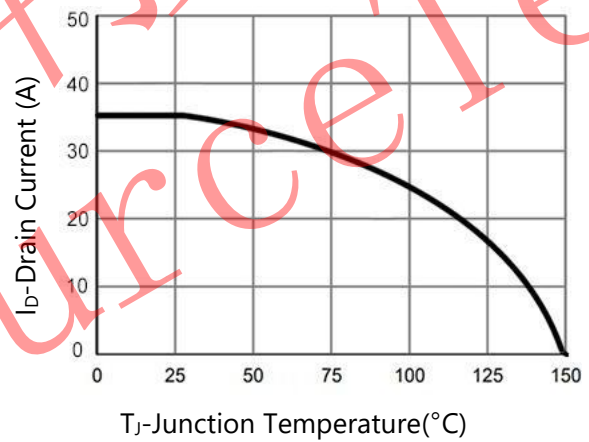


Figure 5. Output Characteristics

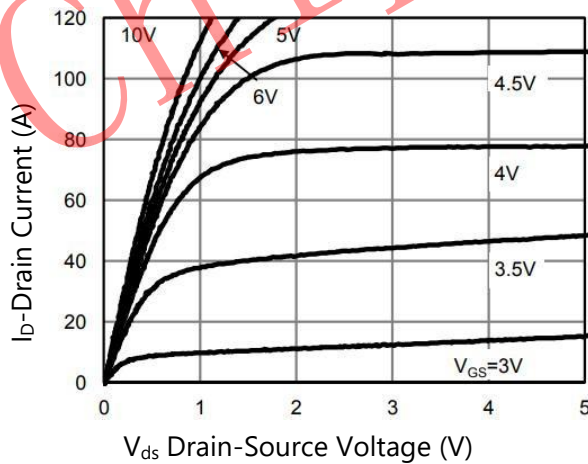
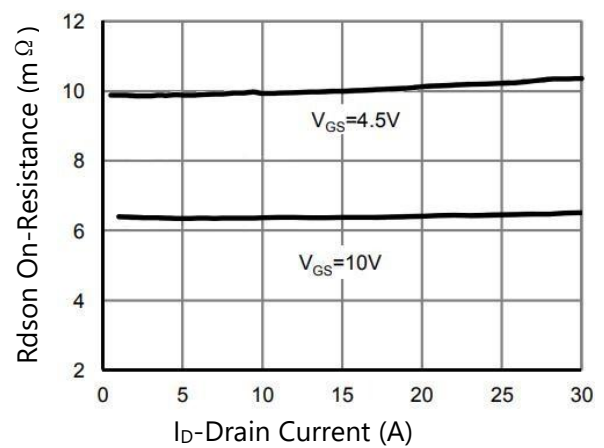


Figure 6. R_{dson} vs Drain Current





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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

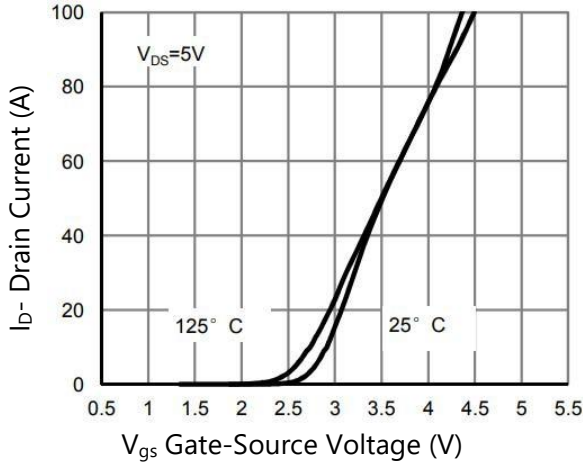


Figure 8. R_{dson} vs Junction Temperature

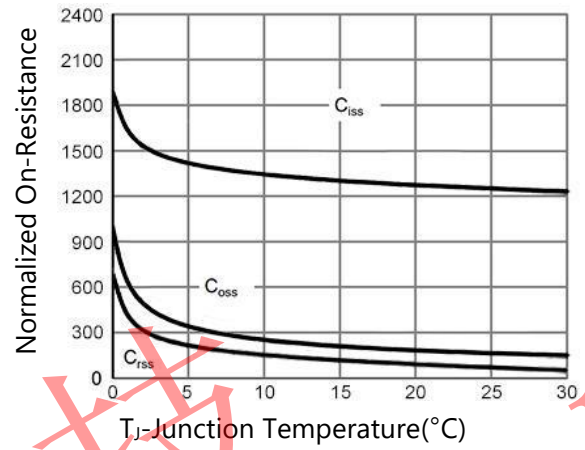


Figure 9. R_{dson} vs V_{gs}

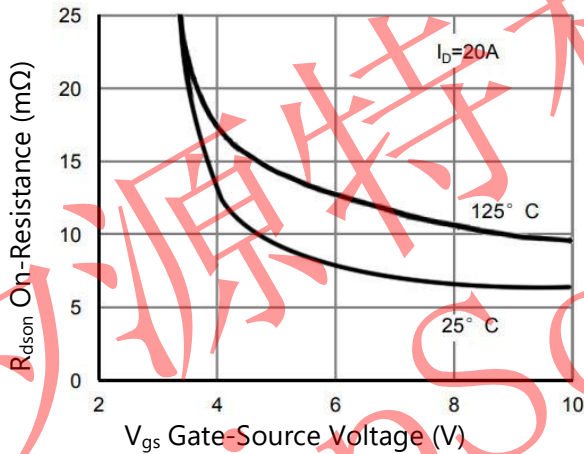


Figure 10. Capacitance vs V_{DS}

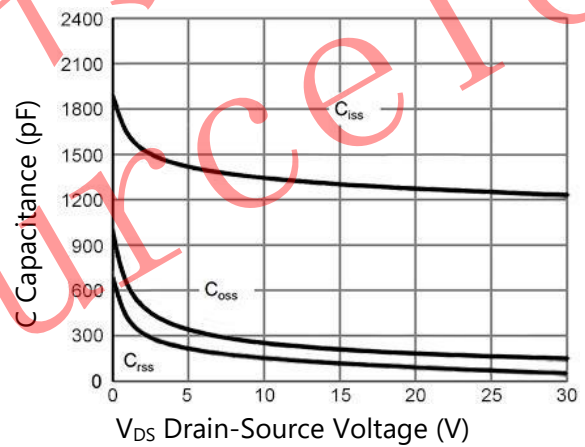


Figure 11. Gate Charge

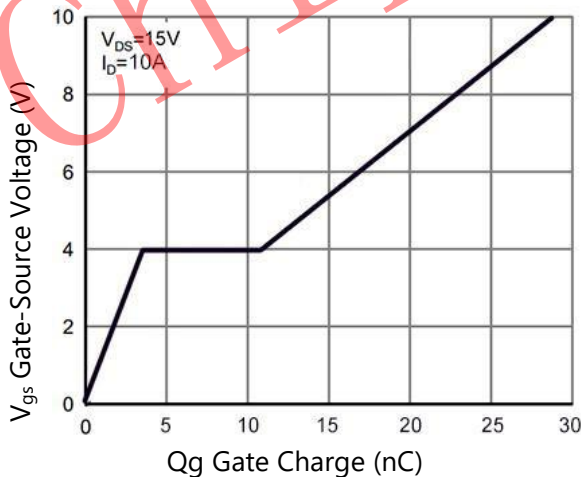
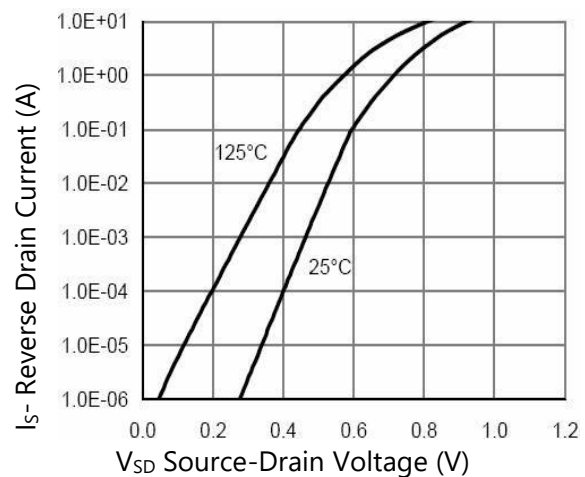


Figure 12. Source- Drain Diode Forward





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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

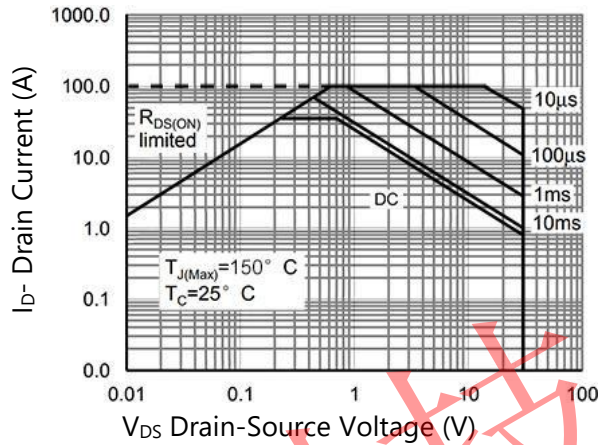
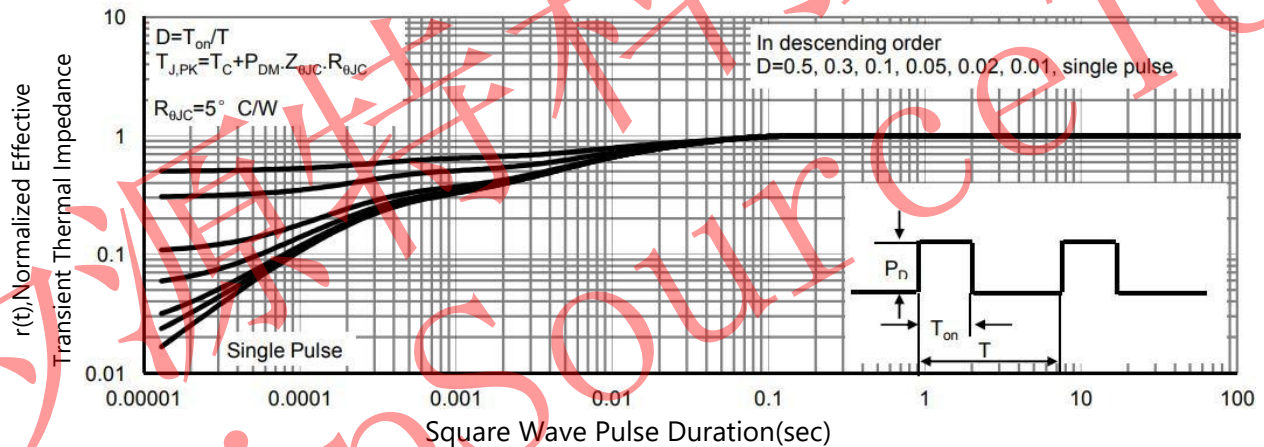


Figure 14. Normalized Maximum Transient Thermal Impedance

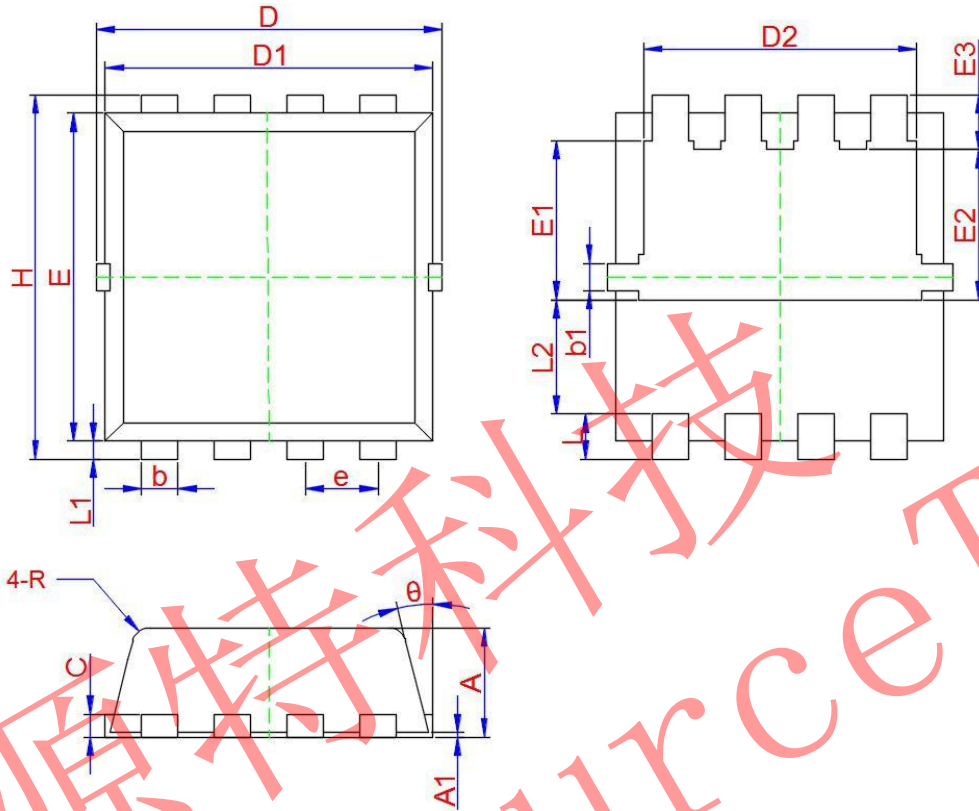




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PACKAGE INFORMATION

DFN3X3-8L



| Symbol | Dimensions InMillimeters | | | Symbol | Dimensions InMillimeters | | |
|--------|--------------------------|-------|-------|--------|--------------------------|-------|-------|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 0.700 | 0.800 | 0.900 | e | 0.650 TYP. | | |
| A1 | 0.000 | 0.030 | 0.050 | H | 3.200 | 3.300 | 3.400 |
| b | 0.240 | 0.300 | 0.350 | L | 0.300 | 0.400 | 0.500 |
| b1 | 0.080 | 0.130 | 0.180 | L1 | 0.100 | 0.150 | 0.200 |
| c | 0.152 TYP. | | | L2 | 1.130 TYP. | | |
| D | 3.250 | 3.320 | 3.400 | R | 0.200 TYP. | | |
| D1 | 3.050 | 3.150 | 3.250 | θ | 6° | 10° | 14° |
| D2 | 2.400 | 2.500 | 2.600 | | | | |
| E | 3.000 | 3.100 | 3.200 | | | | |
| E1 | 1.350 | 1.450 | 1.550 | | | | |
| E2 | 1.200 | 1.300 | 1.400 | | | | |
| E3 | 0.400 | 0.500 | 0.600 | | | | |