# N-Channel 100-V (D-S) MOSFET

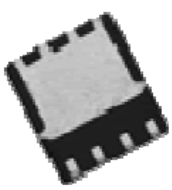
**Key Features:**
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

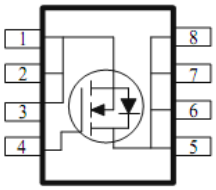
**Typical Applications:**
- LED Inverter Circuits
- DC/DC Conversion Circuits
- Motor drives

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ (mΩ) | $I_D$ (A) |
| 100 | 38 @ $V_{GS}$ = 10V | 20[c] |
| | 50 @ $V_{GS}$ = 4.5V | 17[c] |

Pb-free
RoHS COMPLIANT
HALOGEN FREE

DFN3x3-8L






| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Limit** | **Units** |
| Drain-Source Voltage | | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | 20[c] | A |
| | $T_C$=70°C | | 16[c] | |
| | $T_A$=25°C | | 7.9[a] | |
| | $T_A$=70°C | | 6[a] | |
| Pulsed Drain Current [b] | | $I_{DM}$ | 30 | |
| Continuous Source Current (Diode Conduction) [a] | | $I_S$ | 4.2 | |
| Power Dissipation | $T_C$=25°C | $P_D$ | 22 | W |
| | $T_C$=70°C | | 14 | |
| | $T_A$=25°C | | 3.5[a] | |
| | $T_A$=70°C | | 2[a] | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | °C |

| THERMAL RESISTANCE RATINGS | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Maximum** | **Units** |
| Maximum Junction-to-Ambient [a] | t <= 10 sec | $R_{\theta JA}$ | 35 | °C/W |
| | Steady State | | 81 | |
| Maximum Junction-to-Case | Steady State | $R_{\theta JC}$ | 6 | |

Notes
a. Surface Mounted on 1” x 1” FR4 Board.
b. Pulse width limited by maximum junction temperature
c. Package limited

## Electrical Characteristics

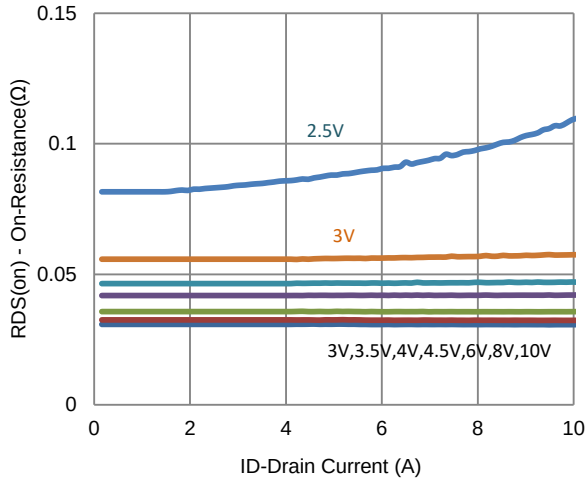
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 uA | 1 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ±20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 80 V, $V_{GS}$ = 0 V | | | 1 | uA |
| | | $V_{DS}$ = 80 V, $V_{GS}$ = 0 V, $T_J$ = 55°C | | | 10 | |
| On-State Drain Current [a] | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 10 V | 12 | | | A |
| Drain-Source On-Resistance [a] | $r_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 4 A | | | 38 | mΩ |
| | | $V_{GS}$ = 4.5 V, $I_D$ = 3.5 A | | | 50 | |
| Forward Transconductance [a] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 4 A | | 11 | | S |
| Diode Forward Voltage [a] | $V_{SD}$ | $I_S$ = 2.1 A, $V_{GS}$ = 0 V | | 0.8 | | V |
| **Dynamic [b]** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 50 V, $V_{GS}$ = 4.5 V, $I_D$ = 4 A | | 6.2 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 2.1 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 2.9 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS}$ = 50 V, $R_L$ = 12.5 Ω, $I_D$ = 4 A, $V_{GEN}$ = 10 V, $R_{GEN}$ = 6 Ω | | 3 | | ns |
| Rise Time | $t_r$ | | | 4 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 18 | | |
| Fall Time | $t_f$ | | | 7 | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 50 V, $V_{GS}$ = 0 V, f = 1 Mhz | | 414 | | pF |
| Output Capacitance | $C_{oss}$ | | | 76 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 33 | | |

Notes

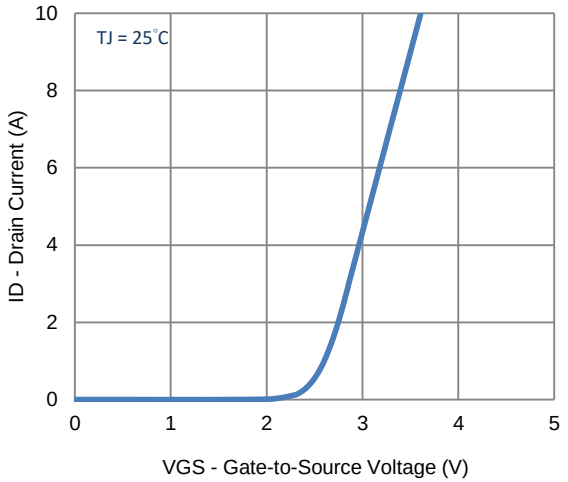
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

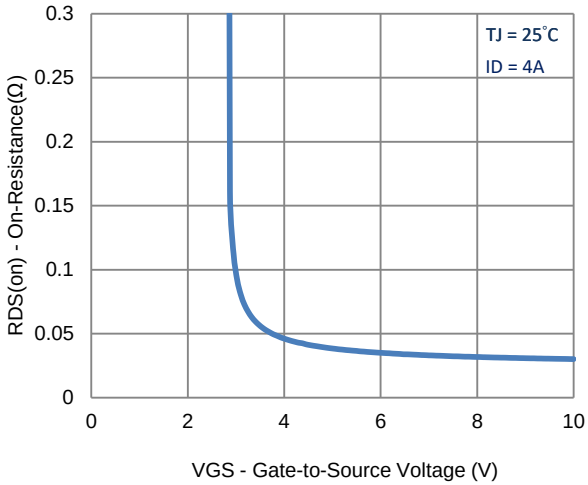
## Typical Electrical Characteristics



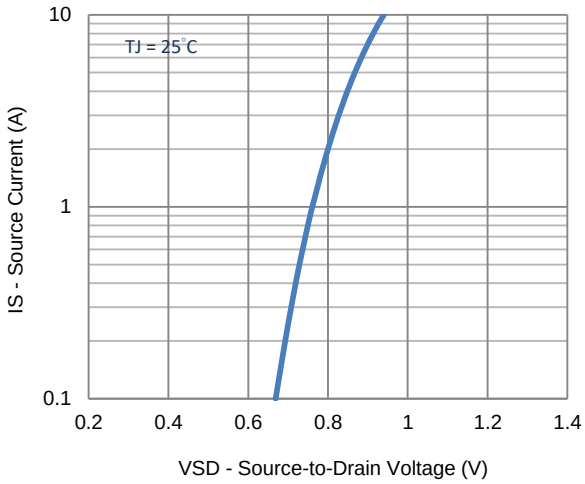

**1. On-Resistance vs. Drain Current**



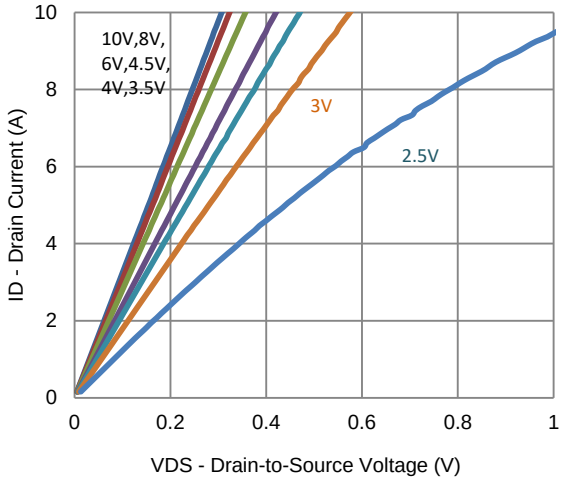

**2. Transfer Characteristics**



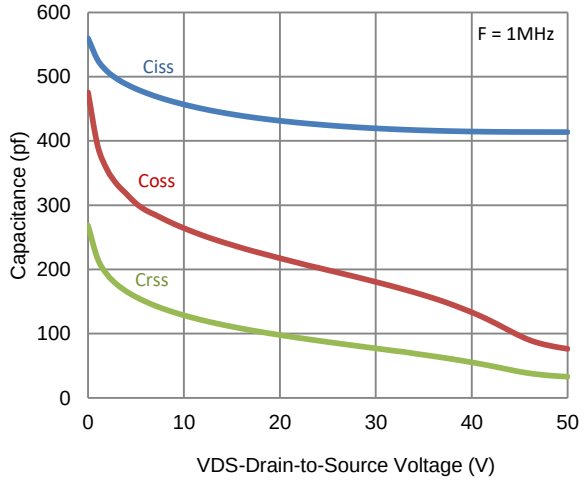

**3. On-Resistance vs. Gate-to-Source Voltage**




**4. Drain-to-Source Forward Voltage**

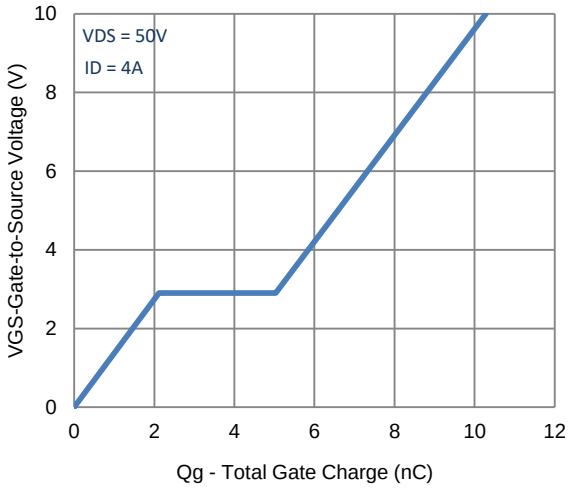



**5. Output Characteristics**

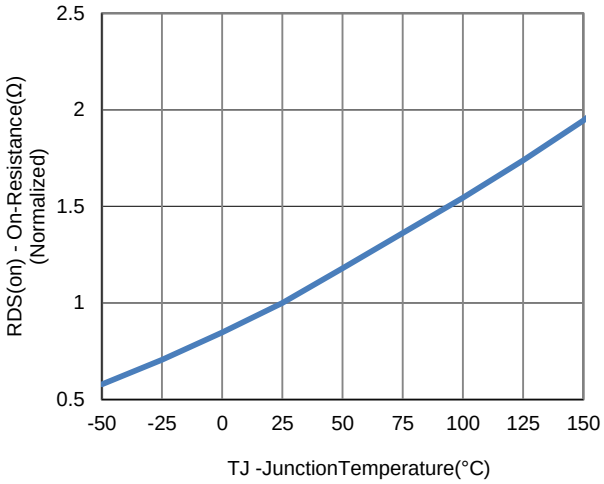



**6. Capacitance**

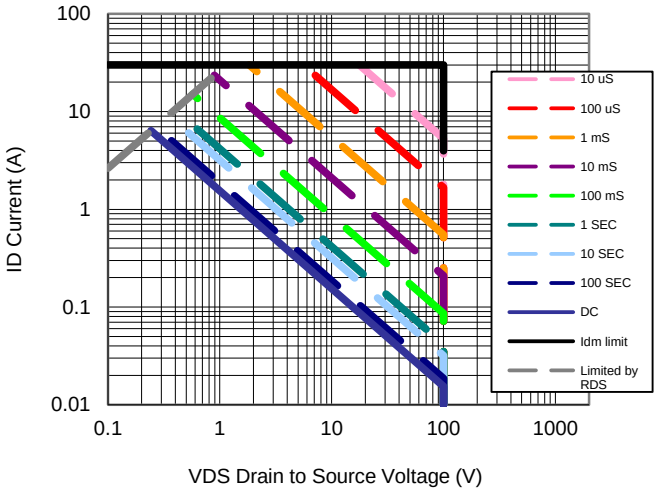
## Typical Electrical Characteristics



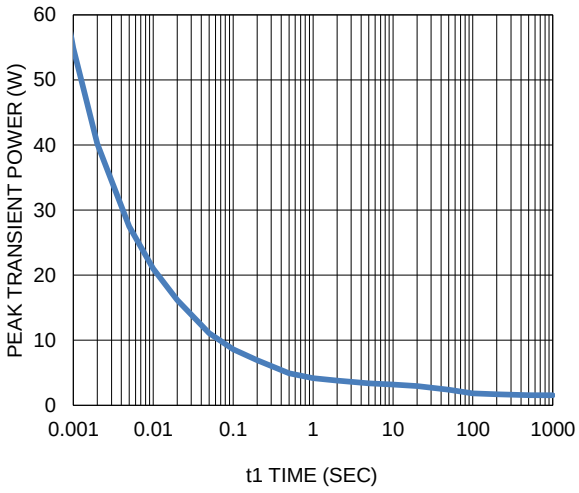

**7. Gate Charge**



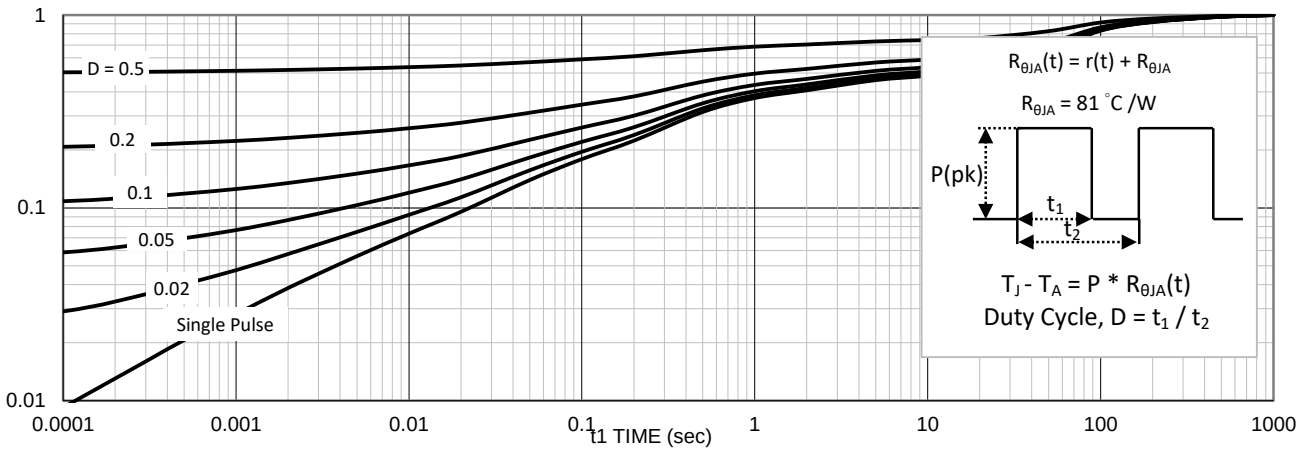

**8. Normalized On-Resistance Vs Junction Temperature**




**9. Safe Operating Area**

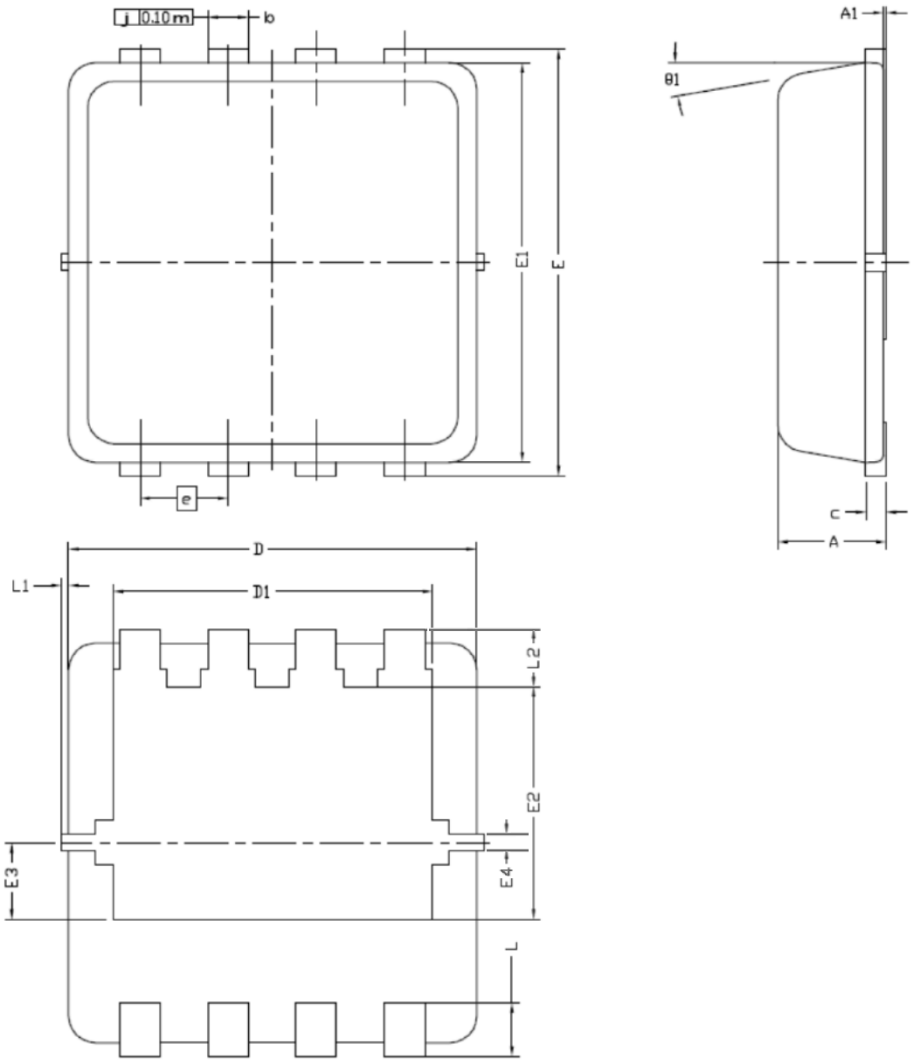



**10. Single Pulse Maximum Power Dissipation**




**11. Normalized Thermal Transient Junction to Ambient**

## Package Information




| DIM. | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.700 | 0.80 | 0.900 | 0.0276 | 0.0315 | 0.0354 |
| A1 | 0.00 | --- | 0.05 | 0.000 | --- | 0.002 |
| b | 0.24 | 0.30 | 0.35 | 0.009 | 0.012 | 0.014 |
| c | 0.10 | 0.152 | 0.25 | 0.004 | 0.006 | 0.010 |
| D | 3.00 BSC | | | 0.118 BSC | | |
| D1 | 2.35 BSC | | | 0.093 BSC | | |
| E | 3.20 BSC | | | 0.126 BSC | | |
| E1 | 3.00 BSC | | | 0.118 BSC | | |
| E2 | 1.75 BSC | | | 0.069 BSC | | |
| E3 | 0.575 BSC | | | 0.023 BSC | | |
| E4 | 0.075 | 0.125 | 0.175 | 0.003 | 0.005 | 0.007 |
| e | 0.65 BSC | | | 0.026 BSC | | |
| L | 0.30 | 0.40 | 0.50 | 0.0118 | 0.0157 | 0.0197 |
| L1 | 0 | --- | 0.100 | 0 | --- | 0.004 |
| L2 | 0.33 | 0.43 | 0.53 | 0.013 | 0.017 | 0.021 |
| θ1 | 0° | 10° | 12° | 0° | 10° | 12° |