

## N-Channel 150-V (D-S) MOSFET

### Key Features:

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

### Typical Applications:

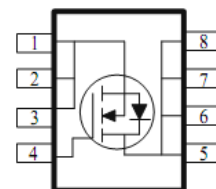
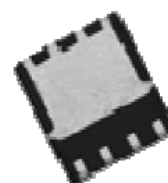
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

| PRODUCT SUMMARY |                            |           |
|-----------------|----------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ (m $\Omega$ ) | $I_D$ (A) |
| 150             | 255 @ $V_{GS} = 10V$       | 3.6       |
|                 | 290 @ $V_{GS} = 4.5V$      | 3.4       |



RoHS  
COMPLIANT  
HALOGEN  
FREE

DFN3x3-8L



### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| Parameter   | Symbol                 | Limit      | Units            |
|---|------------------------|------------|------------------|
| Drain-Source Voltage                                      | $V_{DS}$               | 150        | V                |
| Gate-Source Voltage                                       | $V_{GS}$               | $\pm 20$   |                  |
| Continuous Drain Current <sup>a</sup>                     | $T_A=25^\circ\text{C}$ | 3.6        | A                |
|   | $T_A=70^\circ\text{C}$ | 2.9        |                  |
| Pulsed Drain Current <sup>b</sup>                         | $I_{DM}$               | 20         |                  |
| Continuous Source Current (Diode Conduction) <sup>a</sup> | $I_S$                  | 6.2        | A                |
| Power Dissipation <sup>a</sup>                            | $T_A=25^\circ\text{C}$ | 5          | W                |
|   | $T_A=70^\circ\text{C}$ | 3.2        |                  |
| Operating Junction and Storage Temperature Range          | $T_J, T_{stg}$         | -55 to 150 | $^\circ\text{C}$ |

### THERMAL RESISTANCE RATINGS

| Parameter                                | Symbol                  | Maximum | Units              |
|--|-------------------------|---------|--------------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 10 \text{ sec}$ | 25      | $^\circ\text{C/W}$ |
|  | Steady State            | 65      |                    |

### Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

## Electrical Characteristics

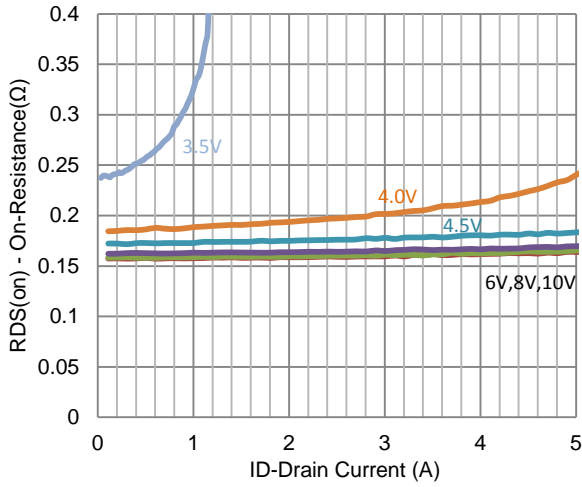
| Parameter                       | Symbol       | Test Conditions  | Min | Typ  | Max      | Unit       |
|---------------------------------|--------------|--|-----|------|----------|------------|
| <b>Static</b>                   |              |  |     |      |          |            |
| Gate-Source Threshold Voltage   | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250 \mu A$   | 1   |      |          | V          |
| Gate-Body Leakage               | $I_{GSS}$    | $V_{DS} = 0 V, V_{GS} = \pm 20 V$  |     |      | $\pm 10$ | $\mu A$    |
| Zero Gate Voltage Drain Current | $I_{DSS}$    | $V_{DS} = 120 V, V_{GS} = 0 V$   |     |      | 1        | $\mu A$    |
|                                 |              | $V_{DS} = 120 V, V_{GS} = 0 V, T_J = 55^\circ C$   |     |      | 10       |            |
| On-State Drain Current          | $I_{D(on)}$  | $V_{DS} = 5 V, V_{GS} = 10 V$  | 10  |      |          | A          |
| Drain-Source On-Resistance      | $r_{DS(on)}$ | $V_{GS} = 10 V, I_D = 2.9 A$   |     |      | 255      | m $\Omega$ |
|                                 |              | $V_{GS} = 4.5 V, I_D = 2.7 A$  |     |      | 290      |            |
| Forward Transconductance        | $g_{fs}$     | $V_{DS} = 15 V, I_D = 2.9 A$   |     | 10   |          | S          |
| Diode Forward Voltage           | $V_{SD}$     | $I_S = 3.1 A, V_{GS} = 0 V$  |     | 0.76 |          | V          |
| <b>Dynamic</b>                  |              |  |     |      |          |            |
| Total Gate Charge               | $Q_g$        | $V_{DS} = 75 V, V_{GS} = 4.5 V, I_D = 2.9 A$   |     | 10.8 |          | nC         |
| Gate-Source Charge              | $Q_{gs}$     |  |     | 3.3  |          |            |
| Gate-Drain Charge               | $Q_{gd}$     |  |     | 5.6  |          |            |
| Turn-On Delay Time              | $t_{d(on)}$  | $V_{DD} = 75 V, R_L = 25.9 \Omega, I_D = 2.9 A,$<br>$V_{GEN} = 10 V, R_{GEN} = 6 \Omega$ |     | 10.1 |          | ns         |
| Rise Time                       | $t_r$        |  |     | 10   |          |            |
| Turn-Off Delay Time             | $t_{d(off)}$ |  |     | 50   |          |            |
| Fall Time                       | $t_f$        |  |     | 22   |          |            |
| Input Capacitance               | $C_{iss}$    | $V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$   |     | 848  |          | pF         |
| Output Capacitance              | $C_{oss}$    |  |     | 69   |          |            |
| Reverse Transfer Capacitance    | $C_{rss}$    |  |     | 29   |          |            |

## Notes

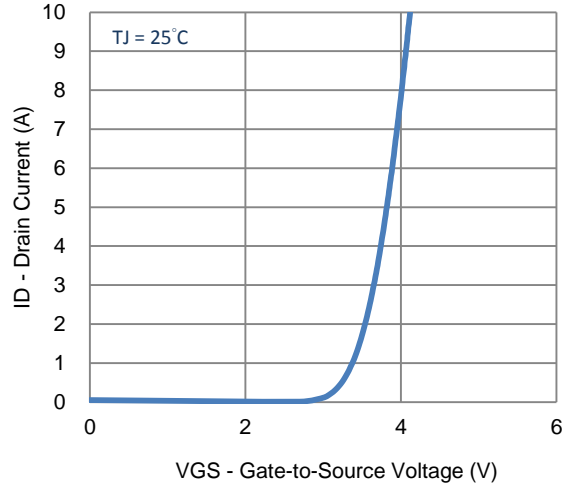
- Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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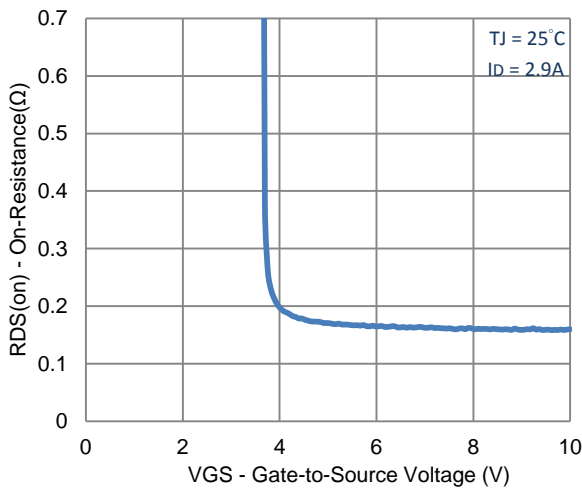
Typical Electrical Characteristics



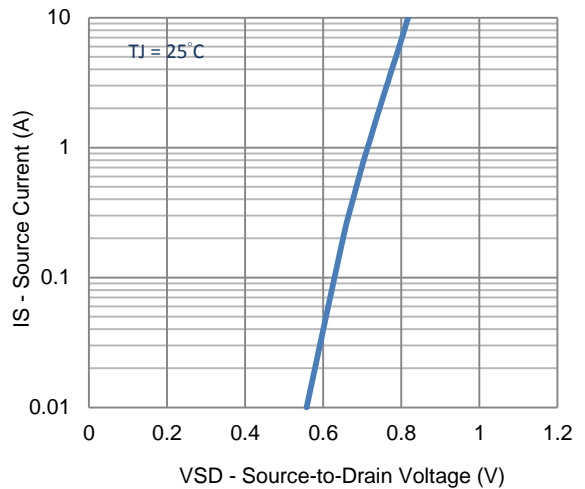
1. On-Resistance vs. Drain Current



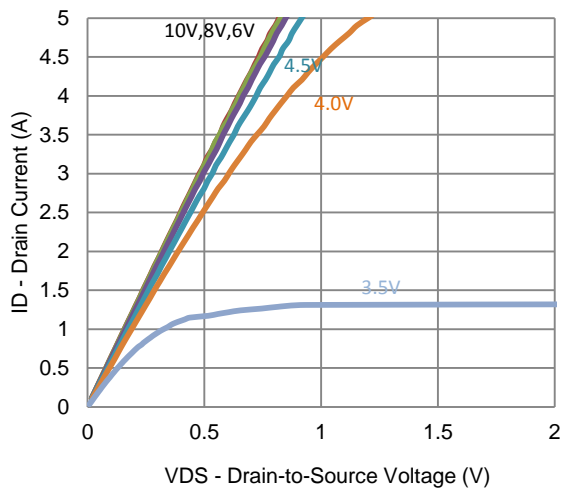
2. Transfer Characteristics



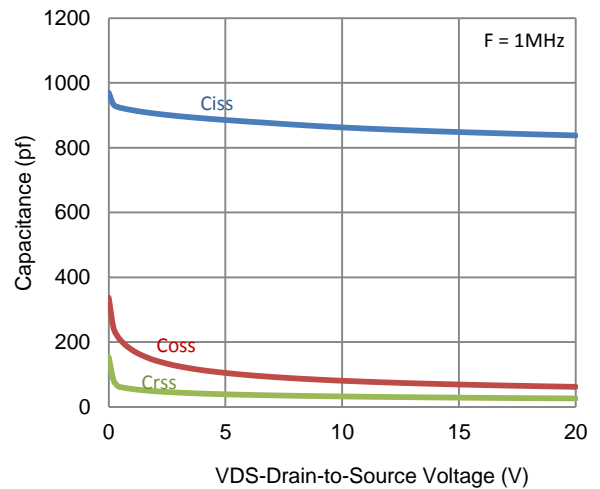
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

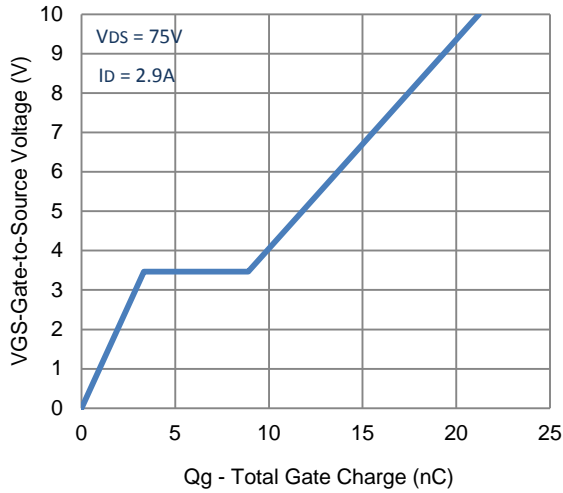


5. Output Characteristics



6. Capacitance

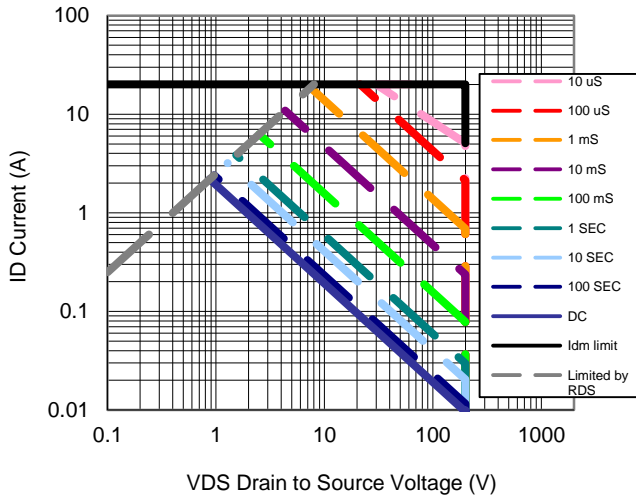
Typical Electrical Characteristics



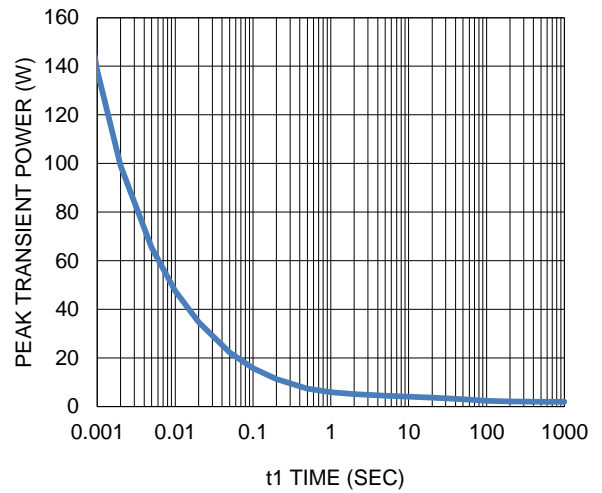
7. Gate Charge



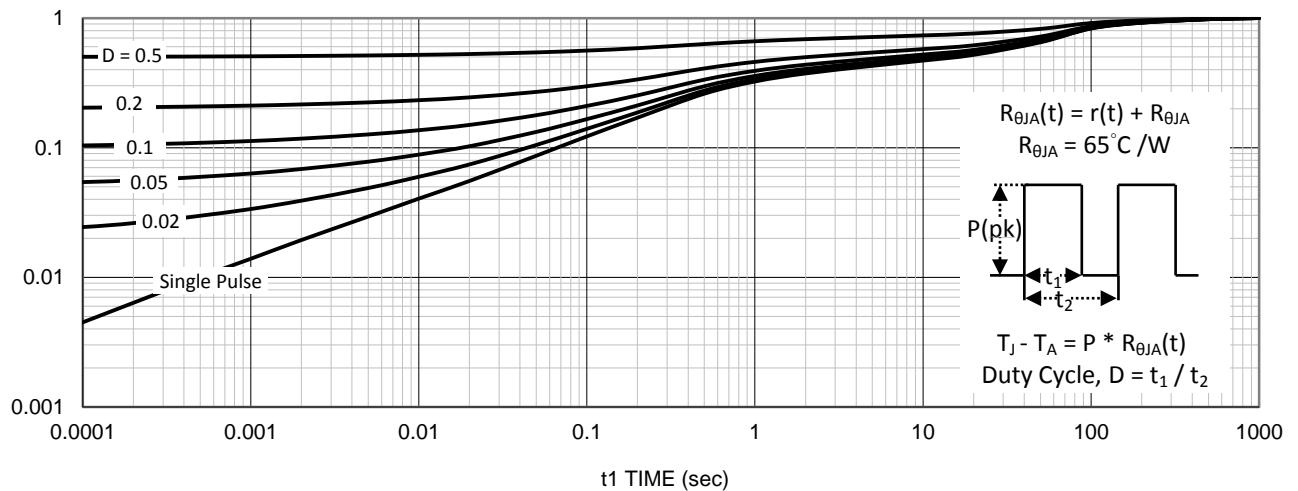
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

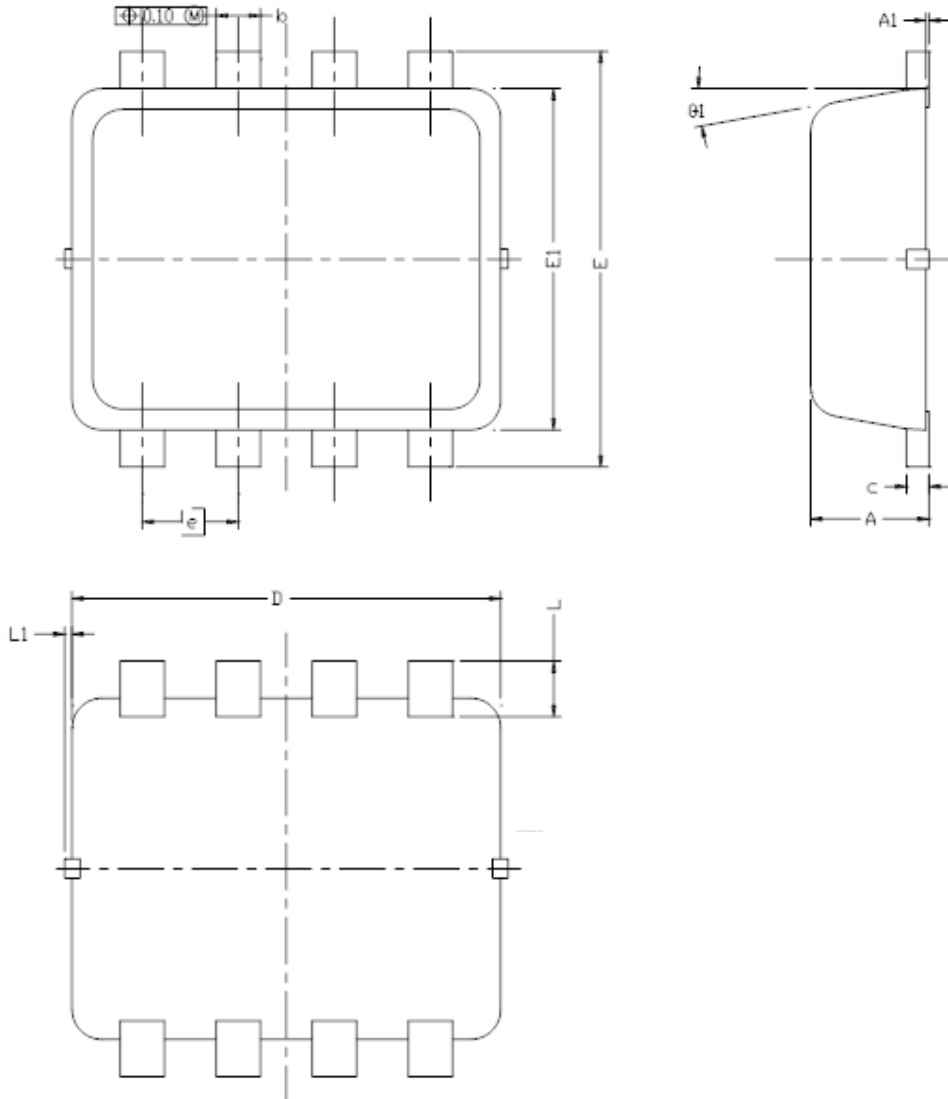


10. Single Pulse Maximum Power Dissipation



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          | 0.08        | 0.152 | 0.25  | 0.003     | 0.006  | 0.010  |
| D          | 2.90 BSC    |       |       | 0.114 BSC |        |        |
| E          | 2.80 BSC    |       |       | 0.110 BSC |        |        |
| E1         | 2.30 BSC    |       |       | 0.091 BSC |        |        |
| e          | 0.65 BSC    |       |       | 0.026 BSC |        |        |
| L          | 0.20        | 0.375 | 0.450 | 0.008     | 0.0148 | 0.0177 |
| L1         | 0           | ---   | 0.100 | 0         | ---    | 0.004  |
| $\theta 1$ | 0           | 10    | 12    | 0         | 10     | 12     |