

## Dual N-Channel 30-V (D-S) MOSFET

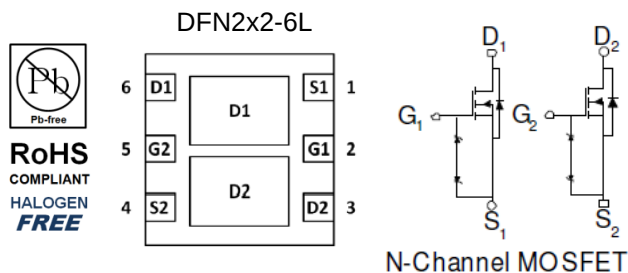
### Key Features:

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

### Typical Applications:

- Power Routing
- Li Ion Battery Packs
- Level Shifting and Driver Circuits

| PRODUCT SUMMARY |                            |           |
|-----------------|----------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ (m $\Omega$ ) | $I_D$ (A) |
| 30              | 25 @ $V_{GS} = 10V$        | 16        |
|                 | 39 @ $V_{GS} = 4.5V$       | 13        |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |                          |                |                  |                  |
|-----------------------------------------------------------------------------|--------------------------|----------------|------------------|------------------|
| Parameter                                                                   |                          | Symbol         | Limit            | Units            |
| Drain-Source Voltage                                                        |                          | $V_{DS}$       | 30               | V                |
| Gate-Source Voltage                                                         |                          | $V_{GS}$       | $\pm 20$         |                  |
| Continuous Drain Current                                                    | $T_C = 25^\circ\text{C}$ | $I_D$          | 16               | A                |
|                                                                             | $T_C = 70^\circ\text{C}$ |                | 13               |                  |
|                                                                             | $T_A = 25^\circ\text{C}$ |                | 6.9 <sup>a</sup> |                  |
|                                                                             | $T_A = 70^\circ\text{C}$ |                | 5.7 <sup>a</sup> |                  |
| Pulsed Drain Current <sup>b</sup>                                           |                          | $I_{DM}$       | 30               |                  |
| Continuous Source Current (Diode Conduction) <sup>a</sup>                   |                          | $I_S$          | 1.8              |                  |
| Power Dissipation                                                           | $T_C = 25^\circ\text{C}$ | $P_D$          | 9.9              | W                |
|                                                                             | $T_C = 70^\circ\text{C}$ |                | 6.3              |                  |
|                                                                             | $T_A = 25^\circ\text{C}$ |                | 1.8 <sup>a</sup> |                  |
|                                                                             | $T_A = 70^\circ\text{C}$ |                | 1.2 <sup>a</sup> |                  |
| 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> | $t \leq 10$ sec | $R_{\theta JA}$ | 69      | $^\circ\text{C/W}$ |
|                                          | Steady State    |                 | 100     |                    |
| Maximum Junction-to-Case                 | Steady State    | $R_{\theta JC}$ | 13      |                    |

### Notes

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

## Electrical Characteristics

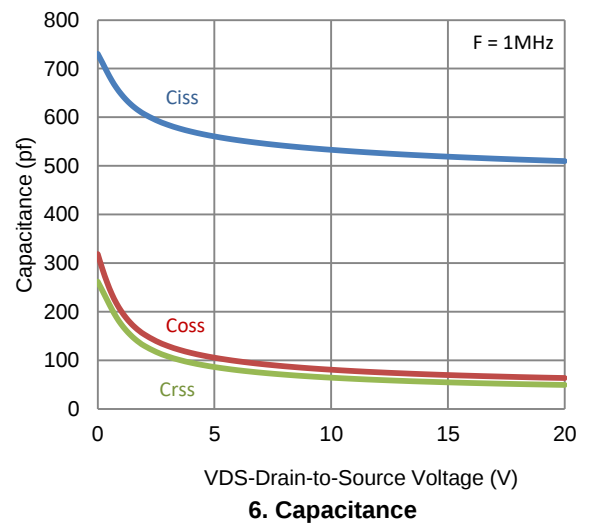
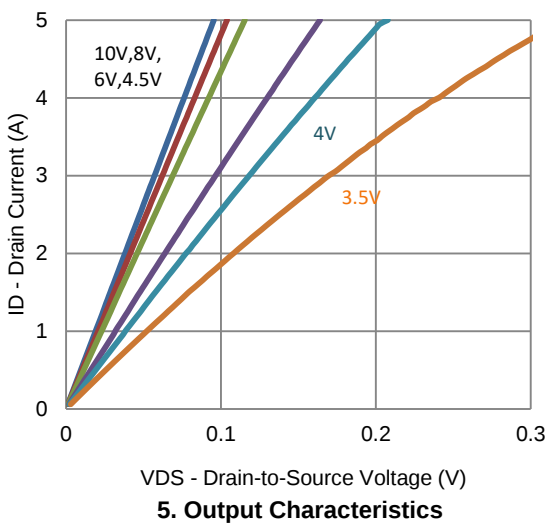
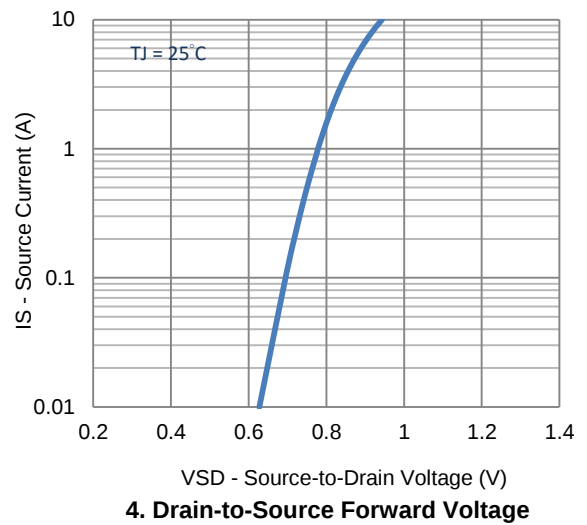
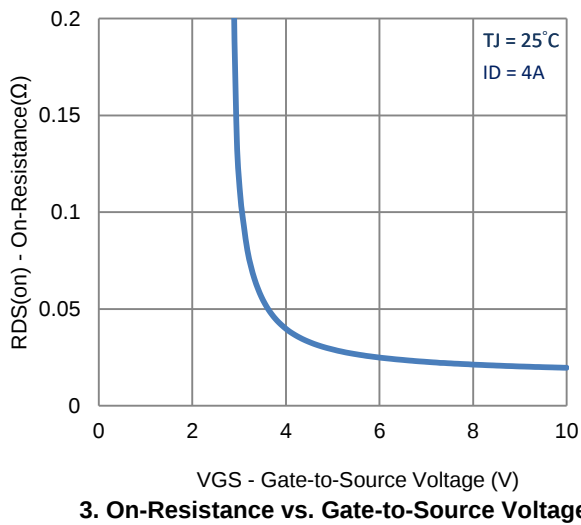
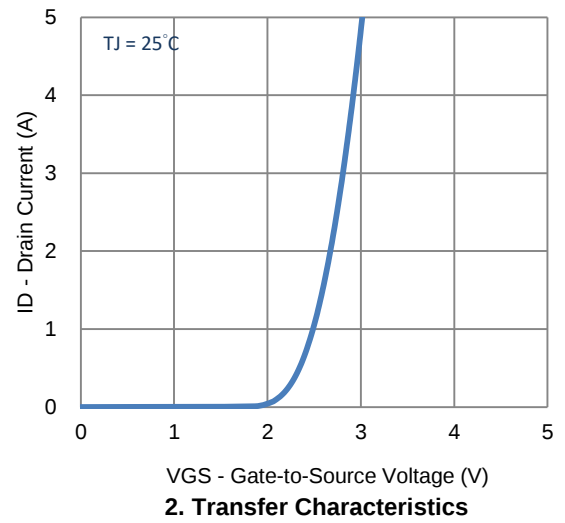
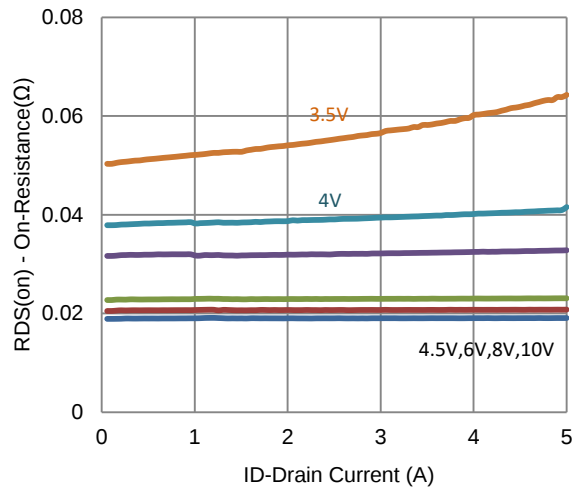
| Parameter                               | Symbol       | Test Conditions                                                                                    | Min | Typ  | Max       | Unit       |
|-----------------------------------------|--------------|----------------------------------------------------------------------------------------------------|-----|------|-----------|------------|
| <b>Static</b>                           |              |                                                                                                    |     |      |           |            |
| Gate-Source Threshold Voltage           | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu A$                                                              | 1   |      |           | V          |
| Gate-Body Leakage                       | $I_{GSS}$    | $V_{DS} = 0 V$ , $V_{GS} = \pm 20 V$                                                               |     |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current         | $I_{DSS}$    | $V_{DS} = 24 V$ , $V_{GS} = 0 V$                                                                   |     |      | 1         | $\mu A$    |
|                                         |              | $V_{DS} = 24 V$ , $V_{GS} = 0 V$ , $T_J = 55^\circ C$                                              |     |      | 10        |            |
| On-State Drain Current <sup>a</sup>     | $I_{D(on)}$  | $V_{DS} = 5 V$ , $V_{GS} = 10 V$                                                                   | 10  |      |           | A          |
| Drain-Source On-Resistance <sup>a</sup> | $r_{DS(on)}$ | $V_{GS} = 10 V$ , $I_D = 4 A$                                                                      |     |      | 25        | m $\Omega$ |
|                                         |              | $V_{GS} = 4.5 V$ , $I_D = 3 A$                                                                     |     |      | 39        |            |
| Forward Transconductance <sup>a</sup>   | $g_{fs}$     | $V_{DS} = 15 V$ , $I_D = 4 A$                                                                      |     | 11   |           | S          |
| Diode Forward Voltage <sup>a</sup>      | $V_{SD}$     | $I_S = 0.9 A$ , $V_{GS} = 0 V$                                                                     |     | 0.78 |           | V          |
| <b>Dynamic <sup>b</sup></b>             |              |                                                                                                    |     |      |           |            |
| Total Gate Charge                       | $Q_g$        | $V_{DS} = 15 V$ , $V_{GS} = 4.5 V$ ,<br>$I_D = 4 A$                                                |     | 6    |           | nC         |
| Gate-Source Charge                      | $Q_{gs}$     |                                                                                                    |     | 2.6  |           |            |
| Gate-Drain Charge                       | $Q_{gd}$     |                                                                                                    |     | 1.9  |           |            |
| Turn-On Delay Time                      | $t_{d(on)}$  | $V_{DS} = 15 V$ , $R_L = 3.8 \Omega$ ,<br>$I_D = 4 A$ ,<br>$V_{GEN} = 10 V$ , $R_{GEN} = 6 \Omega$ |     | 4    |           | ns         |
| Rise Time                               | $t_r$        |                                                                                                    |     | 7    |           |            |
| Turn-Off Delay Time                     | $t_{d(off)}$ |                                                                                                    |     | 19   |           |            |
| Fall Time                               | $t_f$        |                                                                                                    |     | 5    |           |            |
| Input Capacitance                       | $C_{iss}$    | $V_{DS} = 15 V$ , $V_{GS} = 0 V$ , $f = 1 Mhz$                                                     |     | 519  |           | pF         |
| Output Capacitance                      | $C_{oss}$    |                                                                                                    |     | 70   |           |            |
| Reverse Transfer Capacitance            | $C_{rss}$    |                                                                                                    |     | 55   |           |            |

## Notes

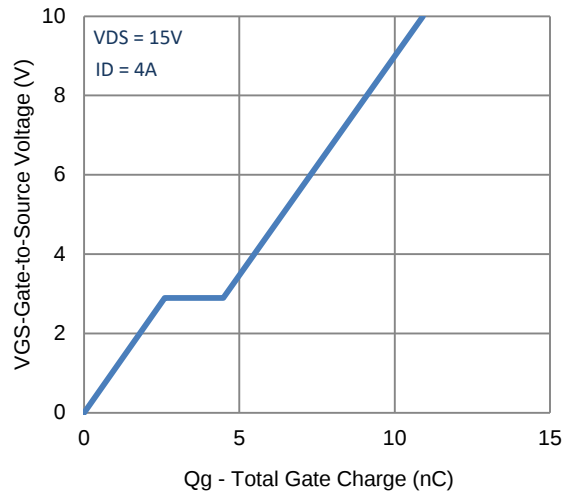
- a. Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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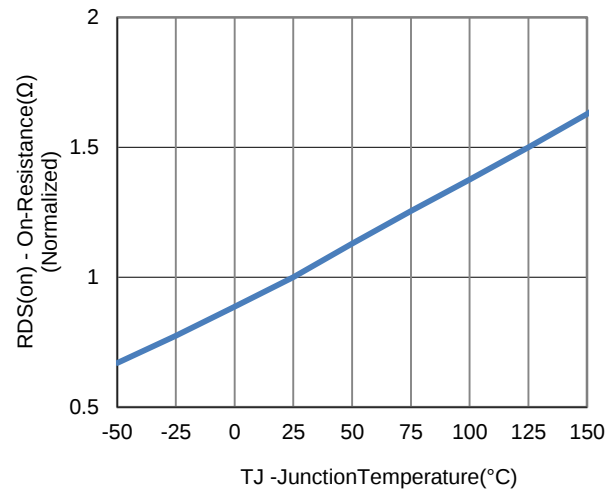
## Typical Electrical Characteristics



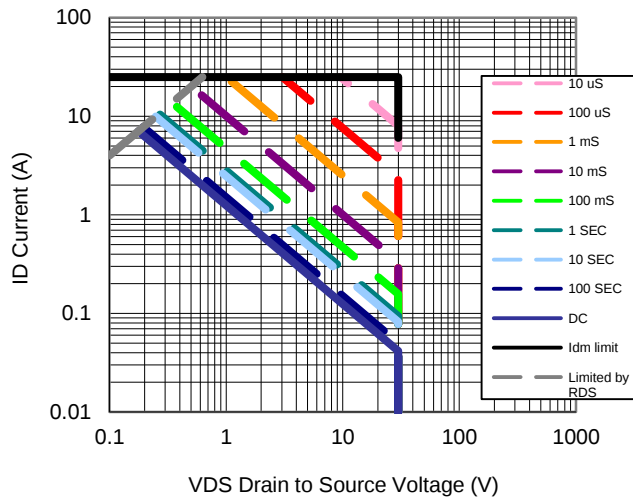
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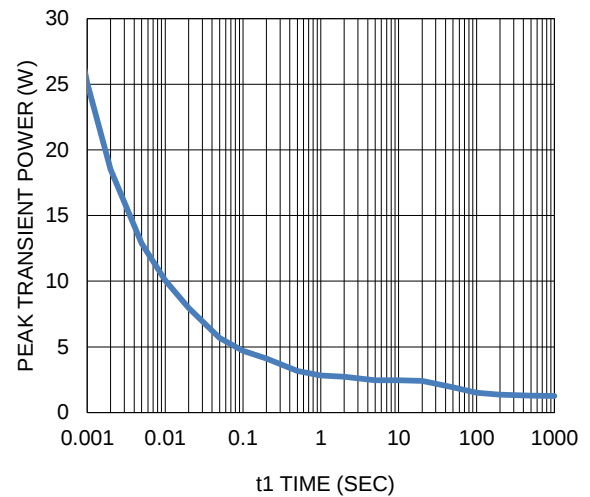
7. Gate Charge



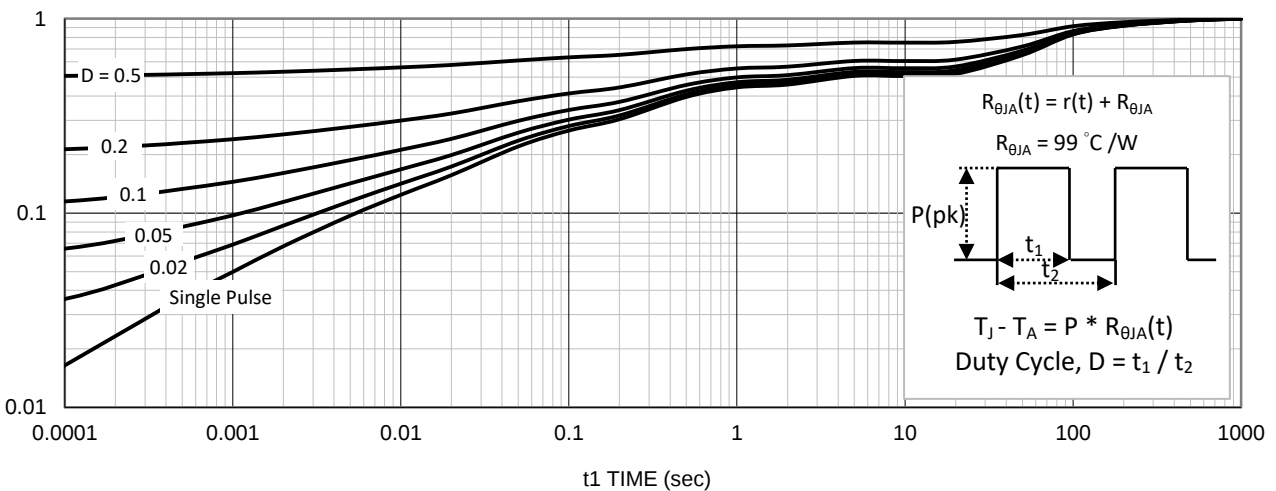
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

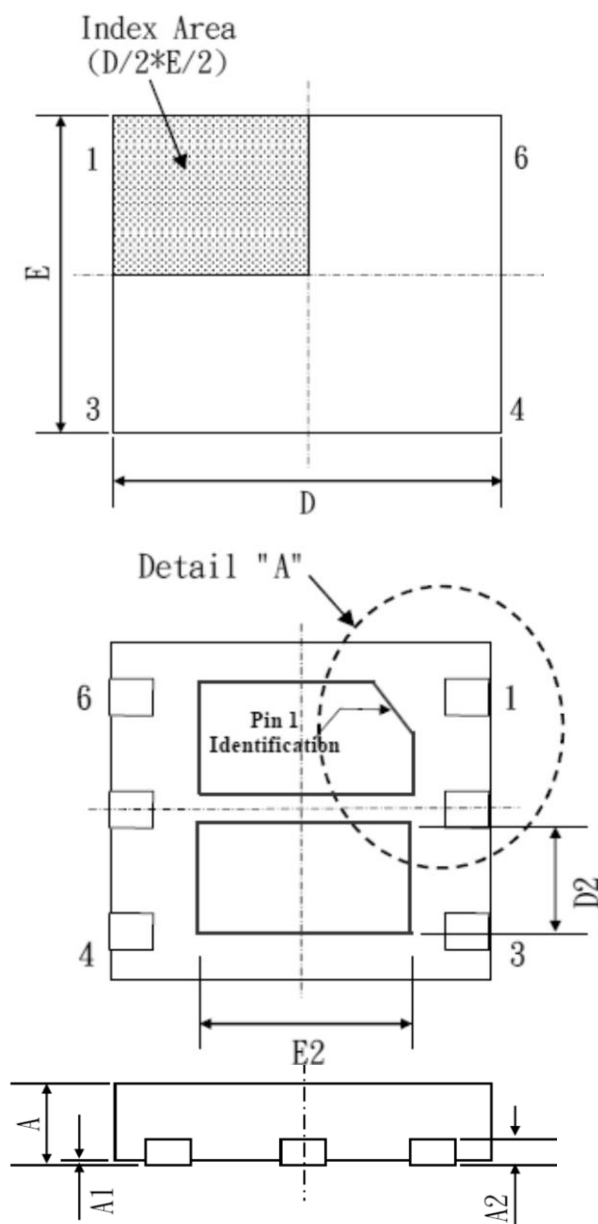


10. Single Pulse Maximum Power Dissipation

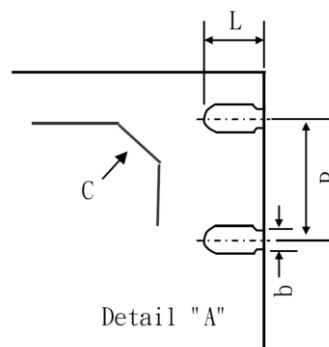


11. Normalized Thermal Transient Junction to Ambient

## Package Information



| DIM. | MILLIMETERS |      |
|------|-------------|------|
|      | MIN         | MAX  |
| A    | 0.7         | 0.8  |
| A1   | 0           | 0.06 |
| A2   | 0.15        | 0.25 |
| b    | 0.25        | 0.4  |
| C    | 0.2 TYP     |      |
| D    | 1.95        | 2.05 |
| E2   | 0.75        | 1.1  |
| E    | 1.95        | 2.05 |
| D2   | 0.6         | 0.85 |
| L    | 0.15        | 0.35 |
| P    | 0.6         | 0.7  |



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