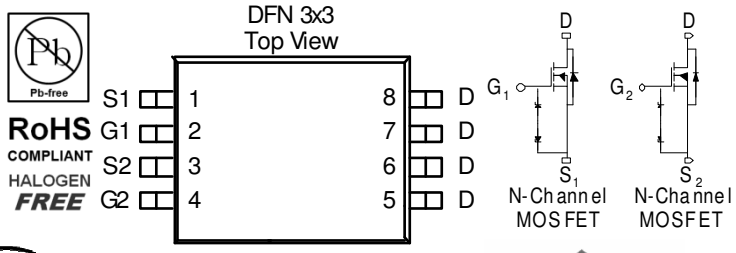
# Dual N-Channel Logical Level MOSFET

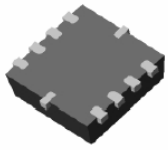
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe DFN 3x3 saves board space
- Fast switching speed
- High performance trench technology

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ (OHM) | $I_D$ (A) |
| 20 | 0.015 @ $V_{GS}$ = 4.5 V | 8.2 |
| | 0.018 @ $V_{GS}$ = 2.5V | 7.5 |




ESD Protected
2000V



| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C UNLESS OTHERWISE NOTED) | | | | |
|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Maximum** | **Units** |
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | |
| Continuous Drain Current[a] | $T_A$=25°C | $I_D$ | 8.2 | A |
| | $T_A$=70°C | | 6.7 | |
| Pulsed Drain Current[b] | | $I_{DM}$ | ±40 | |
| Continuous Source Current (Diode Conduction)[a] | | $I_S$ | 1.5 | A |
| Power Dissipation[a] | $T_A$=25°C | $P_D$ | 1.5 | W |
| | $T_A$=70°C | | 1.0 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | °C |

| THERMAL RESISTANCE RATINGS | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Symbol** | **Typ** | **Max** | |
| Maximum Junction-to-Ambient[a] | t <= 10 sec | $R_{thJA}$ | 72 | 83 | °C/W |
| | Steady State | | 100 | 120 | |

Notes

a. Surface Mounted on 1" x 1" FR4 Board.

b. Pulse width limited by maximum junction temperature

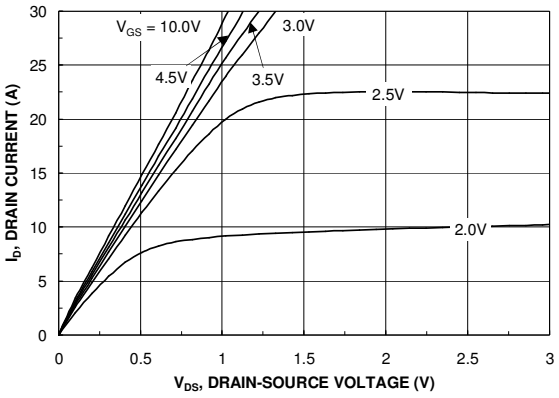
| SPECIFICATIONS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Min** | **Typ** | **Max** | **Unit** |
| **Static** | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 250 uA | 0.4 | | | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 12 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 16 V, $V_{GS}$ = 0 V | | | 1 | uA |
| | | $V_{DS}$ = 16 V, $V_{GS}$ = 0 V, $T_J$ = 55°C | | | 10 | uA |
| On-State Drain Current[A] | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 4.5 V | 30 | | | A |
| Drain-Source On-Resistance[A] | $r_{DS(on)}$ | $V_{GS}$ = 4.5 V, $I_D$ = 2 A | | | 0.015 | Ω |
| | | $V_{GS}$ = 2.5 V, $I_D$ = 2 A | | | 0.018 | |
| Forward Tranconductance[A] | $g_{fs}$ | $V_{DS}$ = 10 V, $I_D$ = 2 A | | 25 | | S |
| Diode Forward Voltage[A] | $V_{SD}$ | $I_S$ = 2 A, $V_{GS}$ = 0 V | | 0.89 | | V |
| **Dynamic[b]** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=10V, $V_{GS}$=4.5V, $I_D$=2A | | 13.4 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 0.9 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 2.0 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=10V, $V_{GS}$=4.5V, $I_D$=1A , $R_{GEN}$=10Ω | | 18 | | nS |
| Rise Time | $t_r$ | | | 25 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 50 | | |
| Fall-Time | $t_f$ | | | 25 | | |

Notes

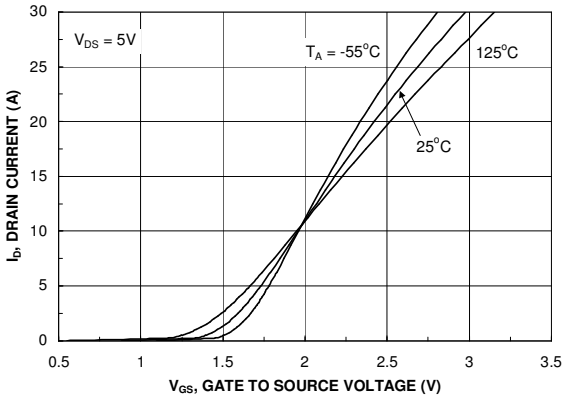
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

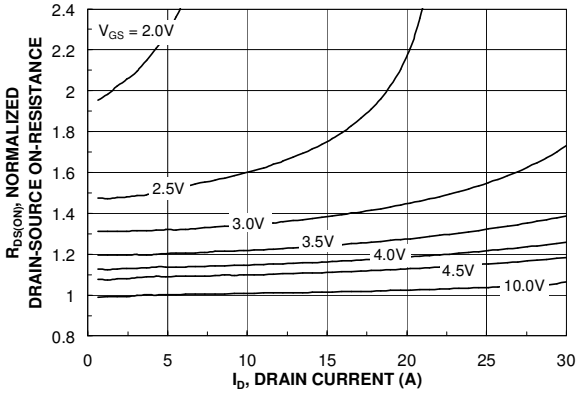
# Typical Electrical Characteristics (N-Channel)



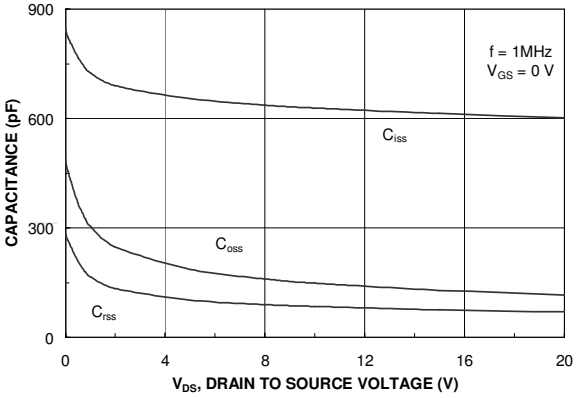

**Output Characteristics**



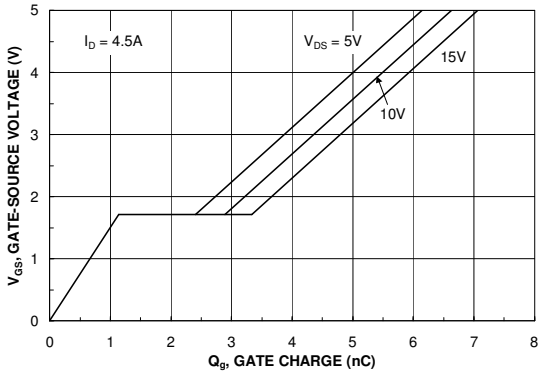

**Transfer Characteristics**



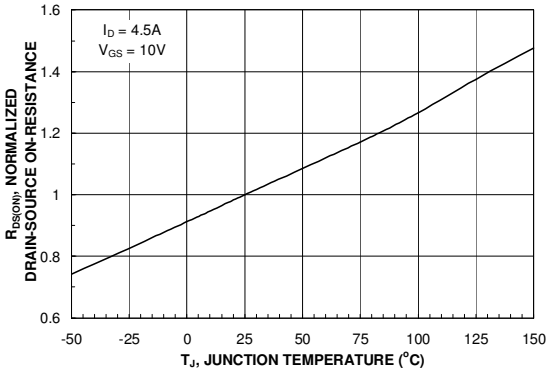

**On-Resistance vs. Drain Current**




**Capacitance**

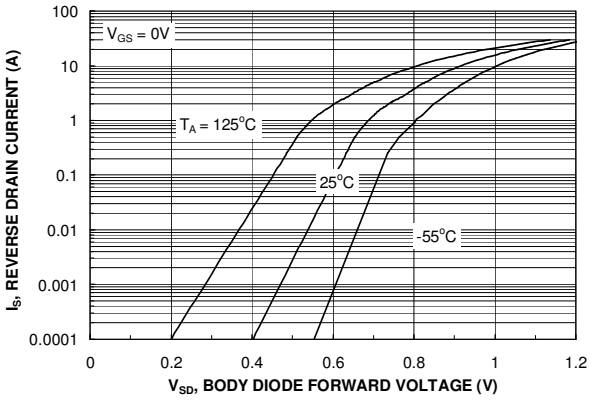



**Gate Charge**

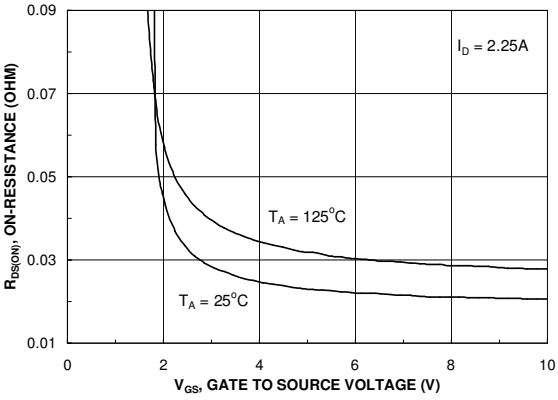



**On-Resistance vs. Junction Temperature**

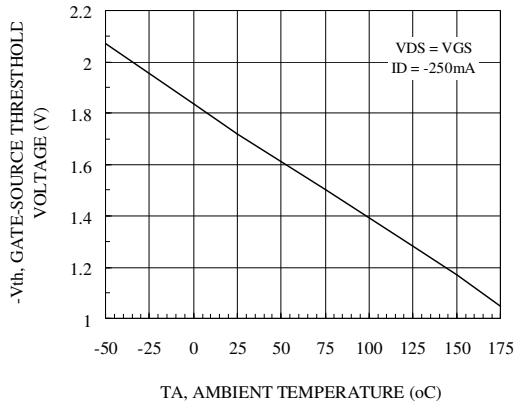
# Typical Electrical Characteristics (N-Channel)



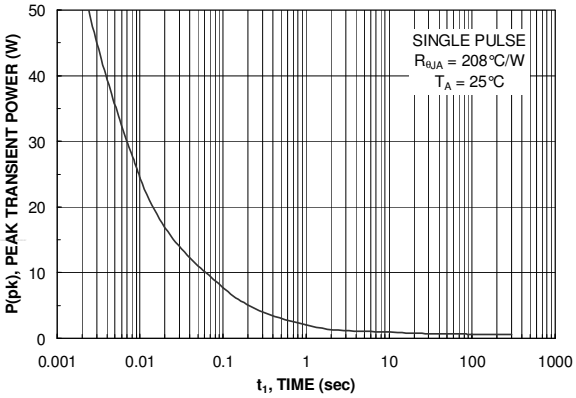

**Source-Drain Diode Forward Voltage**



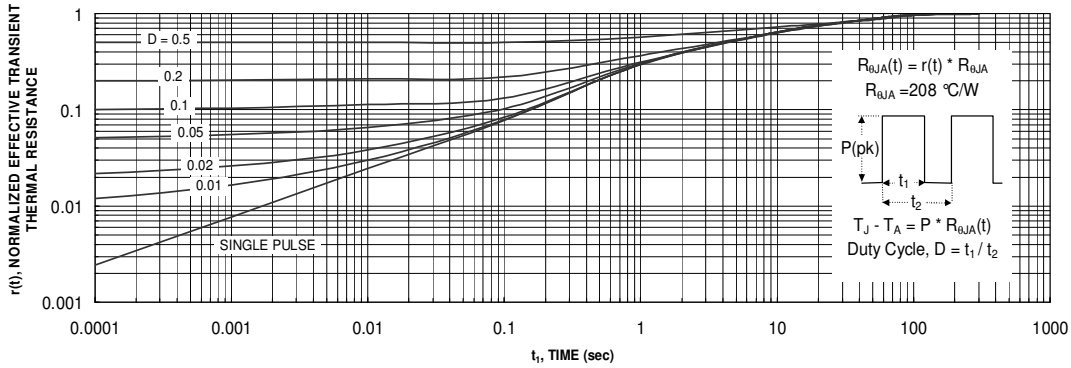

**On-Resistance vs. Gate-to-Source Voltage**




**Vth Gate to Source Voltage Vs Temperature**

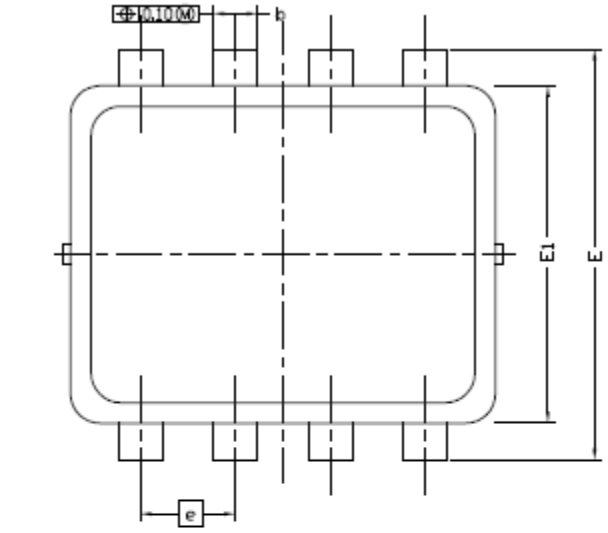


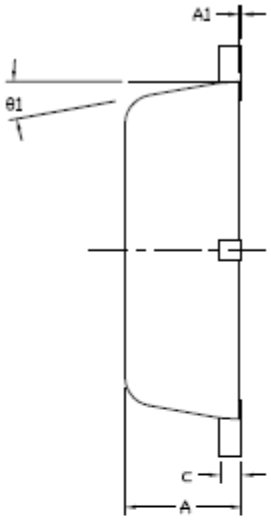

**Single Pulse Power, Junction-to-Ambient**

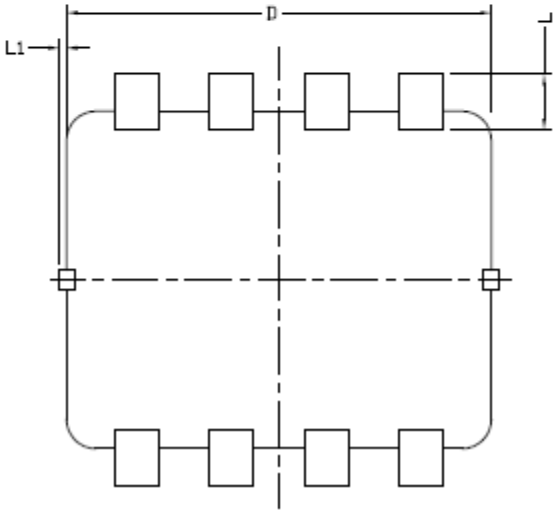



**Normalized Thermal Transient Junction to Ambient**

# 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 |
| θ1 | 0° | 10° | 12° | 0° | 10° | 12° |