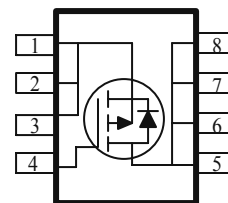
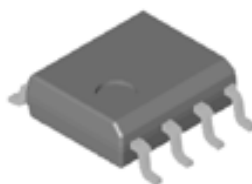


## P-Channel 30-V (D-S) MOSFET

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 SOIC-8 saves board space
- Fast switching speed
- High performance trench technology



| PRODUCT SUMMARY |                            |           |
|-----------------|----------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ m( $\Omega$ ) | $I_D$ (A) |
| -30             | 13 @ $V_{GS} = -10V$       | -11.5     |
|                 | 19 @ $V_{GS} = -4.5V$      | -9.3      |

| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED) |                    |                |            |            |
|---|--------------------|----------------|------------|------------|
| Parameter   |                    | Symbol         | Maximum    | Units      |
| Drain-Source Voltage  |                    | $V_{DS}$       | -30        | V          |
| Gate-Source Voltage   |                    | $V_{GS}$       | $\pm 25$   |            |
| Continuous Drain Current <sup>a</sup>                                 | $T_A = 25^\circ C$ | $I_D$          | -11.5      | A          |
|   | $T_A = 70^\circ C$ |                | -9.3       |            |
| Pulsed Drain Current <sup>b</sup>                                     |                    | $I_{DM}$       | $\pm 50$   |            |
| Continuous Source Current (Diode Conduction) <sup>a</sup>             |                    | $I_S$          | -2.1       | A          |
| Power Dissipation <sup>a</sup>  | $T_A = 25^\circ C$ | $P_D$          | 3.1        | W          |
|   | $T_A = 70^\circ C$ |                | 2.3        |            |
| Operating Junction and Storage Temperature Range                      |                    | $T_J, T_{stg}$ | -55 to 150 | $^\circ C$ |

| THERMAL RESISTANCE RATINGS               |                |                 |         |              |
|--|----------------|-----------------|---------|--------------|
| Parameter                                |                | Symbol          | Maximum | Units        |
| Maximum Junction-to-Case <sup>a</sup>    | $t \leq 5$ sec | $R_{\theta JC}$ | 25      | $^\circ C/W$ |
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 5$ sec | $R_{\theta JA}$ | 50      | $^\circ C/W$ |

### Notes

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

| SPECIFICATIONS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED) |                      |   |        |      |      |      |
|---|----------------------|---|--------|------|------|------|
| Parameter   | Symbol               | Test Conditions   | Limits |      |      | Unit |
|   |                      |   | Min    | Typ  | Max  |      |
| <b>Static</b>   |                      |   |        |      |      |      |
| Drain-Source Breakdown Voltage                                | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA   | -30    |      |      | V    |
| Gate-Threshold Voltage  | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA                                      | -1     |      |      |      |
| Gate-Body Leakage   | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±25 V  |        |      | ±100 | nA   |
| Zero Gate Voltage Drain Current                               | I <sub>DSS</sub>     | V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V  |        |      | -1   | μA   |
|   |                      | V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55°C                             |        |      | -5   |      |
| On-State Drain Current <sup>A</sup>                           | I <sub>D(on)</sub>   | V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -10 V   | -50    |      |      | A    |
| Drain-Source On-Resistance <sup>A</sup>                       | r <sub>DS(on)</sub>  | V <sub>GS</sub> = -10 V, I <sub>D</sub> = -11.5 A   |        |      | 13   | mΩ   |
|   |                      | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -9.3 A   |        |      | 19.0 |      |
| Forward Transconductance <sup>A</sup>                         | g <sub>fs</sub>      | V <sub>DS</sub> = -15 V, I <sub>D</sub> = -11.5 A   |        | 29   |      | S    |
| Diode Forward Voltage   | V <sub>SD</sub>      | I <sub>S</sub> = 2.5 A, V <sub>GS</sub> = 0 V   |        | -0.8 |      | V    |
| <b>Dynamic<sup>b</sup></b>                                    |                      |   |        |      |      |      |
| Total Gate Charge   | Q <sub>g</sub>       | V <sub>DS</sub> = -15 V, V <sub>GS</sub> = -5 V,<br>I <sub>D</sub> = -11.5 A                      |        | 25   |      | nC   |
| Gate-Source Charge  | Q <sub>gs</sub>      |   |        | 11   |      |      |
| Gate-Drain Charge   | Q <sub>gd</sub>      |   |        | 17   |      |      |
| Input Capacitance   | C <sub>iss</sub>     | V <sub>DS</sub> = -15 V, V <sub>GS</sub> = 0 V, f = 1 MHz   |        | 2300 |      | pF   |
| Output Capacitance  | C <sub>oss</sub>     |   |        | 600  |      |      |
| Reverse Transfer Capacitance                                  | C <sub>rss</sub>     |   |        | 300  |      |      |
| Turn-On Delay Time  | t <sub>d(on)</sub>   | V <sub>DD</sub> = -15 V, R <sub>L</sub> = 6 Ω, I <sub>D</sub><br>= -1 A, V <sub>GEN</sub> = -10 V |        | 15   |      | nS   |
| Rise Time   | t <sub>r</sub>       |   |        | 13   |      |      |
| Turn-Off Delay Time   | t <sub>d(off)</sub>  |   |        | 100  |      |      |
| Fall-Time   | t <sub>f</sub>       |   |        | 54   |      |      |

## Notes

- Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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### Typical Electrical Characteristics (P-Channel)

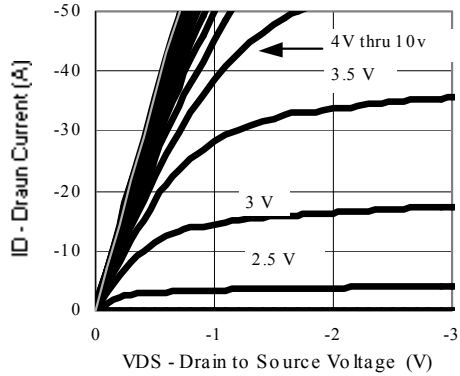


Figure 1. On-Region Characteristics

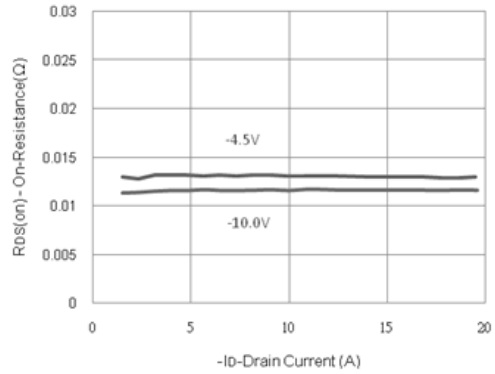


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

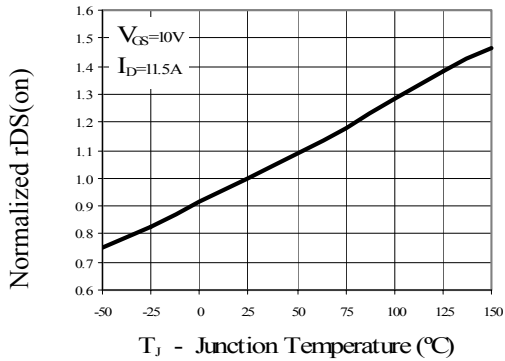


Figure 3. On-Resistance Variation with Temperature

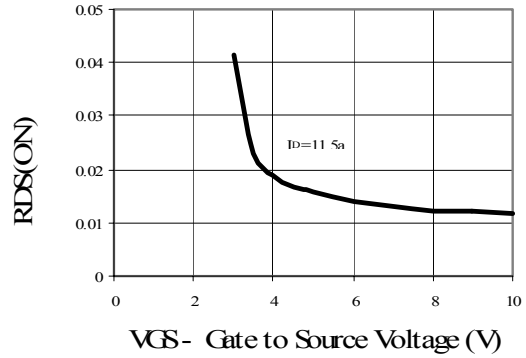


Figure 4. On-Resistance with Gate to Source Voltage

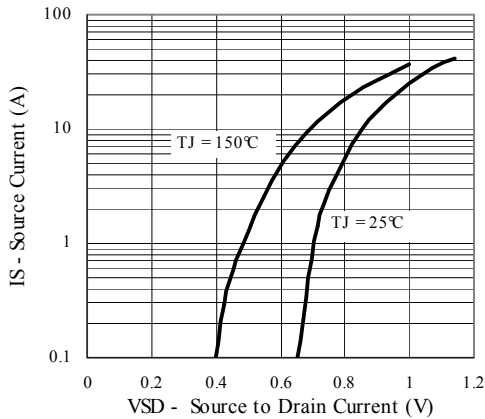


Figure 5. Transfer Characteristics

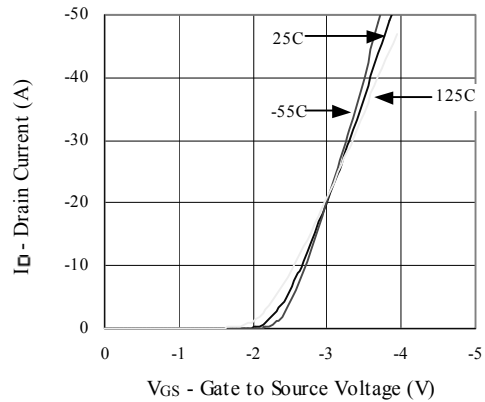


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

### Typical Electrical Characteristics (P-Channel)

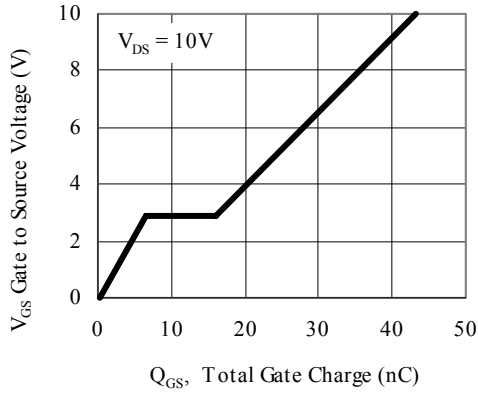


Figure 7. Gate Charge Characteristics

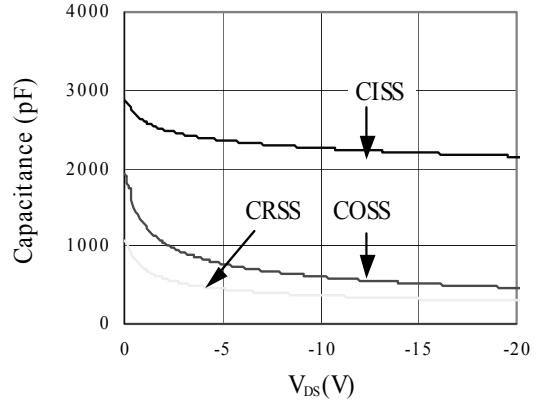


Figure 8. Capacitance Characteristics

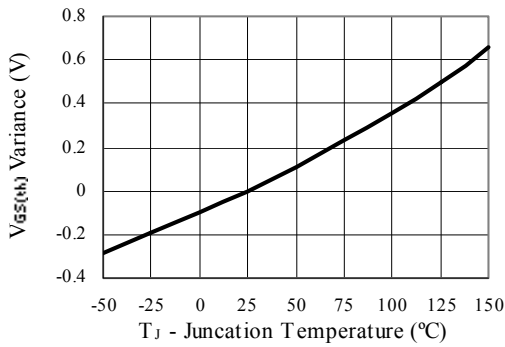


Figure 9. Maximum Safe Operating Area

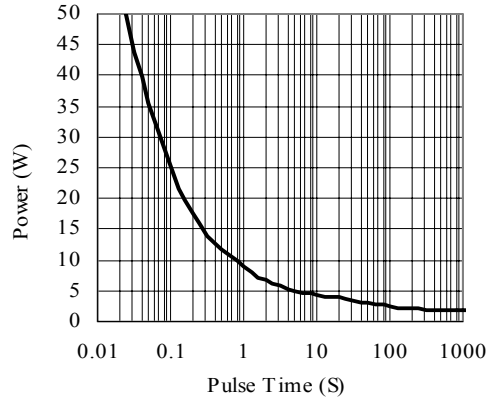


Figure 10. Single Pulse Maximum Power Dissipation

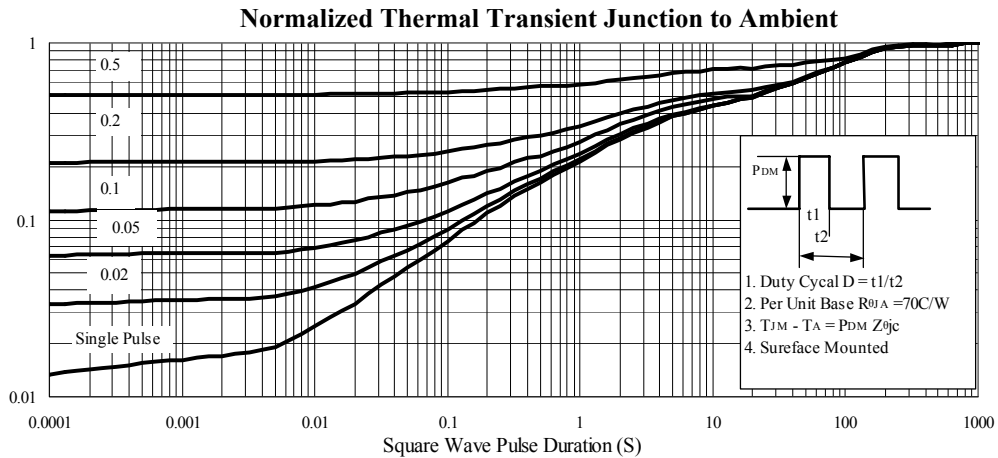
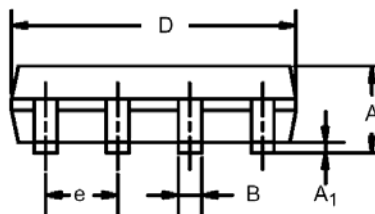
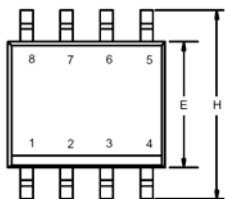


Figure 11. Transient Thermal Response Curve

### Package Information

#### SO-8: 8LEAD



| Dim            | MILLIMETERS |      | INCHES    |       |
|----------------|-------------|------|-----------|-------|
|                | Min         | Max  | Min       | Max   |
| A              | 1.35        | 1.75 | 0.053     | 0.069 |
| A <sub>1</sub> | 0.10        | 0.20 | 0.004     | 0.008 |
| B              | 0.35        | 0.51 | 0.014     | 0.020 |
| C              | 0.19        | 0.25 | 0.0075    | 0.010 |
| D              | 4.80        | 5.00 | 0.189     | 0.196 |
| E              | 3.80        | 4.00 | 0.150     | 0.157 |
| e              | 1.27 BSC    |      | 0.050 BSC |       |
| H              | 5.80        | 6.20 | 0.228     | 0.244 |
| h              | 0.25        | 0.50 | 0.010     | 0.020 |
| L              | 0.50        | 0.93 | 0.020     | 0.037 |
| q              | 0°          | 8°   | 0°        | 8°    |

