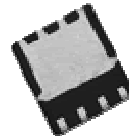


**P-Channel 30-V (D-S) MOSFET**

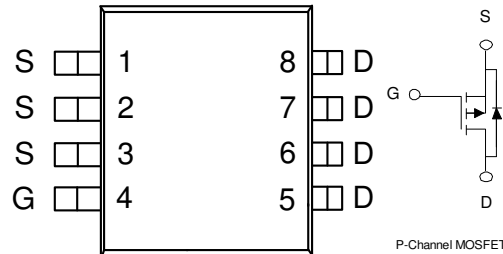
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low  $r_{DS(on)}$  and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA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

- Low  $r_{DS(on)}$  provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe DFN3x3-8PP saves board space
- Fast switching speed
- High performance trench technology

| PRODUCT SUMMARY |                            |           |
|-----------------|----------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ m( $\Omega$ ) | $I_D$ (A) |
| -30             | 14 @ $V_{GS} = -10V$       | -13.4     |
|                 | 26 @ $V_{GS} = -4.5V$      | -11.1     |



DFN3x3-8PP  
Top View



| 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   | $V_{GS}$       | $\pm 20$           |            |
| Continuous Drain Current <sup>a</sup>                                 | $I_D$          | $T_A = 25^\circ C$ | -13.4      |
|   |                | $T_A = 70^\circ C$ | -11.0      |
| Pulsed Drain Current <sup>b</sup>                                     | $I_{DM}$       | $\pm 50$           | A          |
| Continuous Source Current (Diode Conduction) <sup>a</sup>             | $I_S$          | -2.1               | A          |
| Power Dissipation <sup>a</sup>  | $P_D$          | $T_A = 25^\circ C$ | 3.5        |
|   |                | $T_A = 70^\circ C$ | 2.0        |
| 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-Ambient <sup>a</sup> | $R_{\theta JA}$ | $t \leq 10$ sec | 35    |
|  |                 | Steady State    | 81    |

Notes

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

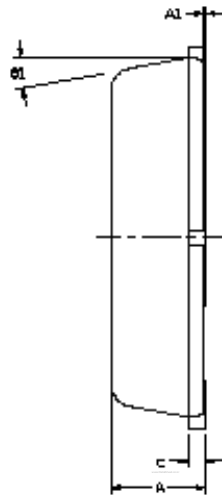
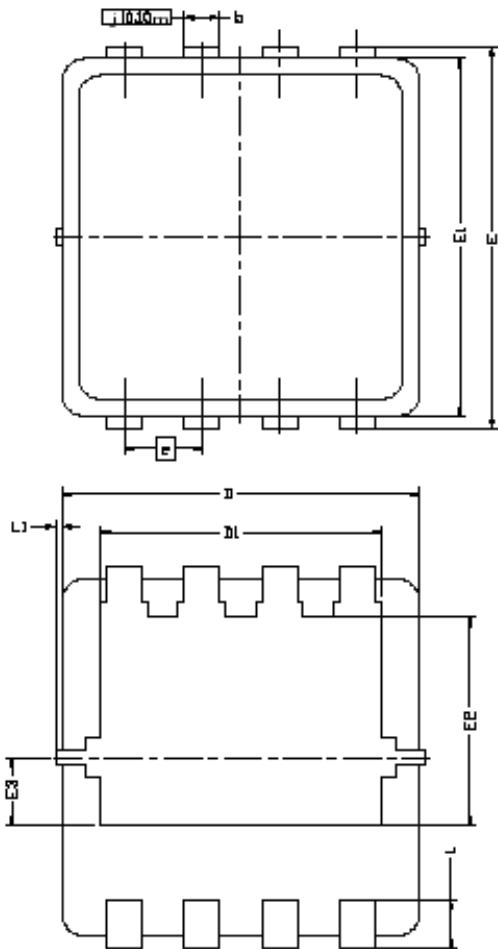
| SPECIFICATIONS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) |              |   |        |      |          |               |
|---|--------------|---|--------|------|----------|---------------|
| Parameter   | Symbol       | Test Conditions   | Limits |      |          | Unit          |
|   |              |   | Min    | Typ  | Max      |               |
| <b>Static</b>   |              |   |        |      |          |               |
| Gate-Threshold Voltage  | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$   | -1     |      |          | V             |
| Gate-Body Leakage   | $I_{GSS}$    | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 25 \text{ V}$                                     |        |      | $\pm 10$ | $\mu\text{A}$ |
| Zero Gate Voltage Drain Current                                   | $I_{DSS}$    | $V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}$  |        |      | -1       | $\mu\text{A}$ |
|   |              | $V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$                |        |      | -25      |               |
| On-State Drain Current <sup>A</sup>                               | $I_{D(on)}$  | $V_{DS} = -5 \text{ V}, V_{GS} = -10 \text{ V}$                                       | -50    |      |          | A             |
| Drain-Source On-Resistance <sup>A</sup>                           | $r_{DS(on)}$ | $V_{GS} = -10 \text{ V}, I_D = -11.5 \text{ A}$                                       |        |      | 14       | m $\Omega$    |
|   |              | $V_{GS} = -4.5 \text{ V}, I_D = -9.3 \text{ A}$                                       |        |      | 26       |               |
| Forward Transconductance <sup>A</sup>                             | $g_{fs}$     | $V_{DS} = -15 \text{ V}, I_D = -11.5 \text{ A}$                                       |        | 29   |          | S             |
| Diode Forward Voltage   | $V_{SD}$     | $I_S = 2.5 \text{ A}, V_{GS} = 0 \text{ V}$   |        | -0.8 |          | V             |
| <b>Dynamic<sup>b</sup></b>  |              |   |        |      |          |               |
| Total Gate Charge   | $Q_g$        | $V_{DS} = -15 \text{ V}, V_{GS} = -5 \text{ V}, I_D = -11.5 \text{ A}$                |        | 25   |          | nC            |
| Gate-Source Charge  | $Q_{gs}$     |   |        | 11   |          |               |
| Gate-Drain Charge   | $Q_{gd}$     |   |        | 17   |          |               |
| Turn-On Delay Time  | $t_{d(on)}$  | $V_{DD} = -15 \text{ V}, R_L = 6 \Omega, I_D = -1 \text{ A}, V_{GEN} = -10 \text{ V}$ |        | 15   |          | nS            |
| Rise Time   | $t_r$        |   |        | 13   |          |               |
| Turn-Off Delay Time   | $t_{d(off)}$ |   |        | 100  |          |               |
| Fall-Time   | $t_f$        |   |        | 54   |          |               |

## Notes

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

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