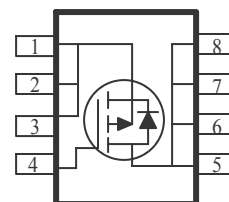


## P-Channel 40-V (D-S) MOSFET

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) |
| -40             | 35 @ $V_{GS} = -10V$       | -9.0      |
|                 | 45 @ $V_{GS} = -4.5V$      | -7.2      |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED) |                |                    |            |
|---|----------------|--------------------|------------|
| Parameter   | Symbol         | Maximum            | Units      |
| Drain-Source Voltage  | $V_{DS}$       | -40                | V          |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 20$           |            |
| Continuous Drain Current <sup>a</sup>                                 | $I_D$          | $T_A = 25^\circ C$ | -9.0       |
|   |                | $T_A = 70^\circ C$ | -7.3       |
| 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>  | $P_D$          | $T_A = 25^\circ C$ | 3.1        |
|   |                | $T_A = 70^\circ C$ | 2.6        |
| 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 | 50    |
|  |                 | Steady State    | 92    |

### Notes

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

**SPECIFICATIONS ( $T_A = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

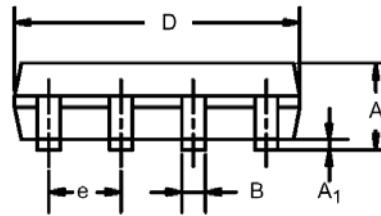
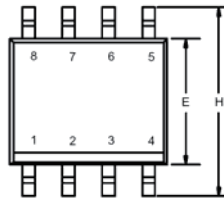
| Parameter                               | Symbol       | Test Conditions  | Limits |      |           | Unit       |
|---|--------------|--|--------|------|-----------|------------|
|   |              |  | Min    | Typ  | Max       |            |
| <b>Static</b>                           |              |  |        |      |           |            |
| Gate-Threshold Voltage                  | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = -250 \mu\text{A}$  | -1     |      |           |            |
| Gate-Body Leakage                       | $I_{GSS}$    | $V_{DS} = 0 \text{ V}, V_{GS} = \pm 25 \text{ V}$  |        |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current         | $I_{DSS}$    | $V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}$   |        |      | -1        | uA         |
|   |              | $V_{DS} = -24 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 55^\circ\text{C}$                                     |        |      | -5        |            |
| 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> | $r_{DS(on)}$ | $V_{GS} = -10 \text{ V}, I_D = -9.0 \text{ A}$   |        |      | 35        | m $\Omega$ |
|   |              | $V_{GS} = -4.5 \text{ V}, I_D = -7.2 \text{ A}$  |        |      | 45        |            |
| Forward Transconductance <sup>A</sup>   | $g_{fs}$     | $V_{DS} = -15 \text{ V}, I_D = -9.0 \text{ A}$   |        | 31   |           | S          |
| Diode Forward Voltage                   | $V_{SD}$     | $I_S = -2.1 \text{ A}, V_{GS} = 0 \text{ V}$   |        | -0.7 |           | V          |
| <b>Dynamic<sup>b</sup></b>              |              |  |        |      |           |            |
| Total Gate Charge                       | $Q_g$        | $V_{DS} = -15 \text{ V}, V_{GS} = -4.5 \text{ V},$<br>$I_D = -9.0 \text{ A}$                               |        | 15.3 |           | nC         |
| Gate-Source Charge                      | $Q_{gs}$     |  |        | 5.2  |           |            |
| Gate-Drain Charge                       | $Q_{gd}$     |  |        | 5.8  |           |            |
| Turn-On Delay Time                      | $t_{d(on)}$  | $V_{DD} = -15 \text{ V}, R_L = 15 \Omega, I_D = -1 \text{ A},$<br>$V_{GEN} = -10 \text{ V}, R_G = 6\Omega$ |        | 15   |           | nS         |
| Rise Time                               | $t_r$        |  |        | 12   |           |            |
| Turn-Off Delay Time                     | $t_{d(off)}$ |  |        | 62   |           |            |
| Fall-Time                               | $t_f$        |  |        | 46   |           |            |

## Notes

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

## Package Information

### SO-8: 8LEAD



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

