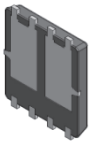
# P & N-Channel 30-V (D-S) MOSFET

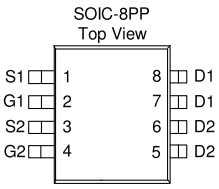
These miniature surface mount MOSFETs utilize a high cell density trench process to provide low $r_{DS(on)}$ and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA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

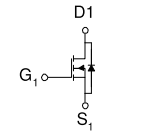
| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DS}$ (V) | $r_{DS(on)}$ m(Ω) | $I_D$ (A) |
| 30 | 58 @ $V_{GS}$ = 4.5V | 6.4 |
| | 82 @ $V_{GS}$ = 2.5V | 5.4 |
| -30 | 112 @ $V_{GS}$ = -4.5V | -4.6 |
| | 172 @ $V_{GS}$ = -2.5V | -3.7 |

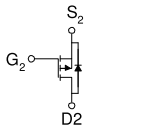
- Low $r_{DS(on)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe SOIC-8 saves board space
- Fast switching speed
- High performance trench technology

Pb-free
RoHS COMPLIANT
HALOGEN FREE






| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C UNLESS OTHERWISE NOTED) | | | | | |
|---|---|---|---|---|---|
| Parameter | | Symbol | N-Channel | P-Channel | Units |
| Drain-Source Voltage | | $V_{DS}$ | 30 | -30 | V |
| Gate-Source Voltage | | $V_{GS}$ | 8 | -8 | |
| Continuous Drain Current[a] | $T_A$=25°C | $I_D$ | 6.4 | -4.6 | A |
| | $T_A$=70°C | | 5.2 | -3.8 | |
| Pulsed Drain Current[b] | | $I_{DM}$ | ±20 | ±20 | |
| Continuous Source Current (Diode Conduction)[a] | | $I_S$ | 2.9 | -2.9 | A |
| Power Dissipation[a] | $T_A$=25°C | $P_D$ | 3.5 | 3.5 | W |
| | $T_A$=70°C | | 2.2 | 2.2 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | -55 to 150 | °C |

| THERMAL RESISTANCE RATINGS | | | | |
|---|---|---|---|---|
| Parameter | | Symbol | Maximum | Units |
| Maximum Junction-to-Ambient[a] | t <= 10 sec | $R_{\theta JA}$ | 35 | °C/W |
| | Steady State | | 85 | °C/W |

Notes

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

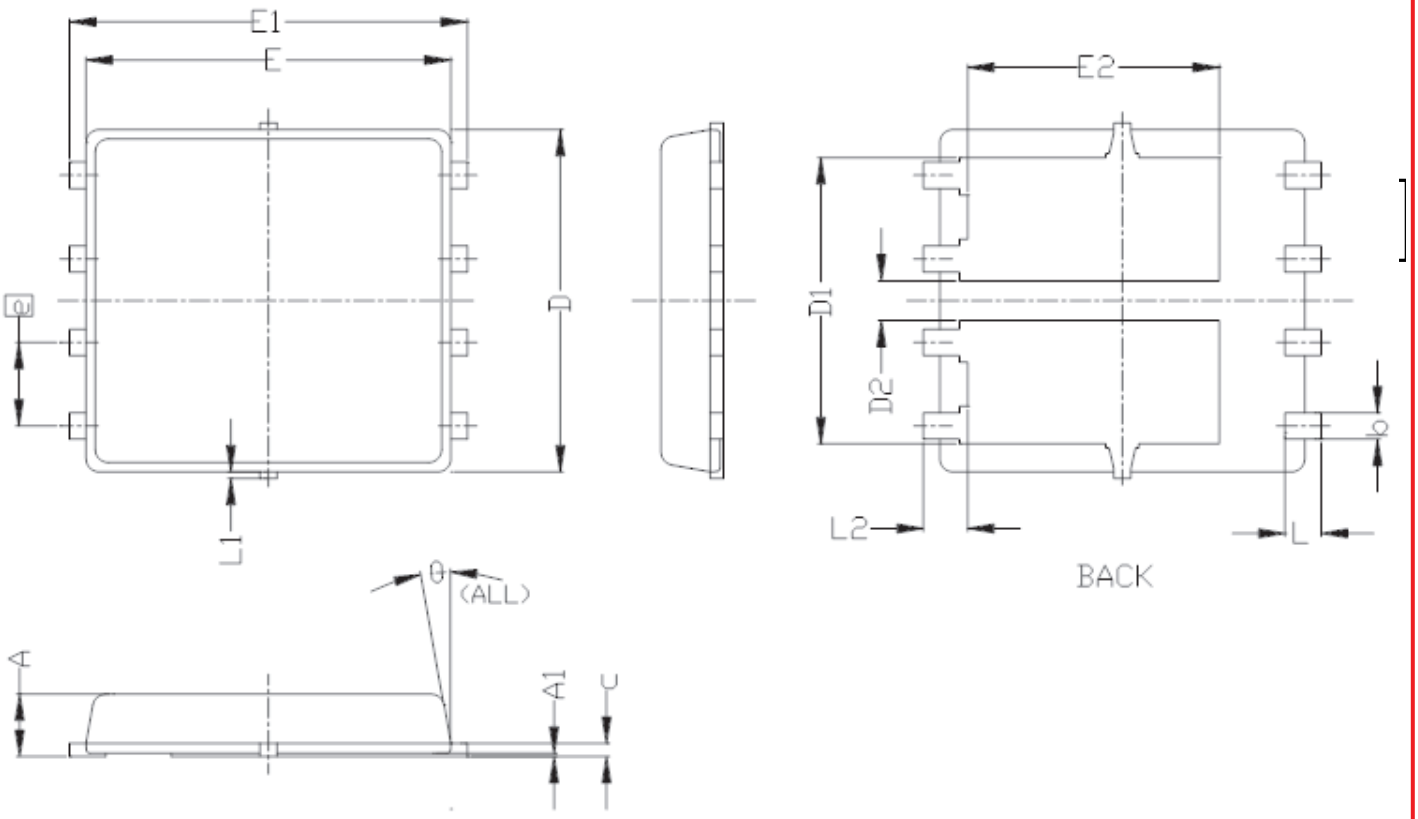
b. Pulse width limited by maximum junction temperature

| SPECIFICATIONS ($T_A$ = 25°C UNLESS OTHERWISE NOTED) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Limits** | | | | **Unit** |
| | | | **Ch** | **Min** | **Typ** | **Max** | |
| **Static** | | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 250 uA | N | 0.3 | | | V |
| | | $V_{GS}$ = $V_{DS}$, $I_D$ = -250 uA | P | -0.3 | | | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{GS}$ = 8 V, $V_{DS}$ = 0 V | N | | | ±100 | nA |
| | | $V_{GS}$ = -8 V, $V_{DS}$ = 0 V | P | | | ±100 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -24 V, $V_{GS}$ = 0 V | P | | | -1 | uA |
| | | $V_{DS}$ = 24 V, $V_{GS}$ = 0 V | N | | | 1 | |
| On-State Drain Current[A] | $I_{D(on)}$ | $V_{DS}$ = 5 V, $V_{GS}$ = 10 V | N | 20 | | | A |
| | | $V_{DS}$ = -5 V, $V_{GS}$ = -10 V | P | -20 | | | |
| Drain-Source On-Resistance[A] | $r_{DS(on)}$ | $V_{GS}$ = 4.5 V, $I_D$ = 1 A | N | | | 58 | mΩ |
| | | $V_{GS}$ = 2.5 V, $I_D$ = 1 A | | | | 82 | |
| | | $V_{GS}$ = -4.5 V, $I_D$ = -1 A | P | | | 112 | |
| | | $V_{GS}$ = -2.5 V, $I_D$ = -1 A | | | | 172 | |
| Forward Tranconductance[A] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 1 A | N | | 40 | | S |
| | | $V_{DS}$ = -15 V, $I_D$ = -1 A | P | | 31 | | |
| **Dynamic** | | | | | | | |
| Total Gate Charge | $Q_g$ | N-Channel $V_{DS}$=15V, $V_{GS}$=4.5V, $I_D$=1A P-Channel $V_{DS}$=-15V, $V_{GS}$=-4.5V, $I_D$=-1A | N | | 6 | | nC |
| | | | P | | 7 | | |
| Gate-Source Charge | $Q_{gs}$ | | N | | 1 | | |
| | | | P | | 1 | | |
| Gate-Drain Charge | $Q_{gd}$ | | N | | 1 | | |
| | | | P | | 2 | | |
| Turn-On Delay Time | $t_{d(on)}$ | N-Chaneel $V_{DD}$=15V, $V_{GS}$=5V, $I_D$=1A , $R_{GEN}$=25Ω, P-Channel $V_{DD}$=-15V, $V_{GS}$=-5V, $I_D$=-1A $R_{GEN}$=15Ω | N | | 9 | | nS |
| | | | P | | 6 | | |
| Rise Time | $t_r$ | | N | | 15 | | |
| | | | P | | 13 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | | N | | 40 | | |
| | | | P | | 20 | | |
| Fall-Time | $t_f$ | | N | | 10 | | |
| | | | P | | 10 | | |

Notes

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

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




| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.85 | 0.95 | 1.00 | 0.033 | 0.037 | 0.039 |
| A1 | 0.00 | —— | 0.05 | 0.000 | —— | 0.002 |
| b | 0.30 | 0.40 | 0.50 | 0.012 | 0.016 | 0.020 |
| c | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| D | 5.20 BSC | | | 0.205 BSC | | |
| D1 | 4.35 BSC | | | 0.171 BSC | | |
| E | 5.55 BSC | | | 0.219 BSC | | |
| E1 | 6.05 BSC | | | 0.238 BSC | | |
| E2 | 3.625 BSC | | | 0.143 BSC | | |
| E3 | 1.275 BSC | | | 0.050 BSC | | |
| e | 1.27 BSC | | | 0.050 BSC | | |
| L | 0.45 | 0.55 | 0.65 | 0.018 | 0.022 | 0.026 |
| L1 | 0 | —— | 0.15 | 0 | —— | 0.006 |
| L2 | 0.68 REF | | | 0.027 REF | | |
| θ | 0° | —— | 10° | 0° | —— | 10° |