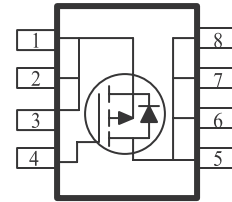


## P-Channel 30-V (D-S) MOSFET

These miniature surface mount MOSFETs utilize High Cell Density process. Low  $r_{DS(on)}$  assures minimal power loss and conserves energy, making this device ideal for use in power management circuitry. Typical applications are PWMDC-DC converters, power management in portable and battery-powered products such as computers, printers, battery charger, telecommunication power system, and telephones power system.

- Low  $r_{DS(on)}$  Provides Higher Efficiency and Extends Battery Life
- Miniature SO-8 Surface Mount Package Saves Board Space
- High power and current handling capability
- Extended VGS range ( $\pm 25$ ) for battery pack applications

| PRODUCT SUMMARY |                            |           |
|-----------------|----------------------------|-----------|
| $V_{DS}$ (V)    | $r_{DS(on)}$ m( $\Omega$ ) | $I_D$ (A) |
| -30             | 19 @ $V_{GS} = -10V$       | -9.5      |
|                 | 30 @ $V_{GS} = -4.5V$      | -7.5      |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ 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>                                       | $T_A = 25^\circ\text{C}$ | $I_D$          | -9.5       | A                |
|                                                                             | $T_A = 70^\circ\text{C}$ |                | -8.3       |                  |
| 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>                                              | $T_A = 25^\circ\text{C}$ | $P_D$          | 3.1        | W                |
|                                                                             | $T_A = 70^\circ\text{C}$ |                | 2.6        |                  |
| Operating Junction and Storage Temperature Range                            |                          | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

| THERMAL RESISTANCE RATINGS               |                         |                 |         |                    |
|------------------------------------------|-------------------------|-----------------|---------|--------------------|
| Parameter                                |                         | Symbol          | Maximum | Units              |
| Maximum Junction-to-Case <sup>a</sup>    | $t \leq 5 \text{ sec}$  | $R_{\theta JC}$ | 25      | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 10 \text{ sec}$ | $R_{\theta JA}$ | 50      | $^\circ\text{C/W}$ |

### 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  |      |
| Static                                                        |                     |                                                                                                                          |        |      |      |      |
| Gate-Threshold Voltage                                        | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 uA                                                             | -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   | uA   |
|                                                               |                     | 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> = -9.5 A                                                                         |        |      | 19   | mΩ   |
|                                                               |                     | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -7.5 A                                                                        |        |      | 30   |      |
|                                                               |                     | V <sub>GS</sub> = -10 V, I <sub>D</sub> = -9.5 A, T <sub>J</sub> = 55°C                                                  |        |      | 29   |      |
| Forward Tranconductance <sup>A</sup>                          | g <sub>fs</sub>     | V <sub>DS</sub> = -15 V, I <sub>D</sub> = -9.5 A                                                                         |        | 31   |      | S    |
| Diode Forward Voltage                                         | V <sub>SD</sub>     | I <sub>S</sub> = -2.1 A, V <sub>GS</sub> = 0 V                                                                           |        | -0.7 |      | V    |
| Dynamic <sup>b</sup>                                          |                     |                                                                                                                          |        |      |      |      |
| Total Gate Charge                                             | Q <sub>g</sub>      | V <sub>DS</sub> = -15 V, V <sub>GS</sub> = -4.5 V,<br>I <sub>D</sub> = -9.5 A                                            |        | 15.3 |      | nC   |
| Gate-Source Charge                                            | Q <sub>gs</sub>     |                                                                                                                          |        | 5.2  |      |      |
| Gate-Drain Charge                                             | Q <sub>gd</sub>     |                                                                                                                          |        | 5.8  |      |      |
| Switching                                                     |                     |                                                                                                                          |        |      |      |      |
| Turn-On Delay Time                                            | t <sub>d(on)</sub>  | V <sub>DD</sub> = -15 V, R <sub>L</sub> = 15 Ω , I <sub>D</sub> = -1 A,<br>V <sub>GEN</sub> = -10 V, R <sub>G</sub> = 6Ω |        | 15   |      | nS   |
| Rise Time                                                     | t <sub>r</sub>      |                                                                                                                          |        | 12   |      |      |
| Turn-Off Delay Time                                           | t <sub>d(off)</sub> |                                                                                                                          |        | 62   |      |      |
| Fall-Time                                                     | t <sub>f</sub>      |                                                                                                                          |        | 46   |      |      |

## Notes

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

## Typical Electrical Characteristics (P-Channel)

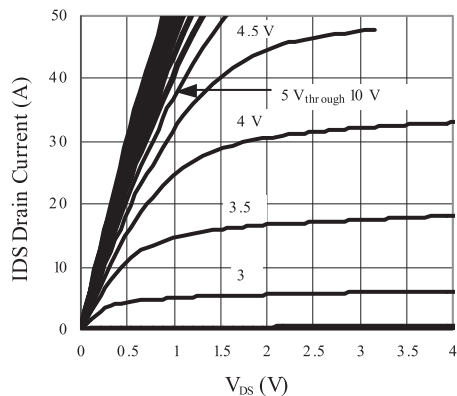


Figure 1. On-Region Characteristics

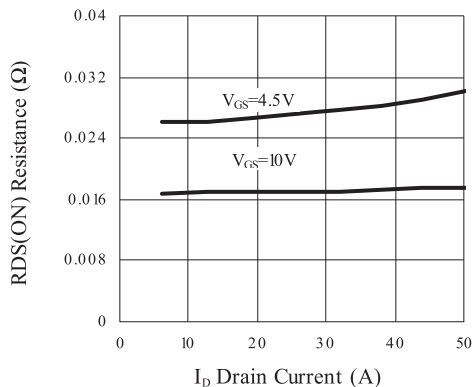


Figure 2. On-Resistance with Drain Current

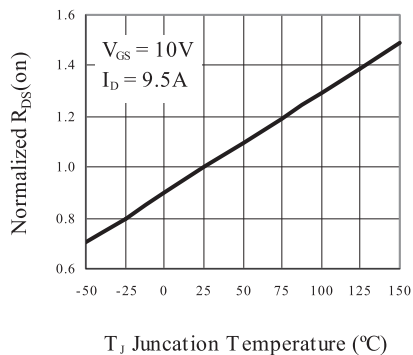


Figure 3. On-Resistance Variation with Temperature

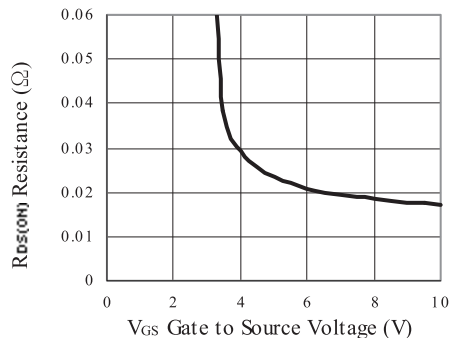


Figure 4. On-Resistance Variation with Gate to Source Voltage

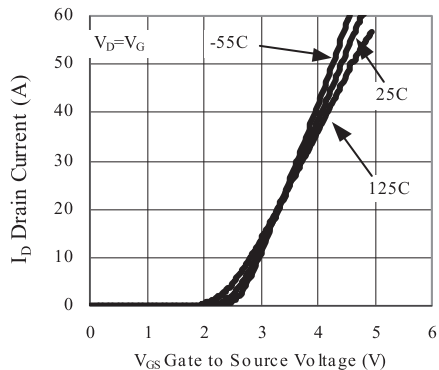


Figure 5. Transfer Characteristics

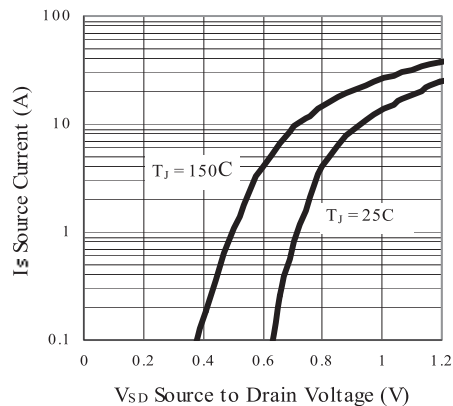


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

## Typical Electrical Characteristics (P-Channel)

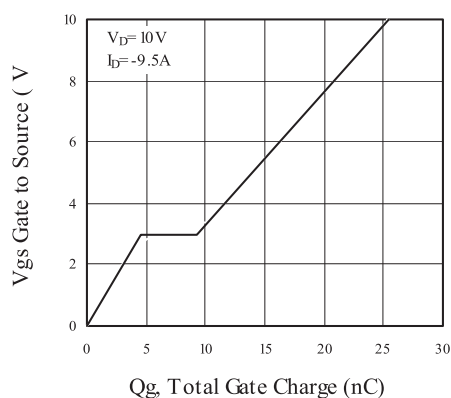


Figure 7. Gate Charge Characteristics

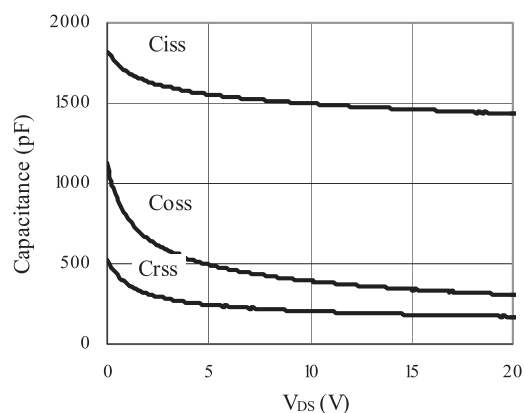


Figure 8. Capacitance Characteristics

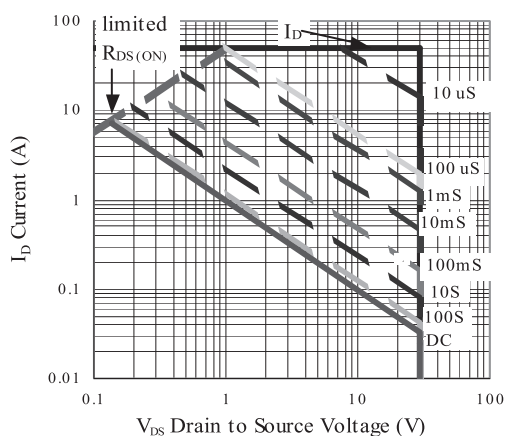


Figure 9. Maximum Safe Operating Area

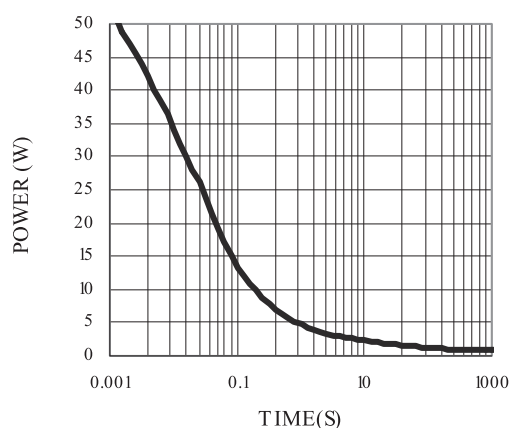


Figure 10. Single Pulse Maximum Power Dissipation

## Normalized Thermal Transient Junction to Ambient

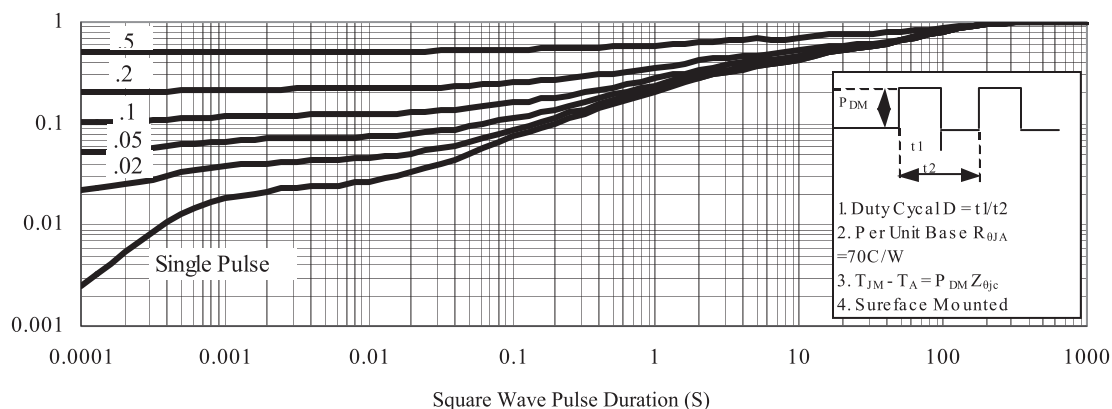
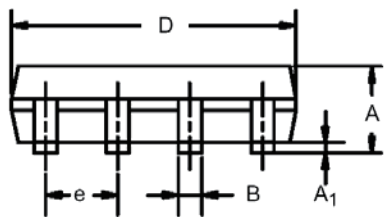
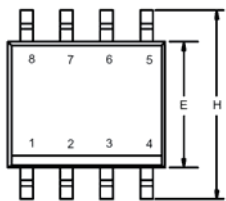


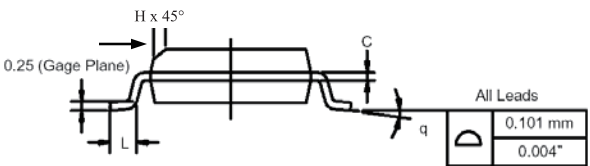
Figure 11. Transient Thermal Response Curve

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°    |



# Ordering information

- AM4835P-T1-XX
  - A: Analog Power
  - M: MOSFET
  - 4835: Part number
  - P: P-Channel
  - T1: Tape & reel
  - XX: Blank: Standard  
PF: Leadfree