



## P-Channel Enhancement Mode Field Effect Transistor

### General Description

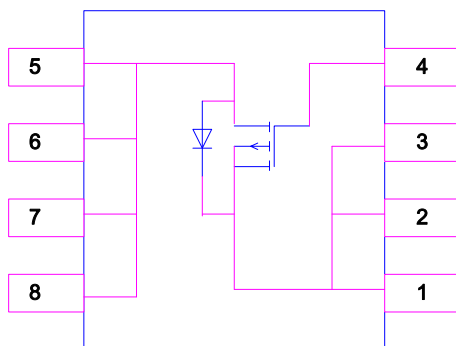
The LPM9435 is the P-channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application, notebook computer power management and other battery powered circuits where high side switching.

### Order Information

LPM9022 □ □ □  
F: Pb-Free  
Package Type  
SO: SOP-8

### Pin Configurations



### Features

- ◆ -30V/-5.8A,  $R_{DS(ON)}=42m\Omega$ (typ.)@VGS=-10V
- ◆ -30V/-4.0A,  $R_{DS(ON)}=65m\Omega$ (typ.)@VGS=-4.5V
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ SOP8 Package

### Applications

- ✧ Portable Media Players
- ✧ Cellular and Smart mobile phone
- ✧ LCD
- ✧ DSC Sensor
- ✧ Wireless Card

### Marking Information

| Device  | Marking                | Package | Shipping |
|---------|------------------------|---------|----------|
| LPM9435 | LPM<br>LPM9435<br>XXXX | SOP8    | 3K/REEL  |

### Pin Description

| Pin Number | Pin Description |
|------------|-----------------|
| 1,2,3      | Source Pin      |
| 4          | Gate Electrode  |
| 5,6,7,8    | Drain Electrode |



## Absolute Maximum Ratings

| Symbol  | PARAMETER                                                          | Ratings     | Units              |
|---------|--------------------------------------------------------------------|-------------|--------------------|
| VDSS    | Drain-Source Voltage                                               | -30         | V                  |
| VGSS    | Gate-Source Voltage                                                | ±20         | V                  |
| IO      | Drain Current – Continuous( $T_A=25^{\circ}\text{C}$ )             | -5.3        | A                  |
|         |                                                                    | -50         |                    |
| PO      | Power Dissipation for Single Operation( $T_A=25^{\circ}\text{C}$ ) | 2.5         | W                  |
| TJ,TSTG | Operating and Storage Junction Temperature Range                   | -55 to +175 | $^{\circ}\text{C}$ |

## Thermal resistance ratings

|      |                                         |    |                      |
|------|-----------------------------------------|----|----------------------|
| RθJA | Thermal Resistance, Junction-to-Ambient | 50 | $^{\circ}\text{C/W}$ |
|------|-----------------------------------------|----|----------------------|





## Electrical Characteristics

| Parameter                                                | Symbol              | Test Conditions                                                            | Min | Typ            | Max  | Units |
|----------------------------------------------------------|---------------------|----------------------------------------------------------------------------|-----|----------------|------|-------|
| Off Characterstics                                       |                     |                                                                            |     |                |      |       |
| Drain-Source Breakdown Voltage                           | BVDSS               | VGS=0V, IO=-250μA                                                          | -30 |                |      | V     |
| Zero Gate Voltage Drain Current                          | IOSS                | VDS=-24, VGS=0V                                                            |     |                | -1   | μA    |
| Gate-Body Leakage, Forward                               | IGSSF               | VGS=25V, VDS=0V                                                            |     |                | 100  | nA    |
| Gate-Body Leakage, Reverse                               | IGSSR               | VGS=-25V, VDS=0V                                                           |     |                | -100 | nA    |
| On Characteristics                                       |                     |                                                                            |     |                |      |       |
| Gate Threshold Voltage                                   | VGS(th)             | VDS=VGS, IO=-250μA                                                         | -1  | -1.7           | -3   | V     |
| Static Drain-Source<br>On-Resistance                     | R <sub>DS(ON)</sub> | VGS=-10V, IO=-5.3A<br>VGS=-4.5V, IO=-4A<br>VGS=-10V, IO=-5.3A,<br>TJ=125°C |     | 42<br>65<br>57 |      | mΩ    |
| Forward Transconductance                                 | gFS                 | VDS=-5V, IO=-5.3A                                                          |     | 10             |      | S     |
| Dynamic Characteristics                                  |                     |                                                                            |     |                |      |       |
| Input Capacitance                                        | Ciss                | VDS=-15V, VGS=0V<br>F=1.0MHz                                               |     | 528            |      | pF    |
| Output Capacitance                                       | Coss                |                                                                            |     | 132            |      | pF    |
| Reverse Transfer Capacitance                             | Crss                |                                                                            |     | 70             |      | pF    |
| Switching Characteristics                                |                     |                                                                            |     |                |      |       |
| Turn-On Delay Time                                       | Td(on)              | VDD=-15V, IO=-1A<br>VGS=-10V, RGEN=6Ω                                      |     | 7              | 14   | ns    |
| Turn-On Rise Time                                        | tr                  |                                                                            |     | 13             | 24   | ns    |
| Turn-Off Delay Time                                      | Td(off)             |                                                                            |     | 14             | 25   | ns    |
| Turn-Off Fall Time                                       | tf                  |                                                                            |     | 9              | 17   | ns    |
| Total Gata Charge                                        | Qg                  | VDD=-15V, IO=-4A<br>VGS=-10V,                                              |     | 10             | 14   | nc    |
| Gata Source Charge                                       | Qgs                 |                                                                            |     | 2.2            |      | nc    |
| Gata Drain Charge                                        | Qgd                 |                                                                            |     | 2              |      |       |
| Drain-Source Diode Characteristics and Maximum Ratings   |                     |                                                                            |     |                |      |       |
| Maximum Continuous<br>Drain-Source Diode Forward Voltage | IS                  |                                                                            |     |                | -2.1 | A     |
| Drain-Source Forward Voltage                             | VSD                 | VGS=0V, IS=-2.1A                                                           |     | -0.8           | -1.2 | V     |



## Typical Operating Characteristics

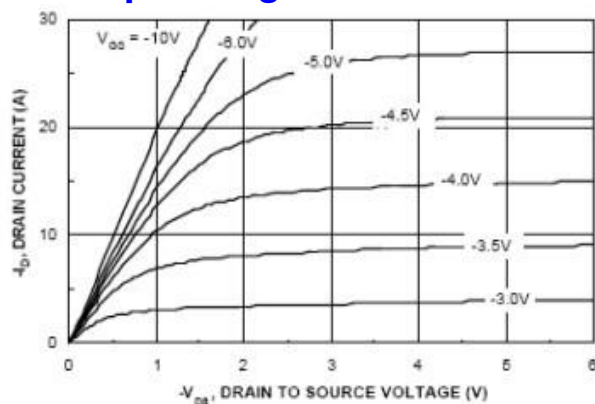


Figure 1. On-Region Characteristics.

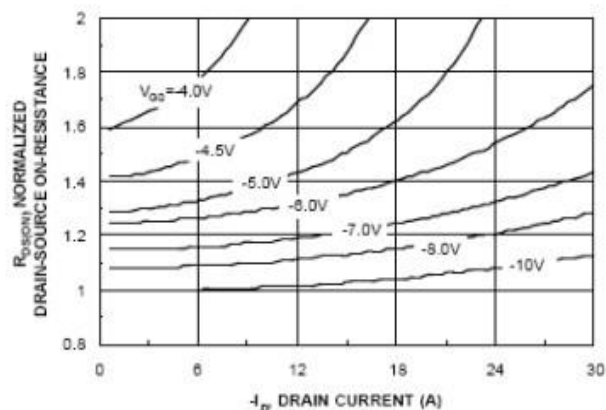


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

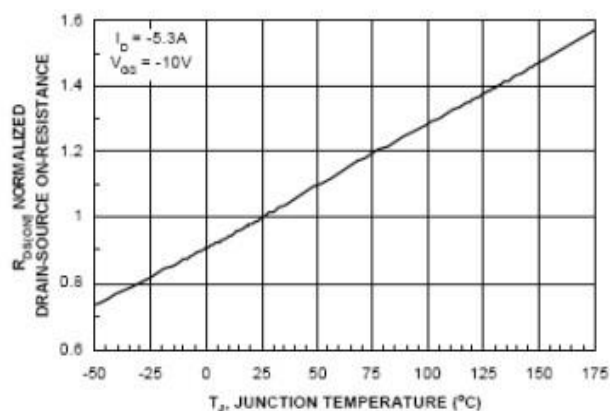


Figure 3. On-Resistance Variation with Temperature.

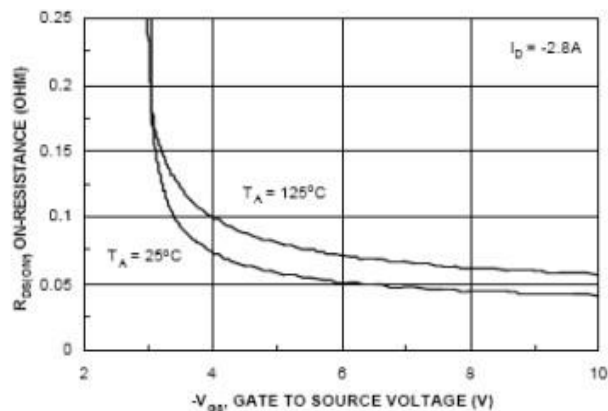


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

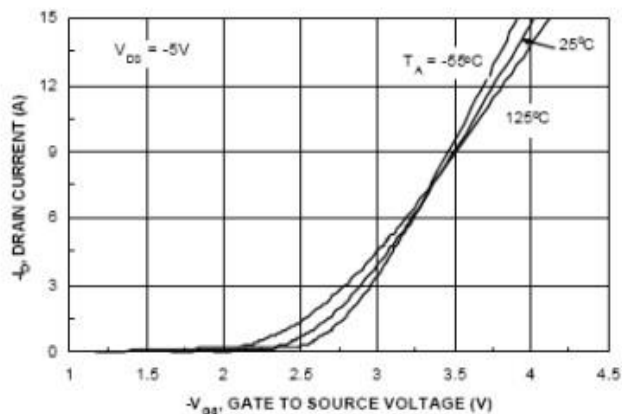


Figure 5. Transfer Characteristics.

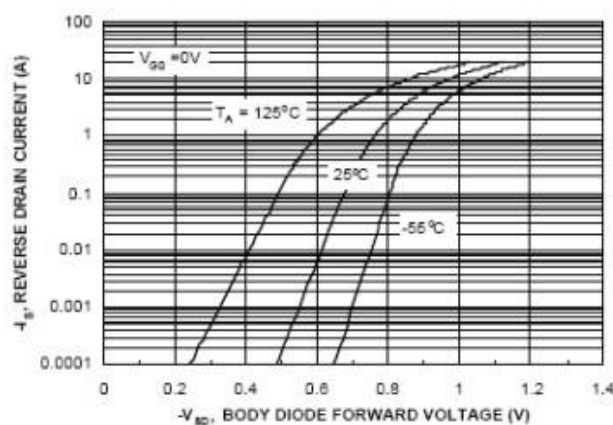


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

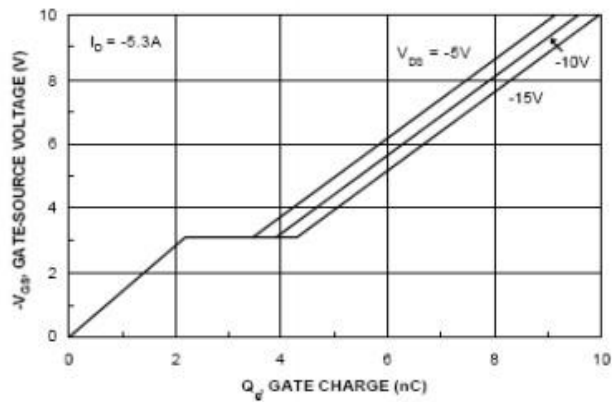


Figure 7. Gate Charge Characteristics.

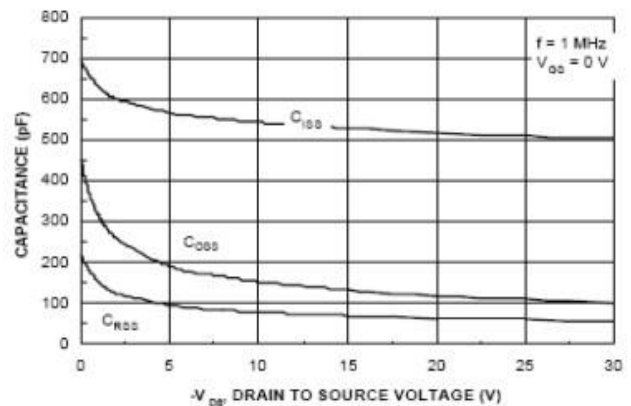


Figure 8. Capacitance Characteristics.

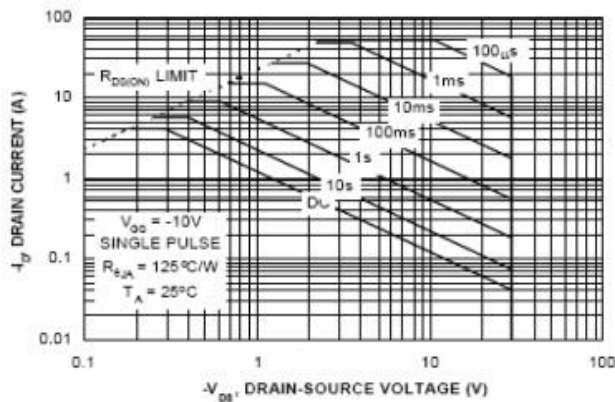


Figure 9. Maximum Safe Operating Area.

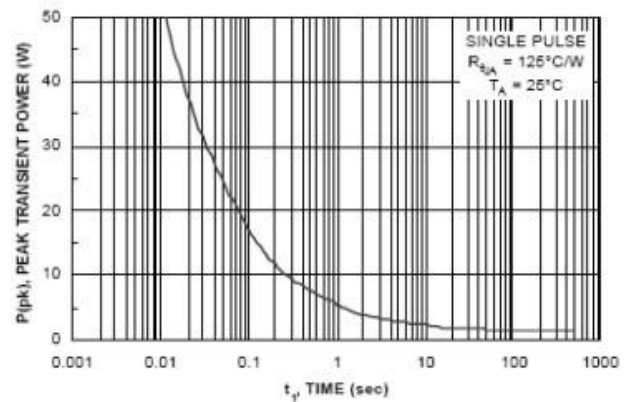


Figure 10. Single Pulse Maximum Power Dissipation.

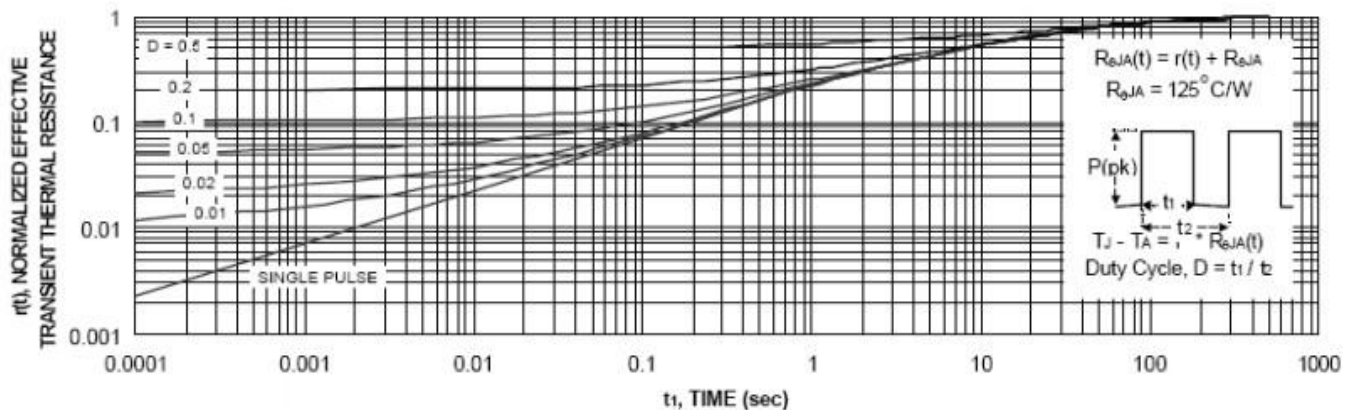
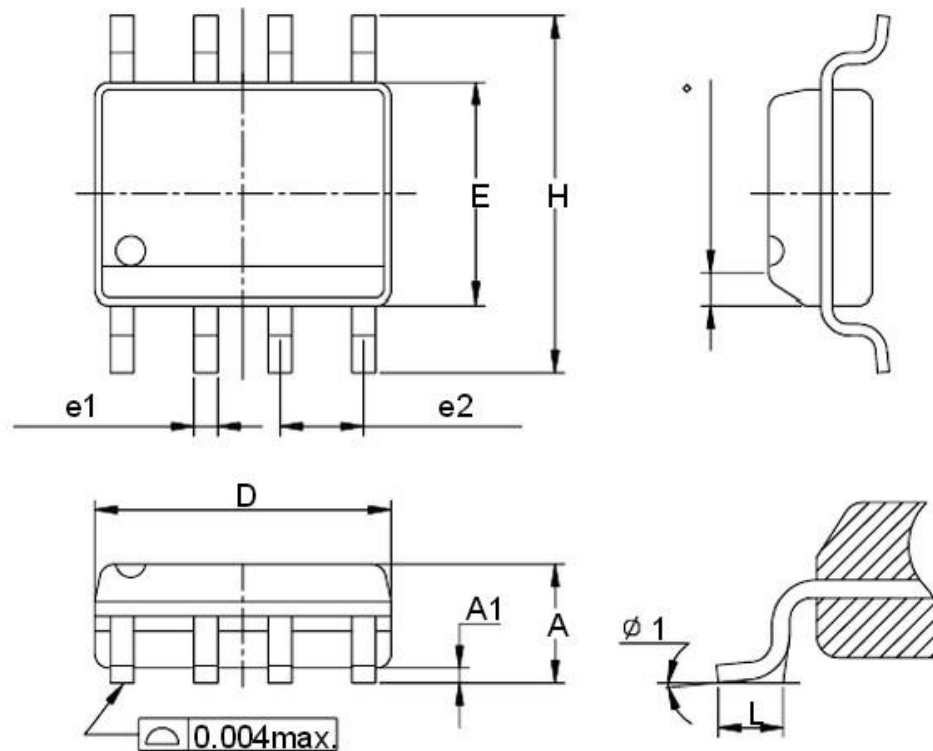


Figure 11. Transient Thermal Response Curve.



## Packaging Information



| Dim | Millimeters |      | Inches  |       |
|-----|-------------|------|---------|-------|
|     | Min.        | Max. | Min.    | Max.  |
| A   | 1.35        | 1.75 | 0.053   | 0.069 |
| A1  | 0.10        | 0.25 | 0.004   | 0.010 |
| D   | 4.80        | 5.00 | 0.189   | 0.197 |
| E   | 3.80        | 4.00 | 0.150   | 0.157 |
| H   | 5.80        | 6.20 | 0.228   | 0.244 |
| L   | 0.40        | 1.27 | 0.016   | 0.050 |
| e1  | 0.33        | 0.51 | 0.013   | 0.020 |
| e2  | 1.27BSC     |      | 0.50BSC |       |
| φ 1 | 8°          |      | 8°      |       |