# LSR4407S8 30V P-Channel MOSFET

## Features

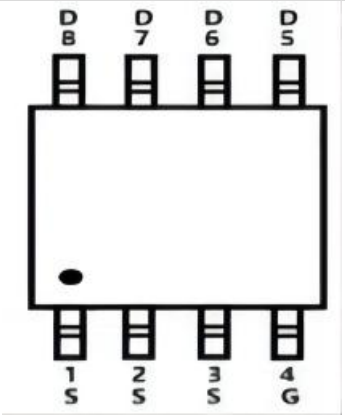
- Advanced Trench cell design
- Low Thermal Resistance
- Low Gate Charge
- Halogen-Free & Lead-Free
- 100% EAS Test
- 100% Rg Test

## Applications

- Motor/Body Load Control
- Load Switch
- PWM Application
- DC/DC converters and Off-line UPS

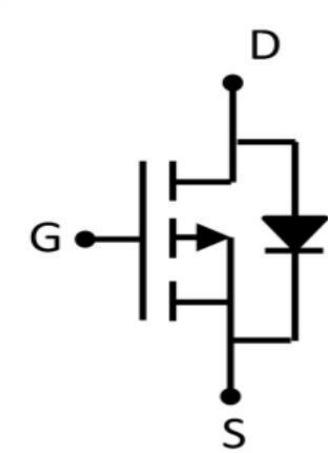
## Pin Configuration

**LSR4407S8(SOP-8)**




Top View

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



## Marking Information

| Part Marking | Part Number | LFC code |
|---|---|---|
| Q4407<br>YWWXXX | Q4407 | YWWXXX |

## Absolute Maximum Ratings

($T_A$=25ºC Unless otherwise noted)

| Symbol | Parameter | | Typical | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | -30 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | $T_A$=25ºC | -12 | A |
| | | $T_A$=70ºC | -10 | |
| $I_{DM}$ | Pulsed Drain Current[1] | | -48 | A |
| IAS | Avalanche Current | | -27.2 | A |
| EAS | Single Pulse Avalanche Energy[2] | | 115 | mJ |
| $P_D$ | Power Dissipation | | 1.4 | W |
| $T_J$ | Operating Junction Temperature Range | | -55 to +150 | ºC |
| $T_{STG}$ | Storage Temperature Range | | -55 to +150 | ºC |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient[3] | | 89 | ºC/W |

Note:
1. Pulse Test: Pulse Width ≦ 300us, Duty Cycle ≦ 2%, Limited by $T_{J(MAX)}$.
2. Limited by $T_{J(MAX)}$, starting $T_J$ = 25ºC, L = 0.5mH, $R_g$ = 25Ω, $I_D$ = -27.2A, $V_{GS}$ = -10V.
3. Device mounted on single sided FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

## Electrical Characteristics

($T_A$=25ºC Unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=-250uA | -30 | | | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=-250uA | -1.0 | -1.6 | -2.5 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±100 | nA |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=-30V, $V_{GS}$=0V | | | -1 | uA |
| $R_{DS(on)}$ | Drain-Source On-Resistance | $V_{GS}$=-10V, $I_D$=-8A | | 9.8 | 13 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-4A | | 14.6 | 21 | |
| **Dynamic** | | | | | | |
| $R_g$ | Gate Resistance | $V_{DS}$=0V, $V_{GS}$=0V, f=1MHz | | 6 | | Ω |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$=-5V, $I_D$=-15A | | 28 | | S |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-15V, $V_{GS}$=0V, f=1MHz | | 2900 | | pF |
| $C_{oss}$ | Output Capacitance | | | 410 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 280 | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$=-15V, $V_{GS}$=-10V, $I_D$=-10A | | 48 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 12 | | |
| $Q_{gd}$ | Gate-Drain Charge | | | 14 | | |
| $t_{d(on)}$ | Turn-On Time | $V_{DS}$=-15V, $V_{GS}$=-10V, $R_L$=1.25Ω, $R_g$=3Ω | | 15 | | ns |
| $T_r$ | | | | 11 | | |
| $t_{d(off)}$ | Turn-Off Time | | | 44 | | |
| $T_f$ | | | | 21 | | |
| **Body-Diode** | | | | | | |
| $V_{SD}$ | Drain-Source Diode Forward Voltage | $V_{GS}$=0V, $I_S$=-2A | | | -1.2 | V |
| trr | Body Diode Reverse Recovery Time | $I_S$=-10A, di/dt=500A/us | | 11.5 | | ns |
| Qrr | Body Diode Reverse Recovery Charge | $I_S$=-10A, di/dt=500A/us | | 25 | | nC |

## Typical Performance Characteristics

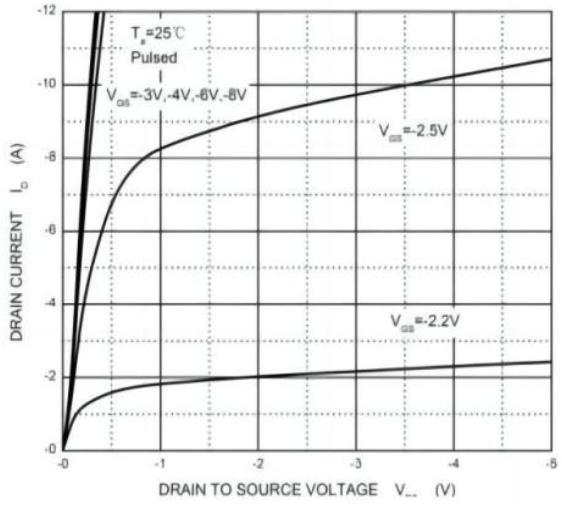



Fig.1 Typical Output Characteristics

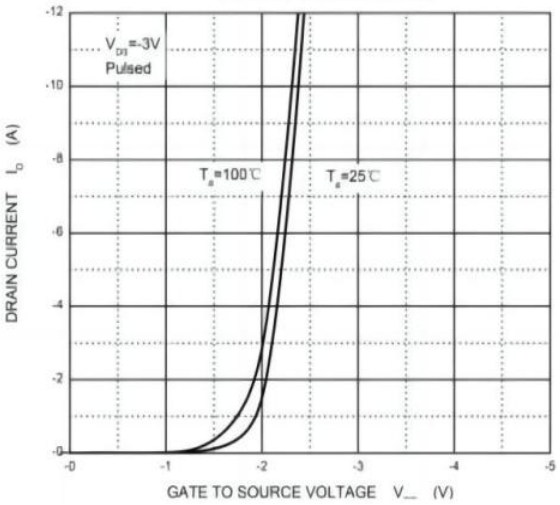



Fig.2 Typical Transfer Characteristics

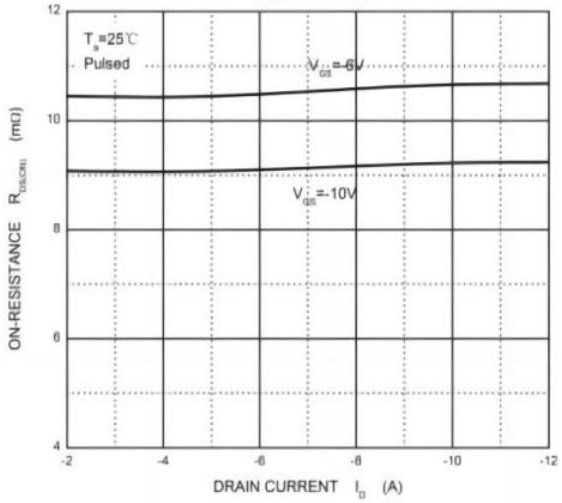



Fig.3 On-Resistance vs. Drain Current

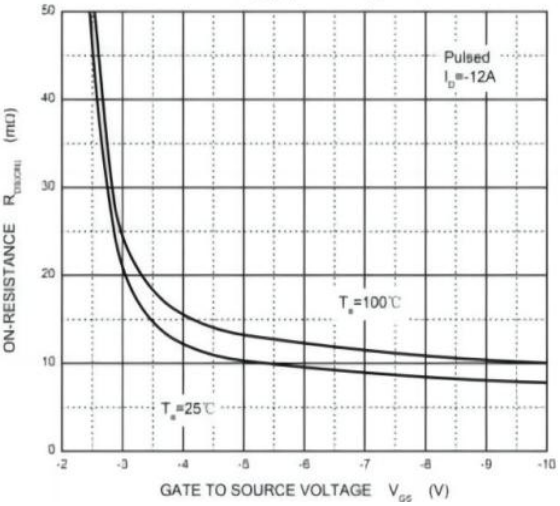



Fig.4 On-Resistance vs. Gate-Source Voltage

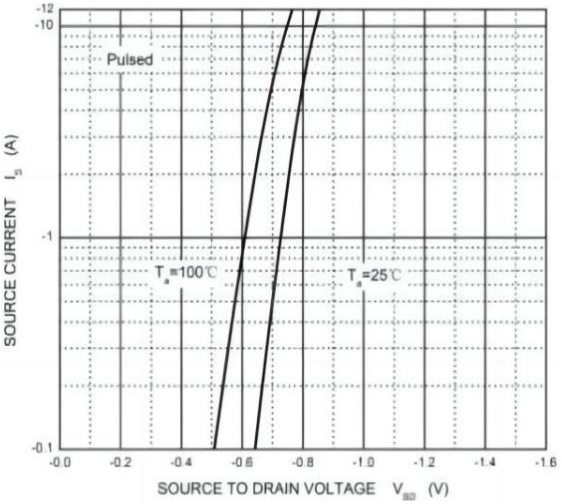



Fig.5 Source Current vs. $V_{SD}$

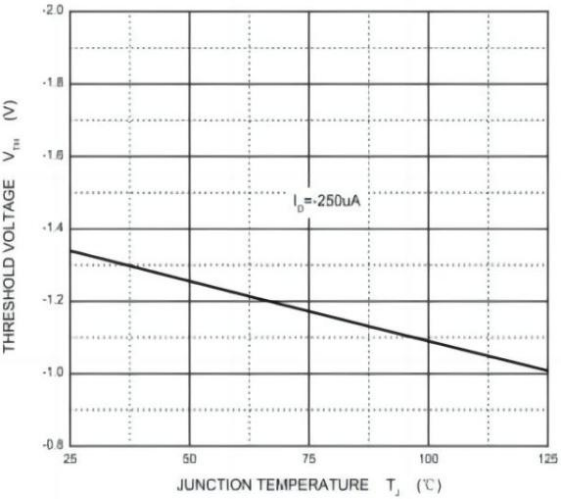
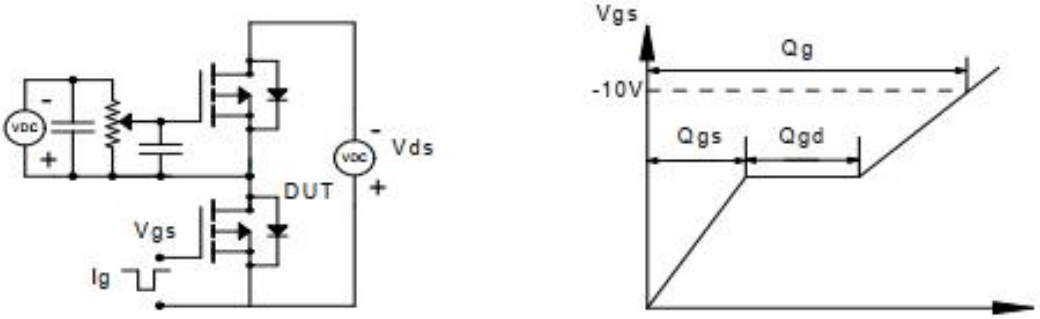


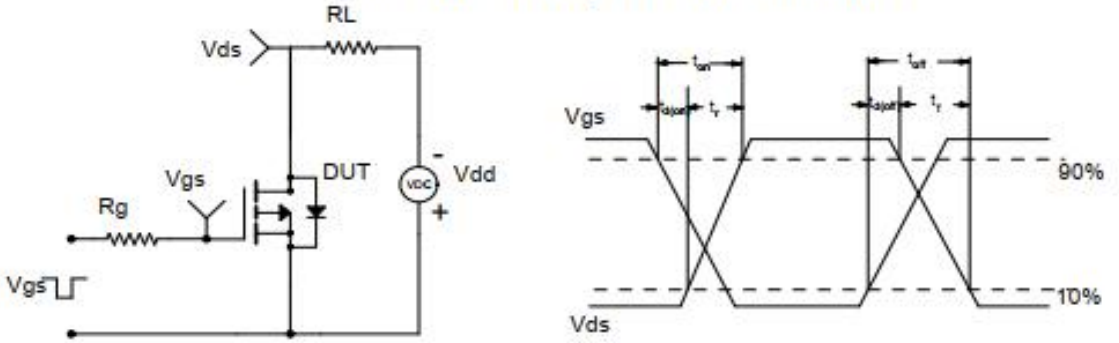

Fig.6 $V_{GS(th)}$ vs. Junction Temperature

## Typical Characteristics

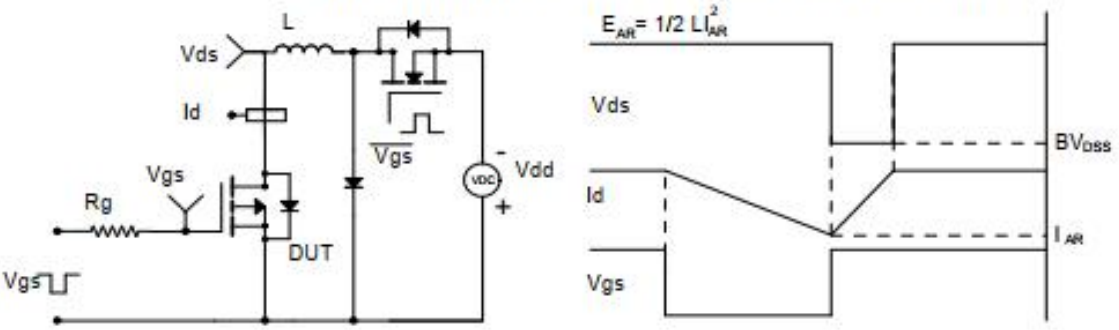
Gate Charge Test Circuit & Waveform



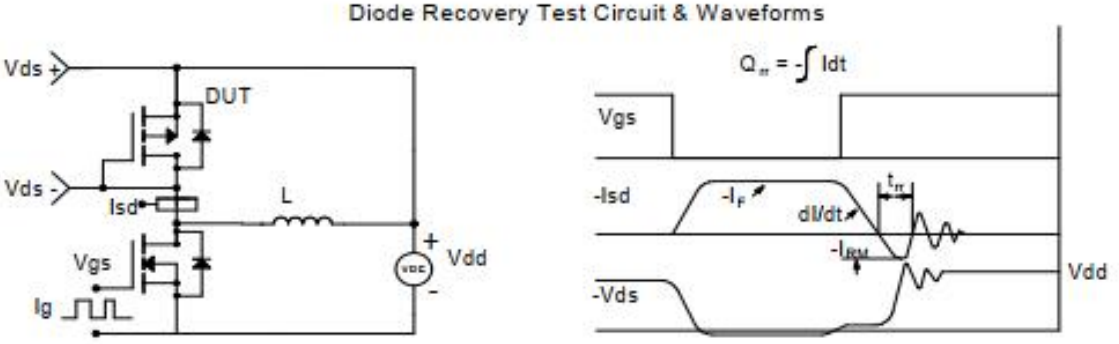

Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

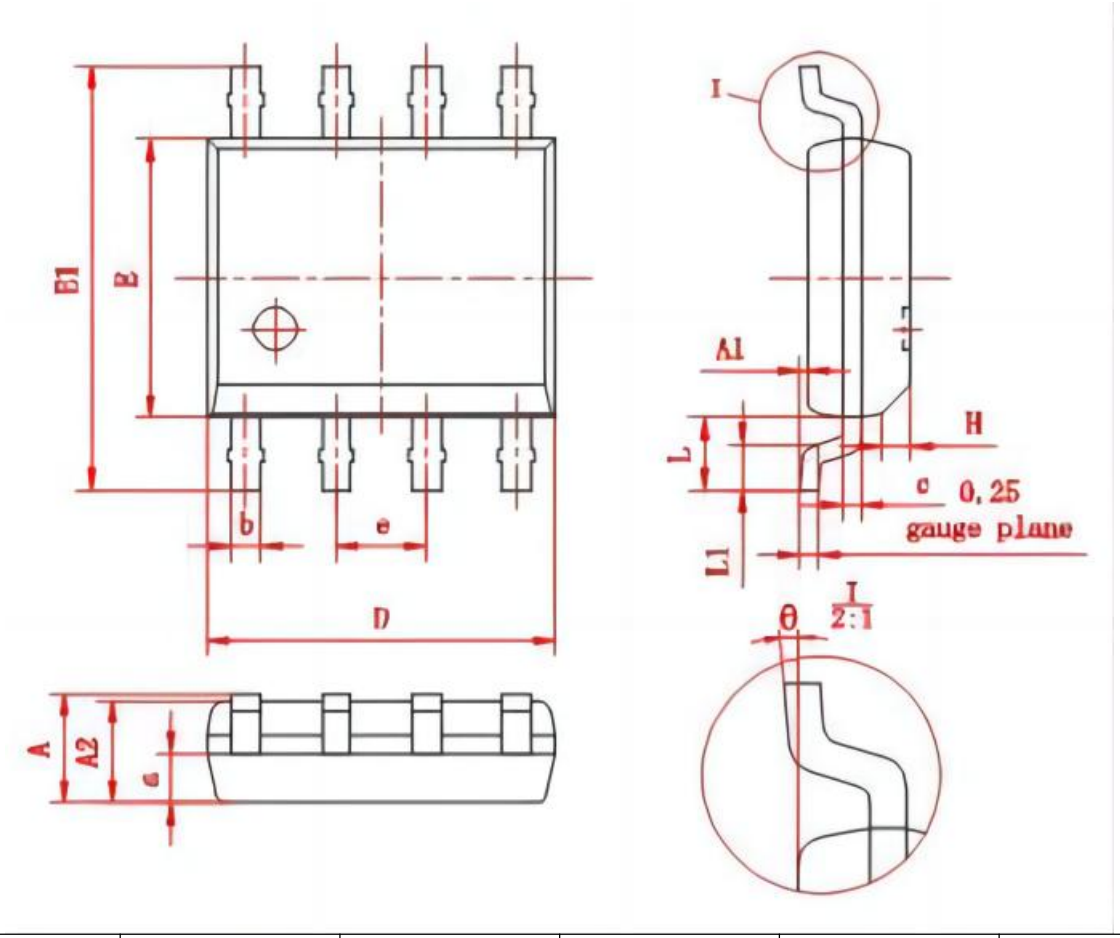



Diode Recovery Test Circuit & Waveforms



**Package Dimension(Units:mm)**

## SOP-8




| Symbol | Min | Max | Symbol | Min | Max |
|---|---|---|---|---|---|
| **A** | 1.35 | 1.75 | **H** | 0.40 BSC | |
| **A1** | 0.10 | 0.25 | **e** | 1.27 BSC | |
| **A2** | 1.35 | 1.55 | **b** | 0.30 | 0.50 |
| **a** | 0.70 BSC | | **c** | 0.18 | 0.30 |
| **D** | 4.70 | 5.10 | **L** | 1.00 BSC | |
| **E** | 3.80 | 4.10 | **L1** | 0.40 | 0.80 |
| **E1** | 5.80 | 6.20 | **θ** | 0° | 8° |