



Description

The HXY9435S uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



SOP-8

General Features

$V_{DS} = -30V$ $I_D = -5A$

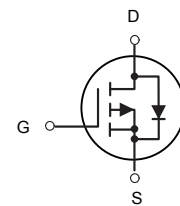
$R_{DS(ON)} < 55m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|------------|-------|---------------|----------|
| HXY9435S | SOP-8 | 9435 XXX YYYY | 3000 |

Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|----------------------|---|------------|-------|
| V_{DS} | Drain-Source Voltage | - 30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D@T_A=25^\circ C$ | Drain Current ³ , V_{GS} @ 10V | -5 | A |
| I_{DM} | Pulsed Drain Current ¹ | -20 | A |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation | 2.5 | W |
| | Linear Derating Factor | 0.02 | W/°C |
| TSTG | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |
| R_{thj-a} | Maximum Thermal Resistance, Junction-ambient ³ | 40 | °C/W |



Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|--|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -30 | -33 | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-24V, V_{GS}=0V$ | - | - | -1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1 | -1.6 | -3 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-5A$ | - | 43 | 55 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-4.2A$ | - | 62 | 90 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=-15V, I_D=-4.5A$ | 4 | 7 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-15V, V_{GS}=0V,$ $F=1.0\text{MHz}$ | - | 520 | - | PF |
| Output Capacitance | C_{oss} | | - | 130 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 70 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-15V, I_D=-1A, V_{GS}=-10V, R_{GEN}=6\Omega$ | - | 7 | - | nS |
| Turn-on Rise Time | t_r | | - | 13 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 14 | - | nS |
| Turn-Off Fall Time | t_f | | - | 9 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-15V, I_D=-5.1A, V_{GS}=-10V$ | - | 11 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 2.2 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 3 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-5.1A$ | - | - | -1.2 | V |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

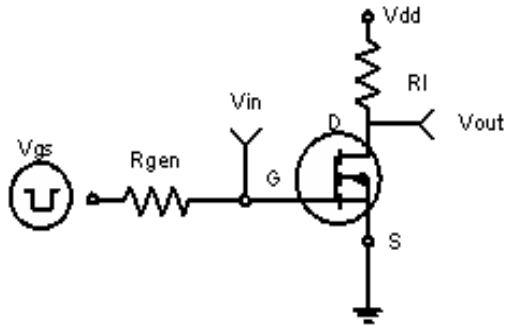


Figure 1: Switching Test Circuit

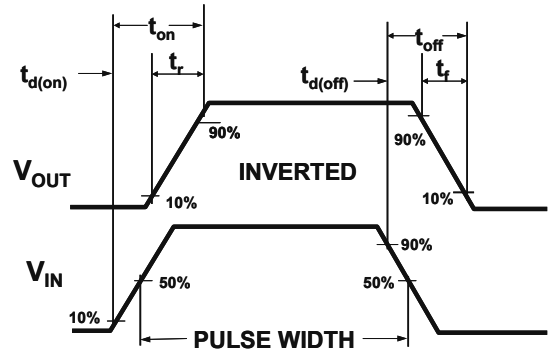


Figure 2: Switching Waveforms

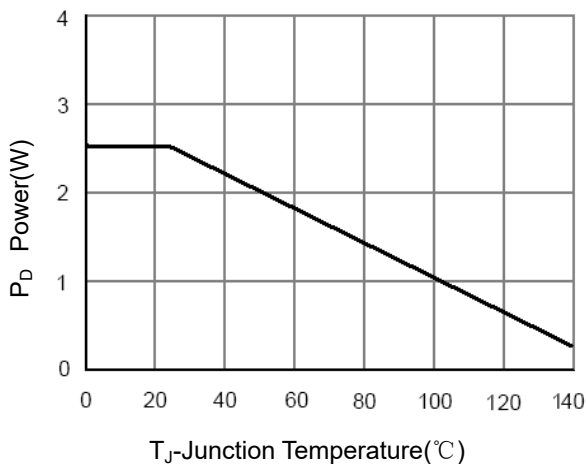


Figure 3 Power Dissipation

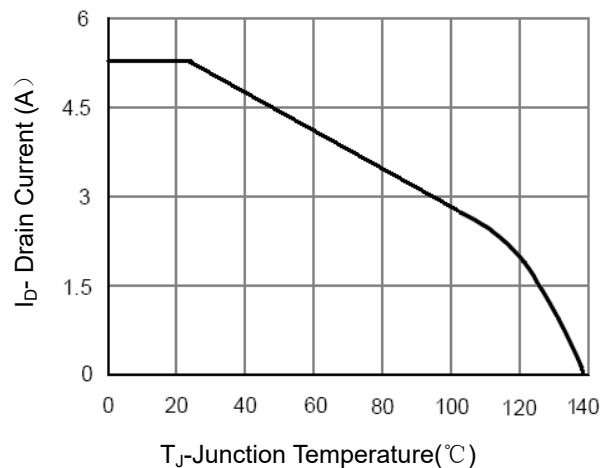


Figure 4 Drain Current

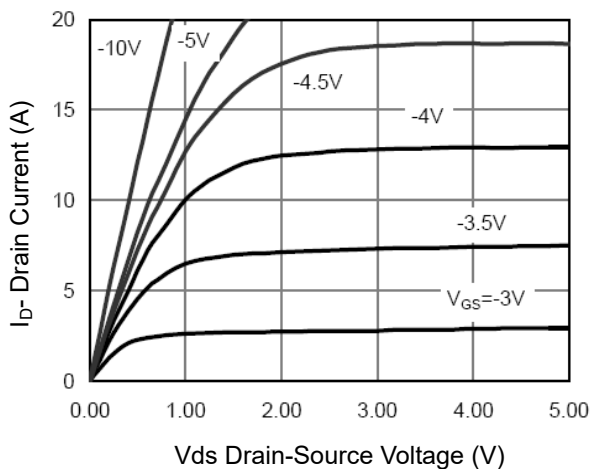


Figure 5 Output Characteristics

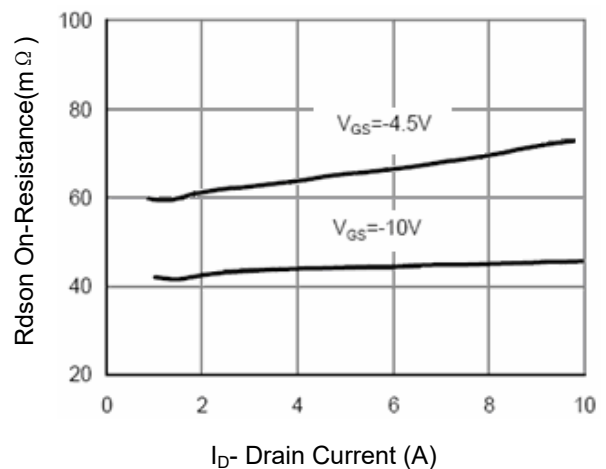


Figure 6 Drain-Source On-Resistance



Figure 5 Output Characteristics

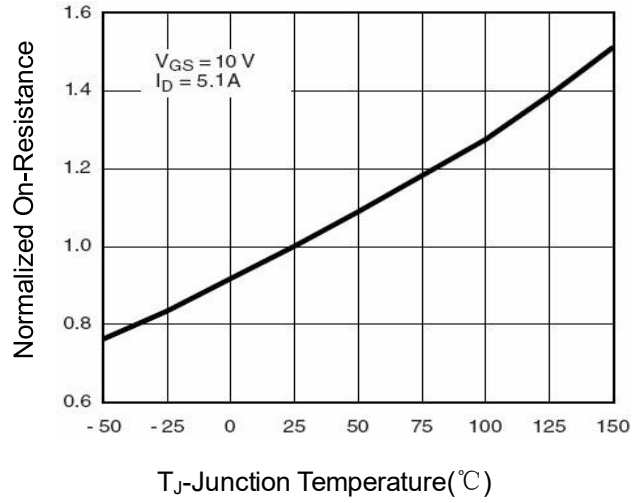
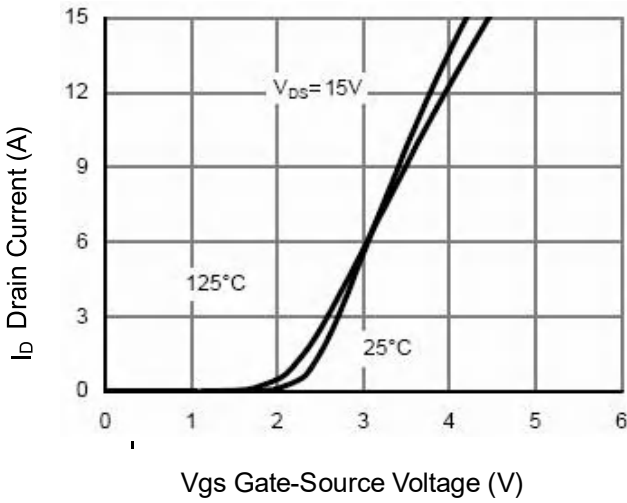


Figure 7 Transfer Characteristics

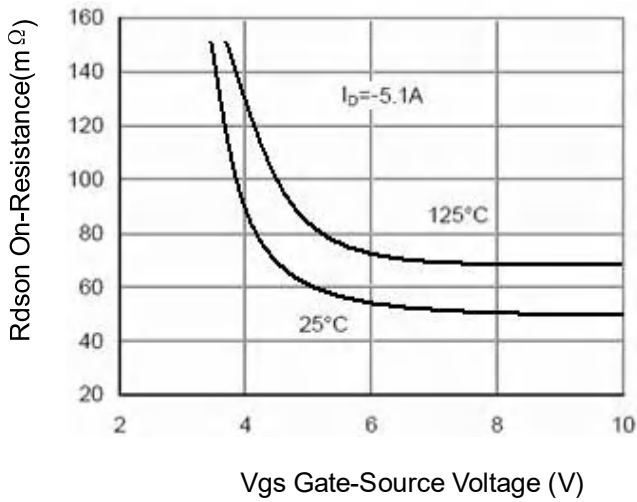


Figure 8 Drain-Source On-Resistance

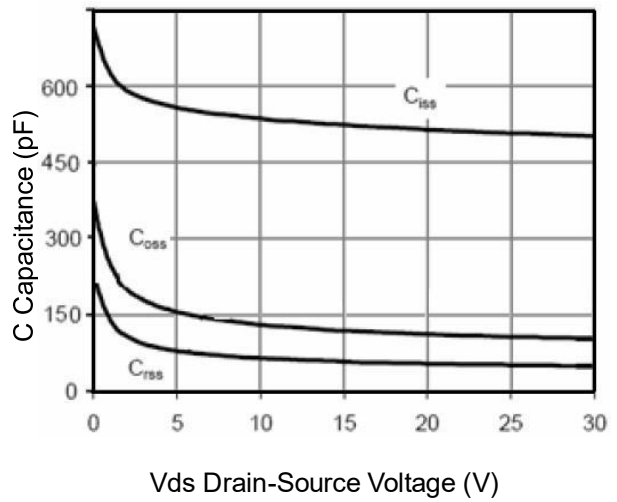


Figure 9 Rdson vs Vgs

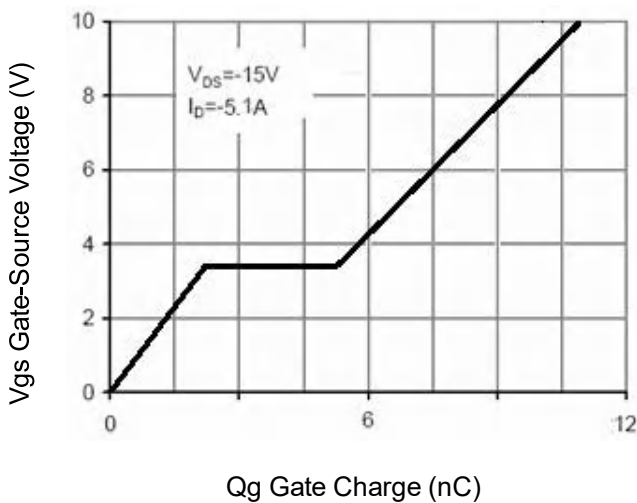


Figure 10 Capacitance vs Vds

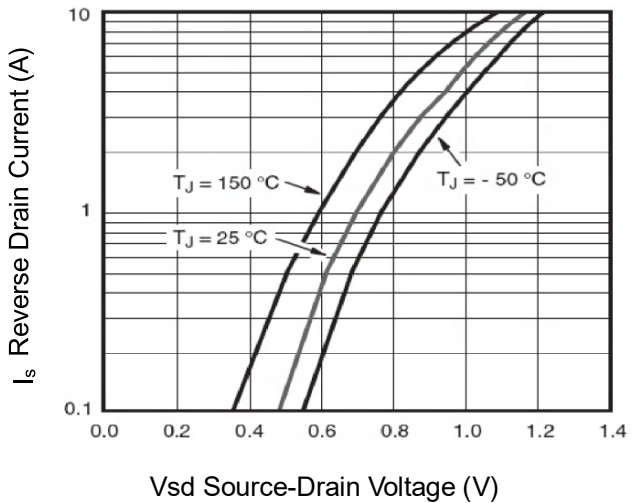


Figure 11 Gate Charge

Figure 12 Source- Drain Diode Forward

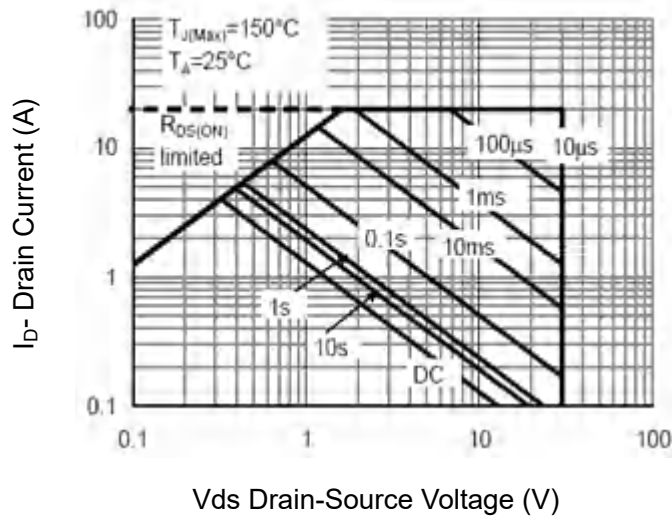


Figure 13 Safe Operation Area

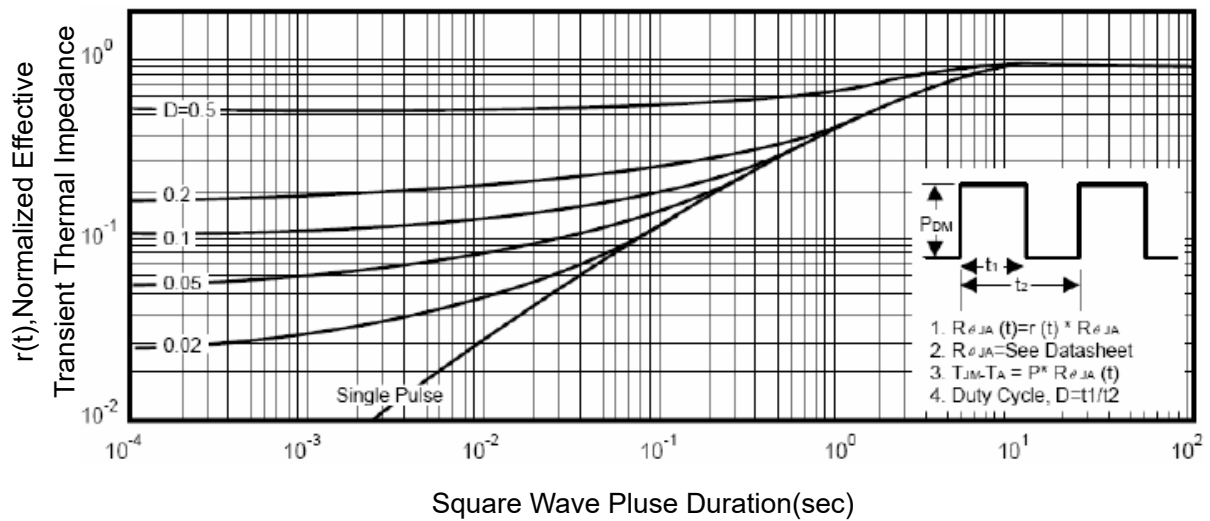
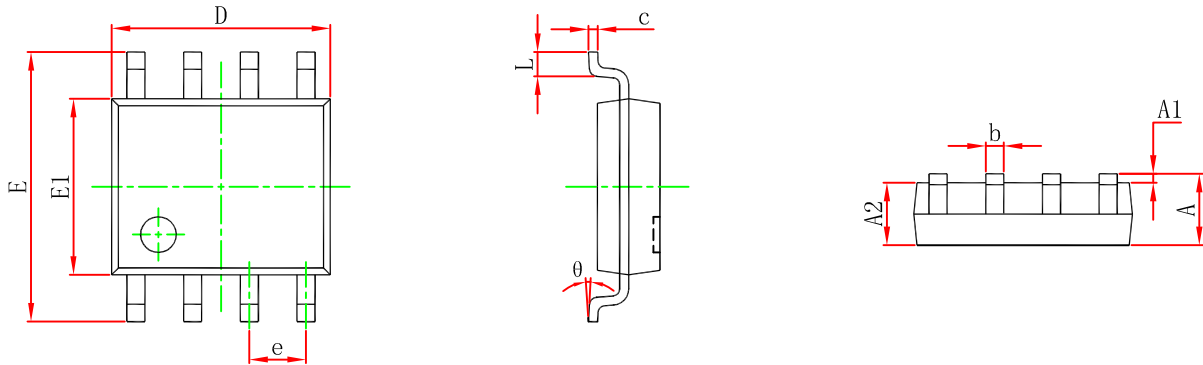


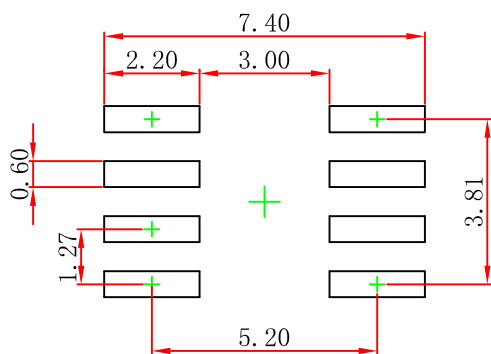
Figure 14 Normalized Maximum Transient Thermal Impedance



SOP-8 Package Outline Dimensions



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 4.800 | 5.000 | 0.189 | 0.197 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |



- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.



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