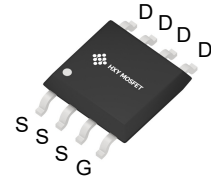




Description

The HRS3E075AT uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



SOP-8
(SOIC-8)

General Features

$V_{DS} = -30V$ $I_D = -11A$

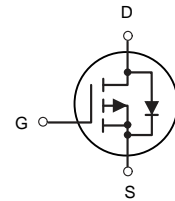
$R_{DS(ON)} < 16m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|------------|---------------|------------|----------|
| HRS3E075AT | SOP-8(SOIC-8) | HXY MOSFET | 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 , V_{GS} @ 10V | -11 | A |
| IDM | Pulsed Drain Current | -40 | A |
| $P_D@T_A=25^\circ C$ | Total Power Dissipation | 3.7 | W |
| TSTG | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient | 33.8 | °C/W |



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

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|--|--|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D = -250\mu A$ | -30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = -30V, V_{GS}=0V,$ | - | - | -1 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS} = \pm 20V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D = -250\mu A$ | -1.0 | -1.6 | -2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance Note3 | $V_{GS} = -10V, I_D = -10A$ | - | 13 | 16 | m Ω |
| | | $V_{GS} = -4.5V, I_D = -5A$ | - | 18 | 27 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS} = -15V, V_{GS}=0V,$ $f=1.0MHz$ | - | 1330 | - | pF |
| C_{oss} | Output Capacitance | | - | 183 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 156 | - | pF |
| Q_g | Total Gate Charge | $V_{DS} = -15V, I_D = -5A,$ $V_{GS} = -10V$ | - | 22 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 1.0 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 1.8 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD} = -15V, I_D = -10A,$ $V_{GS} = -10V, R_{GEN} = 2.5\Omega$ | - | 9 | - | ns |
| t_r | Turn-on Rise Time | | - | 13 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 48 | - | ns |
| t_f | Turn-off Fall Time | | - | 20 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -11 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -40 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S = -15A$ | - | -0.8 | -1.2 | V |
| t_{rr} | Reverse Recovery Time | $T_J=25^\circ\text{C},$ | - | 64 | - | ns |
| Q_{rr} | Reverse Recovery Charge | $V_{DD} = -24V, I_F = -2.8A,$ $di/dt = -100A/\mu s$ | - | 25 | - | nC |

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J=25^\circ\text{C}, V_{GS}=10V, R_G=25\Omega, L=0.5mH, I_{AS}=-12.7A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Characteristics

Figure 1: Output Characteristics



Figure 2: Typical Transfer Characteristics

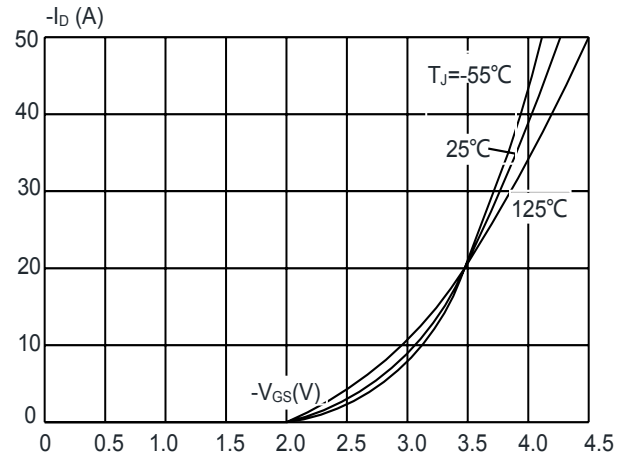


Figure 3: On-resistance vs. Drain Current



Figure 4: Body Diode Characteristics

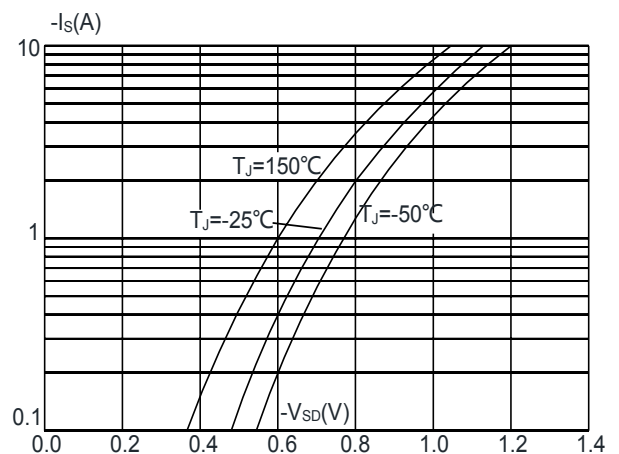


Figure 5: Gate Charge Characteristics



Figure 6: Capacitance Characteristics

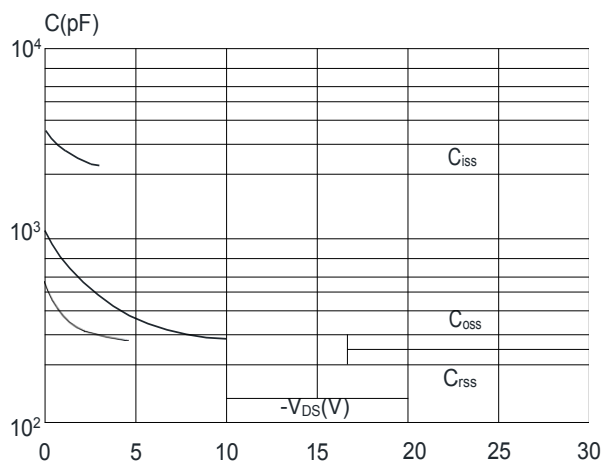




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

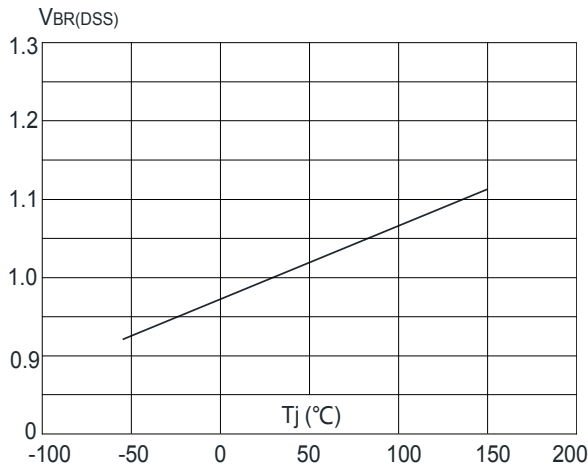


Figure 8: Normalized on Resistance vs. Junction Temperature



Figure 9: Maximum Safe Operating Area

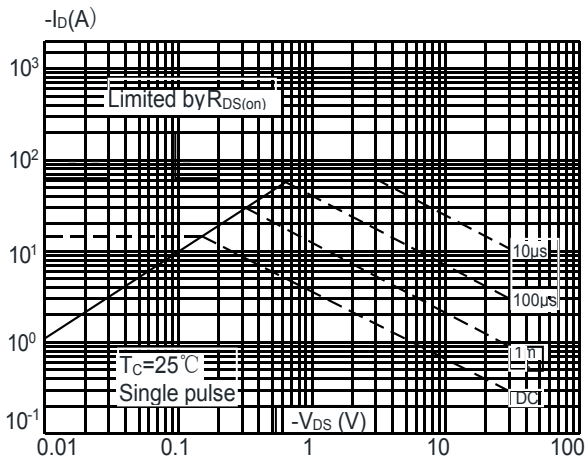


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

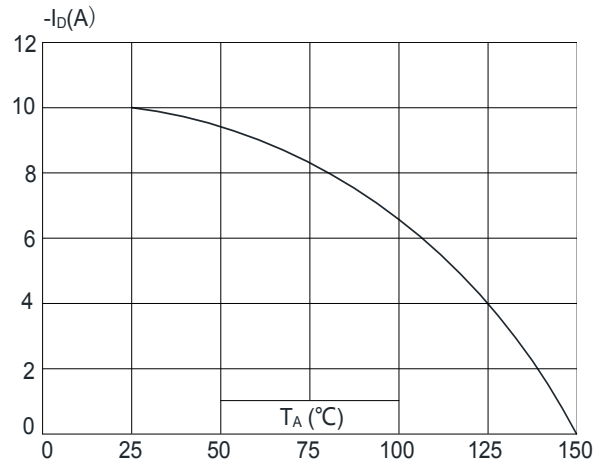
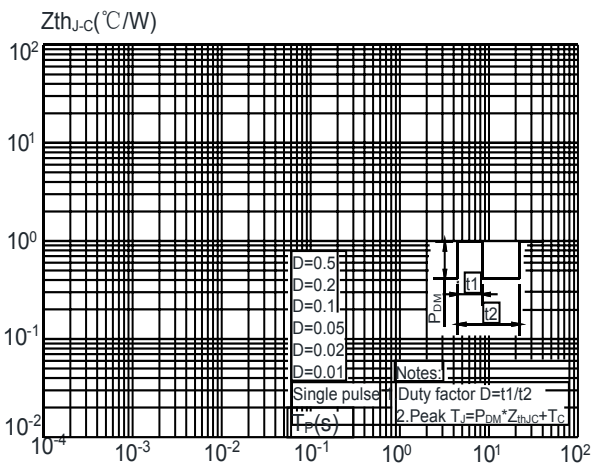


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



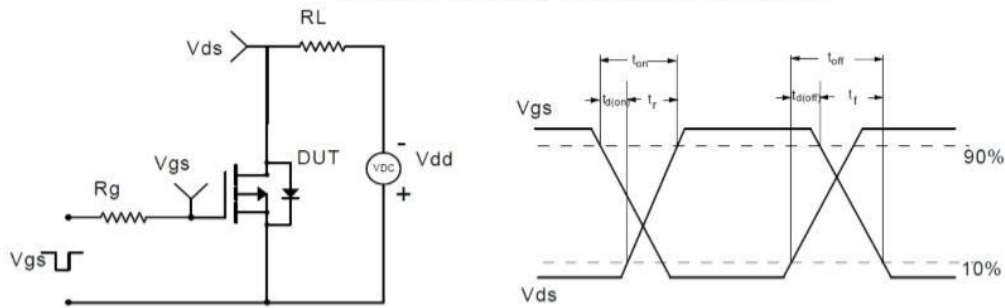


Test Circuit

Gate Charge Test Circuit & Waveform



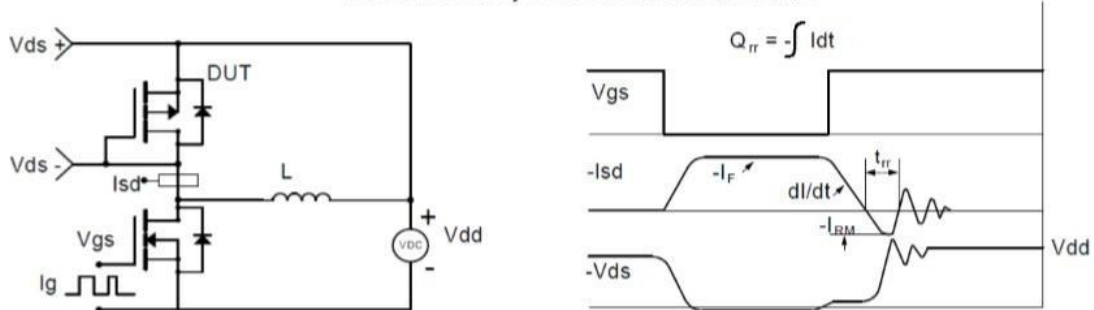
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

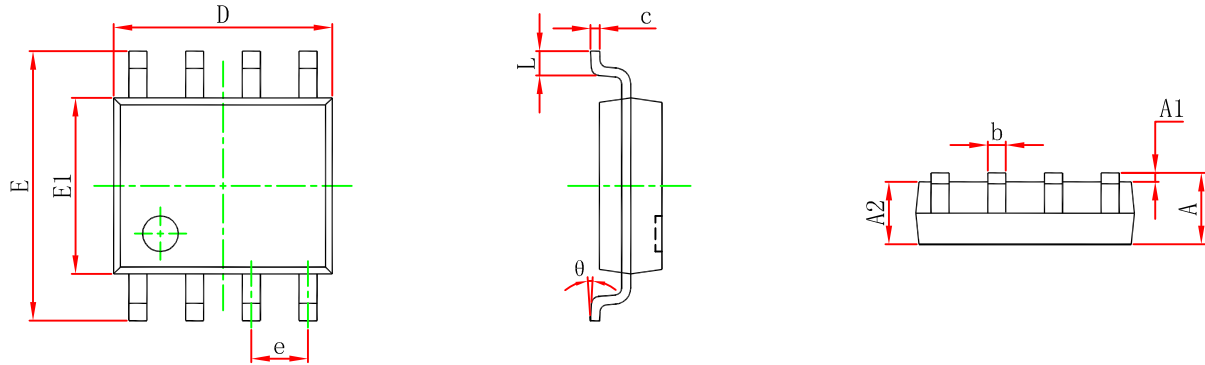


Diode Recovery Test Circuit & Waveforms

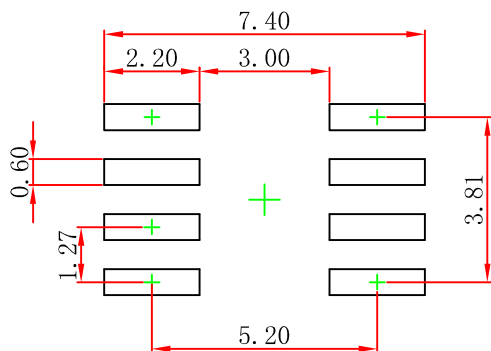




SOP-8(SOIC-8) Package Outline Dimensions



| 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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