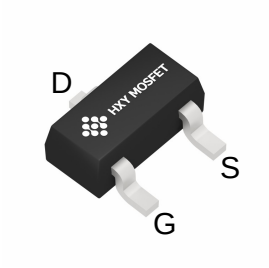
## Description

The HXY30P09MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, This device is suitable for use as a load switch or in PWM applications.



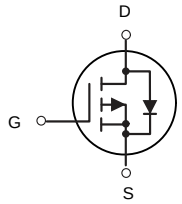

SOT-23-3L

## General Features

$V_{DS}$ = -30V,$I_D$ = -9A

$R_{DS(ON)}$ < 25mΩ @ $V_{GS}$=-10V

$R_{DS(ON)}$ < 38mΩ @ $V_{GS}$=-4.5V




P-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---|---|---|---|
| HXY30P09MI | SOT-23 | 30P09 | 3000 |

## Absolute Maximum Ratings ($T_A$=25°C unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Drain Current-Continuous | -9 | A |
| $I_{DM}$ | Drain Current-Pulsed | -36 | A |
| $P_D$ | Maximum Power Dissipation | 3.0 | W |
| $T_J$,$T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance,Junction-to-Ambient | 48 | °C/W |

## Electrical Characteristics ($T_J$=25°C unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V,$I_D$= -250μA | -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, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$= $V_{GS}$, $I_D$= -250μA | -1.0 | -1.5 | -2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance Note3 | $V_{GS}$ =-10V, $I_D$ =-9A | - | 20 | 25 | mΩ |
| | | $V_{GS}$ =-4.5V, $I_D$ =-5A | - | 27 | 38 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = -15V, $V_{GS}$ = 0V, f = 1.0MHz | - | 900 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 125 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 109 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$= -15V, $I_D$ = -8A, $V_{GS}$ = -10V | - | 42 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 8.8 | - | nC |
| $Q_{gd}$ | Gate-Drain("Miller") Charge | | - | 7.3 | - | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$ = -15V, $I_D$ = -1A, $V_{GS}$=-10V, $R_{GEN}$=6Ω | - | 13 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 15 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 198 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 98 | - | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | -9 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | -36 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = -9A | - | -0.8 | -1.2 | V |

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

2. EAS condition: $T_J$=25°C, $V_{DD}$=-15V, $V_G$=-10V, $R_G$=25Ω, L=0.5mH, $I_{AS}$=-10A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

## Typical Performance Characteristics

**Figure1:** Output Characteristics

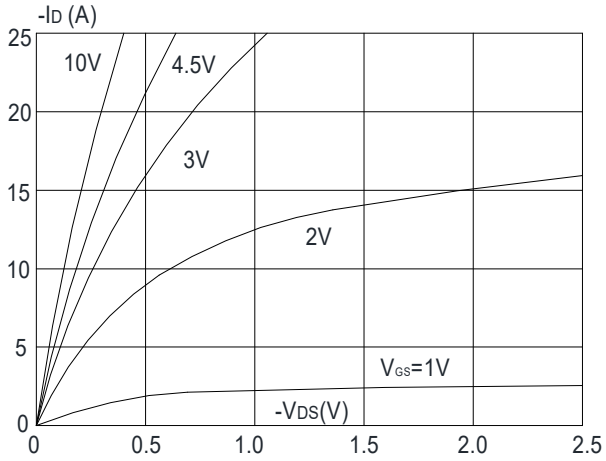



**Figure 2:** Typical Transfer Characteristics

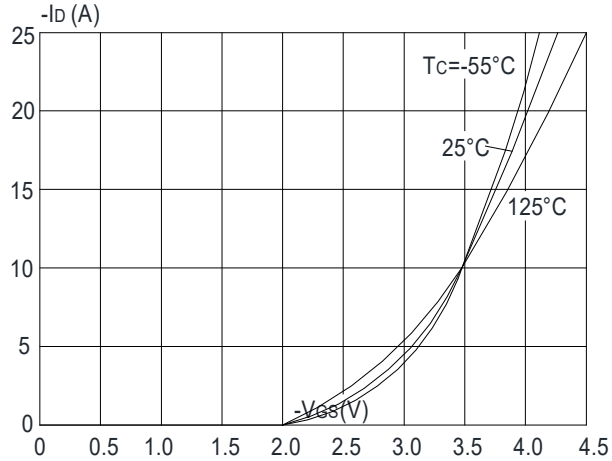



**Figure 3:**On-resistance vs. Drain Current

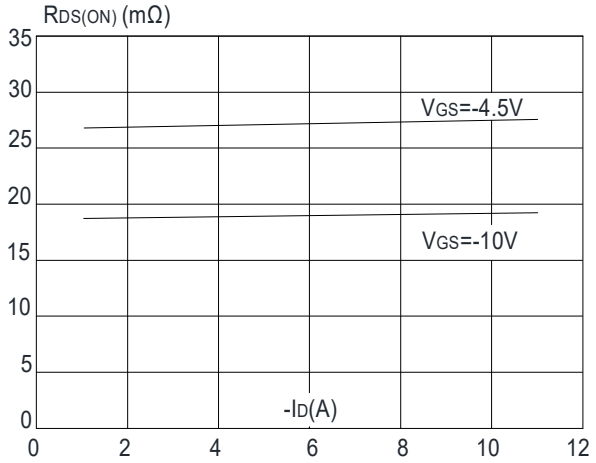



**Figure 4**: Body Diode Characteristics

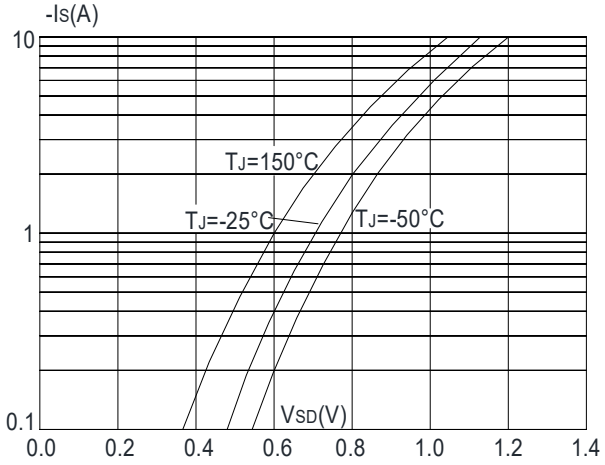



**Figure 5:** Gate Charge Characteristics

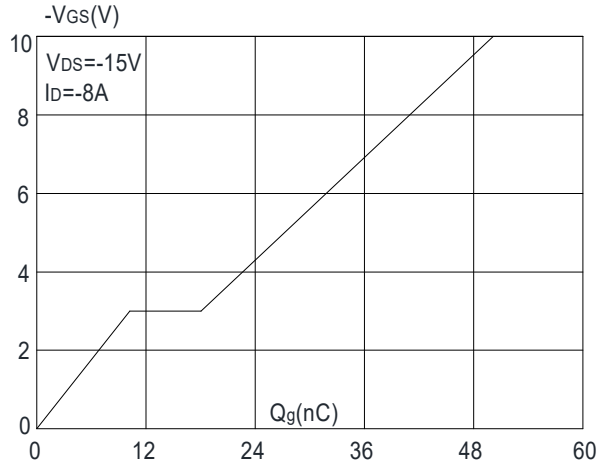



**Figure 6:** Capacitance Characteristics

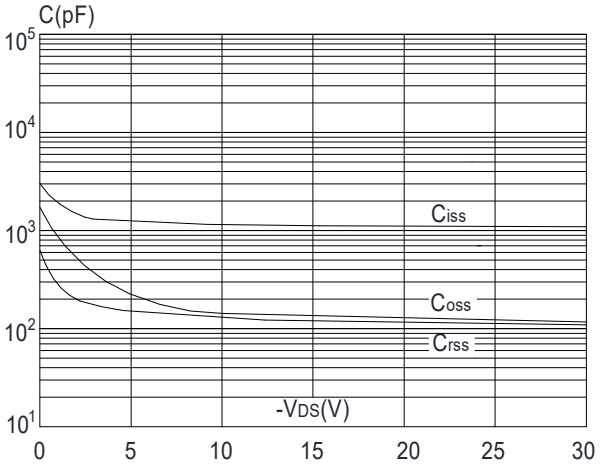


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

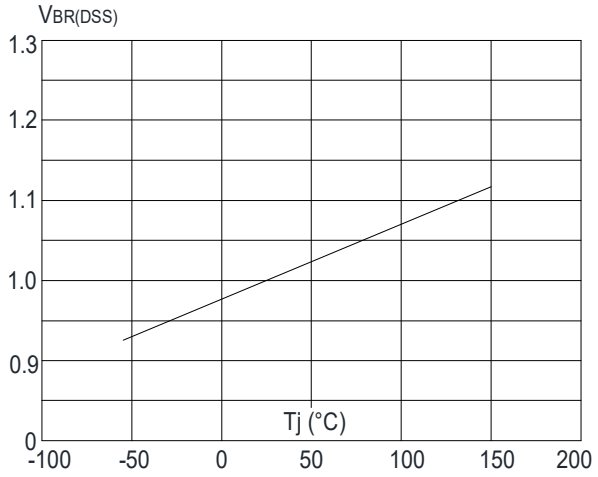



**Figure 8:** Normalized on Resistance vs. Junction Temperature

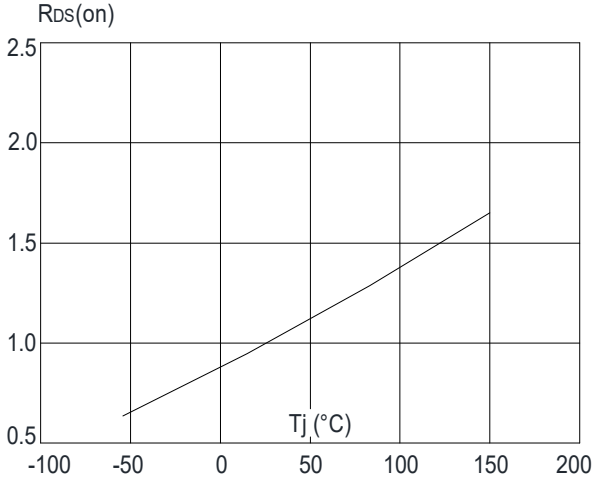



**Figure 9:** Maximum Safe Operating Area

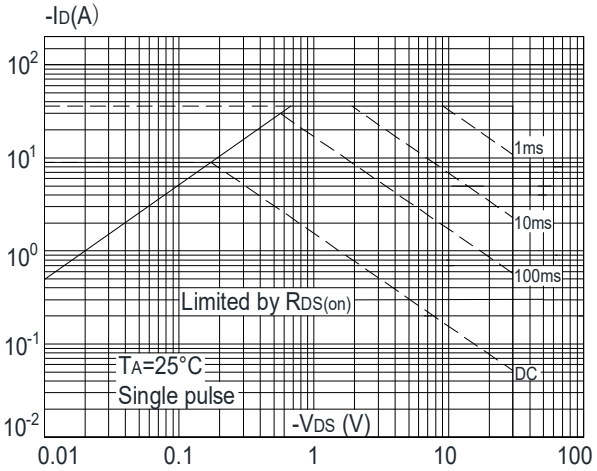



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

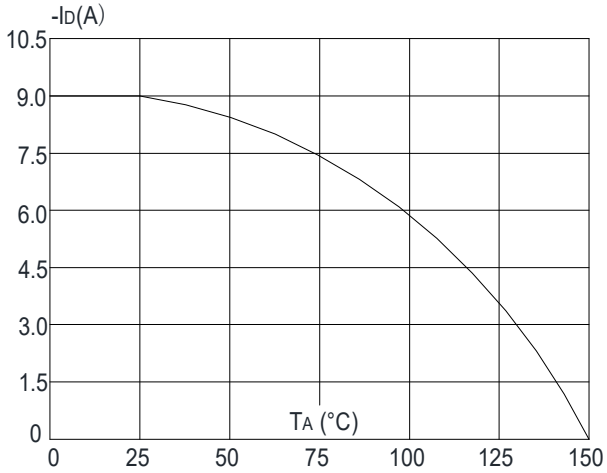
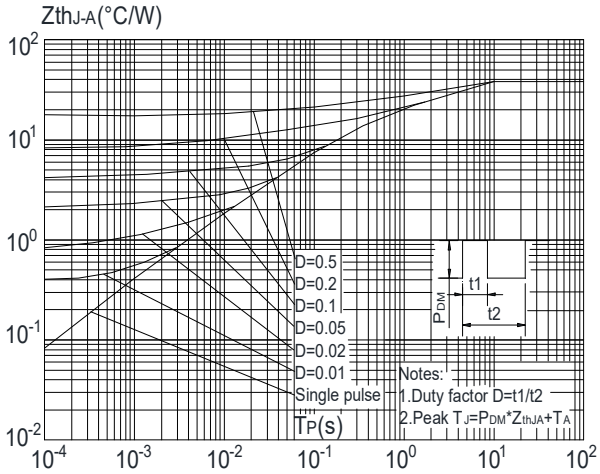



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## Test Circuit

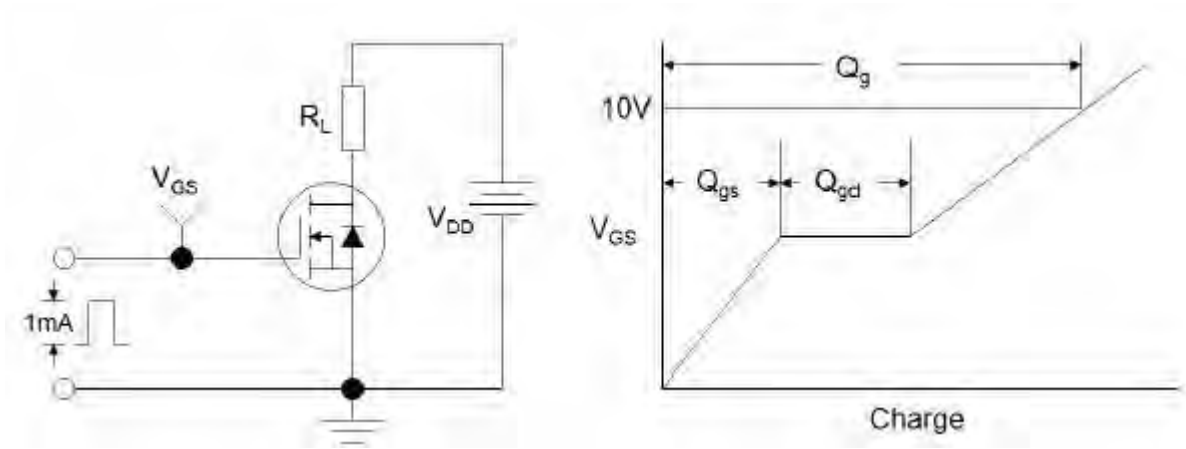



**Figure1:Gate Charge Test Circuit & Waveform**

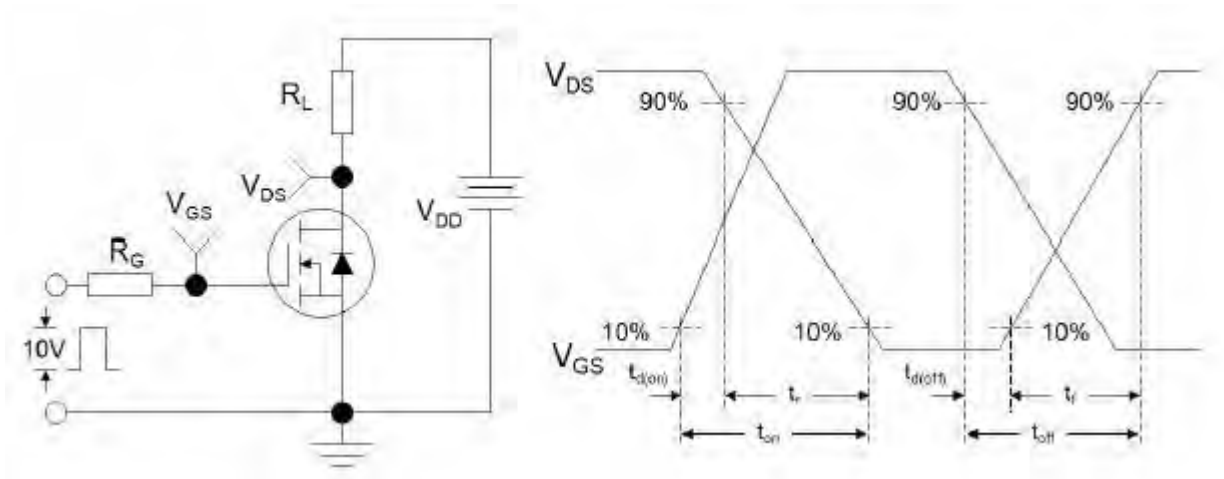



**Figure 2: Resistive Switching Test Circuit & Waveforms**

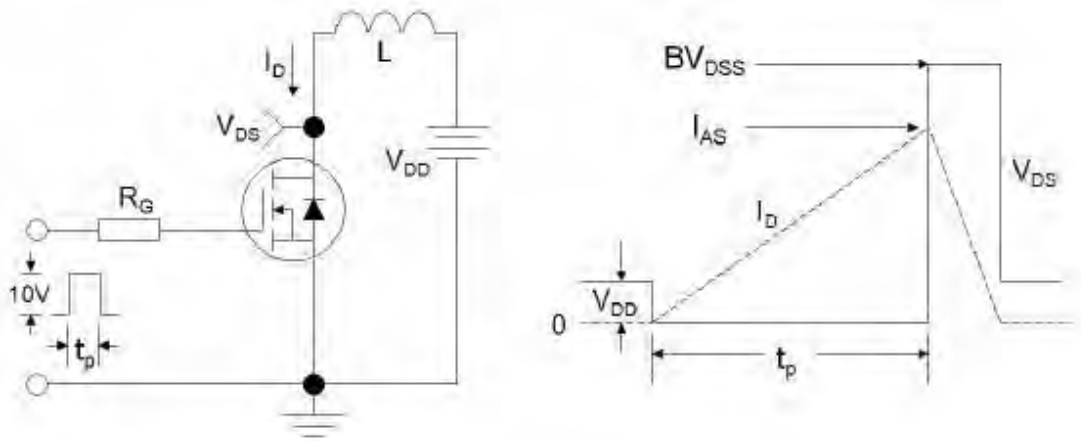
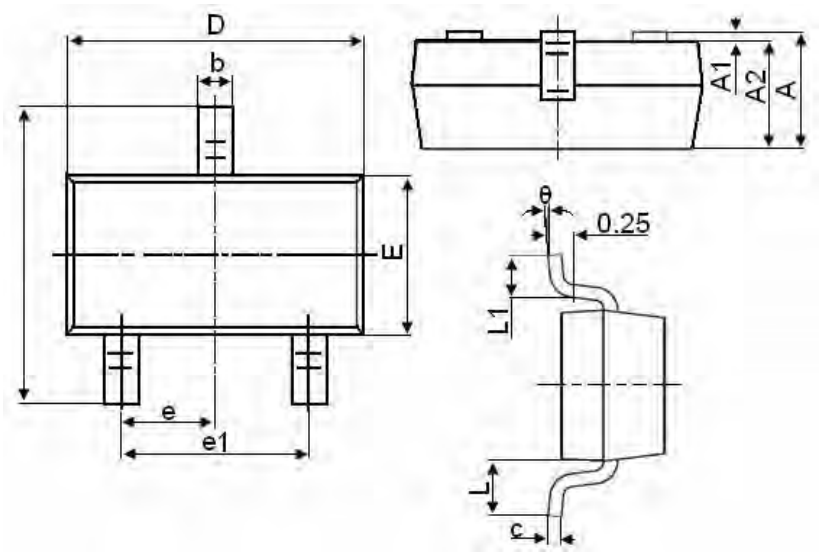



**Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms**

## SOT-23-3L Package Information




| Symbol | Dimensions in Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 1.050 | 1.250 |
| A1 | 0.000 | 0.100 |
| A2 | 1.050 | 1.150 |
| b | 0.300 | 0.500 |
| c | 0.100 | 0.200 |
| D | 2.800 | 3.000 |
| E | 1.500 | 1.700 |
| E1 | 2.650 | 2.950 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.600 |
| θ | 0° | 8° |

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