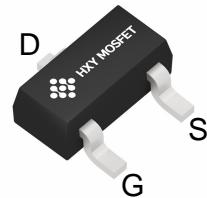




## Description

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

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

$R_{DS(ON)} < 25m\Omega @ V_{GS}=-10V$

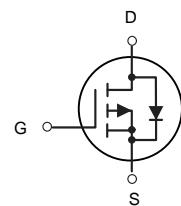
$R_{DS(ON)} < 38m\Omega @ V_{GS}=-4.5V$

## Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

## Package Marking and Ordering Information

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

## Absolute Maximum Ratings ( $T_A=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	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	$^\circ C$
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	48	$^\circ C/W$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_D = -250\mu\text{A}$	-30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V},$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1.0	-1.5	-2.5	V
$R_{DS(\text{on})}$ Note3	Static Drain-Source on-Resistance	$V_{GS} = -10\text{V}, I_D = -9\text{A}$	-	20	25	$\text{m}\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -5\text{A}$	-	27	38	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	-	900	-	pF
$C_{oss}$	Output Capacitance		-	125	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	109	-	pF
$Q_g$	Total Gate Charge	$V_{DS} = -15\text{V}, I_D = -8\text{A},$ $V_{GS} = -10\text{V}$	-	42	-	nC
$Q_{gs}$	Gate-Source Charge		-	8.8	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	7.3	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = -15\text{V}, I_D = -1\text{A},$ $V_{GS} = -10\text{V}, R_{GEN} = 6\Omega$	-	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
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_s$	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	$V_{GS} = 0\text{V}, I_s = -9\text{A}$	-	-0.8	-1.2	V

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

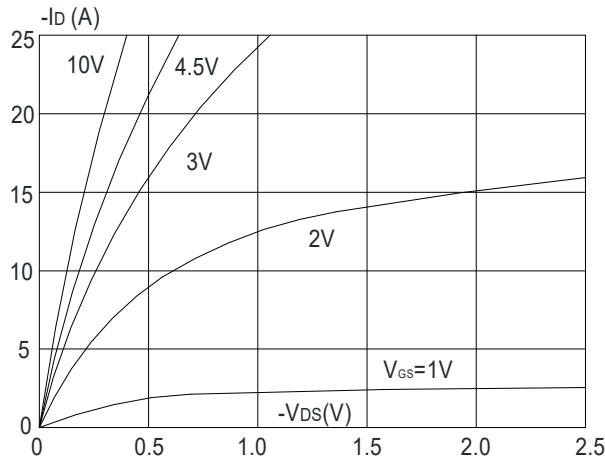
2. EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=-15\text{V}, V_G=-10\text{V}, R_G=25\Omega, L=0.5\text{mH}, I_{AS}=-10\text{A}$

3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 2\%$

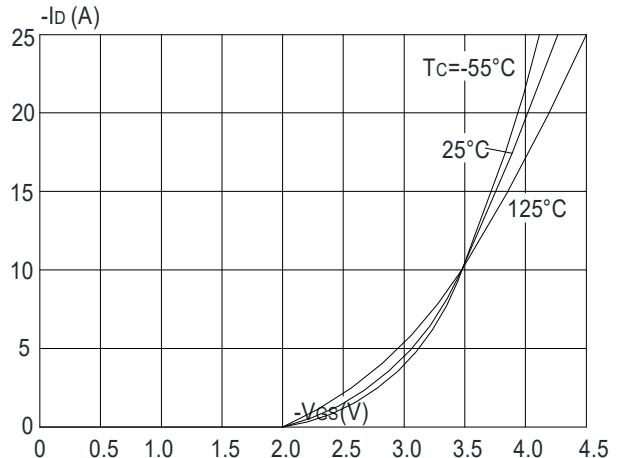


## Typical Performance Characteristics

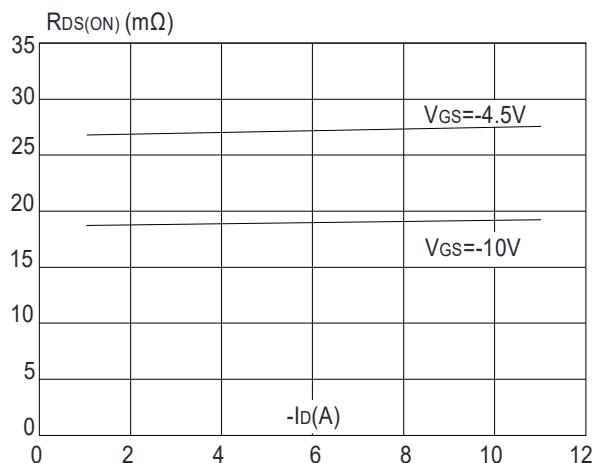
**Figure 1:** Output Characteristics



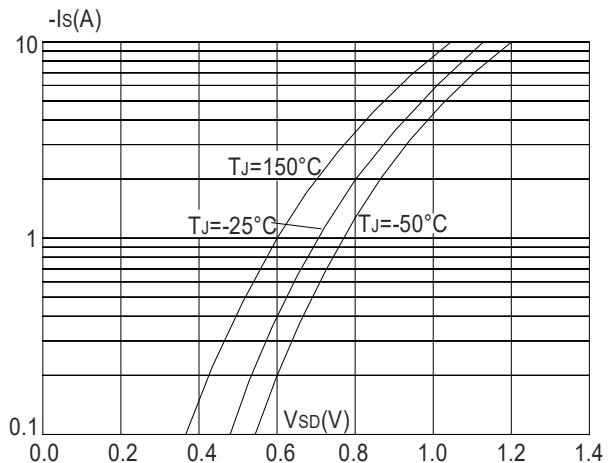
**Figure 2:** Typical Transfer Characteristics



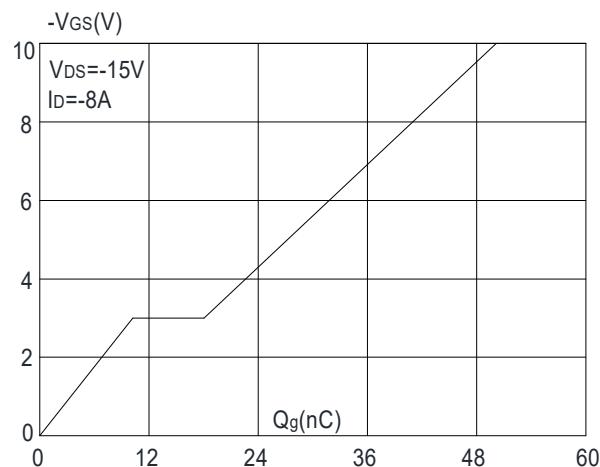
**Figure 3:** On-resistance vs. Drain Current



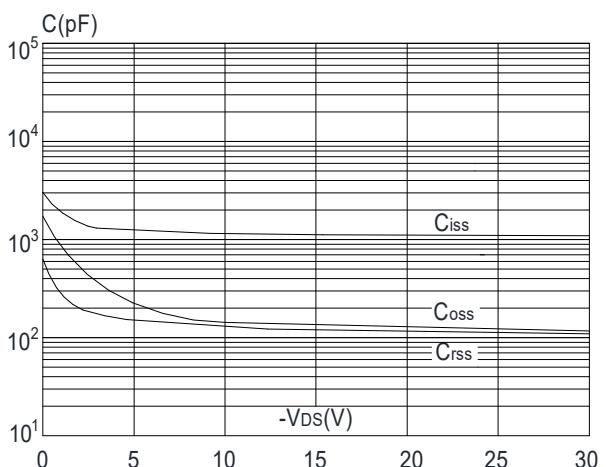
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

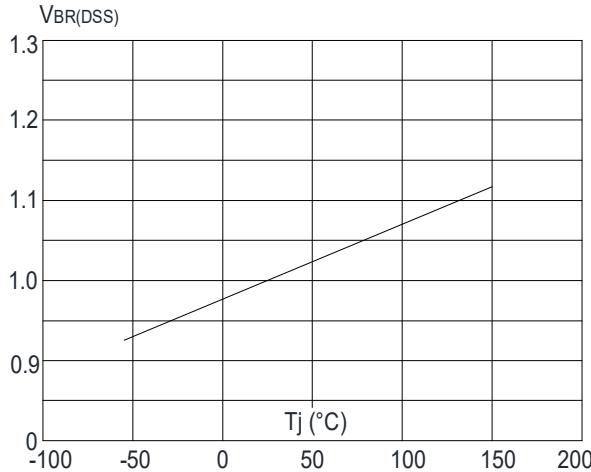


**Figure 6:** Capacitance Characteristics

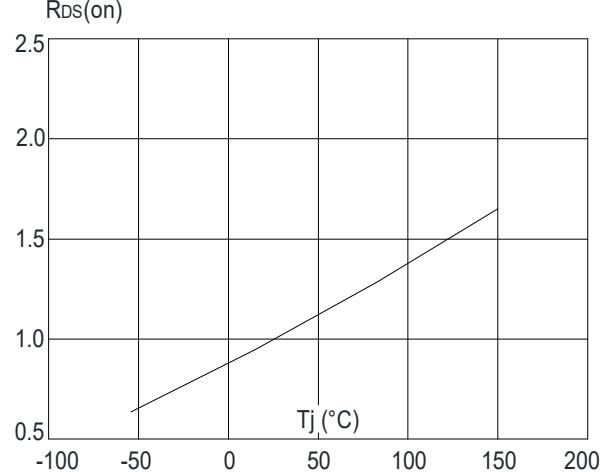




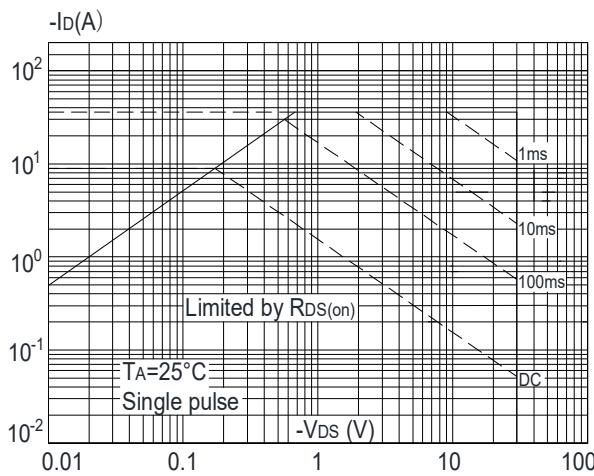
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



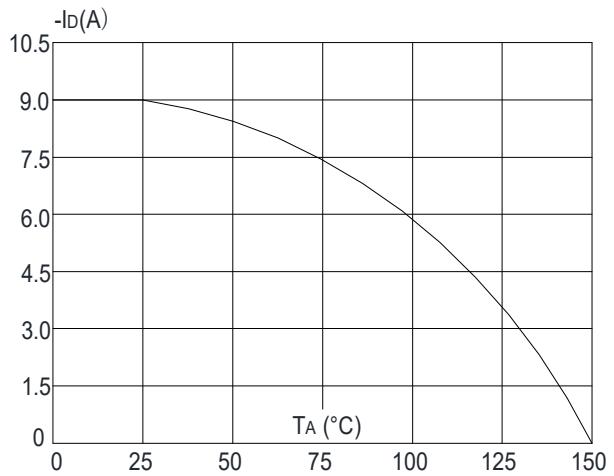
**Figure 8:** Normalized on Resistance vs. Junction Temperature



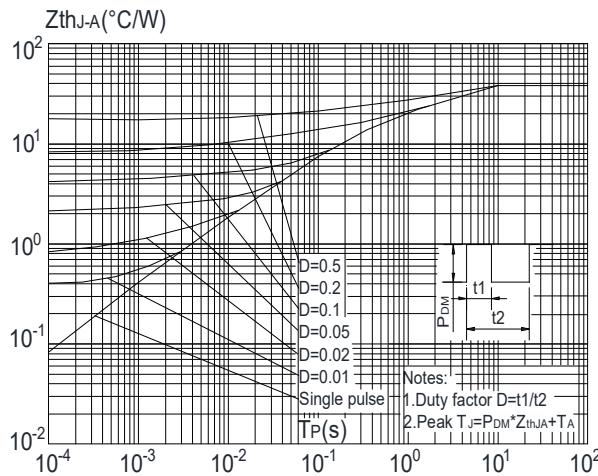
**Figure 9:** Maximum Safe Operating Area



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



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





## Test Circuit

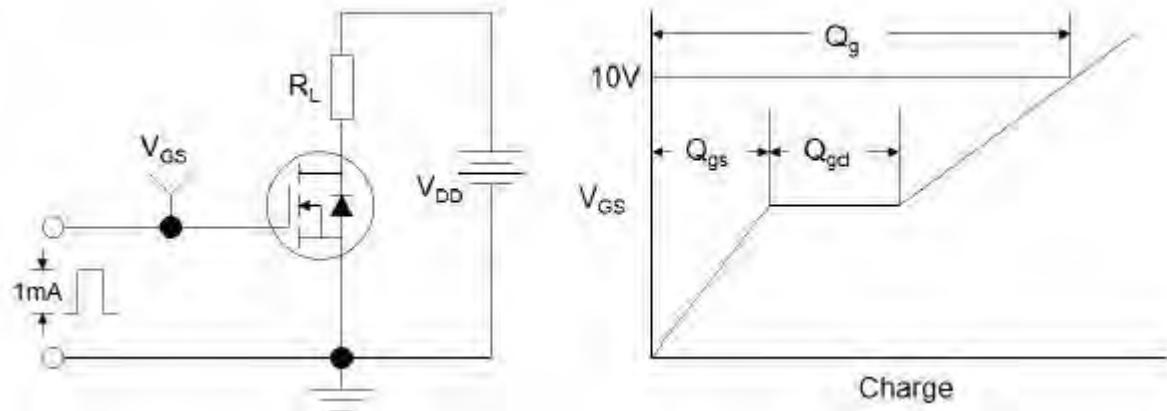


Figure 1: Gate Charge Test Circuit & Waveform

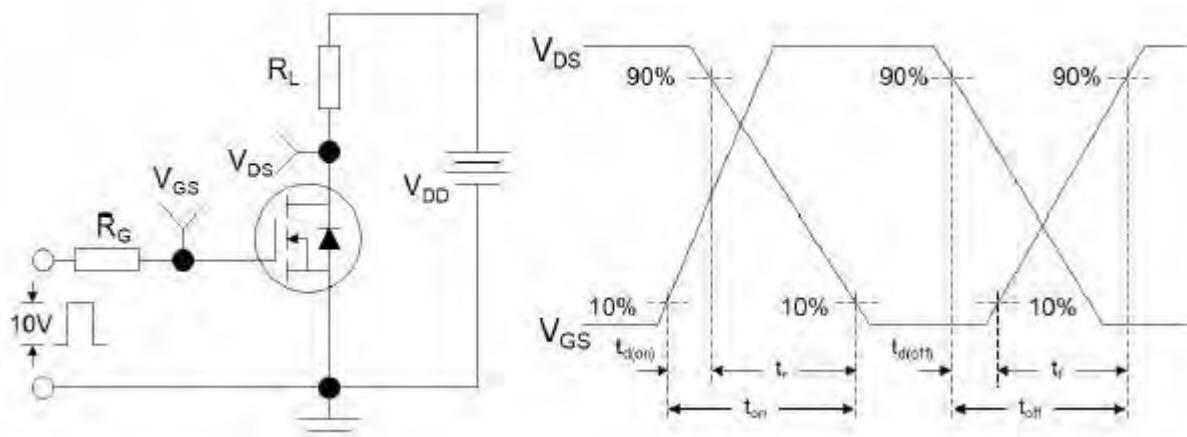


Figure 2: Resistive Switching Test Circuit & Waveforms

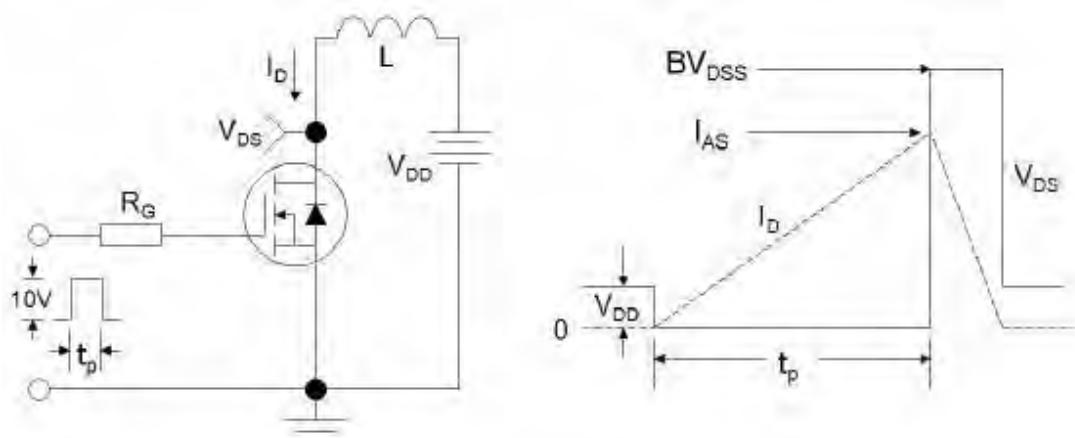
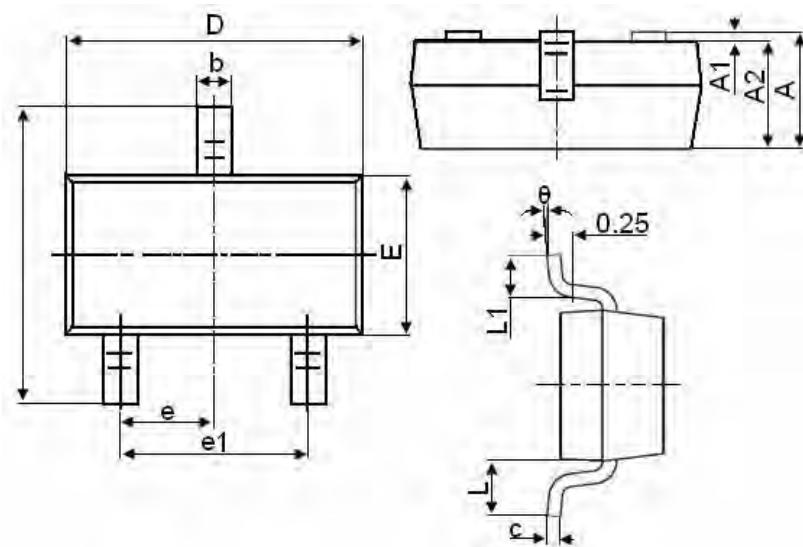


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms



### 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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