



## Description

The HXY2301BI 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.



**SOT-23**

## General Features

$V_{DS} = -20V$   $I_D = -2.8A$

$R_{DS(ON)} < 85m\Omega$  @  $V_{GS} = -4.5V$

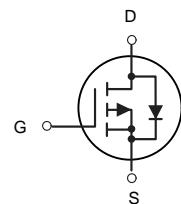
$R_{DS(ON)} < 120m\Omega$  @  $V_{GS} = -2.5V$

## Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
HXY2301BI	SOT-23	A1SHB	3000

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 8$	V
$I_D$	Drain Current-Continuous	-2.8	A
$I_{DM}$	Drain Current-Pulsed	-10	A
$P_D$	Maximum Power Dissipation	1.25	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	100	$^\circ C/W$



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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}} = 0\text{V}, I_{\text{D}} = -250\mu\text{A}$	-20			V
Zero Gate Voltage Drain Current	$I_{\text{DSS}}$	$V_{\text{DS}} = -20\text{V}, V_{\text{GS}} = 0\text{V}$			-1	$\mu\text{A}$
Gate Body Leakage Current, Forward	$I_{\text{GSSF}}$	$V_{\text{GS}} = 8\text{V}, V_{\text{DS}} = 0\text{V}$			100	nA
Gate Body Leakage Current, Reverse	$I_{\text{GSSR}}$	$V_{\text{GS}} = -8\text{V}, V_{\text{DS}} = 0\text{V}$			-100	nA
<b>On Characteristics<sup>c</sup></b>						
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{GS}} = V_{\text{DS}}, I_{\text{D}} = -250\mu\text{A}$	-0.45			V
Static Drain-Source On-Resistance	$R_{\text{DS(on)}}$	$V_{\text{GS}} = -4.5\text{V}, I_{\text{D}} = -2.8\text{A}$		75	85	$\text{m}\Omega$
		$V_{\text{GS}} = -2.5\text{V}, I_{\text{D}} = -2.0\text{A}$		95	120	$\text{m}\Omega$
Forward Transconductance	$g_{\text{FS}}$	$V_{\text{DS}} = -5\text{V}, I_{\text{D}} = -2.8\text{A}$		8		S
<b>Dynamic Characteristics<sup>d</sup></b>						
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}} = -6\text{V}, V_{\text{GS}} = 0\text{V}, f = 1.0 \text{ MHz}$		880		pF
Output Capacitance	$C_{\text{oss}}$			270		pF
Reverse Transfer Capacitance	$C_{\text{rss}}$			175		pF
<b>Switching Characteristics<sup>d</sup></b>						
Turn-On Delay Time	$t_{\text{d(on)}}$	$V_{\text{DD}} = -6\text{V}, I_{\text{D}} = -1\text{A}, V_{\text{GS}} = -4.5\text{V}, R_{\text{GEN}} = 6\Omega$		11	20	ns
Turn-On Rise Time	$t_r$			5	10	ns
Turn-Off Delay Time	$t_{\text{d(off)}}$			32	65	ns
Turn-Off Fall Time	$t_f$			23	45	ns
Total Gate Charge	$Q_g$	$V_{\text{DS}} = -6\text{V}, I_{\text{D}} = -2.8\text{A}, V_{\text{GS}} = -4.5\text{V}$		11	14.5	nC
Gate-Source Charge	$Q_{\text{gs}}$			1.5		nC
Gate-Drain Charge	$Q_{\text{gd}}$			2.1		nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Drain-Source Diode Forward Current <sup>b</sup>	$I_{\text{S}}$				-0.75	A
Drain-Source Diode Forward Voltage <sup>c</sup>	$V_{\text{SD}}$	$V_{\text{GS}} = 0\text{V}, I_{\text{S}} = -0.75\text{A}$			-1.2	V

**Notes :**

a.Repetitive Rating : Pulse width limited by maximum junction temperature.

b.Surface Mounted on FR4 Board,  $t < 5$  sec.

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

d.Guaranteed by design, not subject to production testing.



## Typical Characteristics

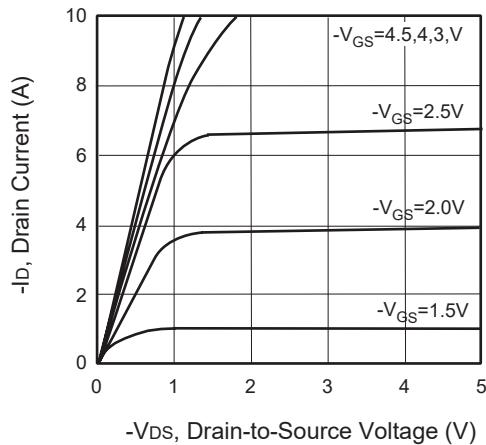


Figure 1. Output Characteristics

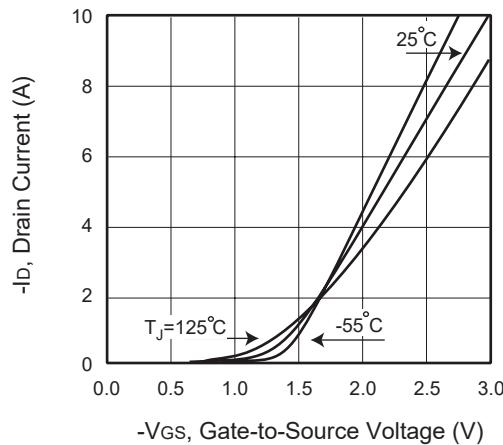


Figure 2. Transfer Characteristics

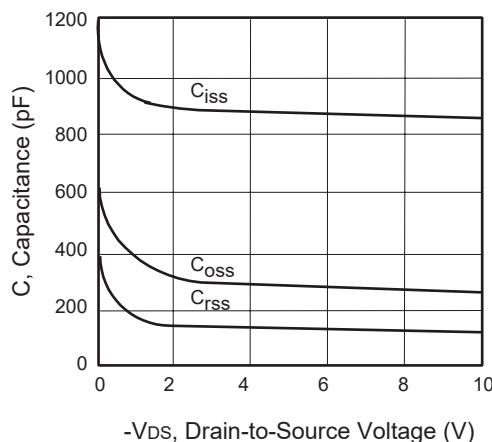


Figure 3. Capacitance

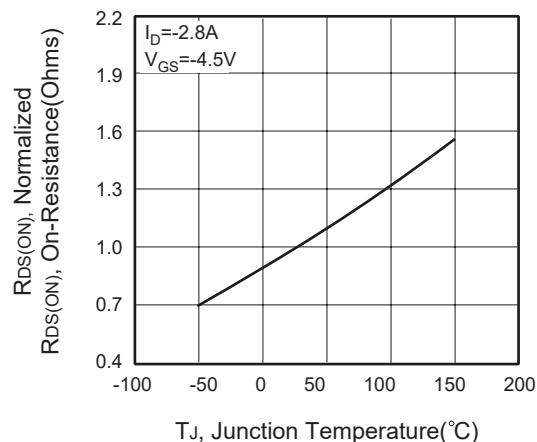


Figure 4. On-Resistance Variation with Temperature

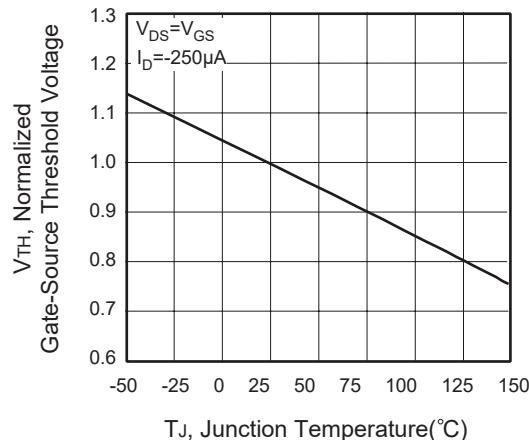


Figure 5. Gate Threshold Variation with Temperature

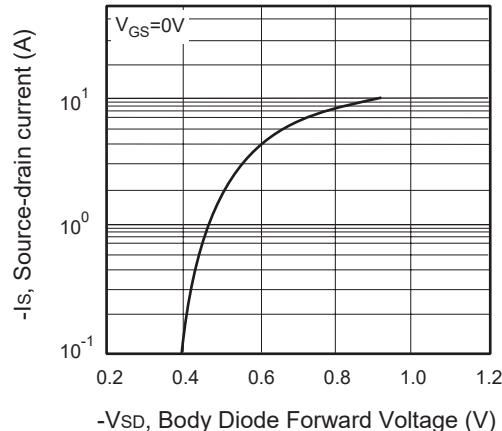


Figure 6. Body Diode Forward Voltage Variation with Source Current

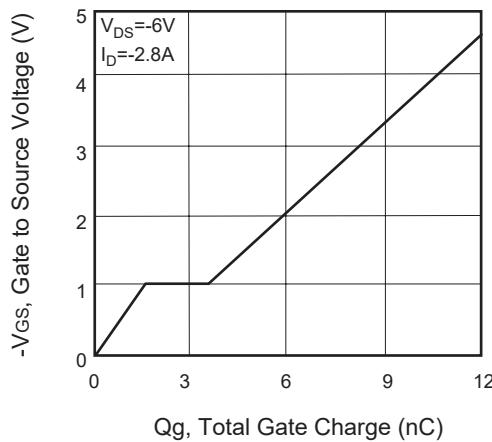


Figure 7. Gate Charge

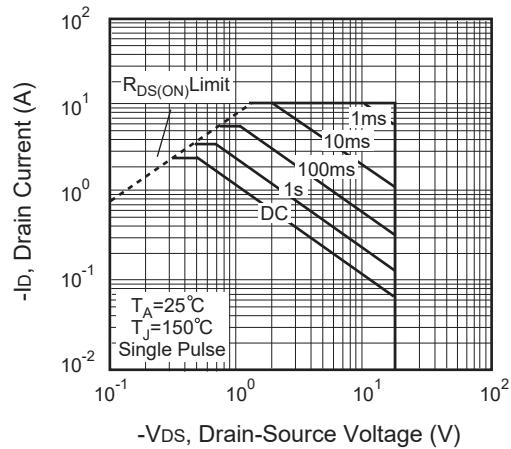


Figure 8. Maximum Safe  
Operating Area

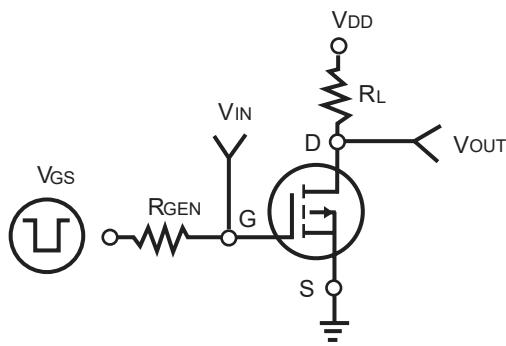


Figure 9. Switching Test Circuit

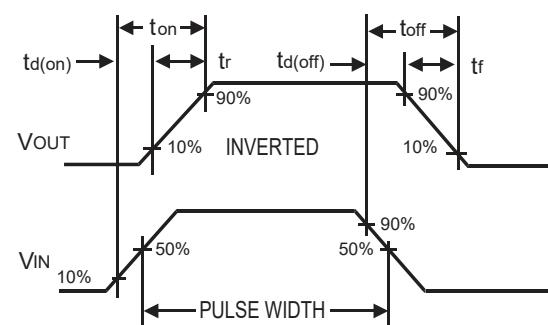


Figure 10. Switching Waveforms

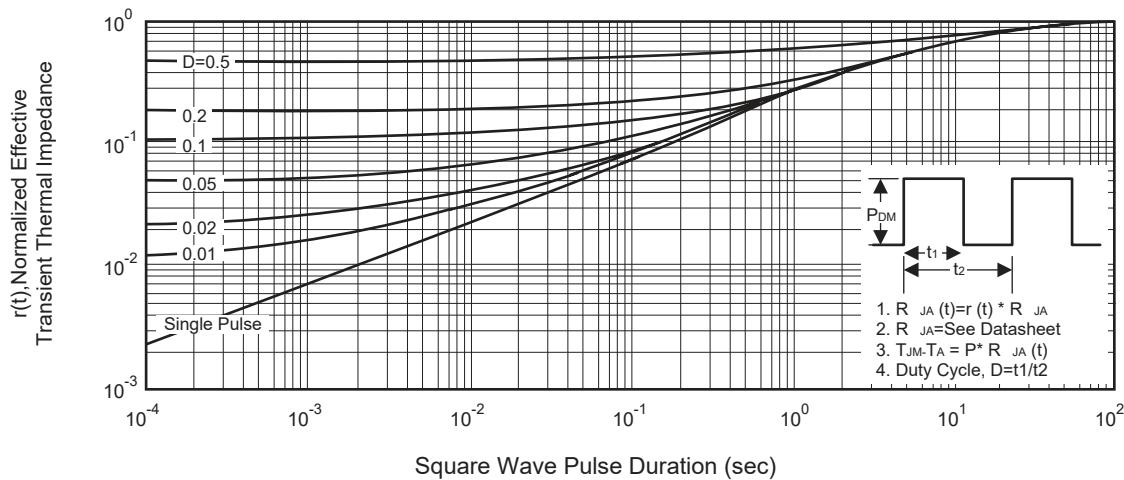
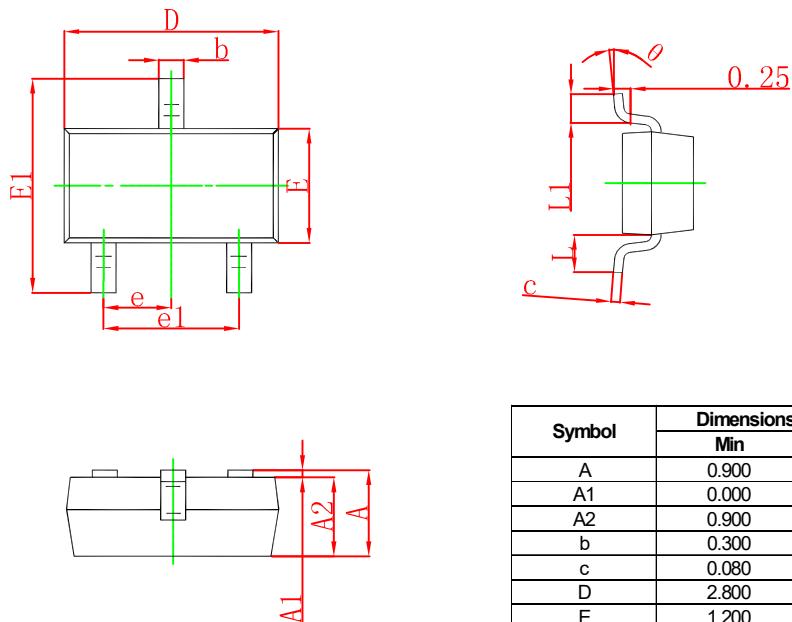


Figure 11. Normalized Thermal Transient Impedance Curve

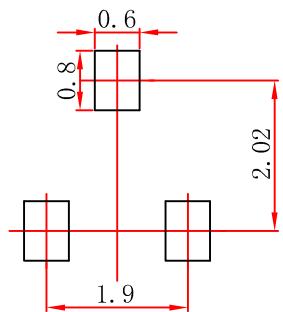


## SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

## SOT-23 Suggested Pad Layout



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



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