



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.

General Features

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

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

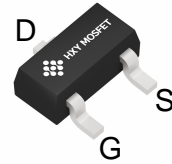
$R_{DS(ON)} < 120m\ \Omega$ @ $V_{GS} = -2.5V$

Application

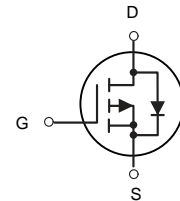
Battery protection

Load switch

Uninterruptible power supply



SOT-23



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

Notes :

- a. Repetitive Rating : Pulse width limited by maximum junction temperature.
b. Surface Mounted on FR4 Board, $t < 5\text{ sec}$.
c. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
d. Guaranteed by design, not subject to production testing.



Typical Characteristics

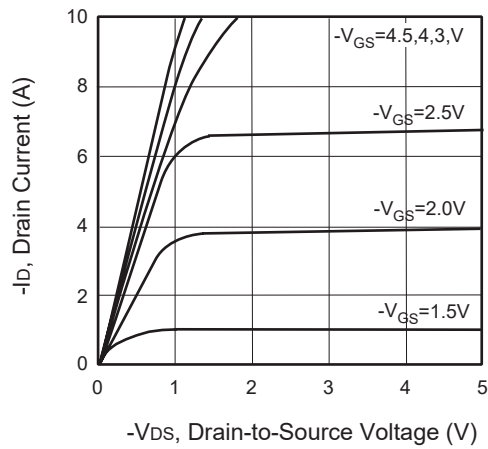


Figure 1. Output Characteristics

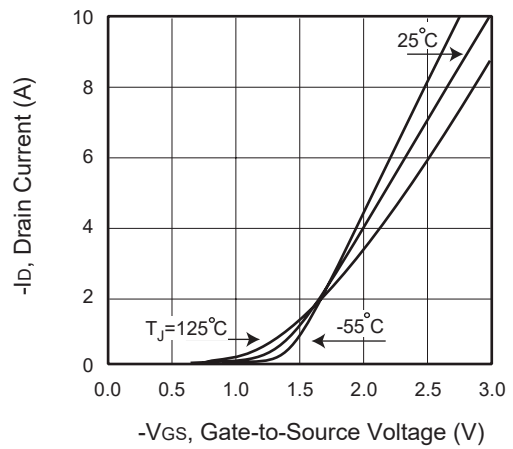


Figure 2. Transfer Characteristics

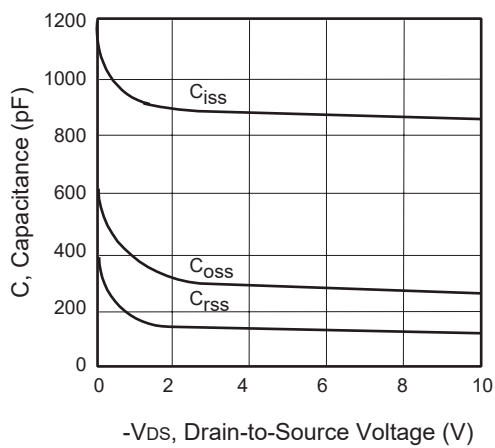


Figure 3. Capacitance

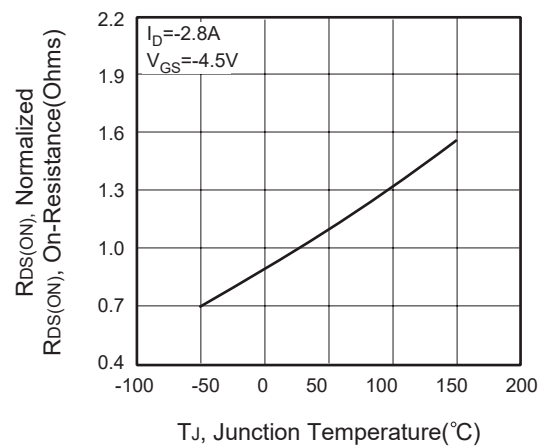


Figure 4. On-Resistance Variation with Temperature

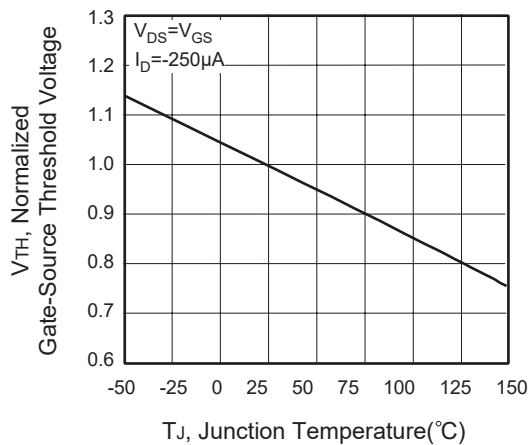


Figure 5. Gate Threshold Variation with Temperature

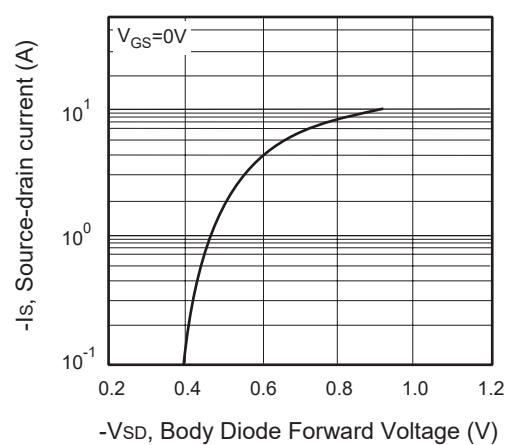


Figure 6. Body Diode Forward Voltage Variation with Source Current

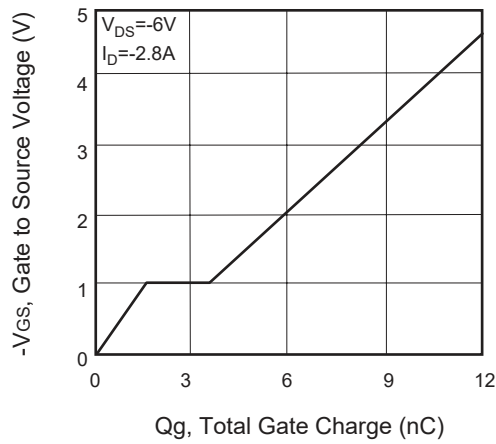


Figure 7. Gate Charge

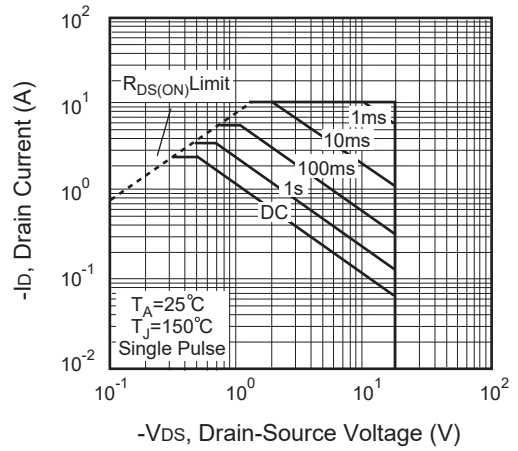


Figure 8. Maximum Safe Operating Area

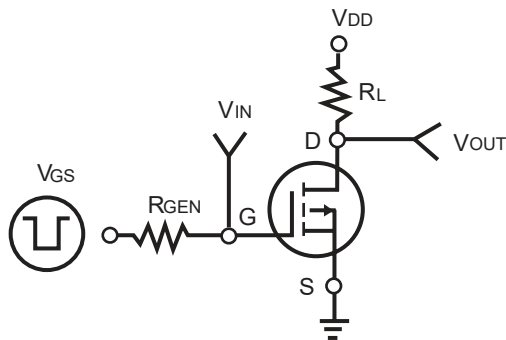


Figure 9. Switching Test Circuit

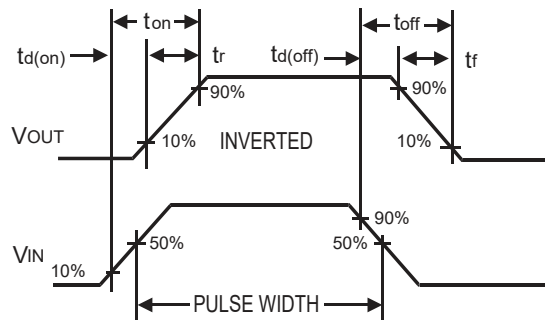


Figure 10. Switching Waveforms

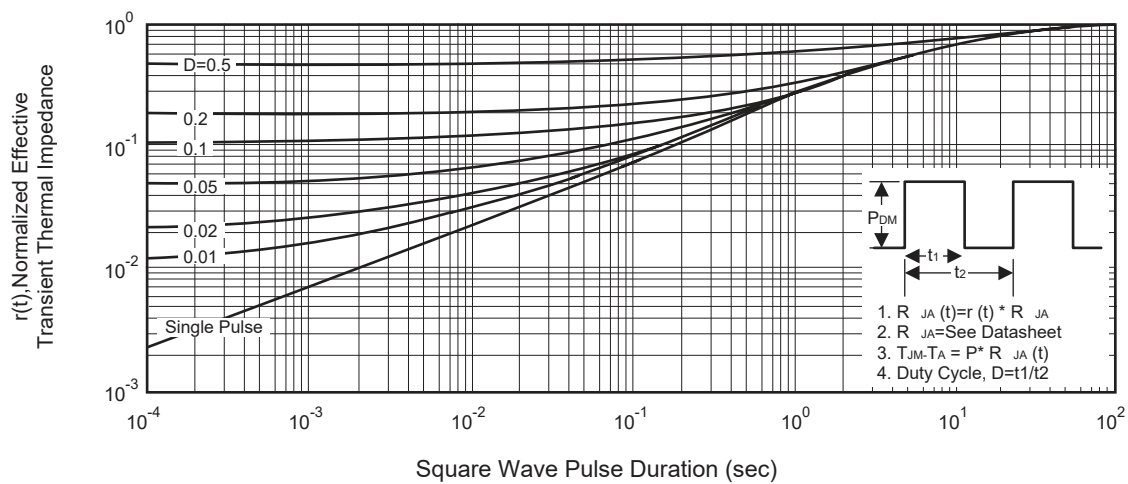
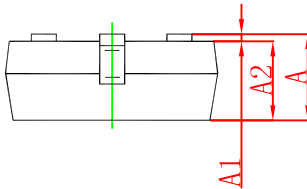
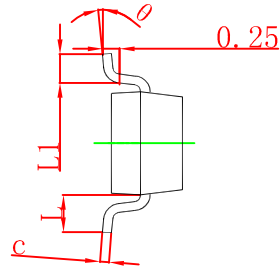
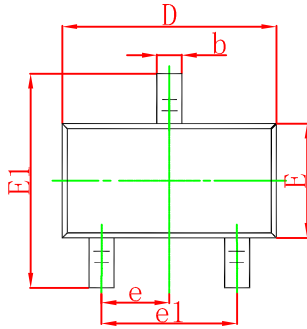


Figure 11. Normalized Thermal Transient Impedance Curve

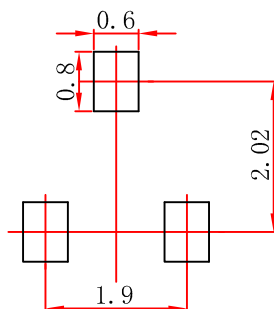


SOT-23 Package Outline Dimensions



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: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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