



## Description

The HXY30P20BF uses advanced trench technology to provide excellent  $R_{DS(ON)}$ . This device is suitable for use as a load switch or in PWM applications.

## General Features

$V_{DS} = -30V, I_D = -20A$

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

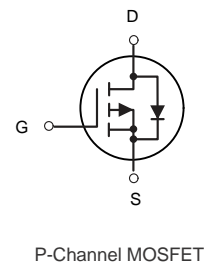
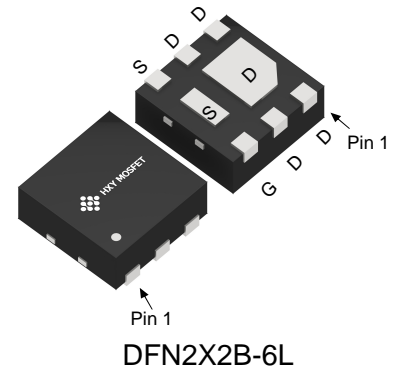
$R_{DS(ON)} < 27m\Omega @ V_{GS} = -5V$

## Application

Battery protection

Load switch

Uninterruptible power supply



## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXY30P20BF	DFN2X2B-6L	HXY MOSFET	5000

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	-30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C = 25^\circ C$	Drain Current-Continuous	-20	A
$I_D @ T_C = 100^\circ C$	Drain Current-Continuous	-16	A
$I_{DM}$	Drain Current-Pulsed	-100	A
ESA	Single Pulse Avalanche Energy	45	MJ
IAS	Avalanche Current	-20	A
$P_D @ T_C = 25^\circ C$	Maximum Power Dissipation	9.5	W
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	4.2	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	°C
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	68	°C/W



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA	-30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -30V, V <sub>GS</sub> =0V,	-	-	-1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.6	-2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance Note3	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A	-	13	16	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A	-	18	27	
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V, V <sub>GS</sub> =0V, f=1.0MHz	-	1330	-	pF
C <sub>oss</sub>	Output Capacitance		-	183	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	156	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -15V, I <sub>D</sub> = -5A, V <sub>GS</sub> = -10V	-	22	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.0	-	nC
Q <sub>gd</sub>	Gate-Drain(“Miller”) Charge		-	1.8	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -15V, I <sub>D</sub> = -10A, V <sub>GS</sub> =-10V, R <sub>GEN</sub> =2.5Ω	-	9	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	13	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	48	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	20	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-20	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-80	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -15A	-	-0.8	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C,	-	64	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	V <sub>DD</sub> = -24V, I <sub>F</sub> =-2.8A, dI/dt=-100A/μs	-	25	-	nC

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

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

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



## Typical Performance Characteristics

Figure1: Output Characteristics

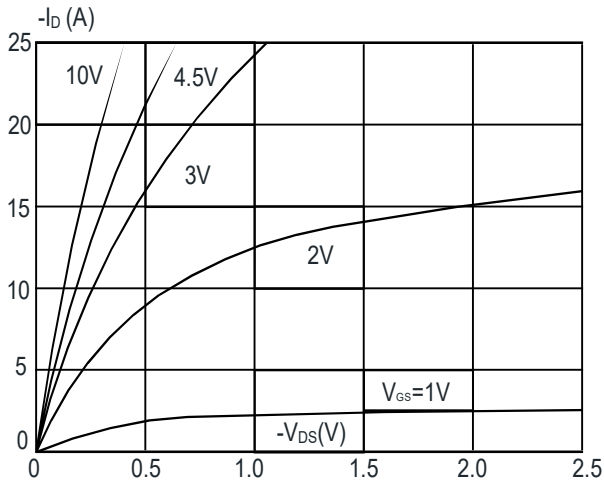


Figure 2: Typical Transfer Characteristics

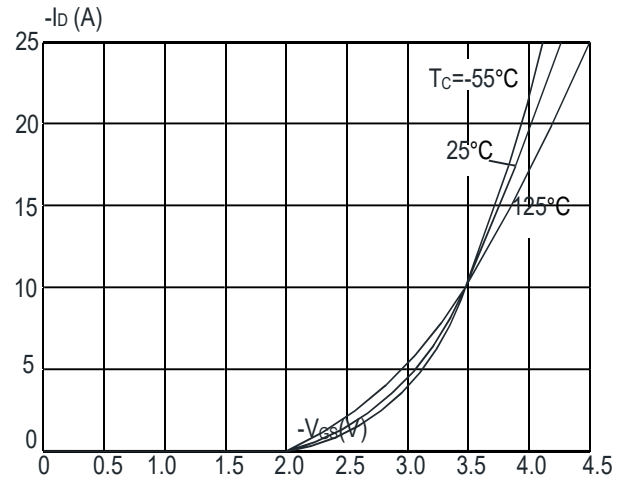


Figure 3: On resistance vs Drain Current

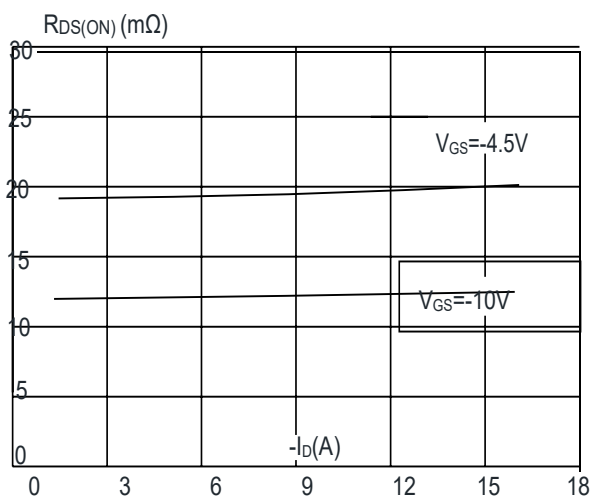


Figure 4 : Body Diode Characteristics

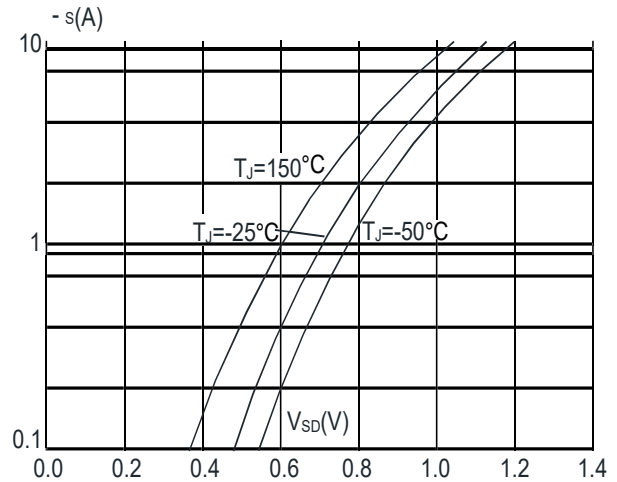


Figure 5: Gate Charge Characteristics

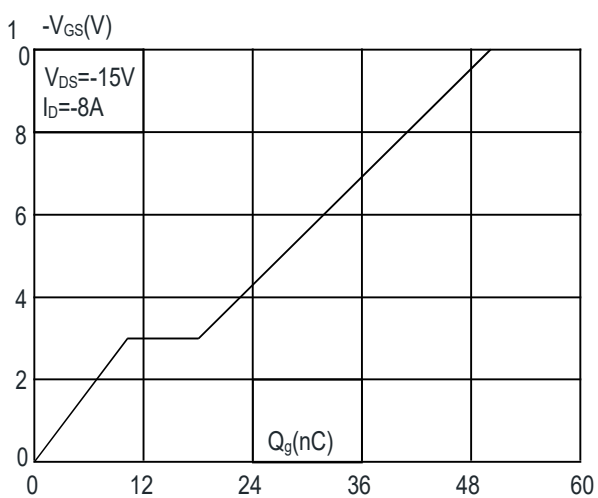
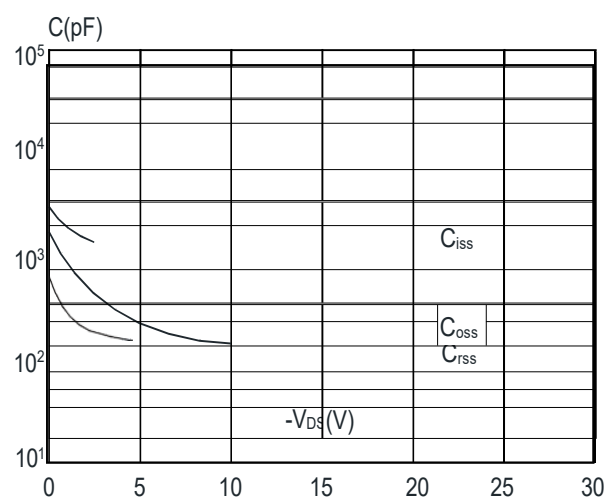
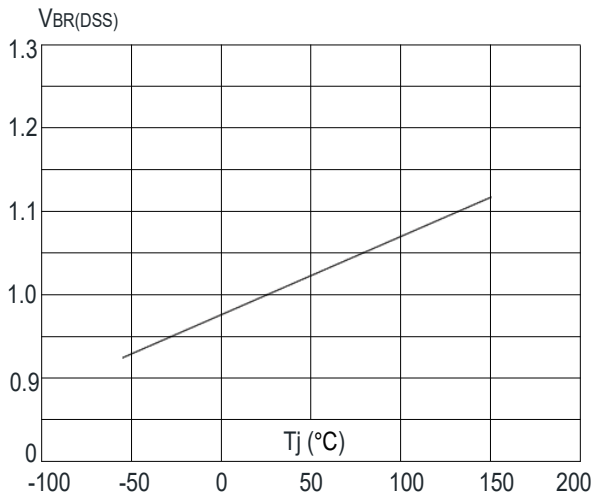


Figure 6: Capacitance Characteristics

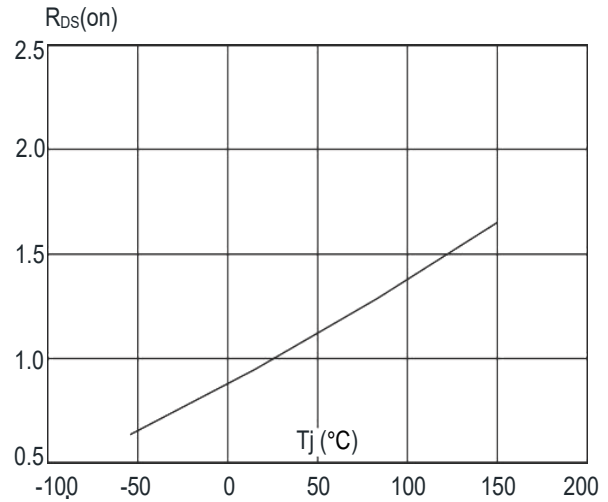




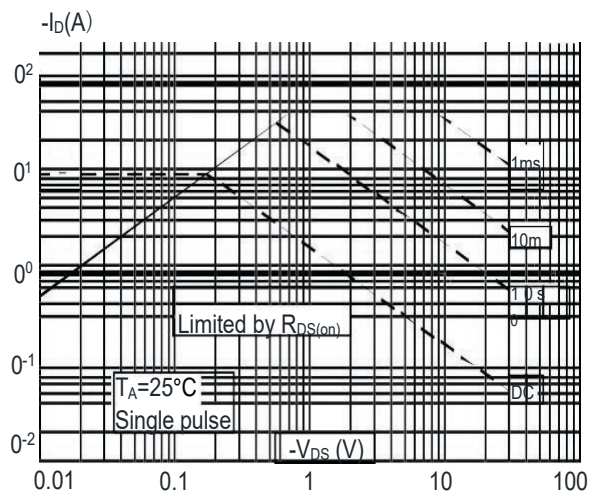
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



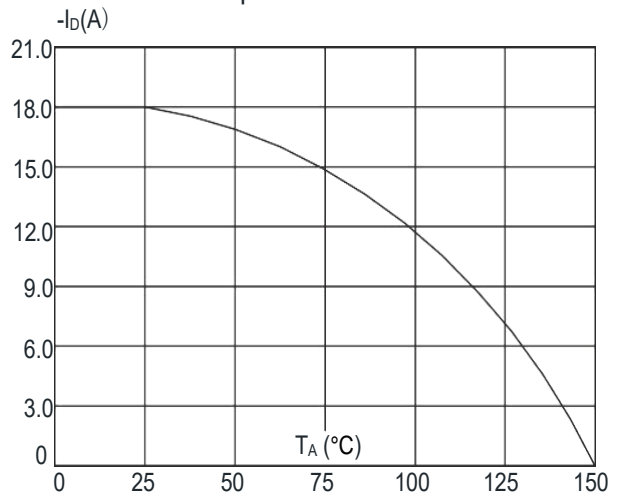
**Figure 8:** Normalized on Resistance vs. Junction Temperature



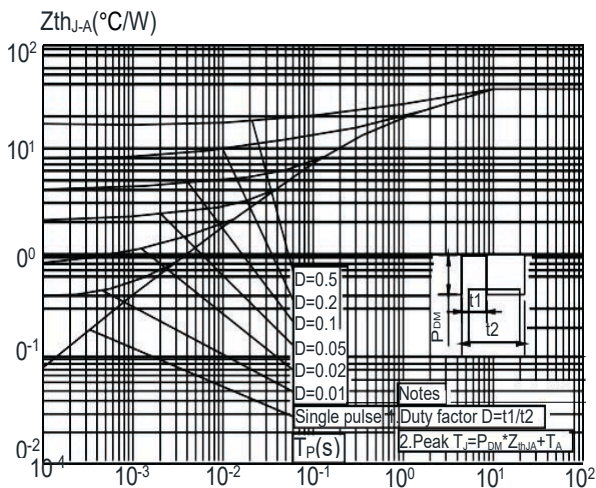
**Figure 9:** Maximum Safe Operating Area



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



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





## Test Circuit

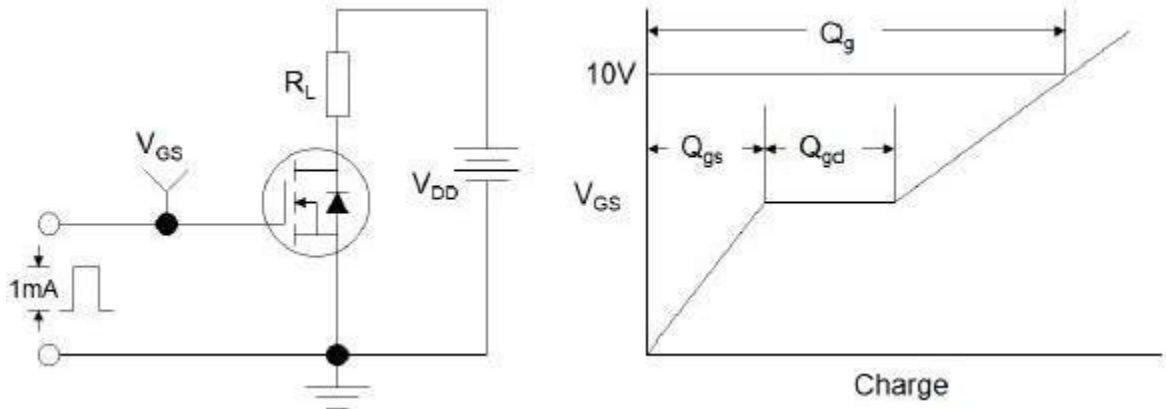


Figure1:Gate Charge Test Circuit & Waveform

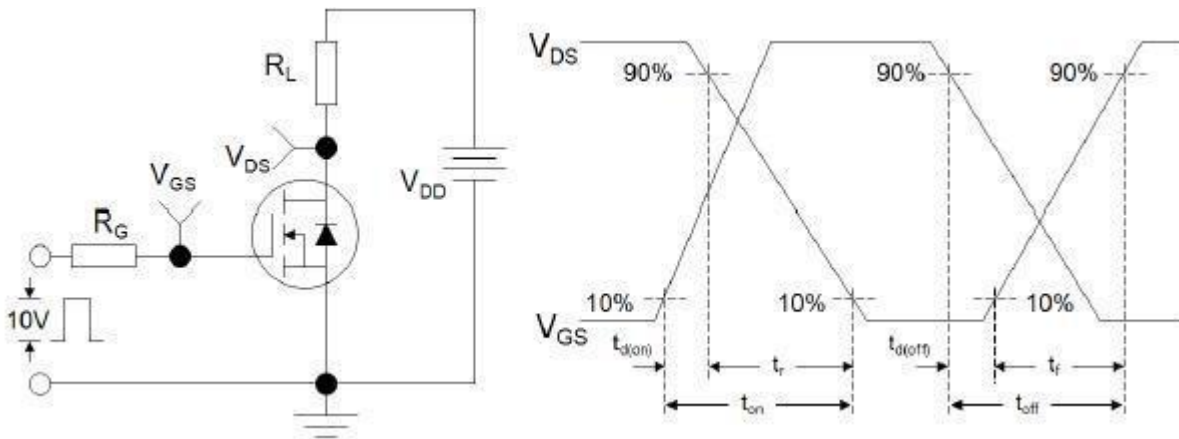


Figure 2: Resistive Switching Test Circuit & Waveforms

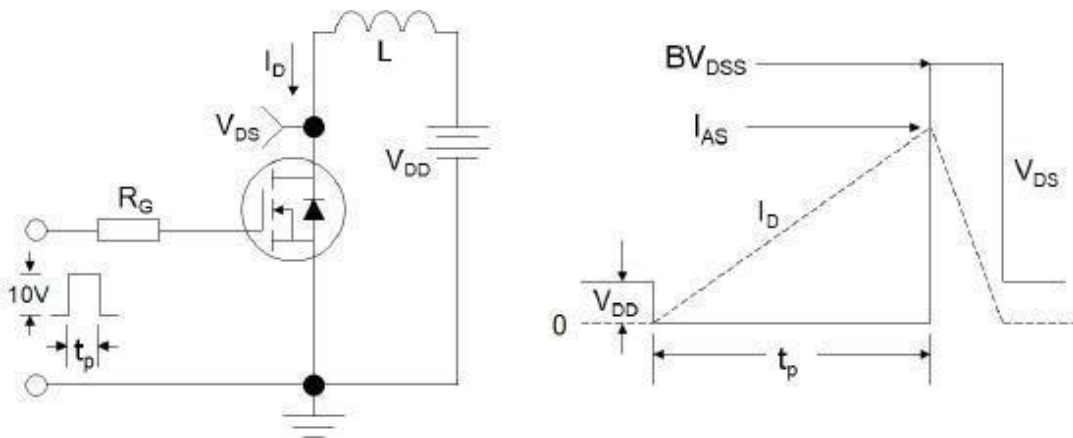
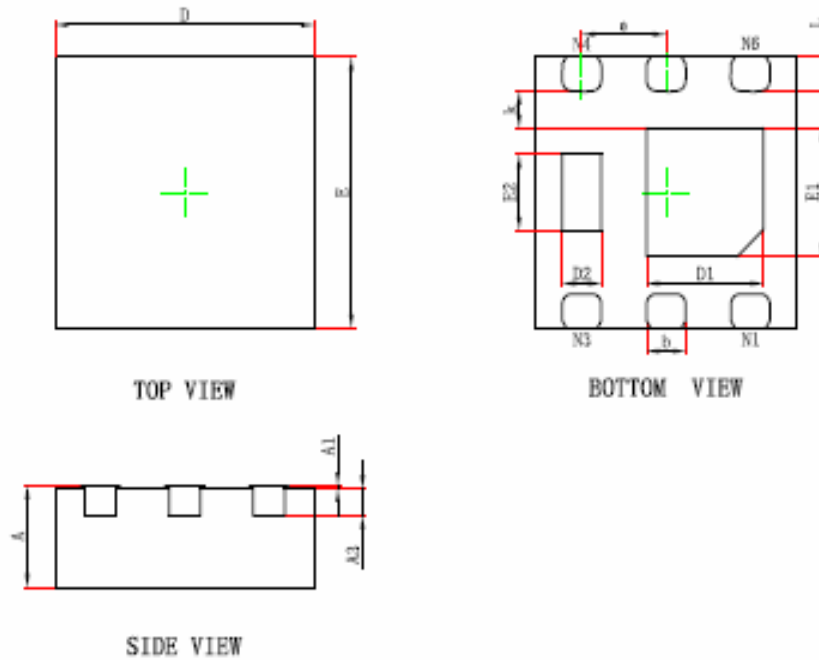


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



DFN2X2B-6L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.076	0.082
E	1.924	2.076	0.076	0.082
D1	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
k	0.200MIN.		0.008MIN.	
b	0.250	0.350	0.010	0.014
e	0.650TYP.		0.026TYP.	
L	0.174	0.326	0.007	0.013



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