



Description

The HSiSH101DN uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = -30V$ $I_D = -70A$

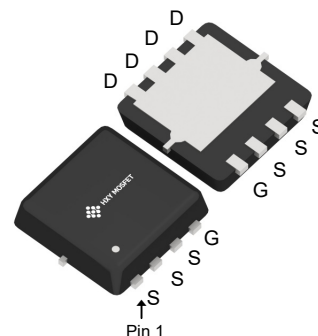
$R_{DS(ON)} < 9.3m\Omega$ @ $V_{GS} = -10V$

Application

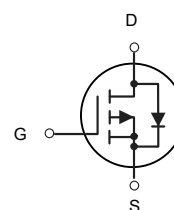
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L



P-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HSiSH101DN	DFN3X3-8L	HXY MOSFET	5000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-30	V
VGS	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	-70	A
$I_D@T_C=75^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	-35	A
IDM	Pulsed Drain Current ²	-175	A
EAS	Single Pulse Avalanche Energy ³	31	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	31.2	W
TSTG	Storage Temperature Range	-55 to 150	$^{\circ}C$
TJ	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
R θ JC	Thermal Resistance Junction-Case ¹	4	$^{\circ}C/W$



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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	V
Gate-body Leakage current		I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^{\circ}C$	I_{DSS}	$V_{DS} = -24V, V_{GS} = 0V$	-	-	-1	μA
	$T_J=55^{\circ}C$			-	-	-5	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance ²		$R_{DS(on)}$	$V_{GS} = -10V, I_D = -12A$	-	6.5	9.3	mΩ
			$V_{GS} = -4.5V, I_D = -8A$	-	9.5	14.5	
Forward Transconductance		g_{fs}	$V_{DS} = -5V, I_D = -20A$	-	28	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	$V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$	-	4320	-	pF
Output Capacitance		C_{oss}		-	529	-	
Reverse Transfer Capacitance		C_{rss}		-	487	-	
Switching Characteristics							
Gate Resistance		R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	-	4.0	-	Ω
Total Gate Charge		Q_g	$V_{GS} = -10V, V_{DS} = -15V, I_D = -15A$	-	45	-	nC
Gate-Source Charge		Q_{gs}		-	8.5	-	
Gate-Drain Charge		Q_{gd}		-	12.8	-	
Turn-On Delay Time		$t_{d(on)}$	$V_{GS} = -10V, V_{DD} = -15V, R_G = 2.5\Omega, I_D = -15A$	-	18.9	-	nS
Rise Time		t_r		-	15.7	-	
Turn-Off Delay Time		$t_{d(off)}$		-	64.8	-	
Fall Time		t_f		-	36.5	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ²		V_{SD}	$I_S = -1A, V_{GS} = 0V$	-	-	-1	V
Continuous Source Current ^{1,5}		I_S	$V_G = V_D = 0V$, Force Current	-	-	-65	A

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD} = -25V, V_{GS} = -10V, L = 0.1mH, I_{AS} = -25A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Characteristics

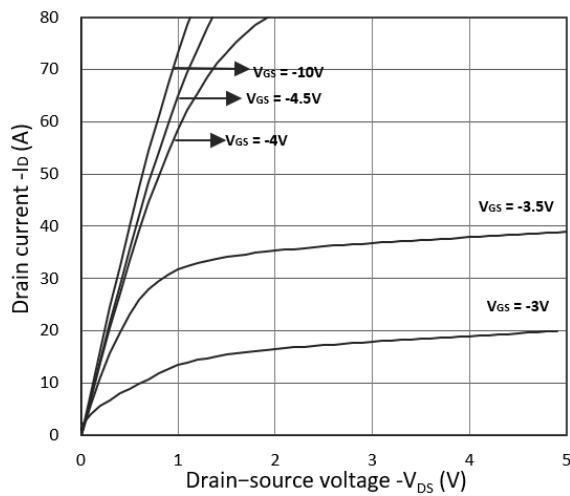


Figure 1. Output Characteristics

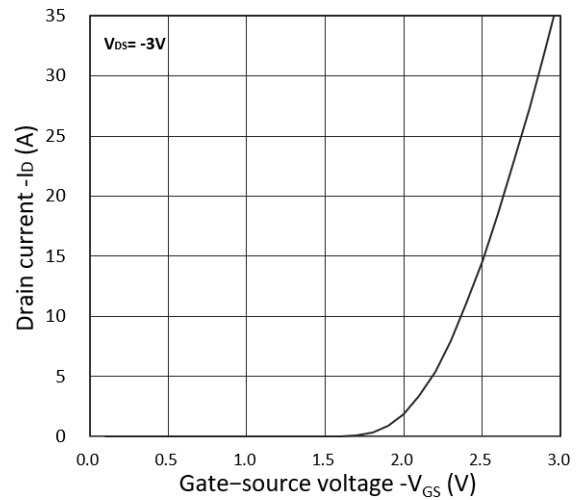


Figure 2. Transfer Characteristics

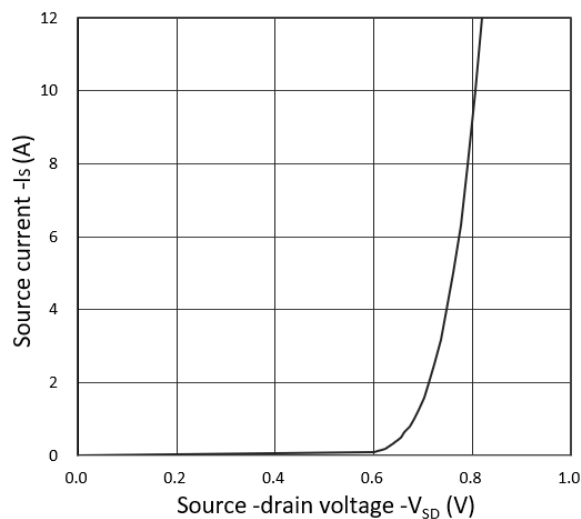


Figure 3. Forward Characteristics of Reverse

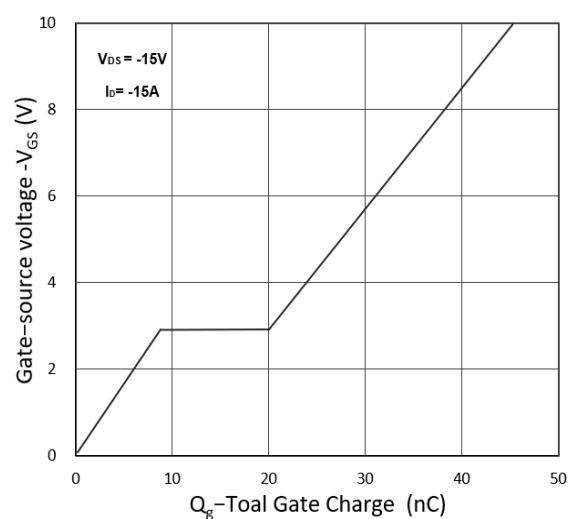


Figure 4. Gate Charge Characteristics

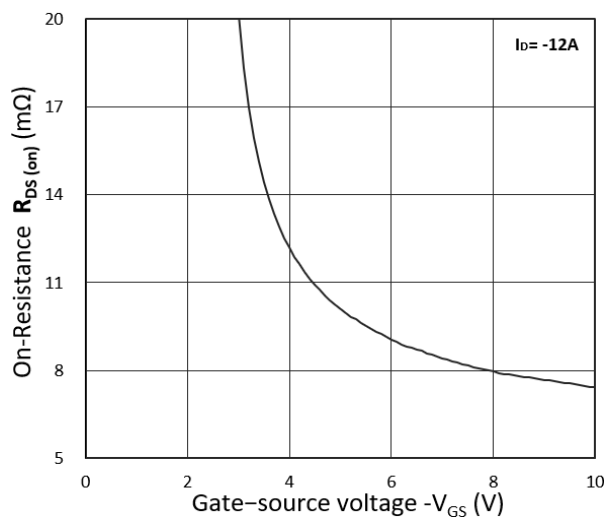


Figure 5. $R_{DS(on)}$ vs. V_{GS}

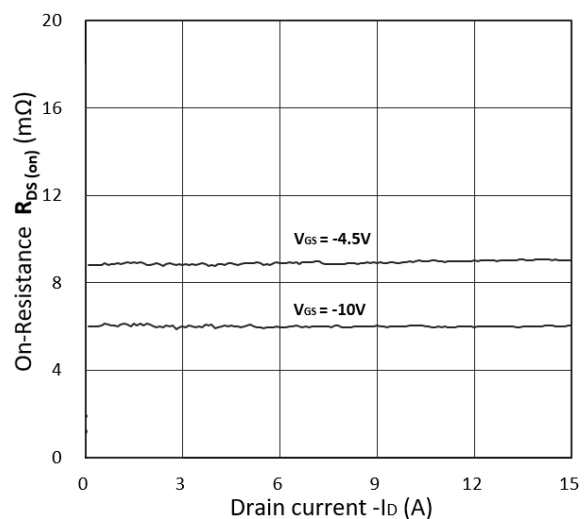


Figure 6. $R_{DS(on)}$ vs. I_D

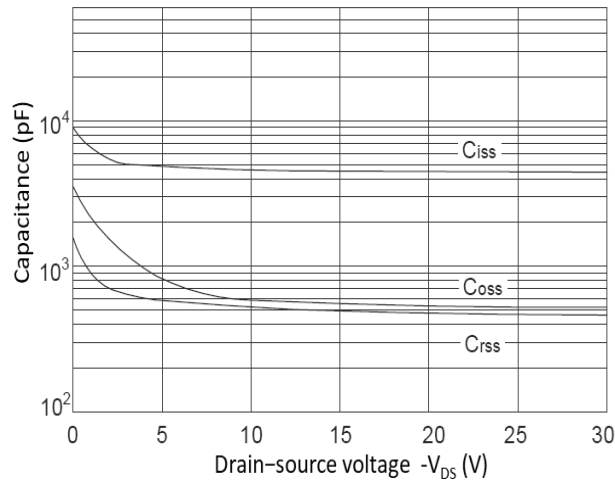


Figure 7. Capacitance Characteristics

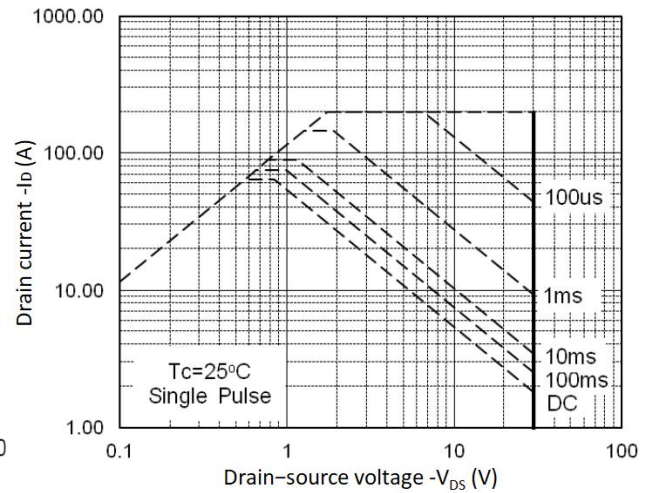


Figure 8. Safe Operating Area

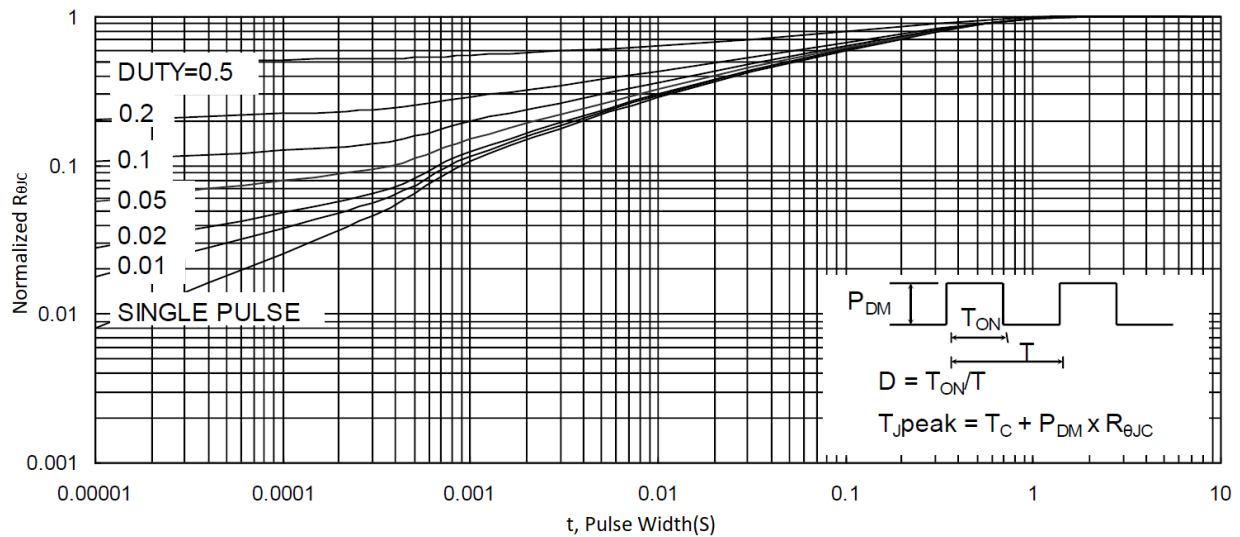


Figure 9. Normalized Maximum Transient Thermal Impedance

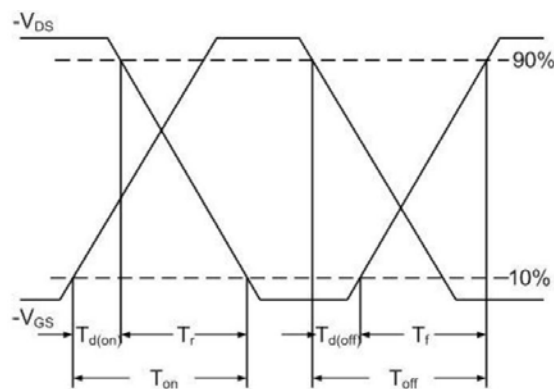


Figure 10. Switching Time Waveform

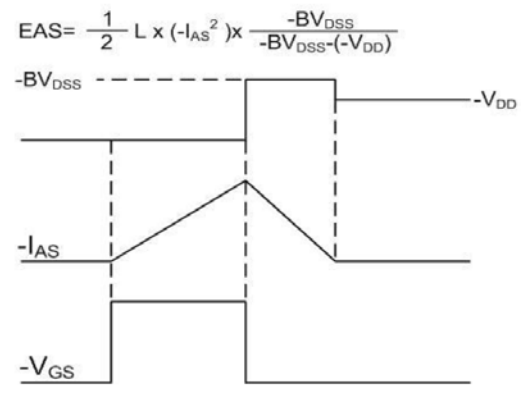
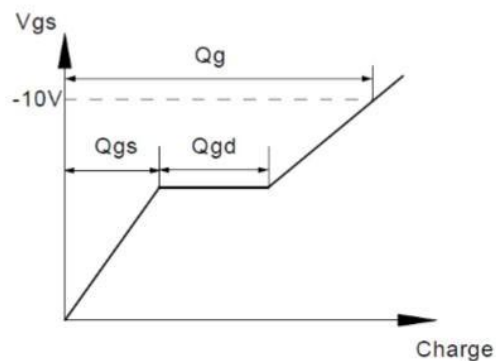
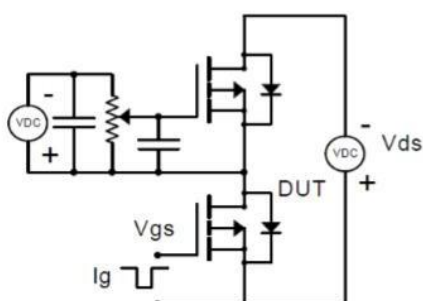


Figure 11. Unclamped Inductive Switching
Waveform

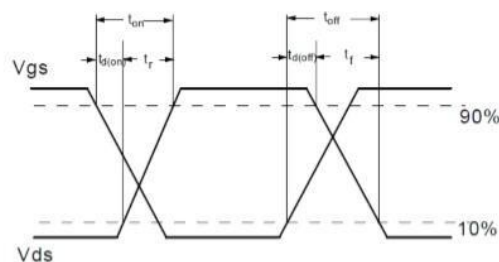
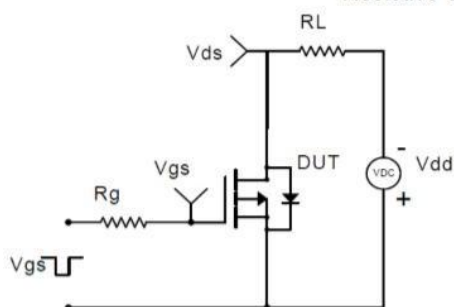


Test Circuit

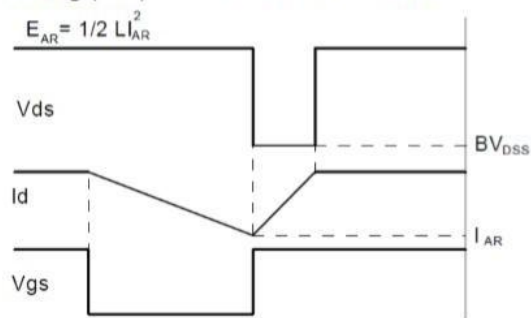
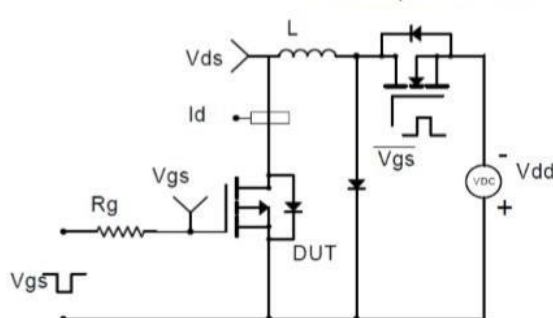
Gate Charge Test Circuit & Waveform



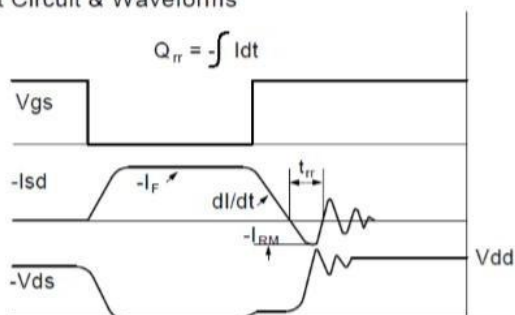
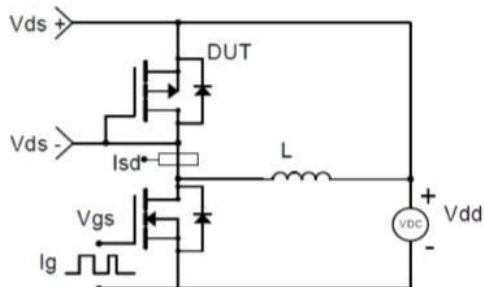
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms





DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°



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