



Description

The SIS412DN-T1-GE3 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

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

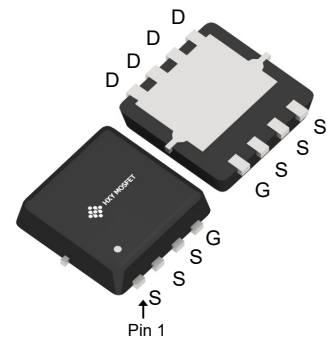
$R_{DS(ON)} < 20m\Omega$ @ $V_{GS}=10V$

Application

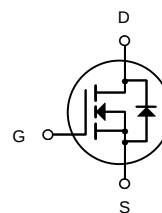
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L
(PowerPAK1212-8)



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SIS412DN-T1-GE3	DFN3X3-8L (PowerPAK1212-8)	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	20	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	8	A
I_{DM}	Pulsed Drain Current ²	38	A
EAS	Single Pulse Avalanche Energy ³	28	mJ
IAS	Avalanche Current	13.8	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	5.5	W
TSTG	Storage Temperature Range	-55 to 175	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	36	$^{\circ}C/W$



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} = 0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =5A	-	15	20	mΩ
		V _{GS} =4.5V, I _D =3A	-	21	29	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	490	-	pF
C _{oss}	Output Capacitance		-	79	-	pF
C _{rss}	Reverse Transfer Capacitance		-	61	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =5.8A, V _{GS} =10V	-	10	-	nC
Q _{gs}	Gate-Source Charge		-	1.7	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	2.5	-	nC
t _{d(on)}	Turn-on Delay Time	V _{DS} =15V, I _D =3A, V _{GS} =10V, R _{REN} =3Ω	-	6	-	ns
t _r	Turn-on Rise Time		-	15	-	ns
t _{d(off)}	Turn-off Delay Time		-	17	-	ns
t _f	Turn-off Fall Time		-	17	-	ns
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} =0V, I _S =9A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I _F =5A, dI/dt=100A/μs	-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	2	-	nC

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

2. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=6A$

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



Typical Performance Characteristics

Figure1: Output Characteristics

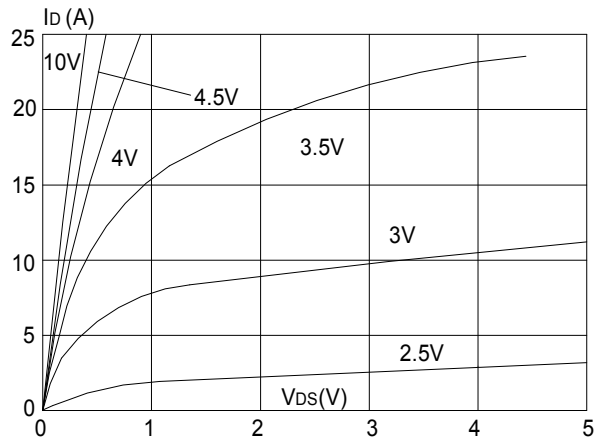


Figure 2: Typical Transfer Characteristics

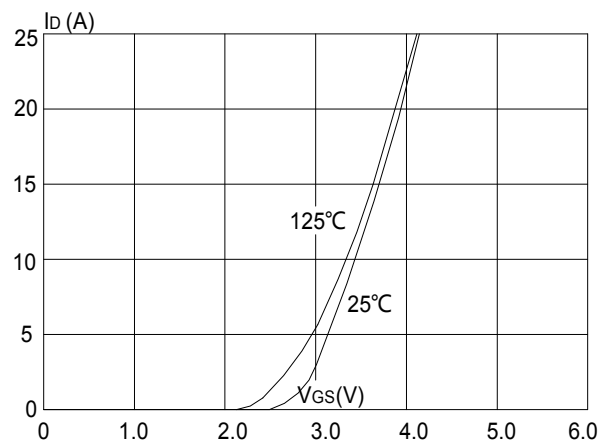


Figure 3: On-resistance vs. Drain Current

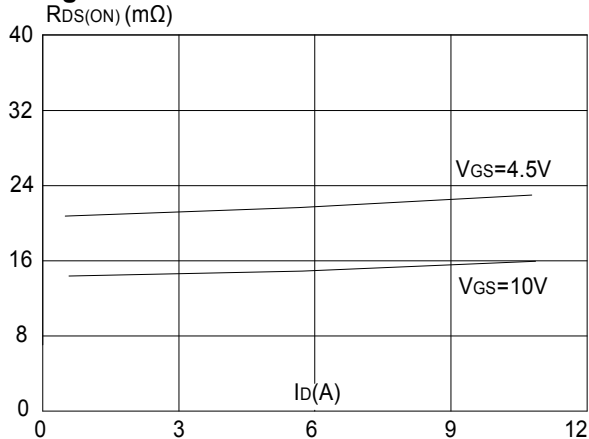


Figure 4: Body Diode Characteristics

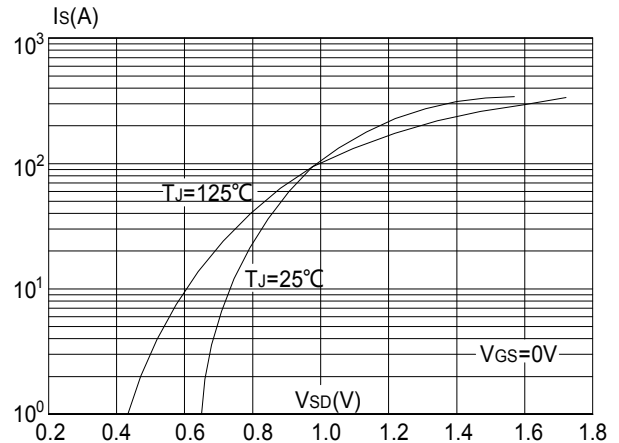


Figure 5: Gate Charge Characteristics

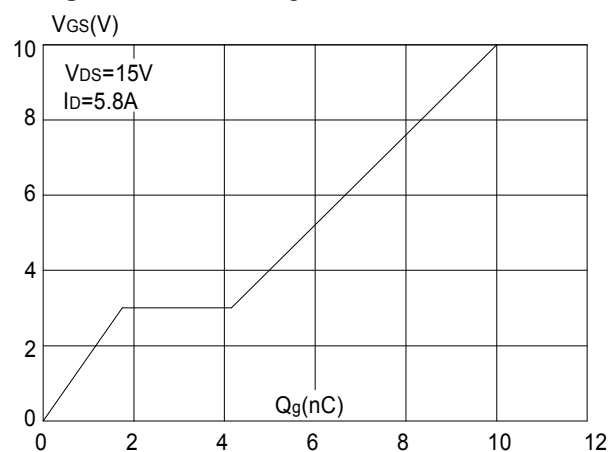


Figure 6: Capacitance Characteristics

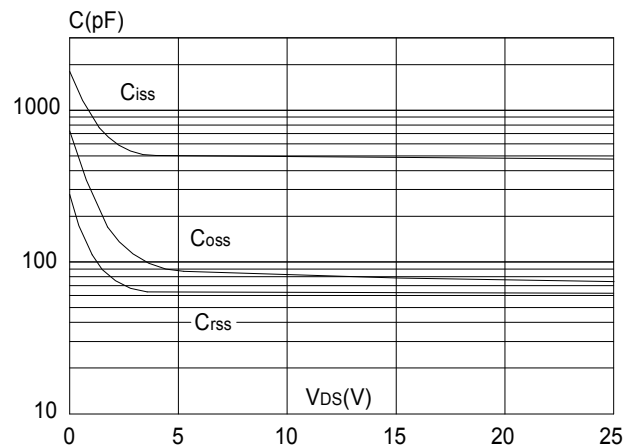




Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

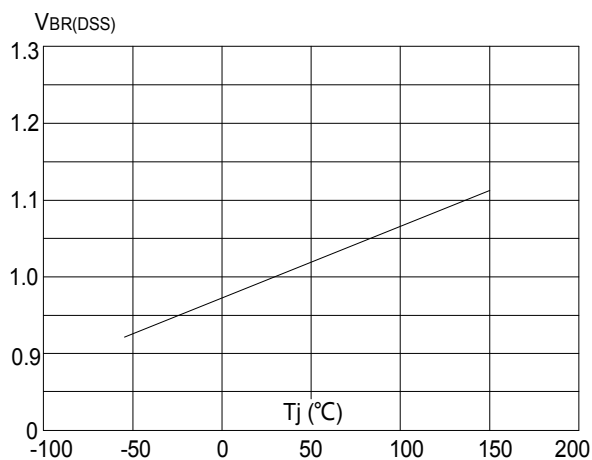


Figure 8: Normalized on Resistance vs. Junction Temperature

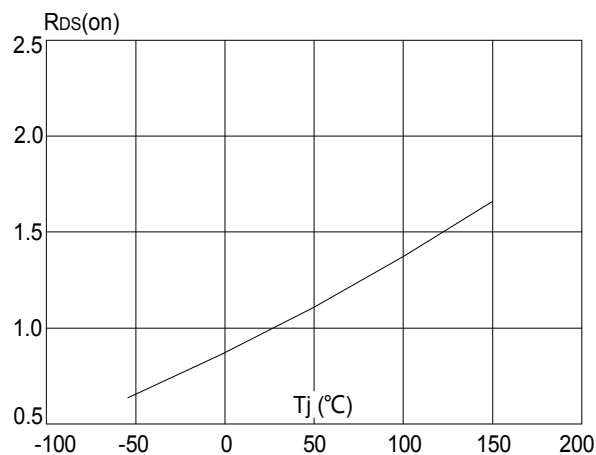


Figure 9: Maximum Safe Operating Area

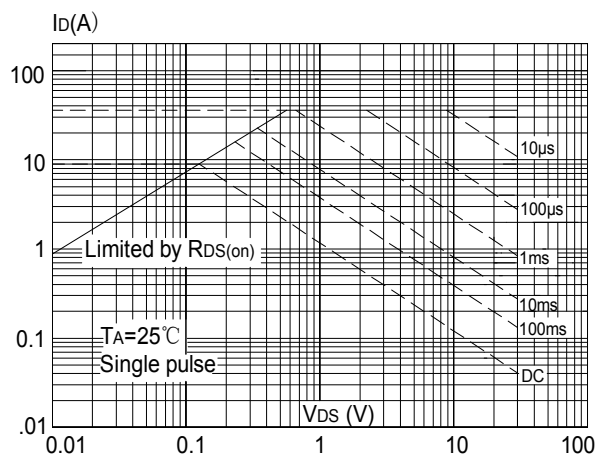


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

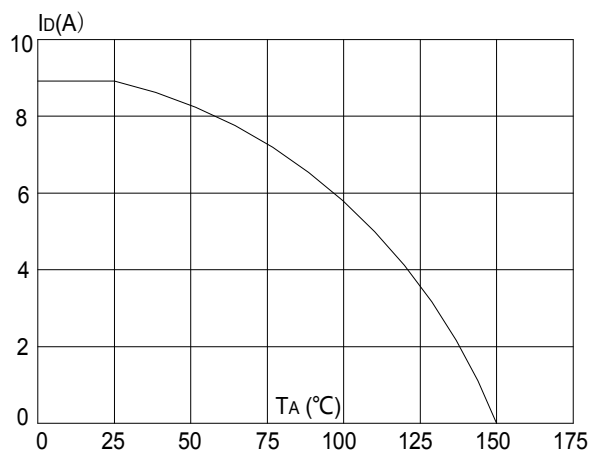
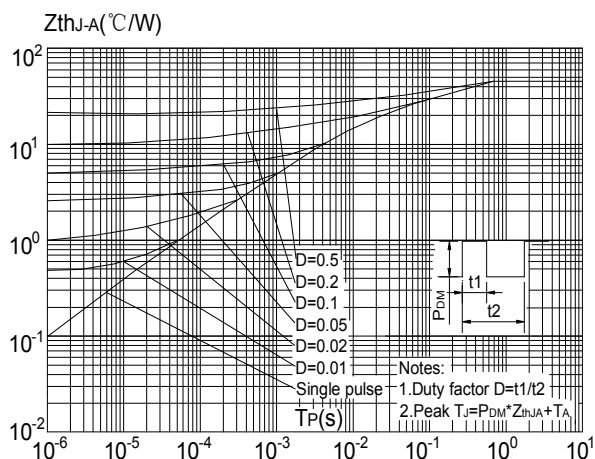


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





Test Circuit

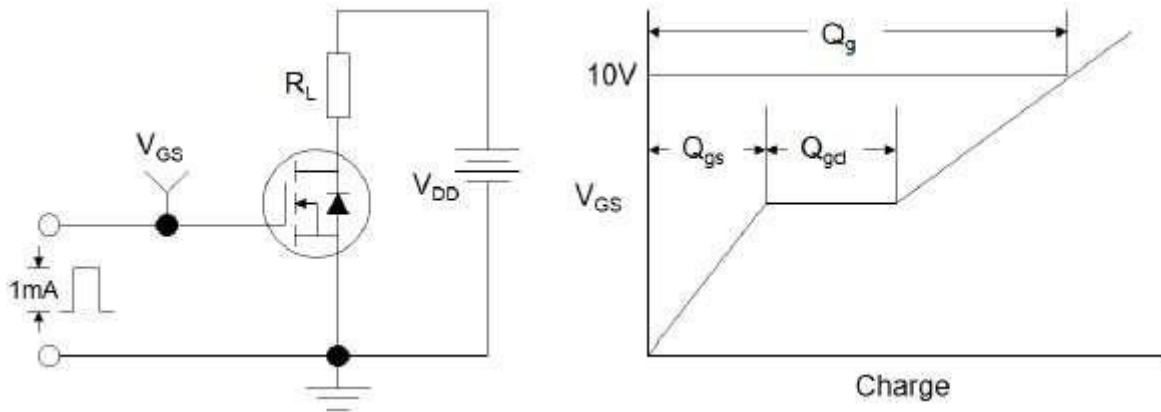


Figure1:Gate Charge Test Circuit & Waveform

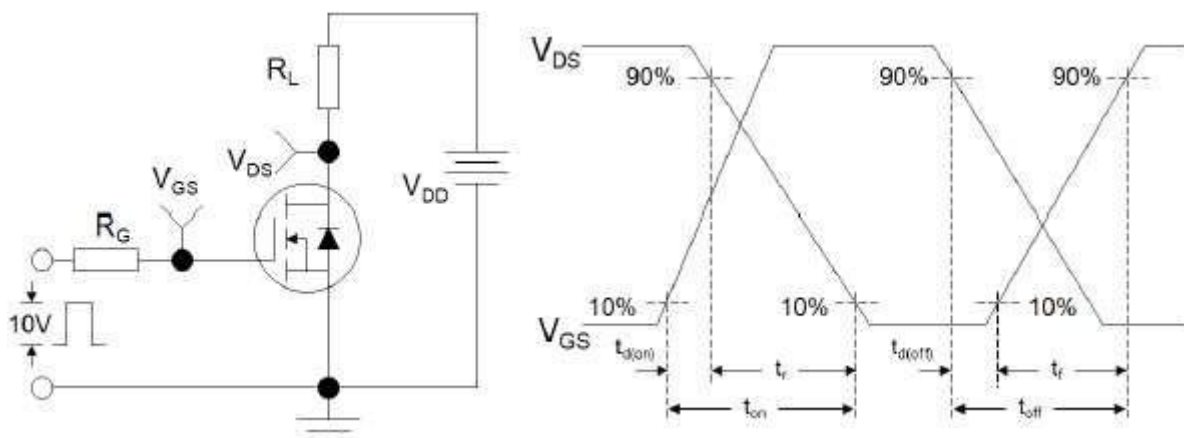


Figure 2: Resistive Switching Test Circuit & Waveforms

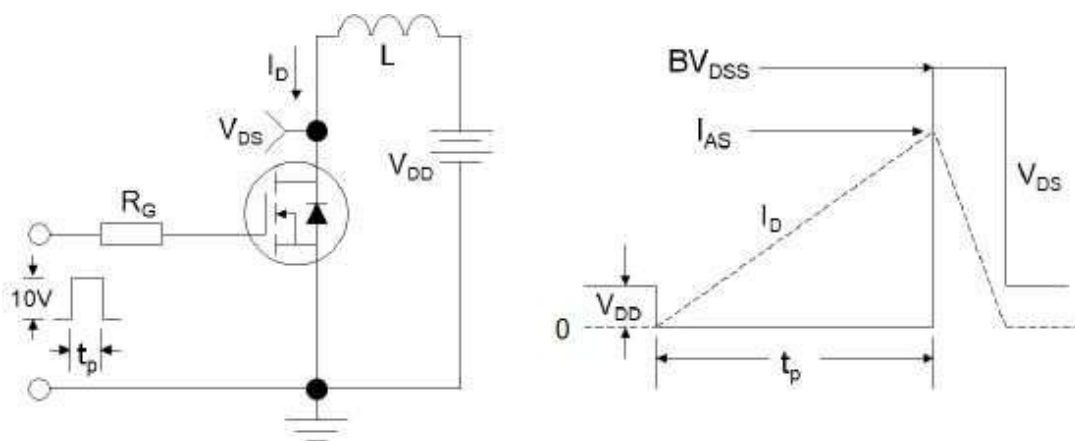


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



DFN3X3-8L(PowerPAK1212-8) 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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