



Description

The SIRA12DP-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

$V_{DS} = 30\text{ V}$ $I_D = 120\text{ A}$

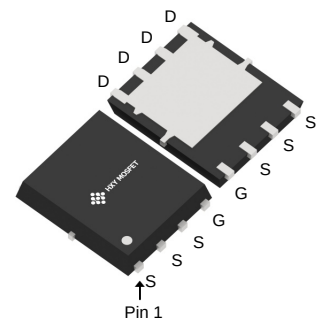
$R_{DS(ON)} < 4.4\text{ m}\Omega$ $V_{GS} = 10\text{ V}$

Application

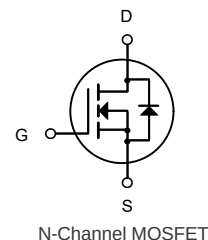
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L
(PowerPAK-SO-8)



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SIRA12DP-T1-GE3	DFN5X6-8L (PowerPAK-SO-8)	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{1,6}$	120	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{1,6}$	66	A
I_{DM}	Pulsed Drain Current ²	320	A
EAS	Single Pulse Avalanche Energy ³	180	mJ
I_{AS}	Avalanche Current	60	A
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation ⁴	187	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.1	$^\circ\text{C/W}$



Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	---	---	V
∂BV _{DSS} /∂T _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.014	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	---	3.5	4.4	mΩ
		V _{GS} =4.5V, I _D =15A	---	4.6	5.8	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	---	2.5	V
∂V _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =30A	---	50	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	1.7	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =10V, I _D =15A	---	56.9	---	nC
Q _{gs}	Gate-Source Charge		---	13.8	---	
Q _{gd}	Gate-Drain Charge		---	23.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	---	20.1	---	ns
T _r	Rise Time		---	6.3	---	
T _{d(off)}	Turn-Off Delay Time		---	124.6	---	
T _f	Fall Time		---	15.8	---	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	4345	---	pF
C _{oss}	Output Capacitance		---	340	---	
C _{rss}	Reverse Transfer Capacitance		---	225	---	
I _s	Continuous Source Current ^{1,6}	V _G =V _D =0V, Force Current	---	---	85	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _s =1A, T _J =25°C	---	---	1.2	V



Typical Characteristics

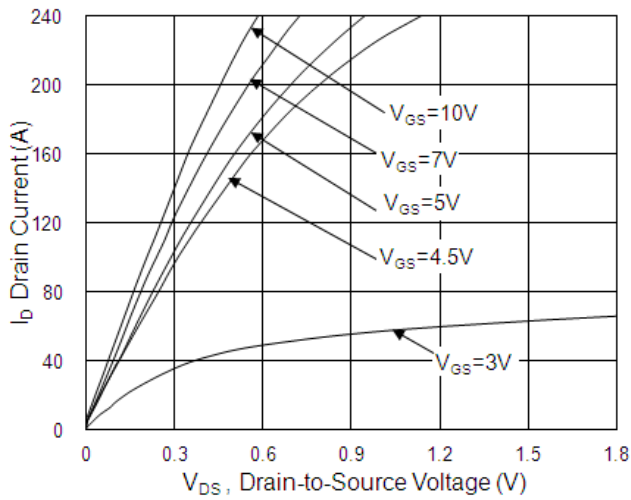


Fig.1 Typical Output Characteristics

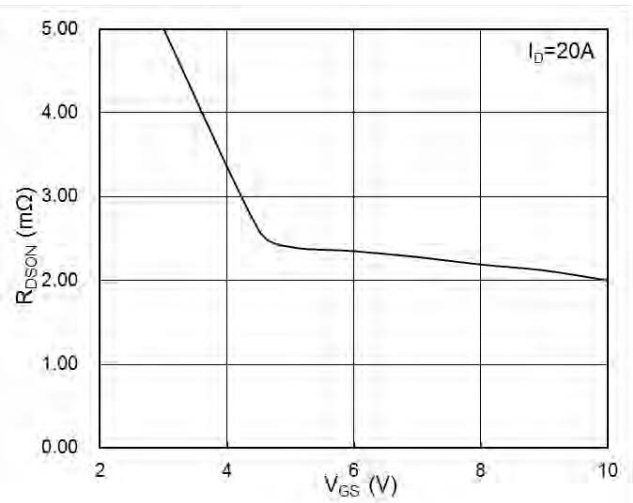


Fig.2 On-Resistance v.s Gate-Source

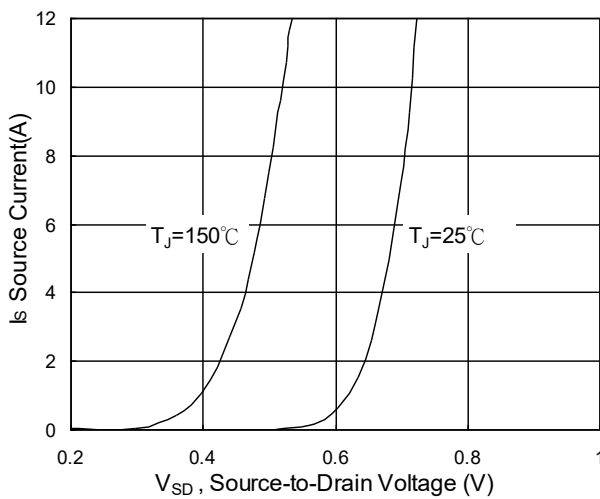


Fig.3 Forward Characteristics of Reverse

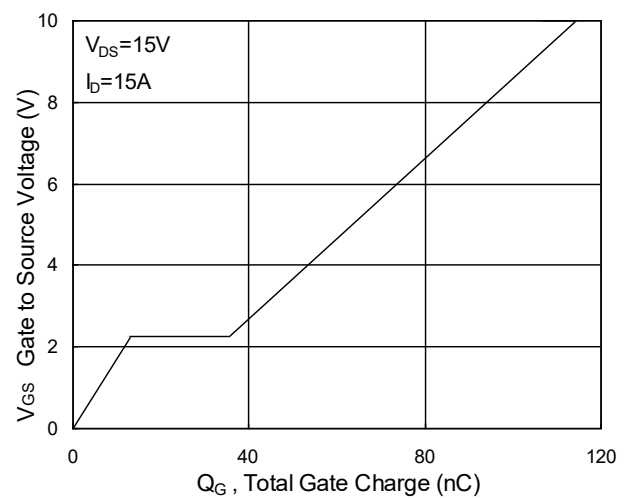


Fig.4 Gate-Charge Characteristics

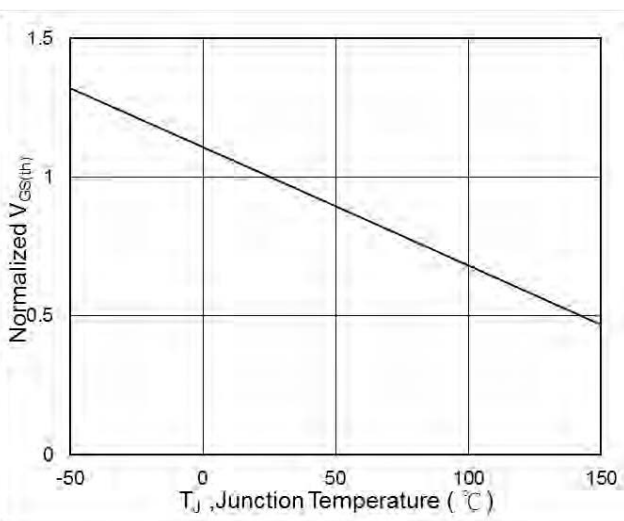


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

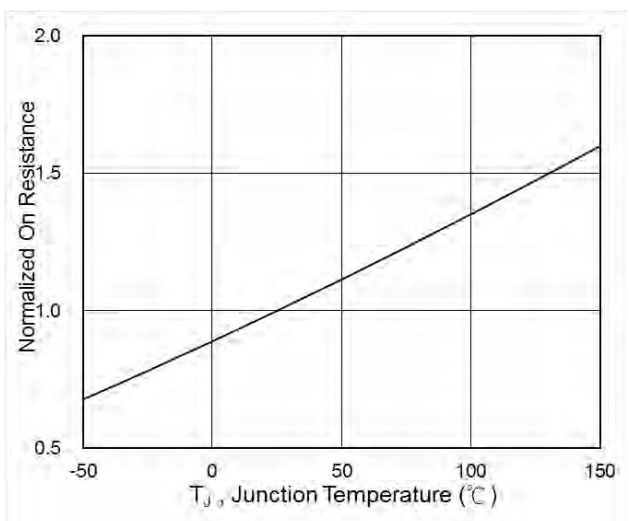


Fig.6 Normalized $R_{DS(on)}$ v.s T_J

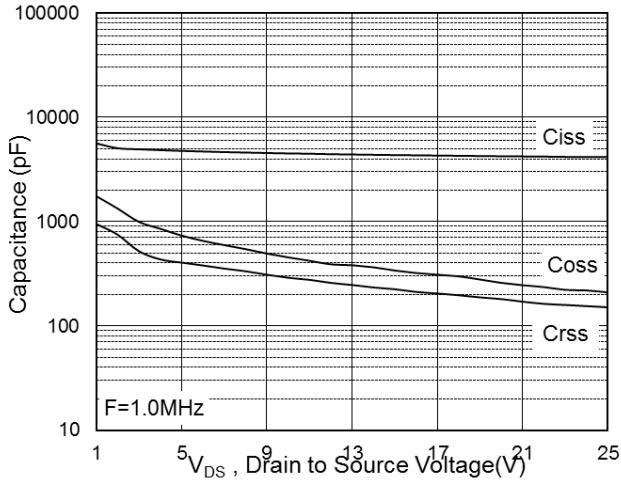


Fig.7 Capacitance

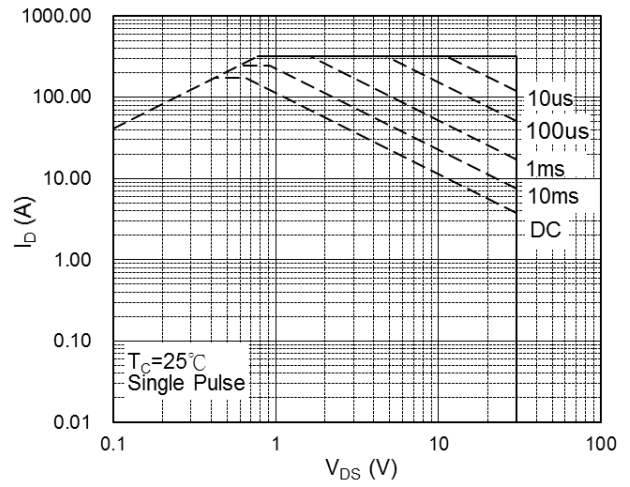


Fig.8 Safe Operating Area

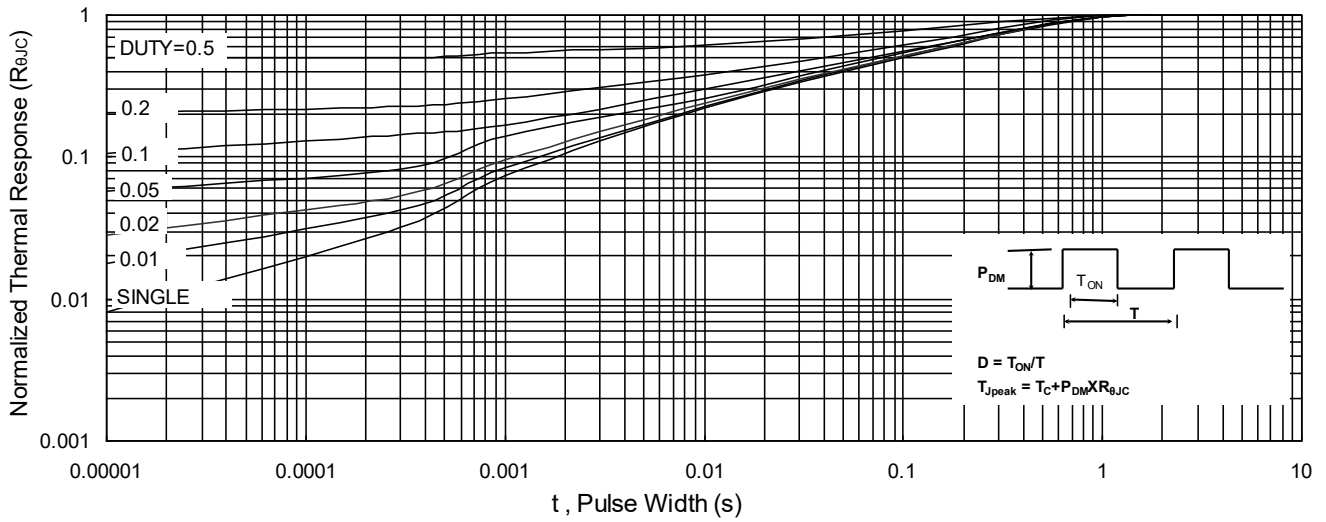


Fig.9 Normalized Maximum Transient Thermal Impedance

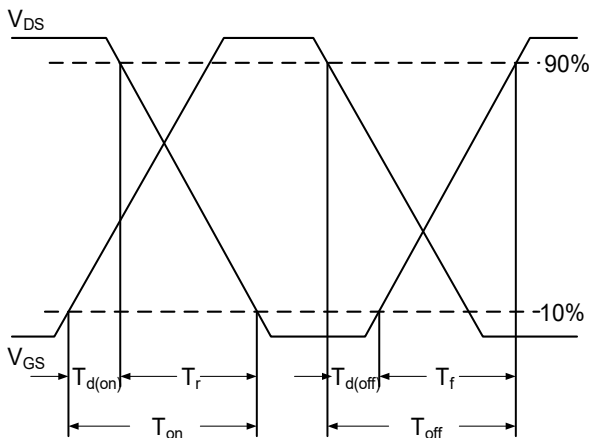


Fig.10 Switching Time Waveform

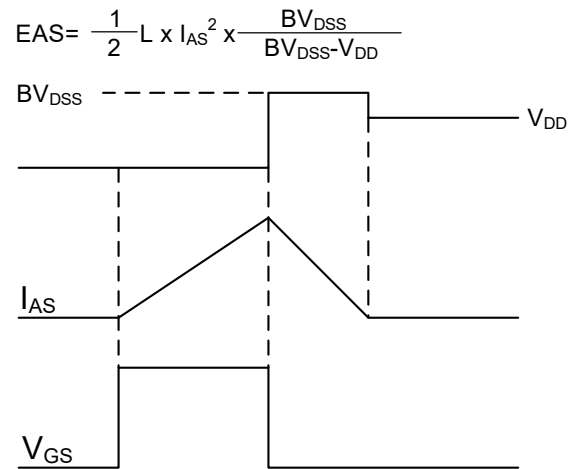
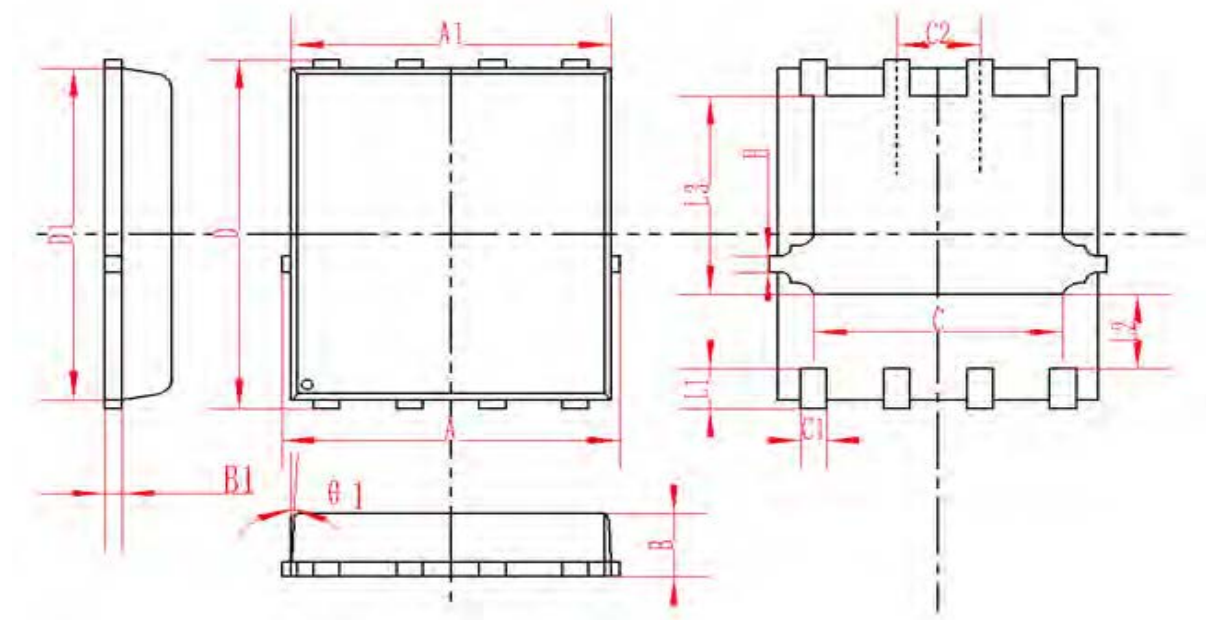


Fig.11 Unclamped Inductive Switching Waveform



DFN3X3-8L(PowerPAK-SO-8) Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	5.3	5.5	5.7	0.208	0.216	0.224
A1	5.1	5.2	5.3	0.2	0.204	0.209
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.85	6.05	6.25	0.23	0.238	0.246
B	0.85	0.95	1.05	0.033	0.037	0.041
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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