



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

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

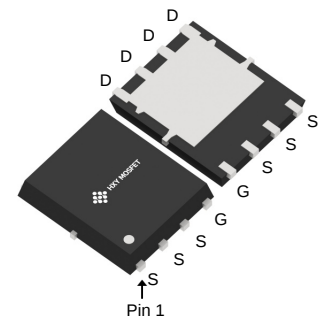
$R_{DS(ON)} < 2.6m\Omega$ $V_{GS} = 10V$

Application

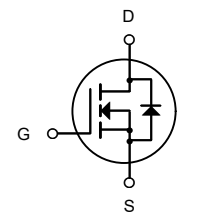
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SIRA12DP-T1-GE3	DFN5X6-8L	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, $V_{GS} @ 10V$	120	A
$I_D @ T_c = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	57	A
I_{DM}	Pulsed Drain Current	360	A
EAS	Single Pulse Avalanche Energy	125	mJ
P_D	Total Power Dissipation ⁴	115	W
T_{STG}	Storage Temperature Range	-55 to 175	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 175	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ²	1.3	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	---	---	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{GS} =0V, V _{DS} =30V	---	---	1	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0A	---	---	±100	nA
On Characteristics ³						
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} =V _{DS} , I _D =250μ A	1	1.6	2.5	V
R _{DS(ON)}	Drain-Source On Resistance ²	V _{GS} =10V, I _D =20A	---	2.6	3.3	mΩ
		V _{GS} =4.5V, I _D =10A	---	3.8	5	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	2218	---	pF
C _{oss}	Output Capacitance		---	480	---	
C _{rss}	Reverse Transfer Capacitance		---	340	---	
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time ^{3, 4}	V _{DD} =15V, I _D =15A, R _G =3.3Ω V _{GS} =10V	---	12.6	---	ns
t _r	Rise Time ^{3, 4}		---	19.5	---	ns
t _{d(off)}	Turn-Off Delay Time ^{3, 4}		---	42.8	---	ns
t _f	Fall Time ^{3, 4}		---	13.2	---	ns
Q _g	Total Gate Charge ^{3, 4}	V _{GS} =4.5V, V _{DS} =15V, I _D =20A	---	24	---	nC
Q _{gs}	Gate-Source Charge ^{3, 4}		---	4.2	---	nC
Q _{gd}	Gate-Drain “Miller” Charge ^{3, 4}		---	13	---	nC
Drain-Source Diode Characteristics						
V _{SD}	Source-Drain Diode Forward Voltage ³	V _{GS} =0V, I _S =1A	---	---	1	V
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	120	A
I _{SM}	Pulsed Source Current		---	---	360	A
T _{rr}	Reverse Recovery Time	V _{GS} =30V, I _S =1A , di/dt=100A/μs	---	258	---	NS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	324	---	NC

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=50A, R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.



Typical Characteristics

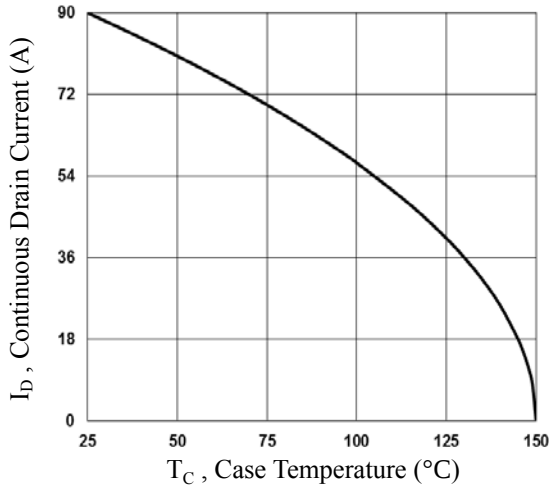


Fig.1 Continuous Drain Current vs. T_C

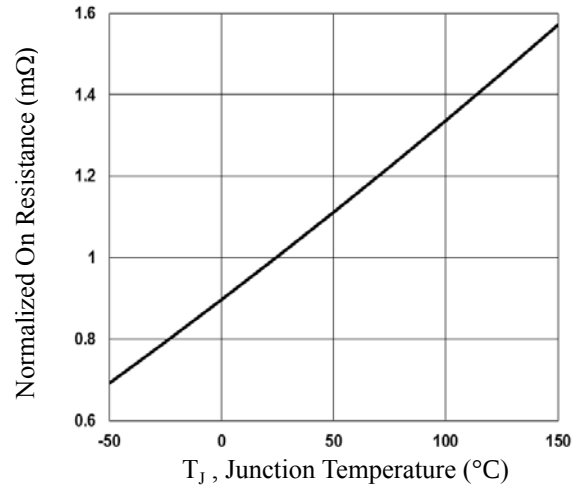


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

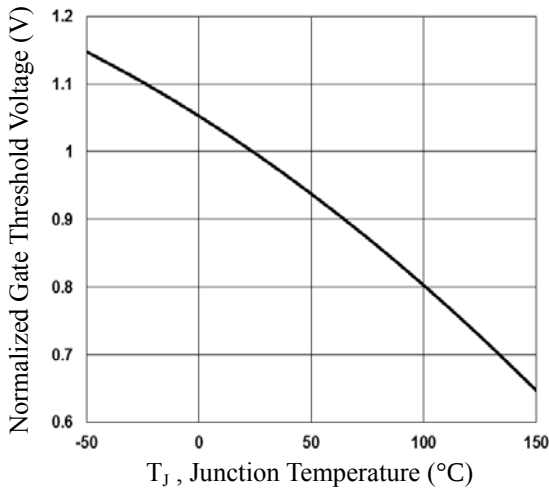


Fig.3 Normalized V_{th} vs. T_J

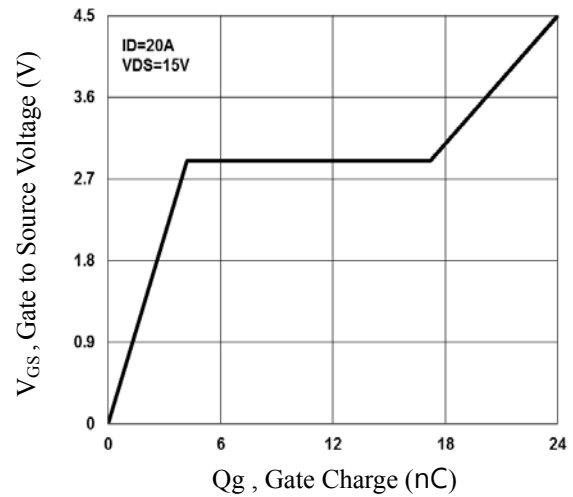


Fig.4 Gate Charge Waveform

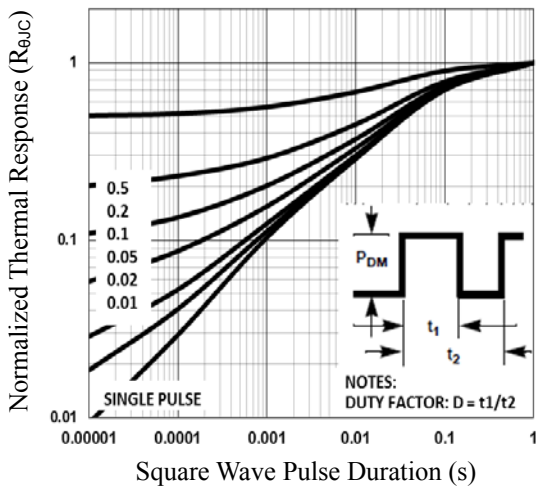


Fig.5 Normalized Transient Impedance

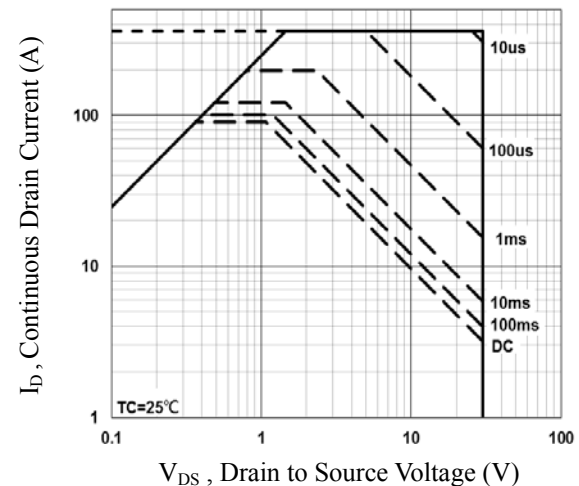


Fig.6 Maximum Safe Operation Area

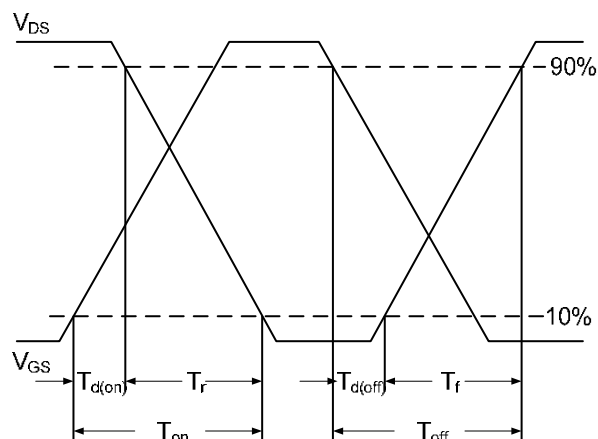


Fig.7 Switching Time Waveform

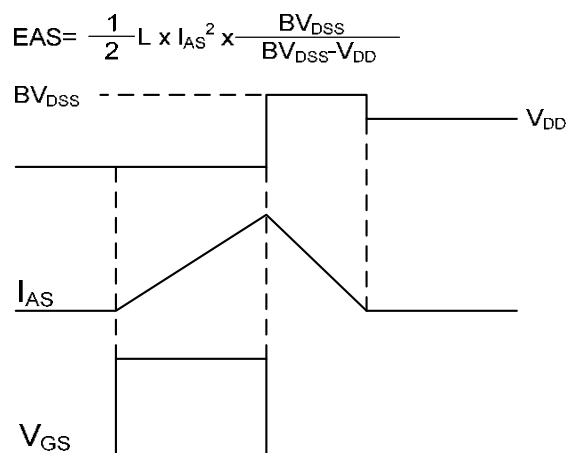


Fig.8 EAS Waveform



DFN5X6-8L 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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