

SIRA12DP-T1-GE3-MS
Product specification

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.

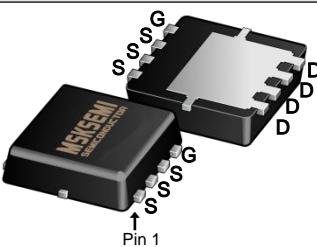
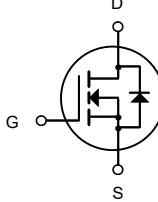
Features

- $V_{DS} = 30V$ $I_D = 120A$
- $R_{DS(ON)} < 4.4m\Omega$ $V_{GS} = 10V$

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Reference News

DFN5X6-8L	N-Channel MOSFET	Marking
		

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

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

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

Typical Characteristics

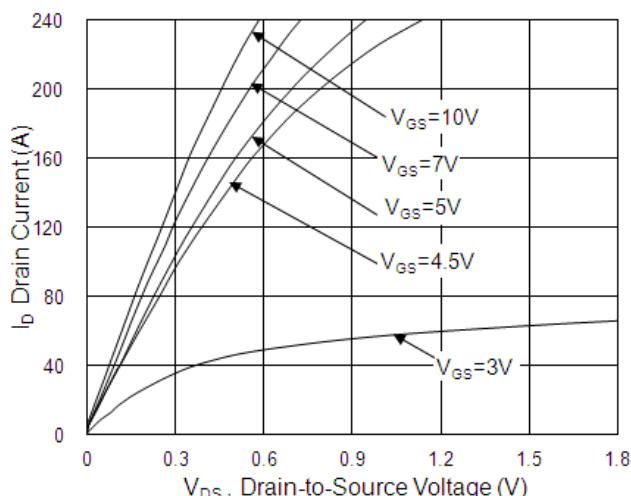


Fig.1 Typical Output Characteristics

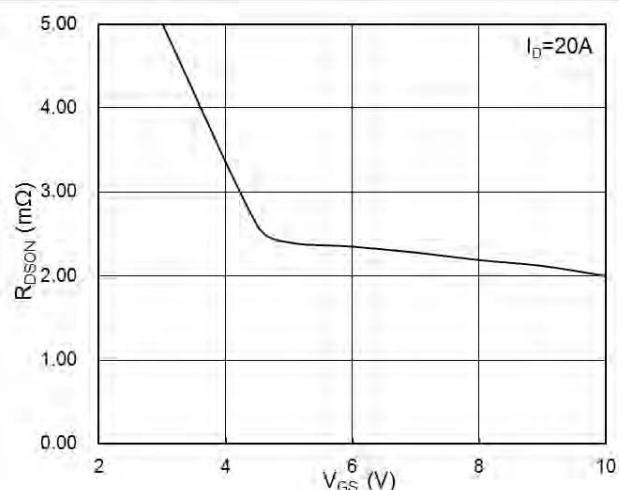


Fig.2 On-Resistance v.s Gate-Source

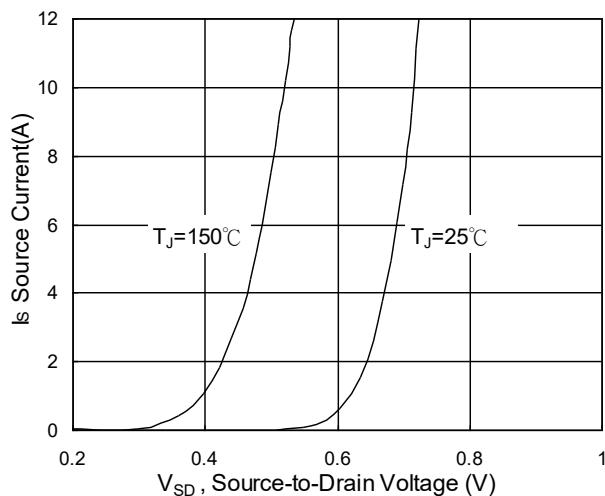


Fig.3 Forward Characteristics of Reverse

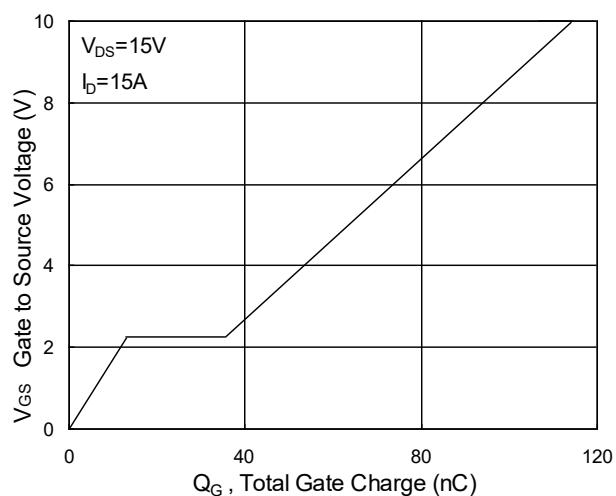


Fig.4 Gate-Charge Characteristics

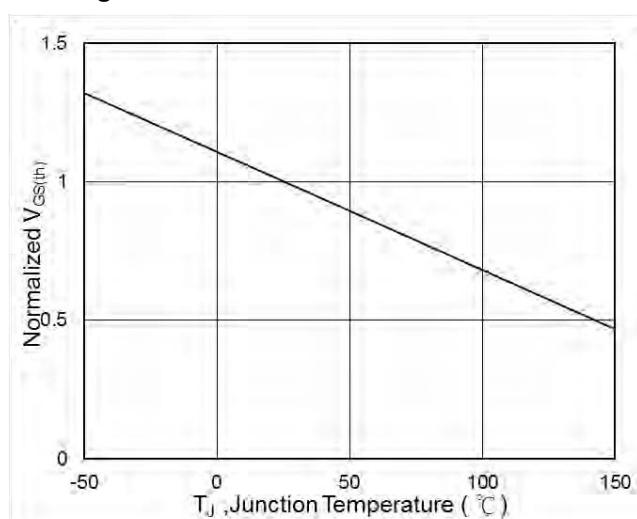


Fig.5 Normalized V_GS(th) v.s T_J

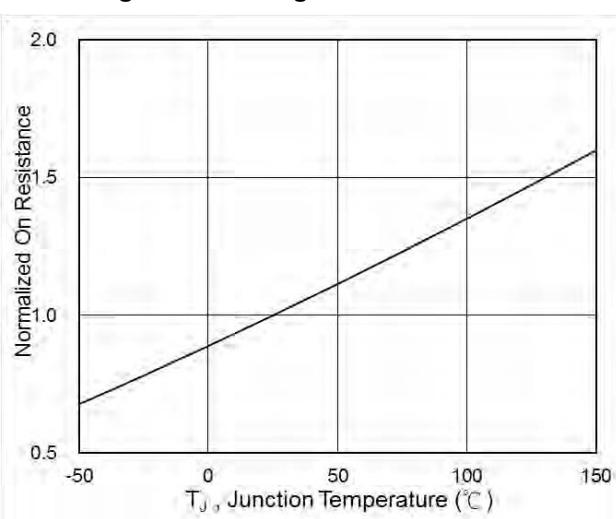


Fig.6 Normalized R_DS(on) v.s T_J

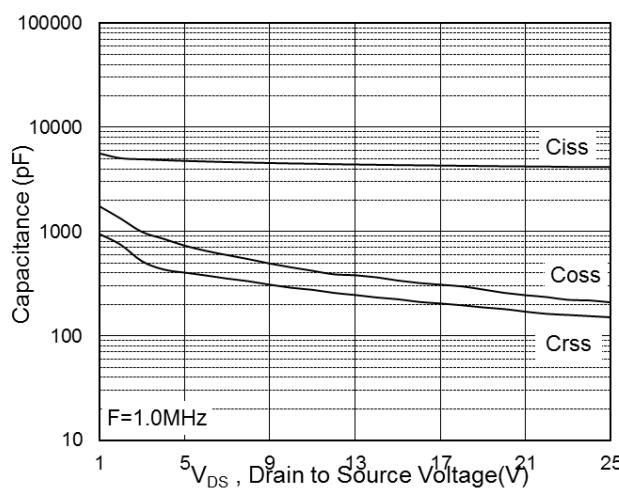


Fig.7 Capacitance

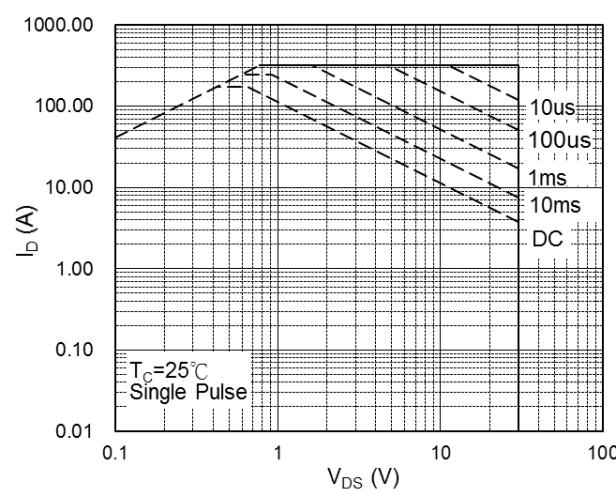


Fig.8 Safe Operating Area

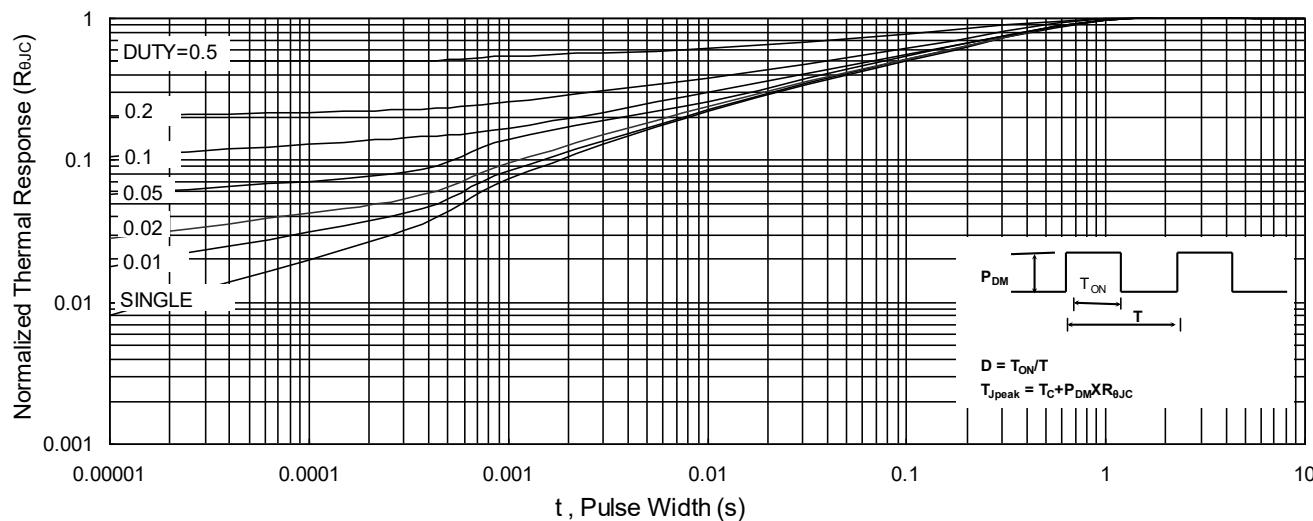


Fig.9 Normalized Maximum Transient Thermal Impedance

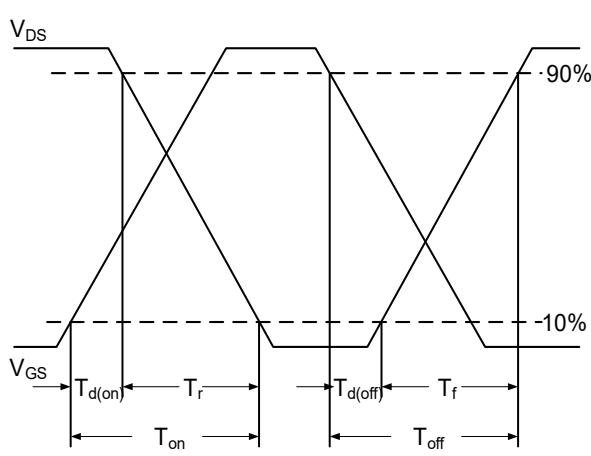


Fig.10 Switching Time Waveform

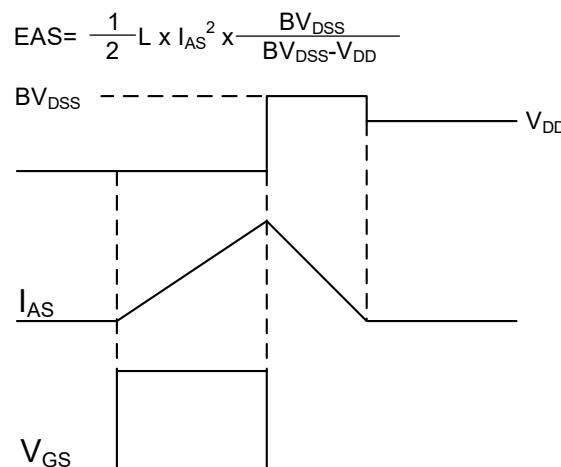
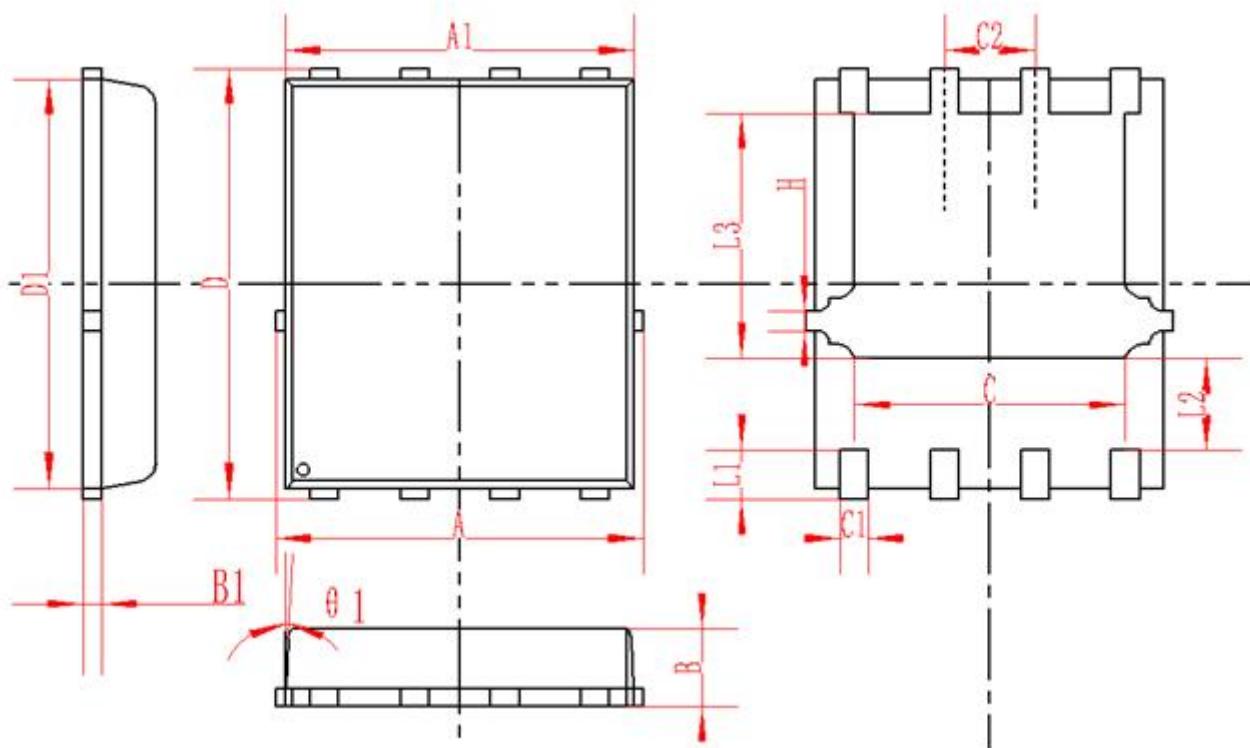


Fig.11 Unclamped Inductive Switching Waveform

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

REEL SPECIFICATION

P/N	PKG	QTY
SIRA12DP-T1-GE3-MS	DFN5X6-8L	5000

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