



Description

The SM6442D1RL 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

$V_{DS} = 40V$ $I_D = 70A$

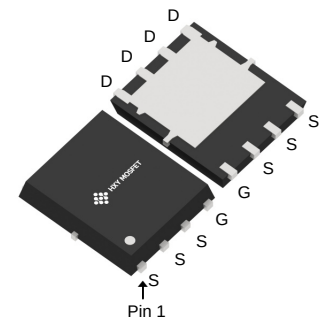
$R_{DS(ON)} < 8.5m\Omega @ V_{GS}=10V$

Application

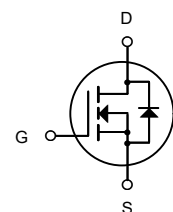
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L
(TDFN-8(5.2x5.9))



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SM6442D1RL	DFN5X6-8L(TDFN-8(5.2x5.9))	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	70	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	44	A
I_{DM}	Pulsed Drain Current ²	280	A
EAS	Single Pulse Avalanche Energy ³	76	mJ
$P_D @ T_C=25^\circ C$	Total Power Dissipation ⁴	72.3	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) ¹	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.73	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =10A	---	6.5	8.5	mΩ
		V _{GS} =4.5V, I _D =5A	---	10	15	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.7	3	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =32V, 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} =10V, I _D =5A	---	13	---	S
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V, V _{GS} =10V, I _D =10A	---	20	---	nC
Q _{gs}	Gate-Source Charge		---	2.8	---	
Q _{gd}	Gate-Drain Charge		---	5.1	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V R _G =3.3Ω I _D =1A	---	13.2	---	ns
T _r	Rise Time		---	2.2	---	
T _{d(off)}	Turn-Off Delay Time		---	72	---	
T _f	Fall Time		---	4.5	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	1278	---	pF
C _{oss}	Output Capacitance		---	135	---	
C _{rss}	Reverse Transfer Capacitance		---	87	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	70	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
- 3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=47A.
- 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

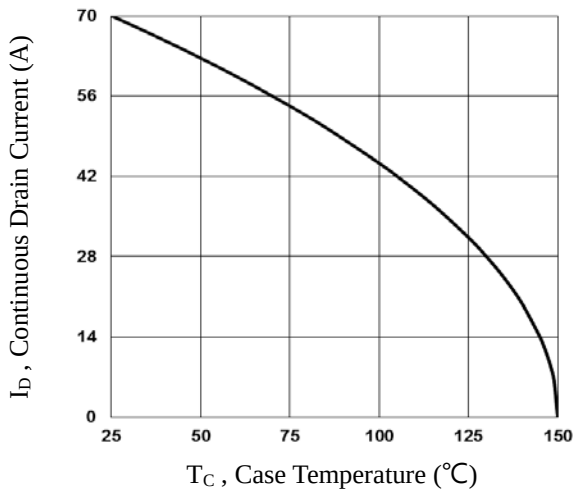


Fig.1 Continuous Drain Current vs. T_C

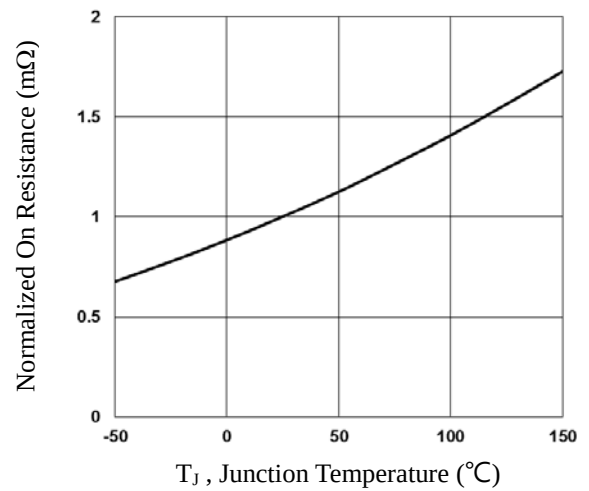


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

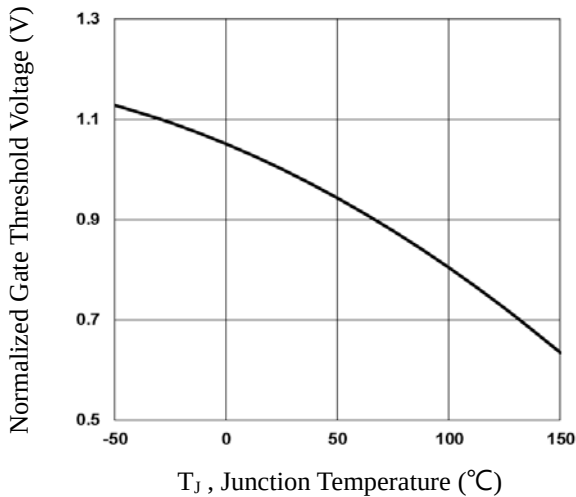


Fig.3 Normalized V_{th} vs. T_J

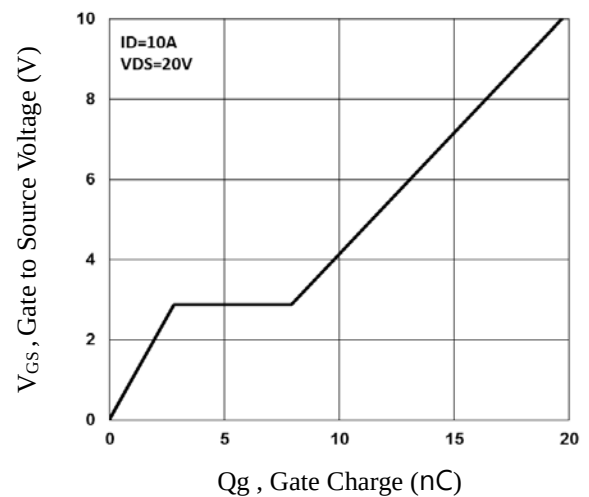


Fig.4 Gate Charge Waveform

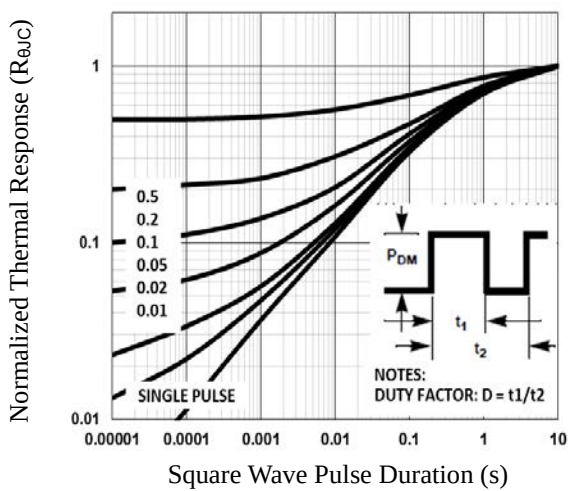


Fig.5 Normalized Transient Impedance

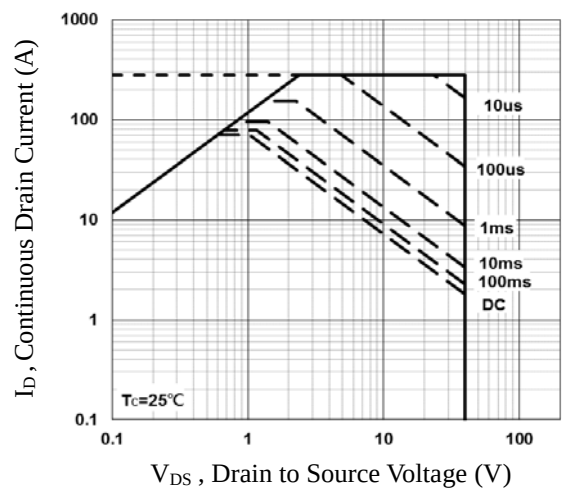


Fig.6 Maximum Safe Operation Area

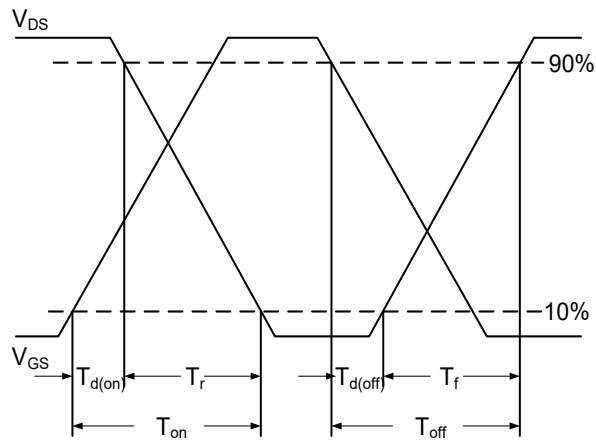


Fig.7 Switching Time Waveform

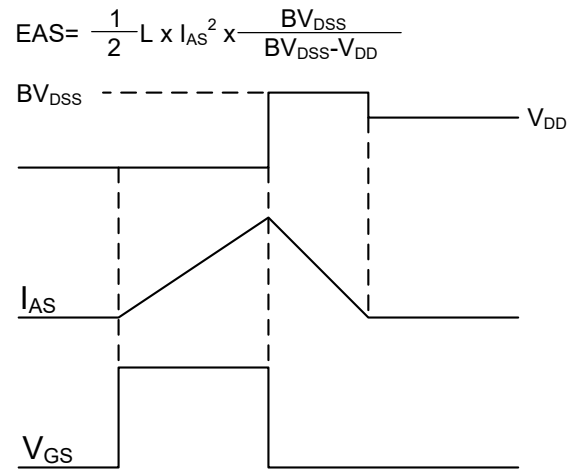
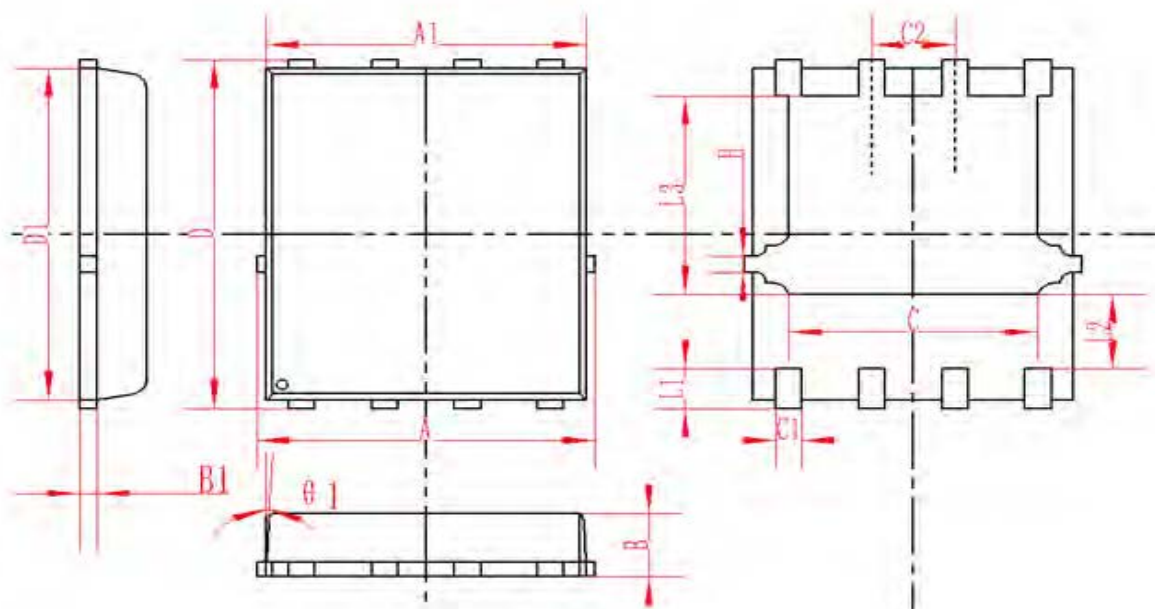


Fig.8 EAS Waveform



DFN5X6-8L(TDFN-8(5.2x5.9))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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