

**Dual N-Ch Fast Switching MOSFETs**
**Description**

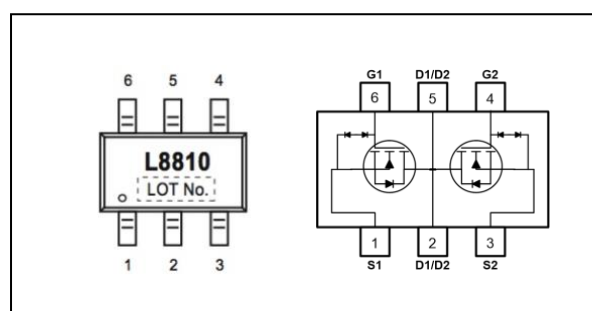
The HSW8810 is the low RDSON trench N-CH MOSFETs with robust ESD protection. This product is suitable for Lithium-ion battery pack applications.

The HSW8810 meet the RoHS and Green Product requirement with full function reliability approved.

- Green Device Available
- Super Low Gate Charge
- ESD Protection
- Excellent Cdv/dt effect decline
- Advanced high cell density Trench

**Product Summary**

$V_{DS}$	20	V
$R_{DS(ON),max}$	20	mΩ
$I_D$	6	A

**SOT23-6L Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	20	V
$V_{GS}$	Gate-Source Voltage	±12	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current <sup>1</sup>	6	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current <sup>1</sup>	4.8	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	24	A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation <sup>3</sup>	1.25	W
$T_{STG}$	Storage Temperature Range	-55 to 150	°C
$T_J$	Operating Junction Temperature Range	-55 to 150	°C

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	---	100	°C/W



**N-Channel Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B <sub>VDS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	15	16.5	20	mΩ
		V <sub>GS</sub> =4.0V, I <sub>D</sub> =3A	15.5	17	20.5	
		V <sub>GS</sub> =3.7V, I <sub>D</sub> =3A	16	17.5	21	
		V <sub>GS</sub> =3.1V, I <sub>D</sub> =3A	17	18.5	23	
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A	18.5	21	26	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	0.5	0.7	1.2	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =16V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V	---	---	±10	uA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =3A	---	17	---	S
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A	---	10.4	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	1.3	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	2.6	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =10V, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3.3Ω I <sub>D</sub> =3A	---	3.2	---	ns
T <sub>r</sub>	Rise Time		---	9.8	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	31	---	
T <sub>f</sub>	Fall Time		---	3.6	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	630	---	pF
C <sub>oss</sub>	Output Capacitance		---	66	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	63	---	

**Diode Characteristics**

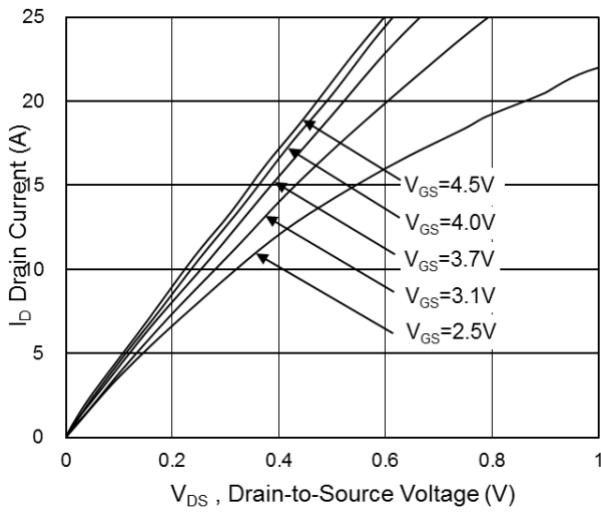
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,4</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	5.5	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	0.78	1.2	V

**Note :**

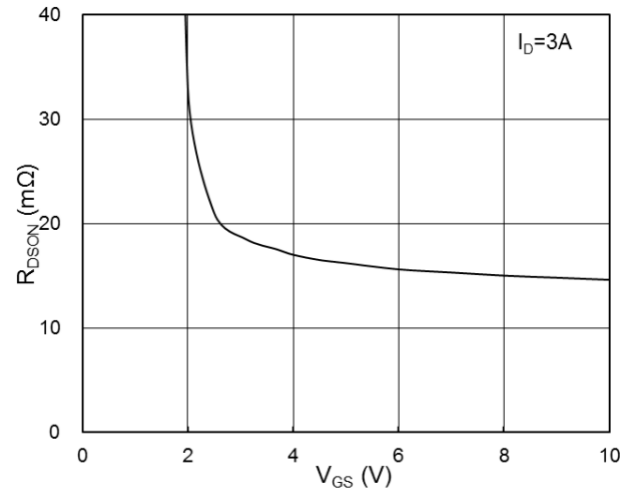
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, t ≤10s.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.



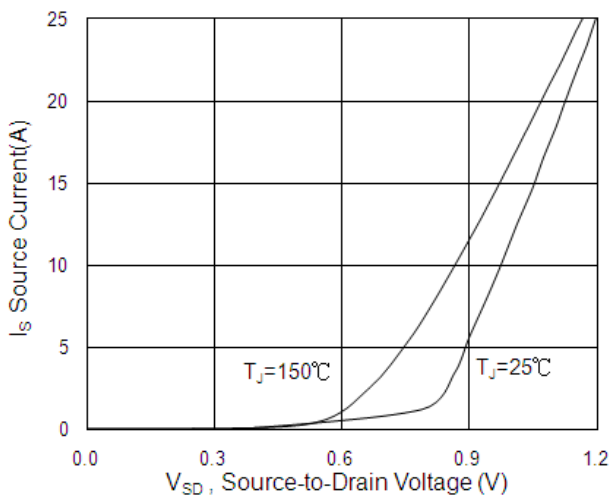
**N-Channel Typical**



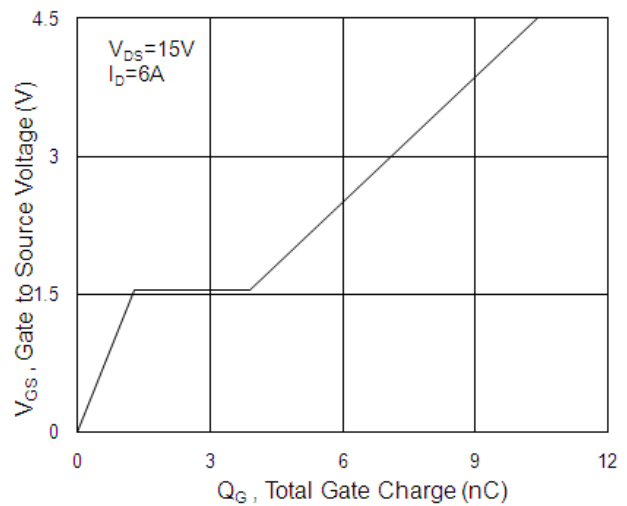
**Fig.1 Typical Output Characteristics**



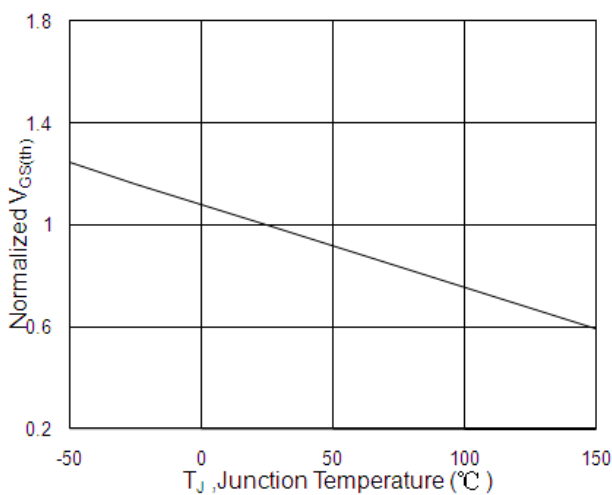
**Fig.2 On-Resistance vs. Gate-Source voltage**



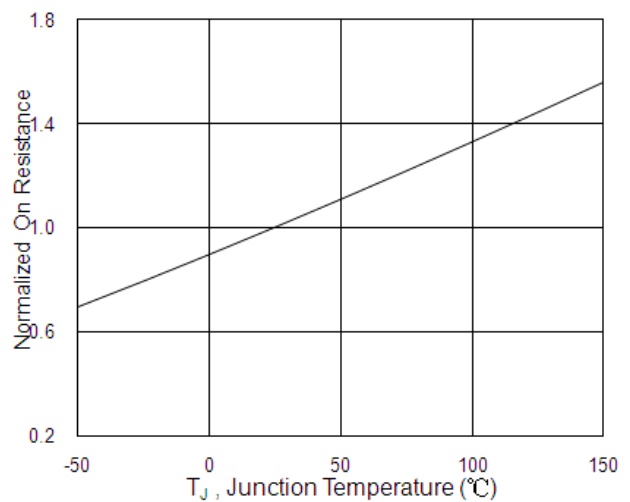
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**



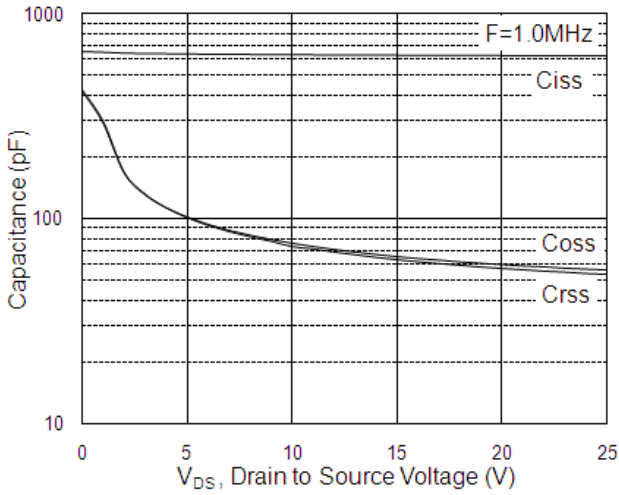
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



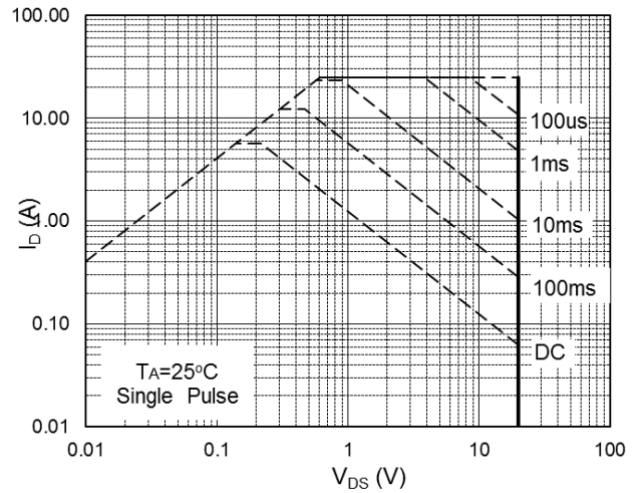
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



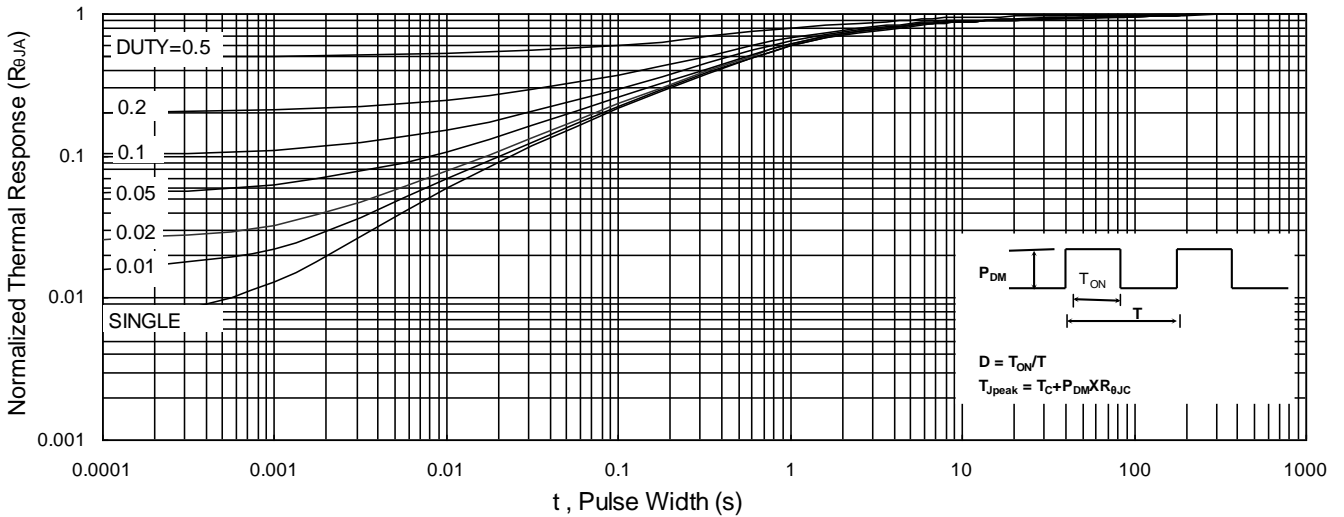
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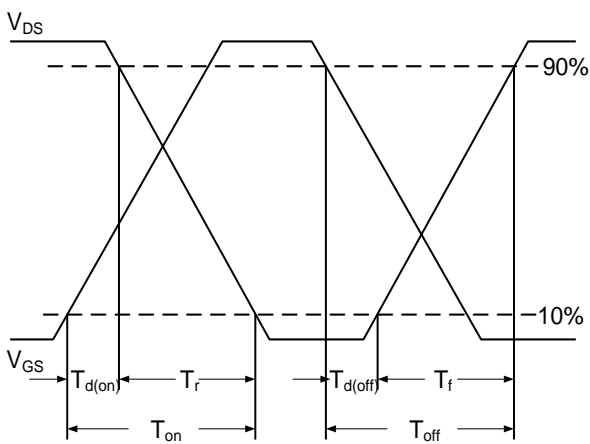
**Fig.7 Capacitance**



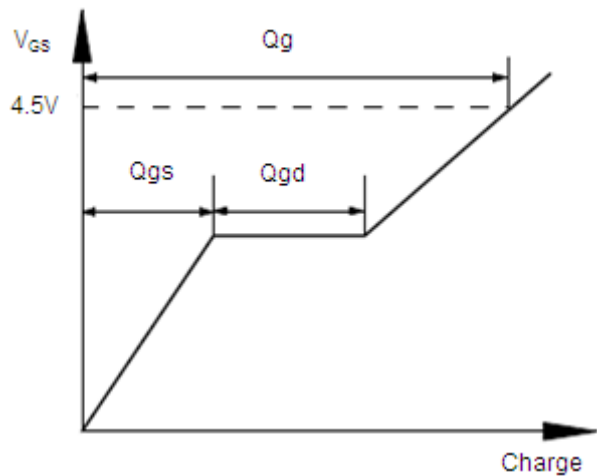
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



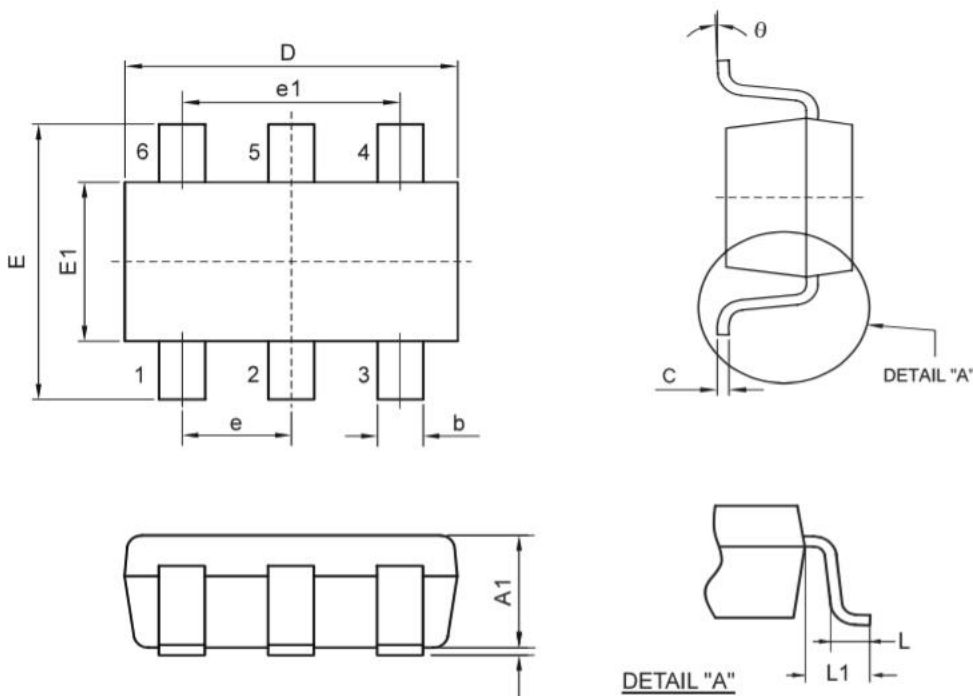
**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**



# SOT23-6L Package Outline Dimensions



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
D	2.692	3.099	0.106	0.122
E	2.591	3.000	0.102	0.118
E1	1.397	1.803	0.055	0.071
e	0.950 REF.		0.037 REF.	
e1	1.900 REF.		0.075 REF.	
b	0.300	0.500	0.012	0.020
C	0.080	0.200	0.003	0.008
A	0.000	0.100	0.000	0.004
A1	0.700	1.200	0.028	0.048
L	0.300	0.600	0.012	0.024
L1	0.600 REF.		0.023 REF.	
$\theta$	0°	9°	0°	9°