

Dual N-Channel Trench Power MOSFET

**General Description**

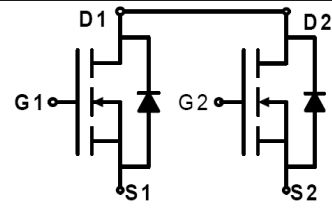
The HM8810S uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching applications.

**Features**

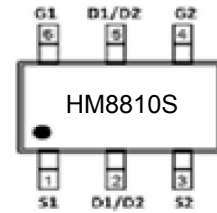
- $V_{DS} = 20V, I_D = 5A$   
 $R_{DS(ON)} < 22m\Omega @ V_{GS} = 4.5V$   
 $R_{DS(ON)} < 28m\Omega @ V_{GS} = 2.5V$
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

**Application**

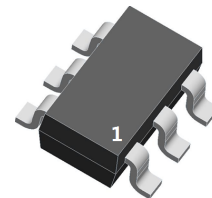
- Battery protection
- Load switch
- Power management



Schematic Diagram



Marking and pin Assignment



SOT23-6 top view

**Package Marking and Ordering Information**

Device Marking	Device	Device Package	Reel Size	Tape width	Quantit
HM8810S	HM8810S	SOT23-6	Ø180mm	8mm	3000 units

**Table 1. Absolute Maximum Ratings (TA=25°C)**

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-Source Voltage ( $V_{GS}=0V$ )	20	V
$V_{GS}$	Gate-Source Voltage ( $V_{DS}=0V$ )	± 12	V
$I_D$	Drain Current-Continuous	5	A
$I_{DM (pluse)}$	Drain Current-Continuous@ Current-Pulsed (Note 1)	25	A
$P_D$	Maximum Power Dissipation	1.5	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	°C

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

**Table 2. Thermal Characteristic**

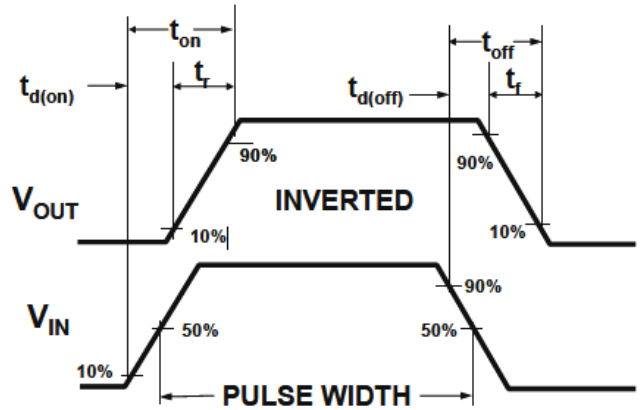
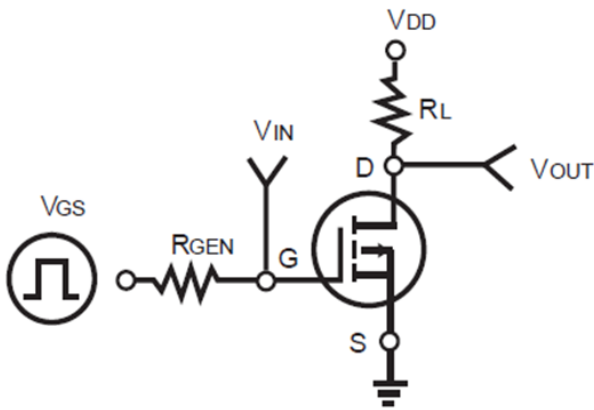
Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	125	°C/W

Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>On/Off States</b>						
B <sub>V</sub> DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	21.5		V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =19.5V, V <sub>GS</sub> =0V			1	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.45	0.65	1.0	V
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =5A	4	8		S
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A		18	22	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4A		22.5	28	mΩ
<b>Dynamic Characteristics</b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =8V, V <sub>GS</sub> =0V, f=1.0MHz		605		pF
C <sub>OSS</sub>	Output Capacitance			315		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			132		pF
<b>Switching Times</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =10V, I <sub>D</sub> =1A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =6Ω		11		nS
t <sub>r</sub>	Turn-on Rise Time			12		nS
t <sub>d(off)</sub>	Turn-Off Delay Time			36		nS
t <sub>f</sub>	Turn-Off Fall Time			32		nS
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =4A, V <sub>GS</sub> =4.5V		10		nC
Q <sub>gs</sub>	Gate-Source Charge			2.8		nC
Q <sub>gd</sub>	Gate-Drain Charge			1.8		nC
<b>Source-Drain Diode Characteristics</b>						
I <sub>SD</sub>	Source-Drain Current(Body Diode)				1.7	A
V <sub>SD</sub>	Forward on Voltage <b>(Note 1)</b>	V <sub>GS</sub> =0V, I <sub>S</sub> =1.7A		0.79	1	V

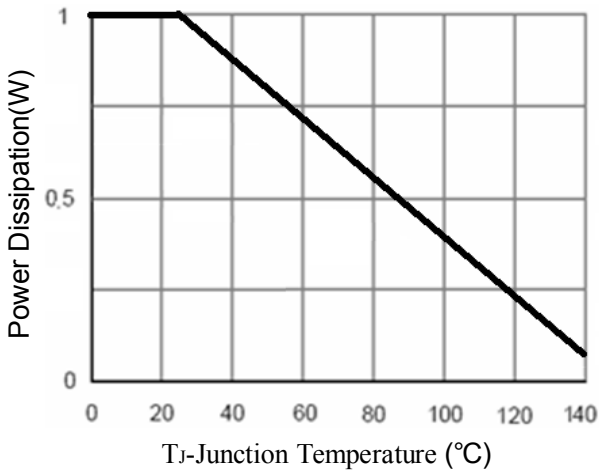
Notes 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

**Switch Time Test Circuit and Switching Waveforms:**

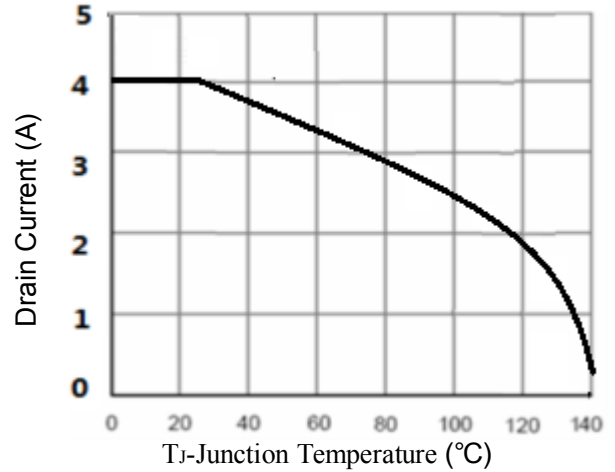


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)**

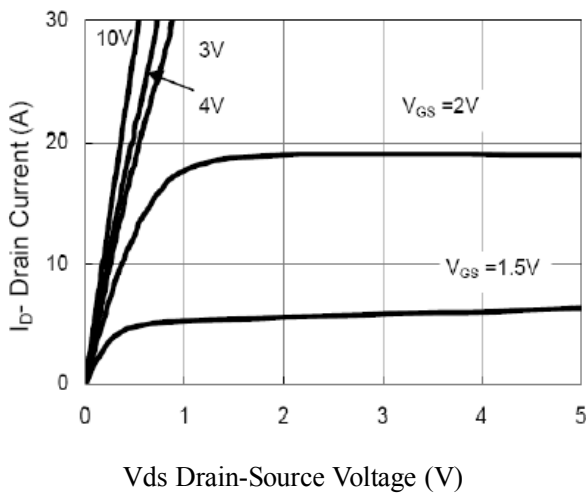
**Figure1. Power Dissipation**



**Figure2. Drain Current**



**Figure3. Output Characteristics**



**Figure4. Transfer Characteristics**

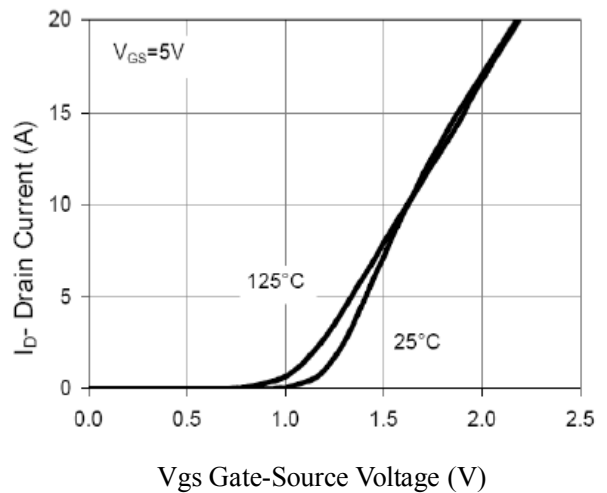


Figure5. Capacitance

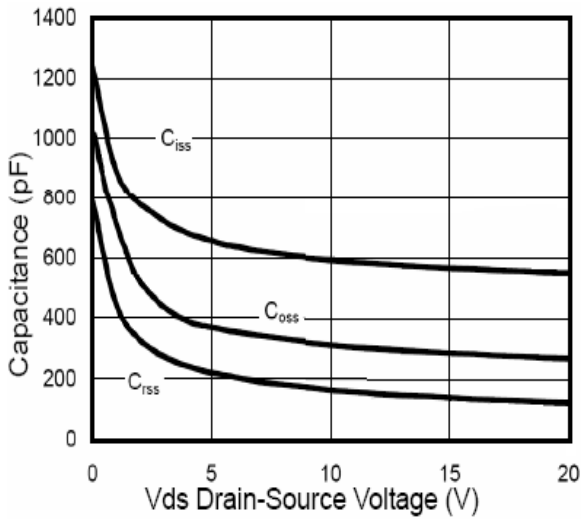


Figure6.  $R_{DS(ON)}$  vs Junction Temperature

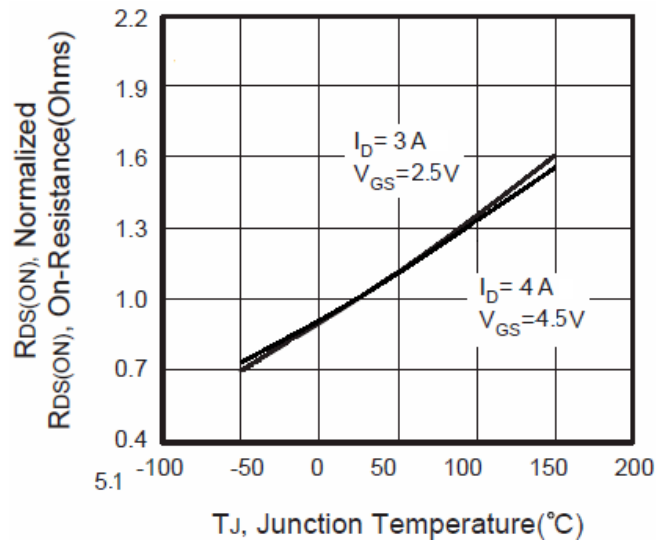


Figure7. Max  $BV_{DSS}$  vs Junction Temperature

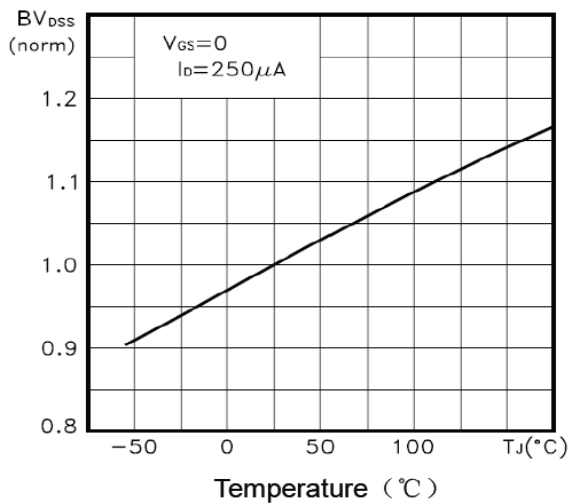


Figure8.  $V_{GS(th)}$  vs Junction Temperature

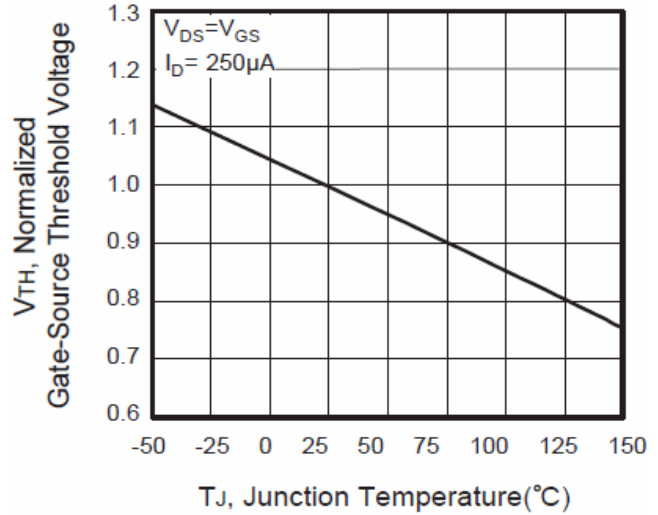


Figure9. Gate Charge Waveforms

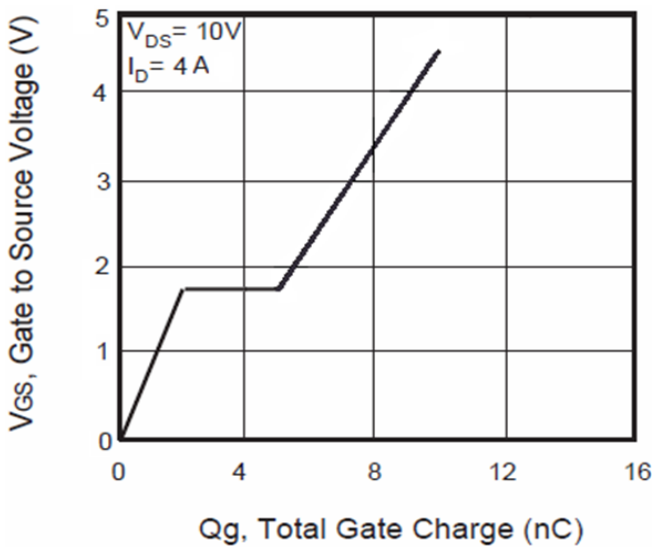


Figure10. Maximum Safe Operating Area

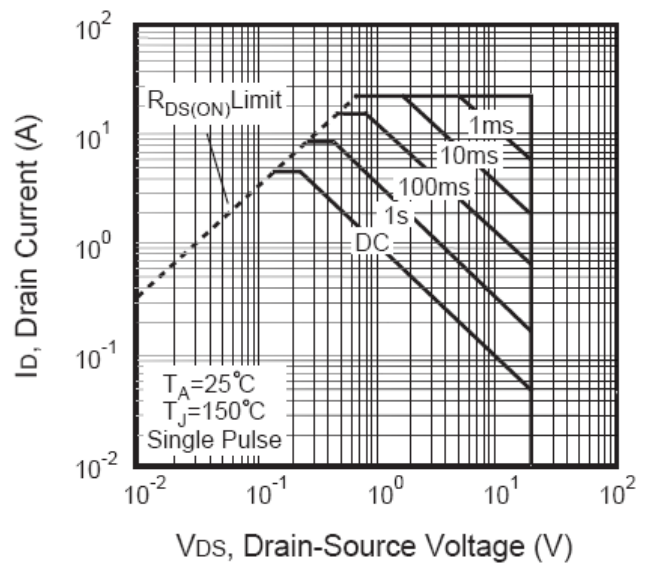
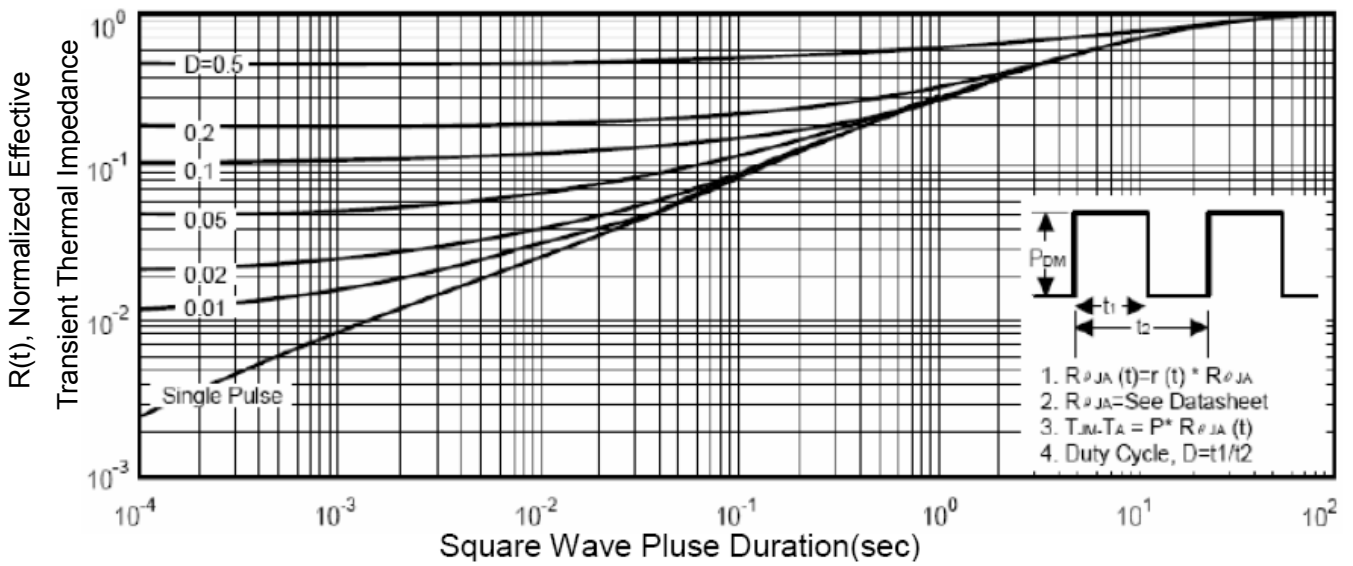
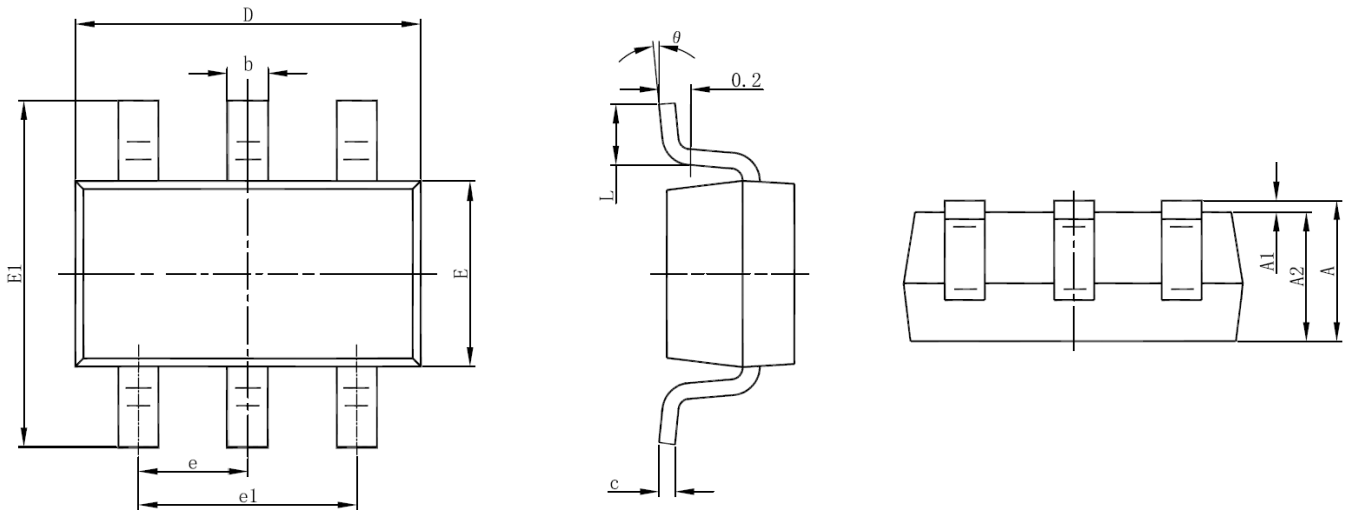


Figure11. Normalized Maximum Transient Thermal Impedance



### SOT23-6 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°