N-Channel Trench Power MOSFET

General Description

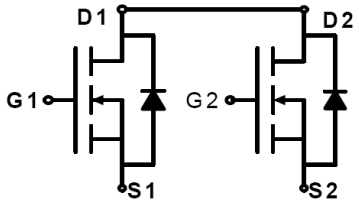
The CS8810 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching applications.

Features

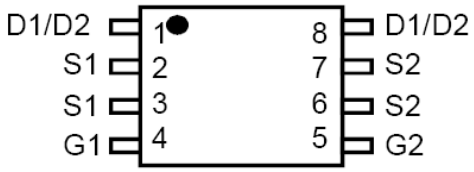
- V_{DS} = 20V,ID =7A
  $R_{DS(ON)}$ < 28mΩ @ V_{GS} =4.5V
  $R_{DS(ON)}$ < 35mΩ @ V_{GS} =2.5V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

Application

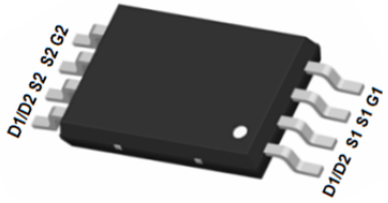
- Battery protection
- Load switch
- Power management



Schematic Diagram



Marking and pin Assignment



TSSOP-8 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
CS8810	CS8810	TSSOP-8	Ø330mm	12mm	3000 units

Table 1. Absolute Maximum Ratings (T_A=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage (V_{GS}=0V）	20	V
V_{GS}	Gate-Source Voltage (V_{DS}=0V)	±10	V
I_D	Drain Current-Continuous (T_A=25°C)	7	A
	Drain Current-Continuous (T_A=70°C)	5.7	A
$I_{DM\ (pluse)}$	Drain Current-Continuous@ Current-Pulsed **(Note 1)**	25	A
P_D	Maximum Power Dissipation (T_A=25°C)	1.5	W
	Maximum Power Dissipation (T_A=70°C)	1	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

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

Table 2. Thermal Characteristic

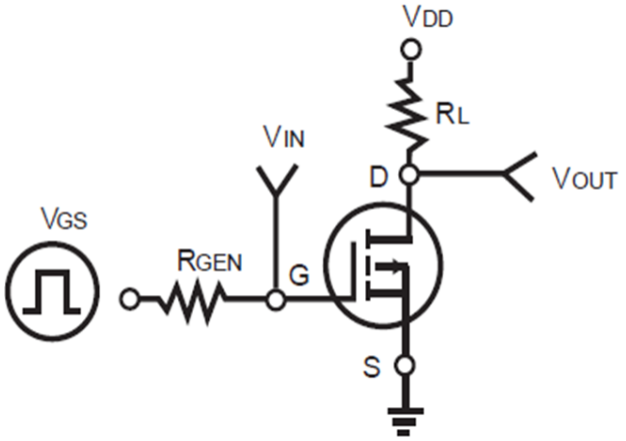
Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	83	℃/W

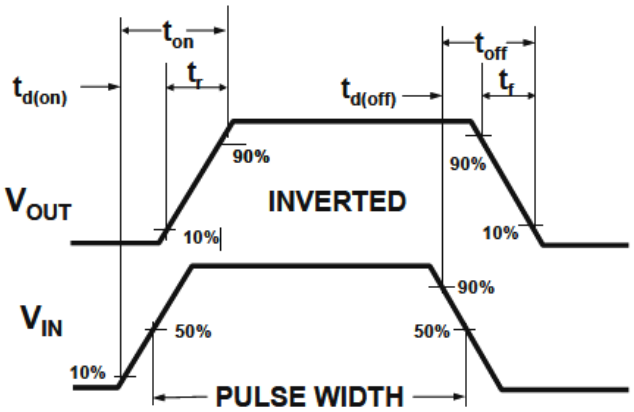
Table 3. Electrical Characteristics (T_A=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V I_D=250μA	20	21.5		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=19.5V,V_{GS}=0V			1	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±10V,V_{DS}=0V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	0.5	0.65	1.1	V
g_{FS}	Forward Transconductance	V_{DS}=5V,I_D=6A	4	11		S
$R_{DS(ON)}$	Drain-Source On-State Resistance	V_{GS}=4.5V, I_D=4A		20	28	mΩ
		V_{GS}=2.5V, I_D=3A		26	35	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=8V,V_{GS}=0V, f=1.0MHz		605		pF
C_{oss}	Output Capacitance			315		pF
C_{rss}	Reverse Transfer Capacitance			132		pF
Switching Times						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=10V,I_D=1A, V_{GS}=4.5V,R_G=6Ω		11		nS
t_r	Turn-on Rise Time			12		nS
$t_{d(off)}$	Turn-Off Delay Time			36		nS
t_f	Turn-Off Fall Time			32		nS
Q_g	Total Gate Charge	V_{DS}=10V,I_D=6A, V_{GS}=4.5V		10		nC
Q_{gs}	Gate-Source Charge			2.8		nC
Q_{gd}	Gate-Drain Charge			1.8		nC
Source-Drain Diode Characteristics						
I_{SD}	Source-Drain Current(Body Diode)				1.7	A
V_{SD}	Forward on Voltage **(Note 1)**	V_{GS}=0V,I_S=1.7A		0.79	1.2	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

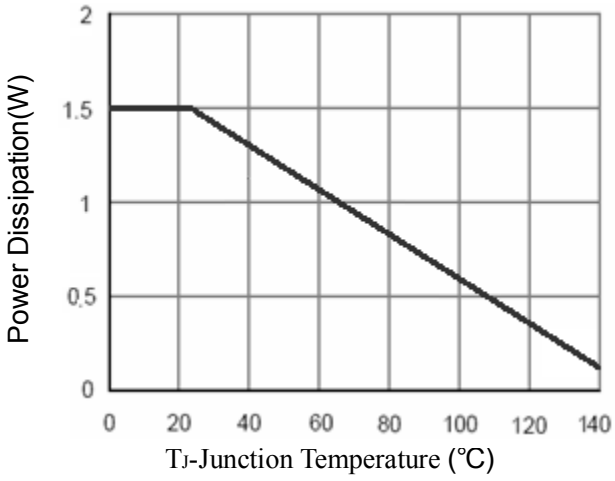


Figure2. Drain Current

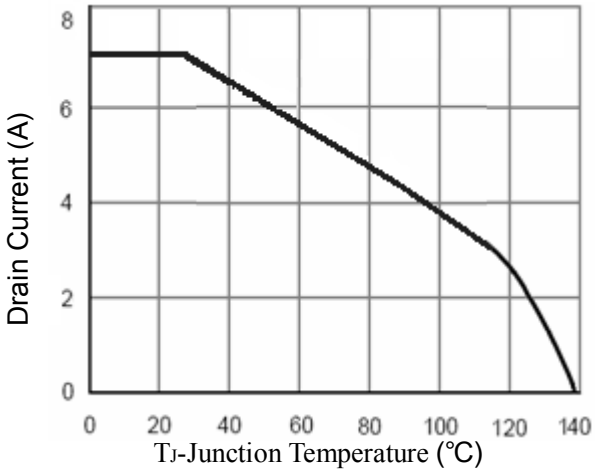


Figure3. Output Characteristics

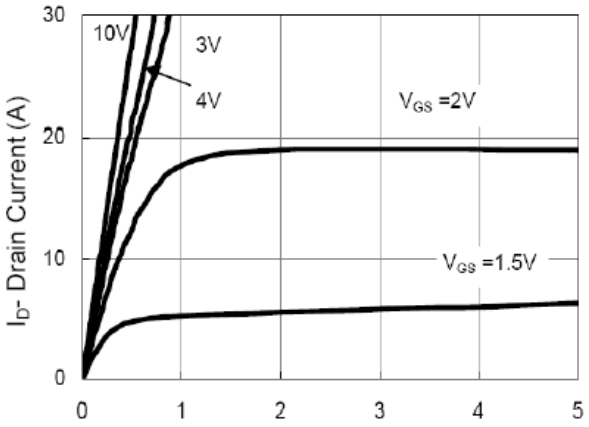


Figure4. Transfer Characteristics

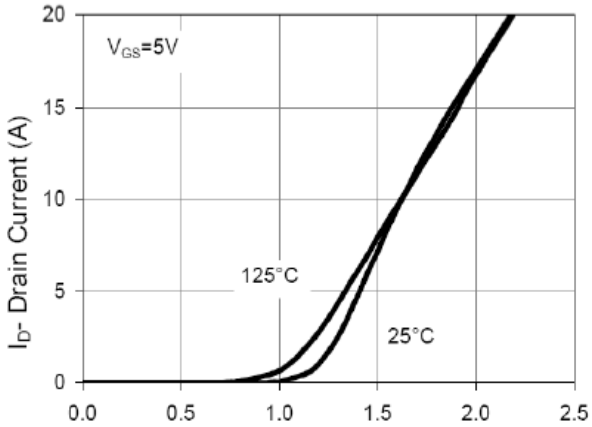


Figure5. Capacitance

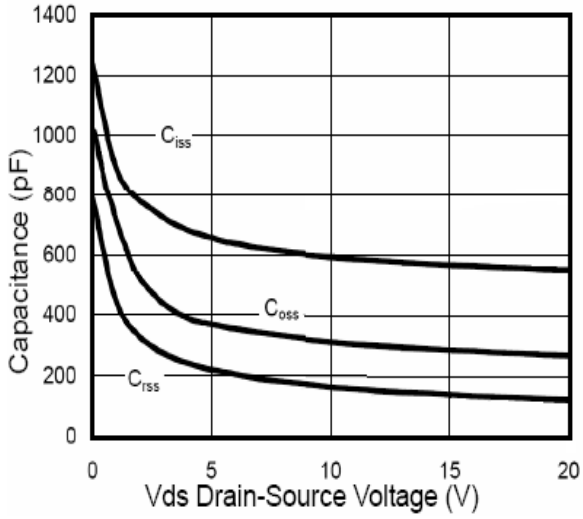


Figure6. $R_{DS(ON)}$ vs Junction Temperature

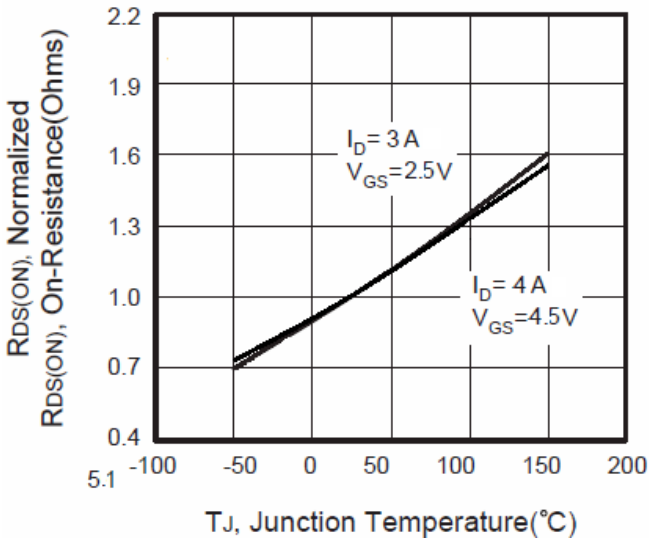


Figure7. Max BV_{DSS} vs Junction Temperature

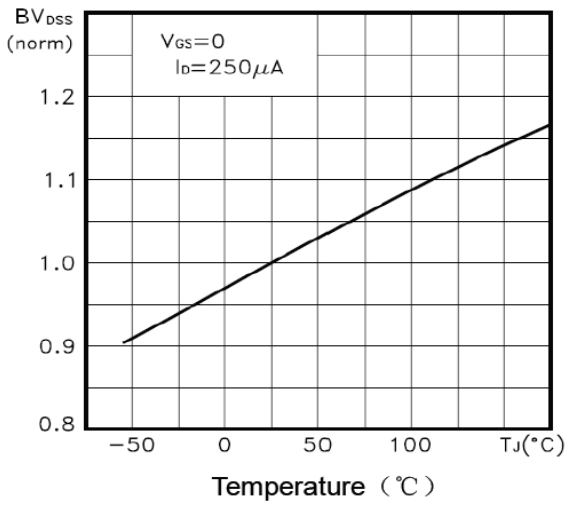


Figure8. $V_{GS(th)}$ vs Junction Temperature

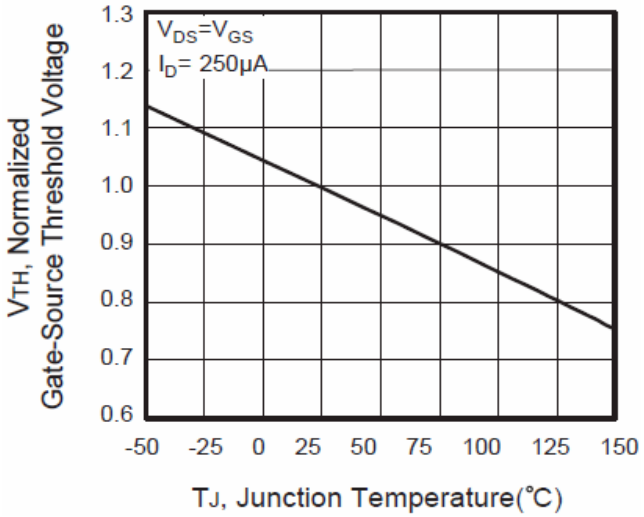


Figure9. Gate Charge Waveforms

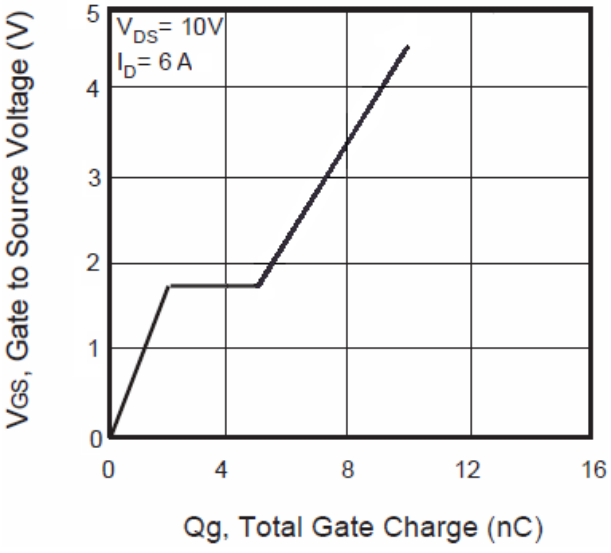


Figure10. Maximum Safe Operating Area

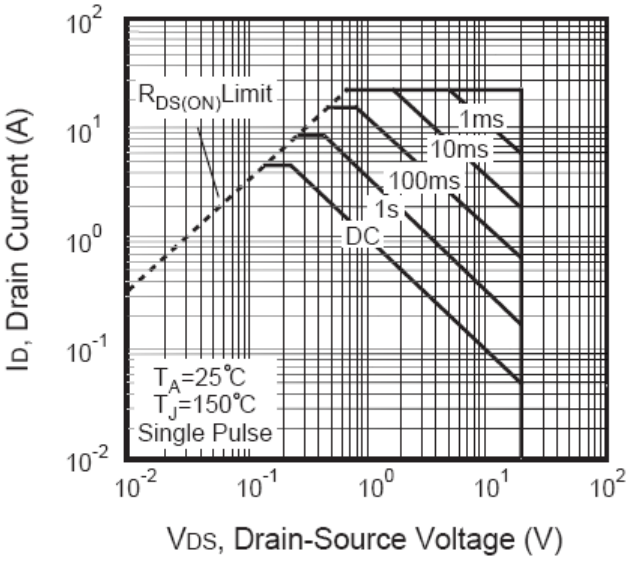
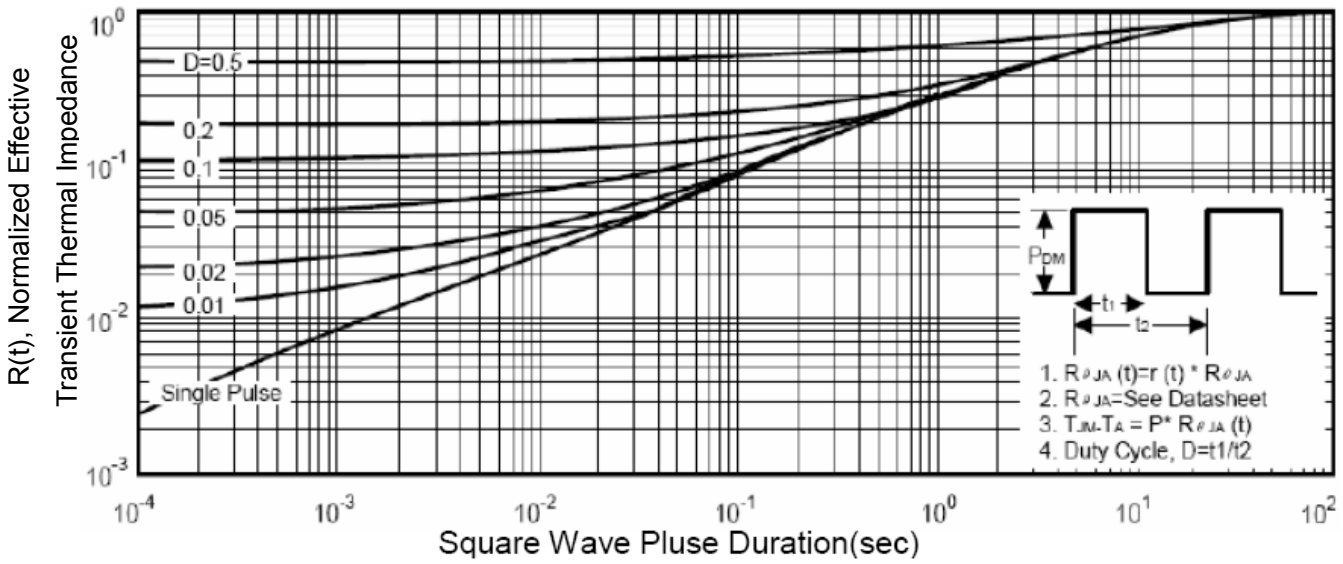
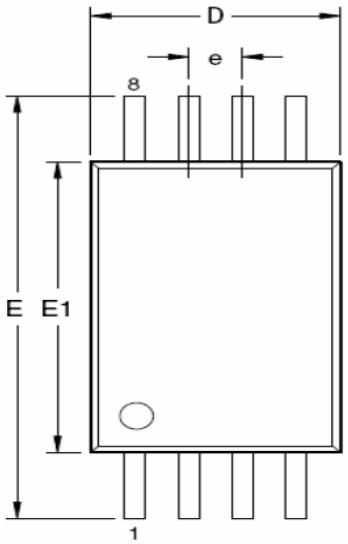


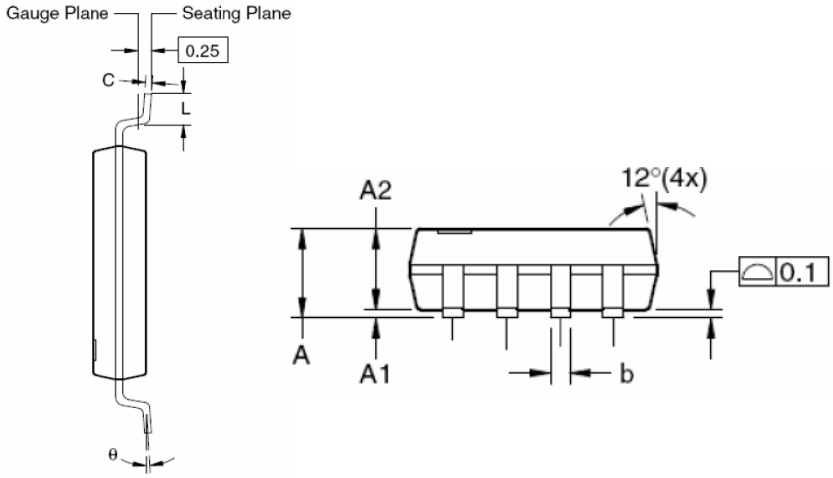
Figure11. Normalized Maximum Transient Thermal Impedance



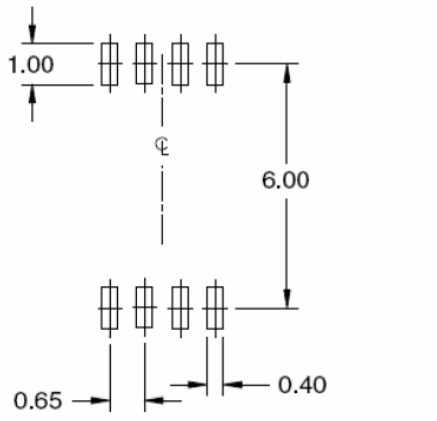
TSSOP-8 Package Information



Dimensions in Millimeters (UNIT:mm)



RECOMMENDED LAND PATTERN



Dimensions in millimeters

Symbols	Min.	Nom.	Max.
A	—	—	1.20
A1	0.05	—	0.15
A2	0.80	1.00	1.05
b	0.19	—	0.30
C	0.09	—	0.20
D	2.90	3.00	3.10
E	6.40 BSC		
E1	4.30	4.40	4.50
e	0.65 BSC		
L	0.45	0.60	0.75
θ	0°	—	8°

Dimensions in inches

Symbols	Min.	Nom.	Max.
A	—	—	0.047
A1	0.002	—	0.006
A2	0.031	0.039	0.041
b	0.007	—	0.012
C	0.004	—	0.008
D	0.114	0.118	0.122
E	0.252 BSC		
E1	0.169	0.173	0.177
e	0.026 BSC		
L	0.018	0.024	0.030
θ	0°	—	8°