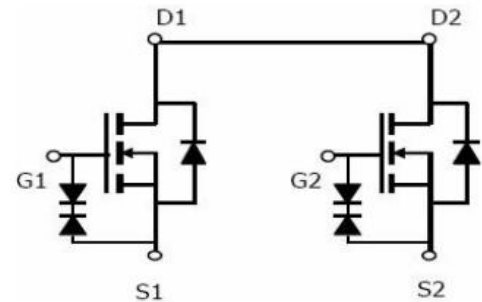




N-Channel Enhancement Mode Power MOSFET

Description

The MX2810 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 load switch or in PWM applications. It is ESD protected.



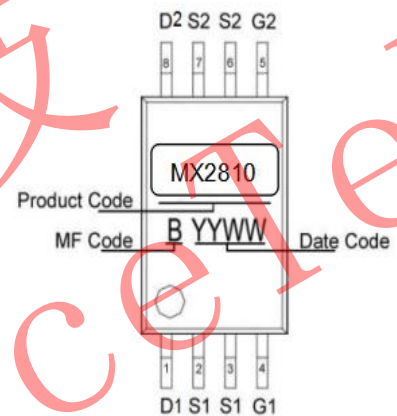
Schematic diagram

General Features

- ◆ $V_{DS} = 20V$, $I_D = 8A$
 - @ $V_{GS} = 4.5V$ $R_{DS(ON)}$ (Typ.) = 14m Ω
 - @ $V_{GS} = 3.8V$ $R_{DS(ON)}$ (Typ.) = 15m Ω
 - @ $V_{GS} = 2.5V$ $R_{DS(ON)}$ (Typ.) = 18m Ω
- ◆ ESD Rating: 2000V HBM
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

Application

- ◆ PWM applications
- ◆ Load switch



Marking and pin assignment

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 10	V
Drain Current-Continuous	I_D	8	A
Drain Current-Pulsed (Note 1)	I_{DM}	34	A
Maximum Power Dissipation	P_D	1.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	± 10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.45	0.7	0.95	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=7.0A$	12	14	17	m Ω
		$V_{GS}=3.8V, I_D=6.0A$	13	15	18	m Ω
		$V_{GS}=2.5V, I_D=5.5A$	16	18	21	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=7A$	-	20	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V,$ $F=1.0MHz$	-	1150	-	PF
Output Capacitance	C_{oss}		-	185	-	PF
Reverse Transfer Capacitance	C_{rss}		-	145	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, R_L=1.35\Omega$ $V_{GS}=5V, R_{GEN}=3\Omega$	-	6		nS
Turn-on Rise Time	t_r		-	13		nS
Turn-Off Delay Time	$t_{d(off)}$		-	52		nS
Turn-Off Fall Time	t_f		-	16		nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=7A,$ $V_{GS}=4.5V$	-	15		nC
Gate-Source Charge	Q_{gs}		-	0.8	-	nC
Gate-Drain Charge	Q_{gd}		-	3.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	7	A

Notes:

- surface mounted on FR4 board, $t \leq 10\text{sec}$
- pulse test: pulse width $\leq 300\mu\text{s}$, duty $\leq 2\%$
- guaranteed by design, not subject to production testing

Thermal Characteristics

Thermal Resistance junction-to ambient	Rth JA	83.3	$^{\circ}\text{C/W}$
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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

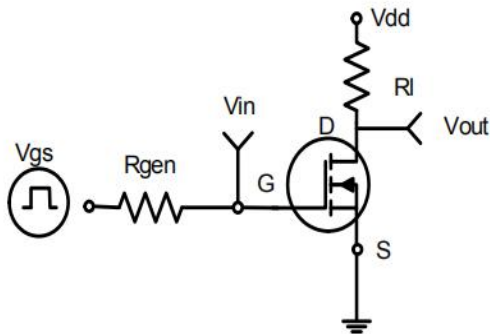


Figure 1: Switching Test Circuit

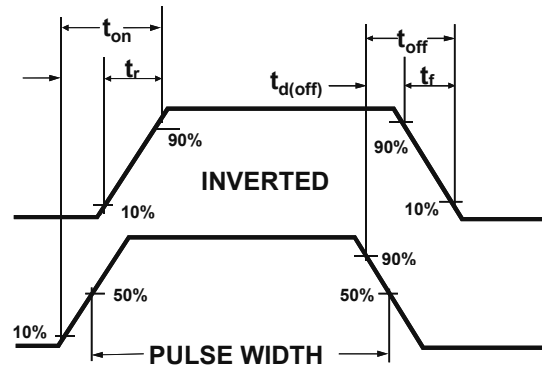


Figure 2: Switching Waveform

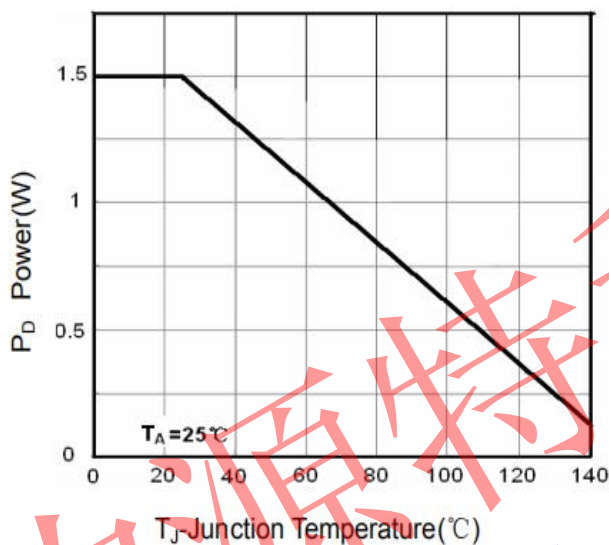


Figure 3: Power Dissipation

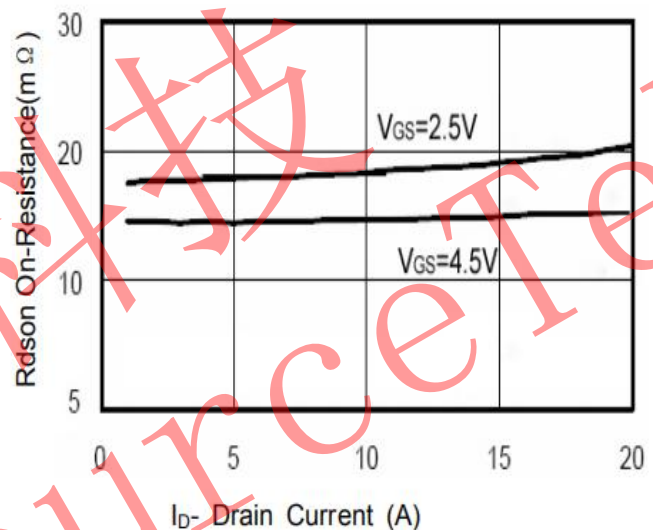


Figure 6: Drain-Source On-Resistance

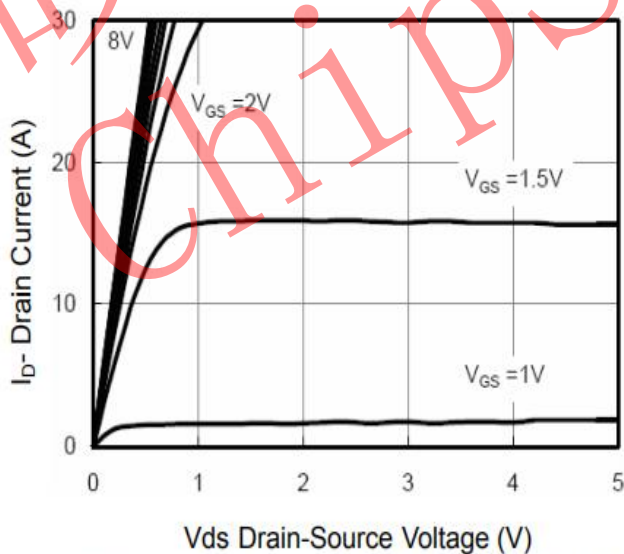


Figure 5: Output CHARACTERISTICS

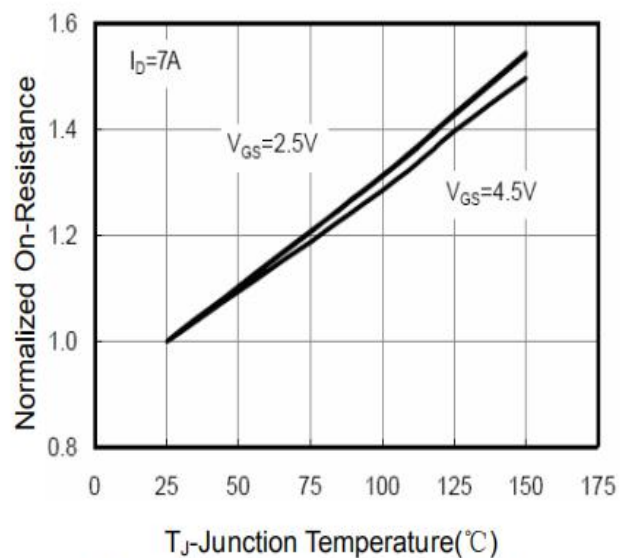


Figure 8: Drain-Source On-Resistance

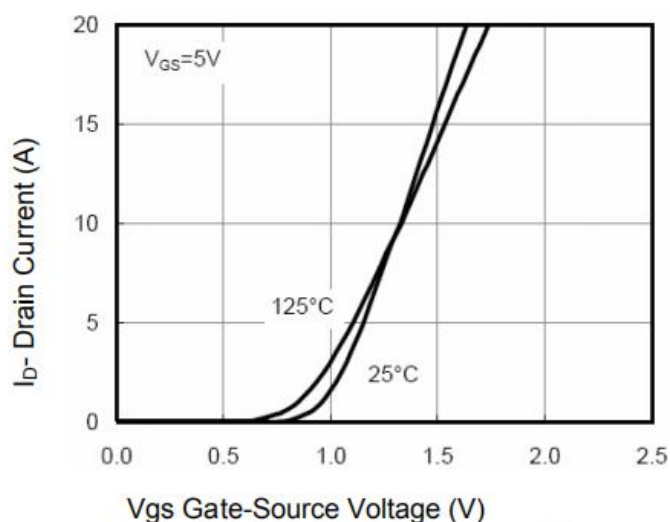


Figure 7 Transfer Characteristics

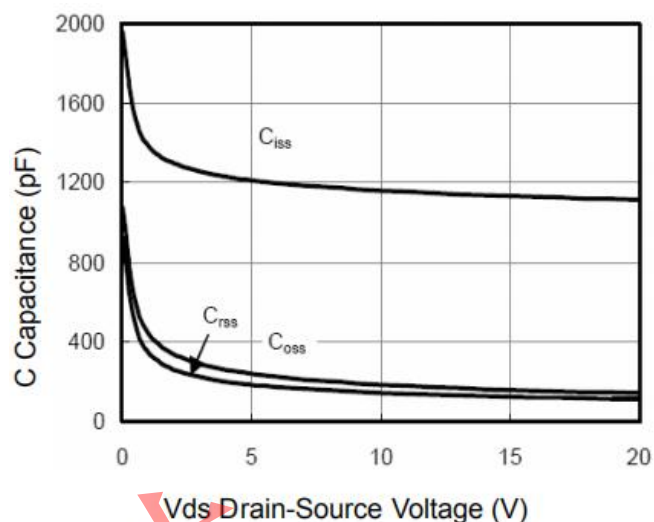


Figure 8 Capacitance vs Vds

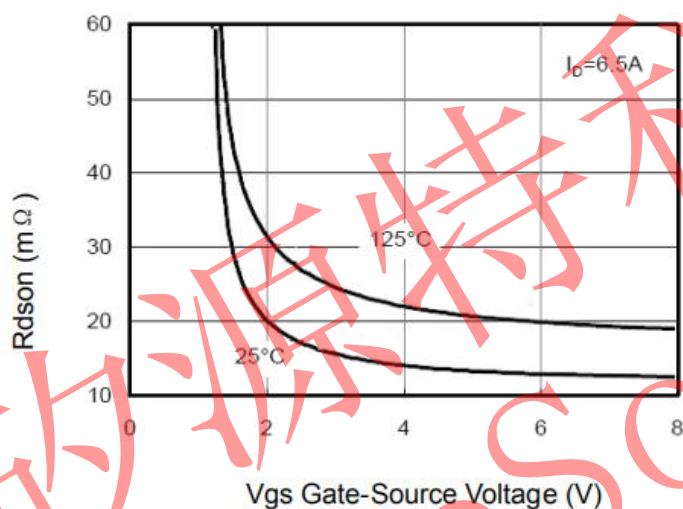


Figure 9 Rdson vs Vgs

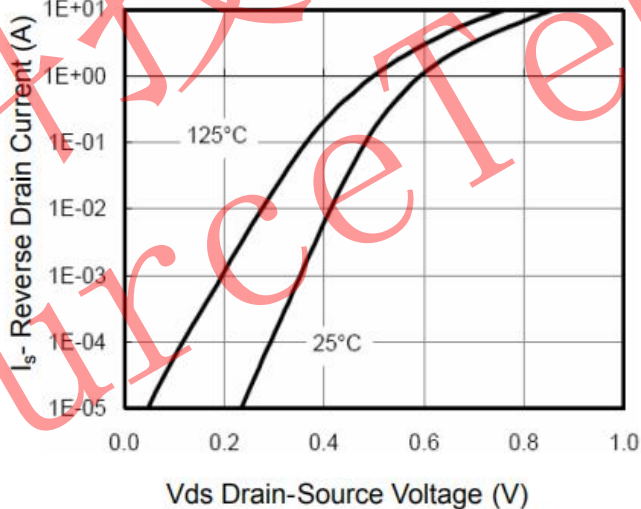


Figure 10 Capacitance vs Vds

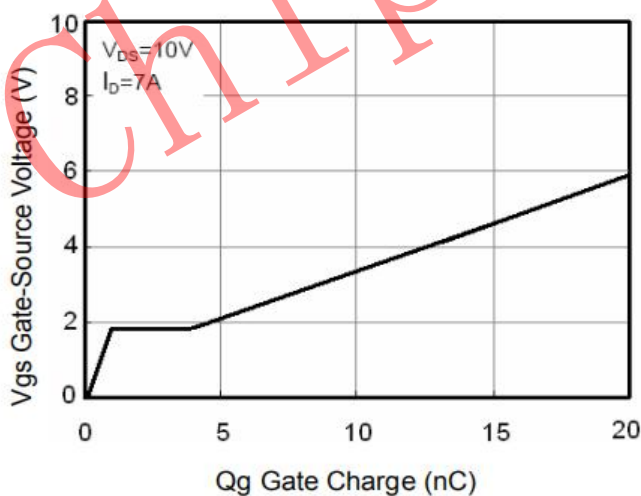


Figure 11 Gate Charge

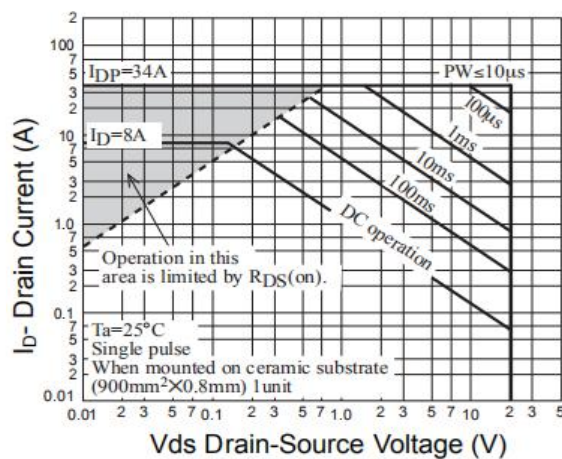


Figure 13 Safe Operation Area

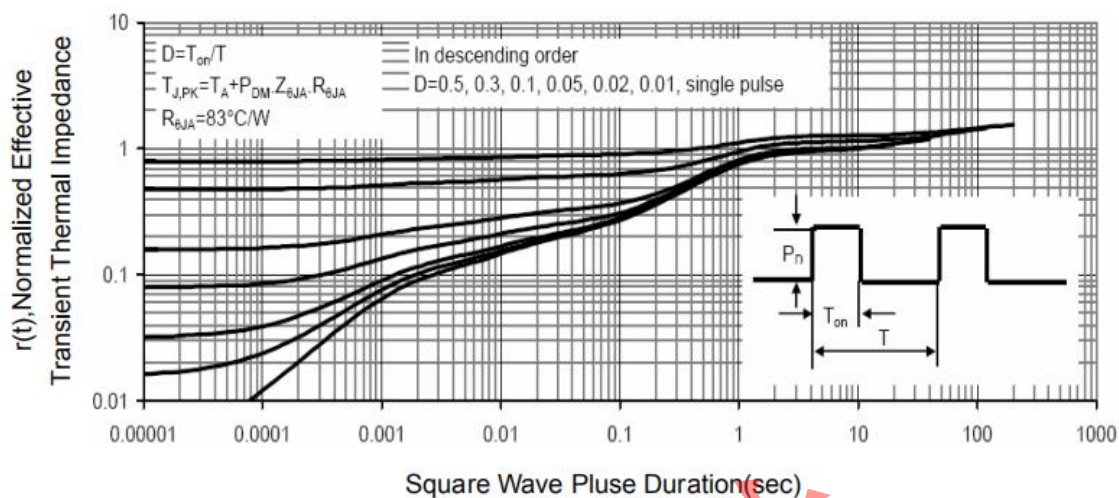
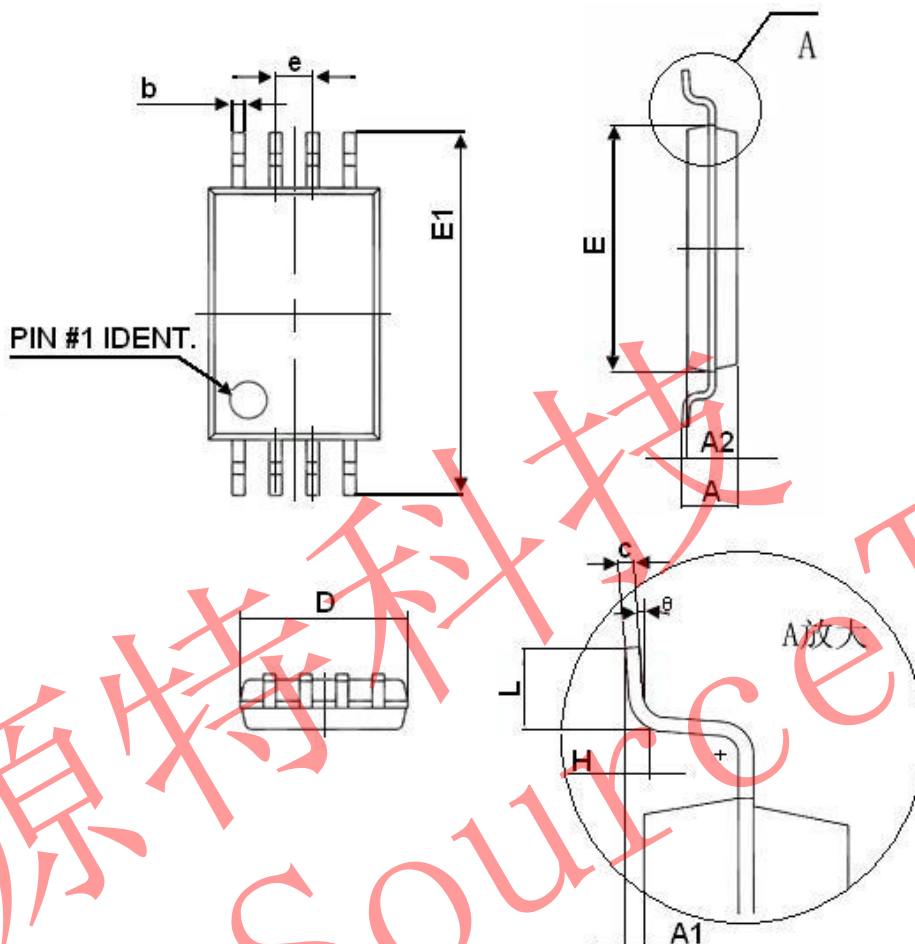


Figure 14 Normalized Maximum Transient Thermal Impedance



TSSOP-8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters	
	Min	Max
D	2.900	3.100
E	4.300	4.500
b	0.190	0.300
c	0.090	0.200
E1	6.250	6.550
A		1.100
A2	0.800	1.000
A1	0.020	0.150
e	0.65(BSC)	
L	0.500	0.700
H	0.25(TYP)	
Ø	1°	7°