

### DESCRIPTION

The MX2814 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 load switch or in PWM applications. It is ESD protected.

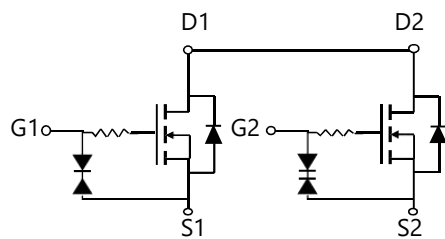
### GENERAL FEATURES

- $V_{DS}=20V$ ,  $I_D=8A$   
 $R_{DS(ON)}(Typ.)=11m\Omega$  @  $V_{GS}=4.5V$   
 $R_{DS(ON)}(Typ.)=12.5m\Omega$  @  $V_{GS}=3.8V$   
 $R_{DS(ON)}(Typ.)=14m\Omega$  @  $V_{GS}=2.5V$   
 ESD Rating: 2000V HBM
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

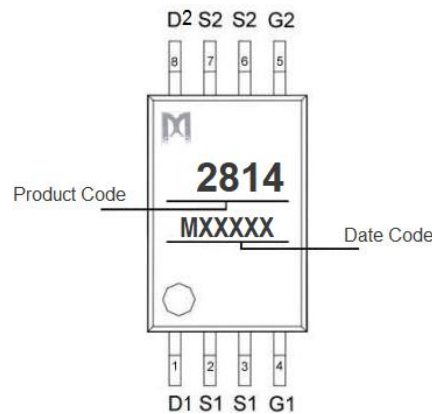
### APPLICATION

- PWM applications
- Load switch

### PINOUT



Schematic diagram



Marking and Pin Assignment

### ORDERING INFORMATION

Part Number	Marking	Storage Temperature	Package	Devices Per Reel
MX2814	MX2814	-55°C to 150°C	TSSOP-8	3000

### 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	$V_{GS}$	$\pm 12$	V
Drain Current-Continuous	$I_D$	8	A
Pulsed Drain Current <sup>(Note1)</sup>	$I_{DM}$	34	A
Maximum Power Dissipation	$P_D$	1.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C

### THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient <sup>(Note2)</sup>	$R_{\theta JA}$	100	°C/W
------------------------------------------------------------	-----------------	-----	------

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

Note 2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.



**ELECTRICAL CHARACTERISTICS** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Conditions	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	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$

**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	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=5.5A$	13	14	18	m $\Omega$
		$V_{GS}=3.8V, I_D=6A$	11	12.5	15	m $\Omega$
		$V_{GS}=4.5V, I_D=7A$	9	11	14	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=7A$	-	20	-	S

**Dynamic Characteristics** (Note 4)

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

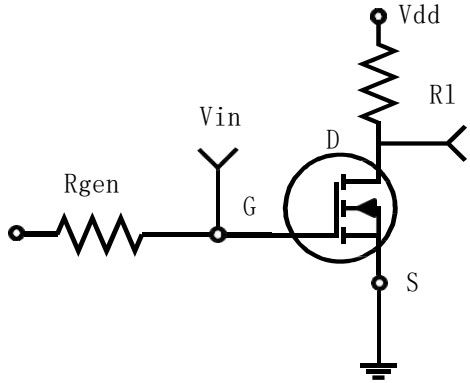
Note 2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

Note 3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

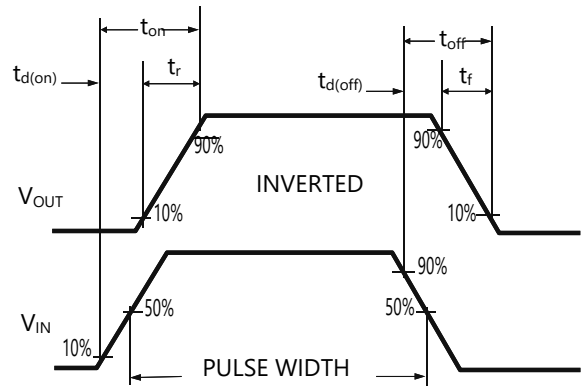
Note 4. Guaranteed by design, not subject to product.

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

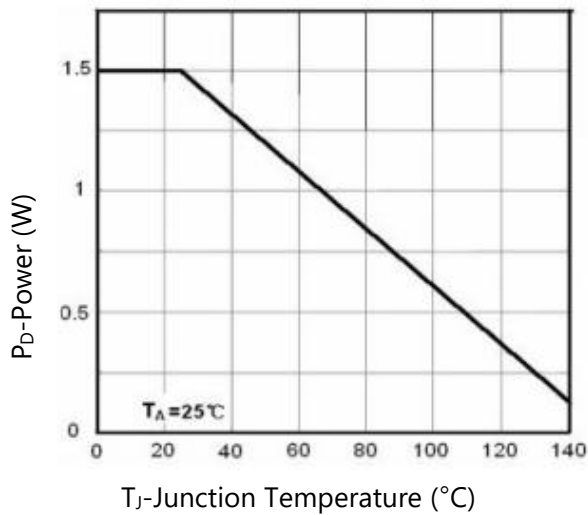
**Figure 1. Switching Test Circuit**



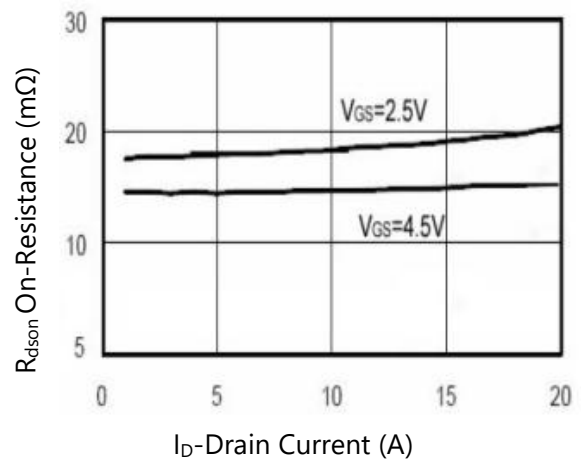
**Figure 2. Switching Waveform**



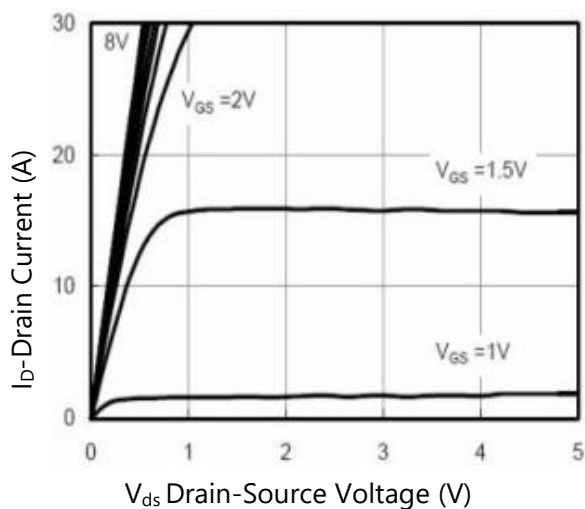
**Figure 3. Power Dissipation**



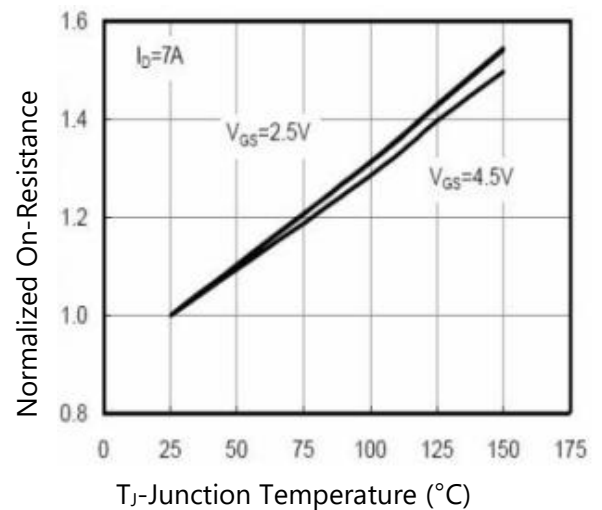
**Figure 4. On-Resistance**



**Figure 5. Output Characteristics**



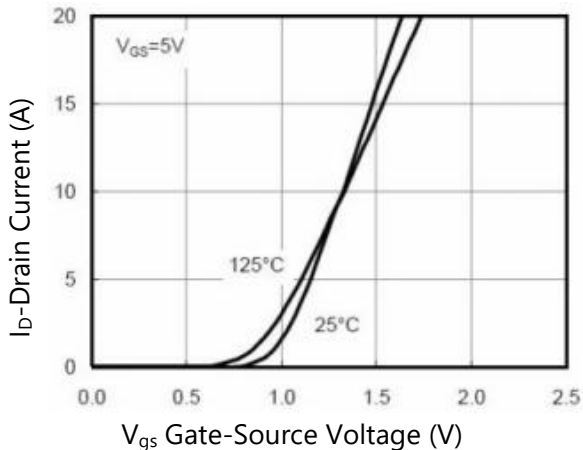
**Figure 6. Normalized On-Resistance**



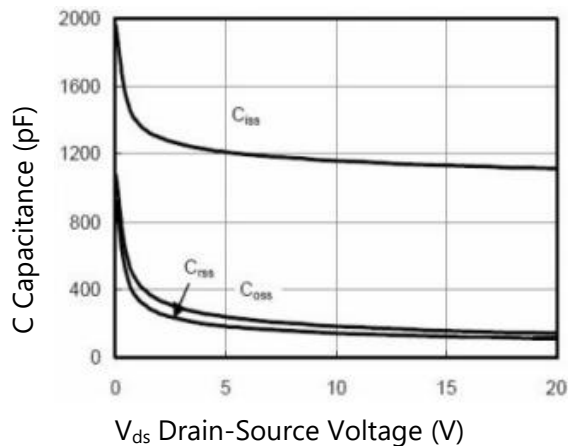


**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

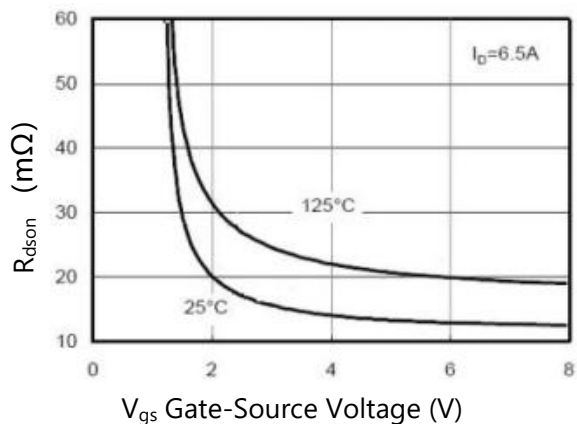
**Figure 7. Transfer Characteristics**



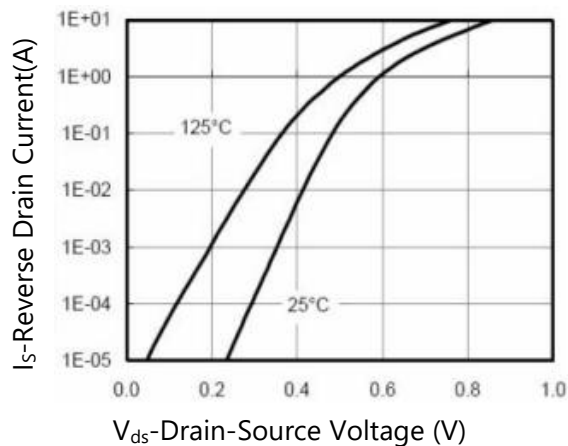
**Figure 8. Capacitance vs Vds**



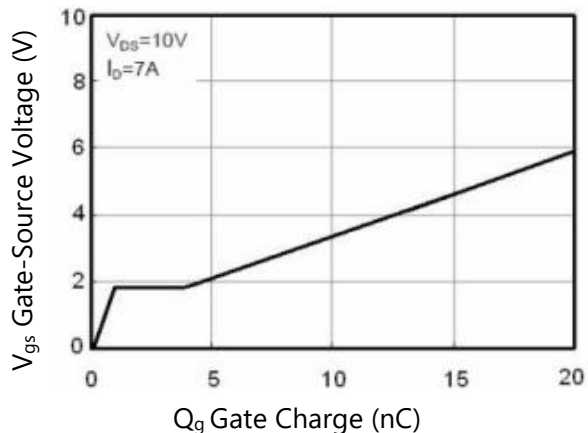
**Figure 9. Rds(on) vs Vgs**



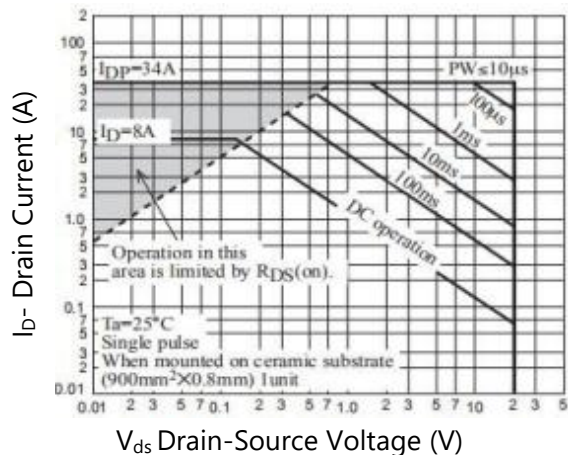
**Figure 10. Capacitance vs Vds**

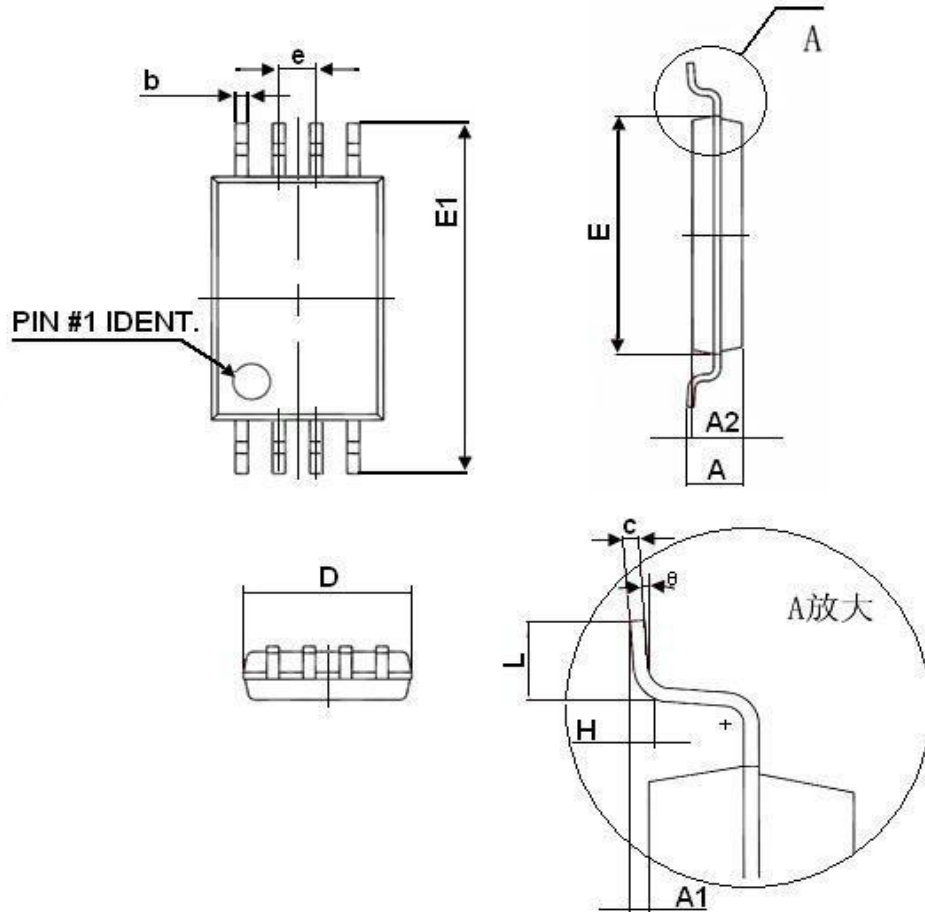


**Figure 11. Gate Charge**



**Figure 12. Safe Operation Area**



**PACKAGE INFORMATION**
**TSSOP-8**


SYMBOLS	DIMENSIONS IN MILLIMETERS	
	MIN	MAX
D	2.90	3.10
E	4.30	4.50
b	0.19	0.30
c	0.09	0.20
E1	6.25	6.55
A	-	1.10
A2	0.80	1.00
A1	0.02	0.15
e	0.65(BSC)	
L	0.50	0.70
H	0.25(TYP)	
θ	1°	7°