

DESCRIPTION

The MX2012E uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications. It is ESD protected.

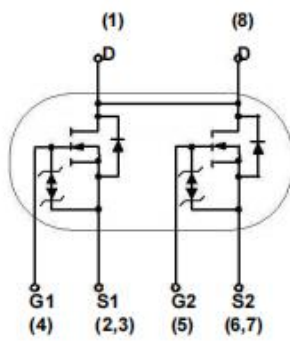
GENERAL FEATURES

- $V_{DS}=20V$, $I_D=8A$
 $R_{DS(ON)}(Typ.)=8.5m\Omega @ V_{GS}=4.5V$
 $R_{DS(ON)}(Typ.)=10m\Omega @ V_{GS}=2.5V$
- Surface-mounted package
- Advanced trench cell design
- Extremely low threshold voltage
- ESD protected (HBM>2KV)

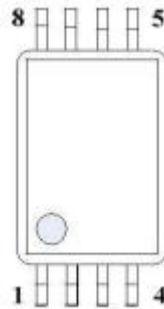
APPLICATION

- Portable appliances
- Battery management

PINOUT



Schematic diagram



Pin Assignment & Top View
TSSOP-8

Pin	Description
1	Drain(D)
2,3	Source(S1)
4	Gate(G1)
5	Gate(G2)
6,7	Source(S2)
8	Drain(D)

Symbol

ORDERING INFORMATION

Part Number	Storage Temperature	Package	Devices Per Reel
MX2012E	-55°C to 150°C	TSSOP-8	-

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}	± 12	V
Drain Current-Continuous ($V_{GS}=4.5V$) ^(Note1)	I_D	8	A
Drain Current-Continuous ($V_{GS}=4.5V, T_A=100^\circ C$) ^(Note1)	I_D	5	A
Pulsed Drain Current ($V_{GS}=4.5V$) ^{(Note1)(Note2)}	I_{DM}	32	A
Total Power Dissipation	P_{tot}	1.25	W
Diode Forward Current	I_S	1.5	A
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient ^(Note1)	$R_{\theta JA}$	100	°C/W
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Note 1. Surface Mounted on 1 in² pad area, $t \leq 10$ sec

Note 2. Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$



Dual N-Channel Enhancement Mode Power MOSFET **MX2012E**



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}	$V_{DS}=16V, V_{GS}=0V$	-	-	1	μA
		$V_{DS}=16V, V_{GS}=0V, T_J=85^\circ C$	-	-	30	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	± 10	μA
		$V_{GS}=\pm 4.5V, V_{DS}=0V$	-	-	± 0.8	μA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1	V
Drain-Source On-State Resistance ^(Note1)	$R_{DS(ON)}$	$V_{GS}=4.5V, I_D=5A$	-	8.5	13	m Ω
		$V_{GS}=2.5V, I_D=4A$	-	10	15	m Ω
Dynamic Characteristics^(Note2)						
Gate Resistance	R_G	$V_{GS}=V_{DS}=0V, F=1.0MHz$	-	800	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V, F=1.0MHz$	-	2840	-	pF
Output Capacitance	C_{oss}		-	310	-	pF
Reverse Transfer Capacitance	C_{rss}		-	290	-	pF
Switching Characteristics^(Note2)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=10V, R_L=10\Omega, V_{GEN}=4.5V, R_G=6\Omega, I_{DS}=1A$	-	19	32	nS
Turn-on Rise Time	t_r		-	29	65	nS
Turn-Off Delay Time	$t_{d(off)}$		-	170	325	nS
Turn-Off Fall Time	t_f		-	102	176	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_{DS}=8A, V_{GS}=4.5V$	-	62	-	nC
Gate-Source Charge	Q_{gs}		-	4	-	nC
Gate-Drain Charge	Q_{gd}		-	24	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note1)	V_{SD}	$V_{GS}=0V, I_{SD}=1.5A$	-	0.7	1.1	V
Reverse Recovery Time	t_{rr}	$I_{SD}=8A, di_{SD}/dt=100A/\mu s$	-	79	-	ns
Reverse Recovery Charge	Q_{rr}		-	43	-	nc

Note 1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Note 2. Guaranteed by design, not subject to product testing.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Power Capability

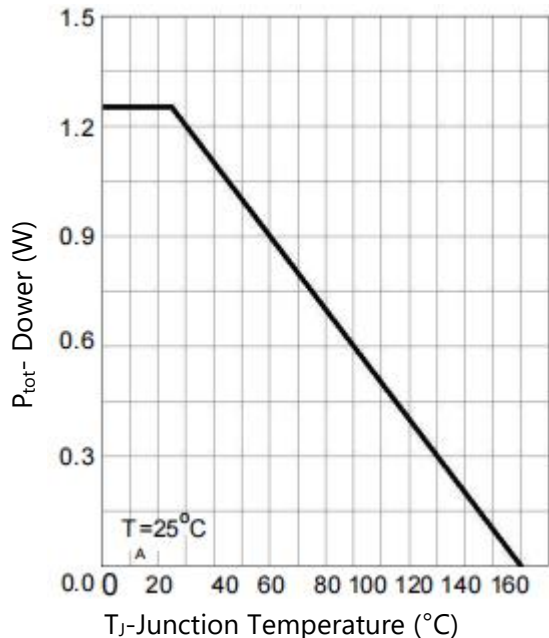


Figure 2. Current Capability

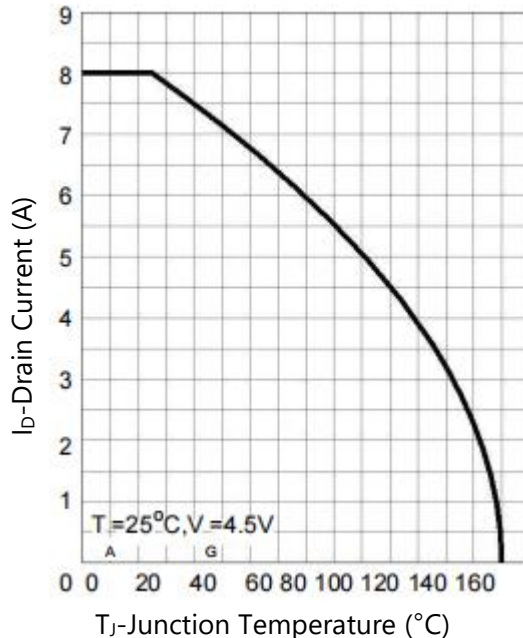


Figure 3. Safe Operating Area

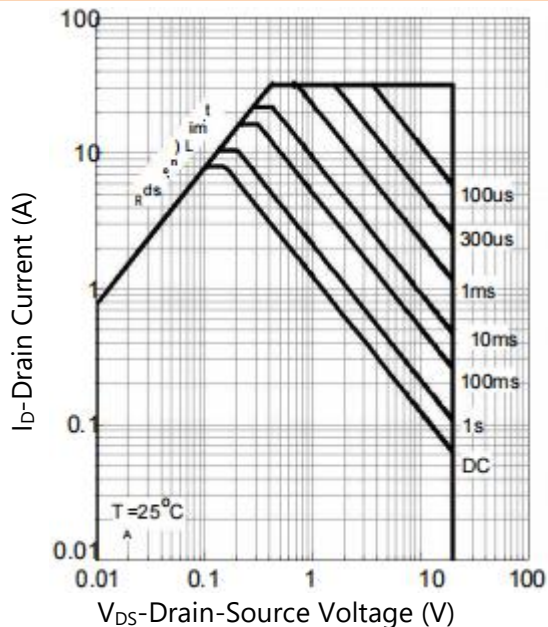
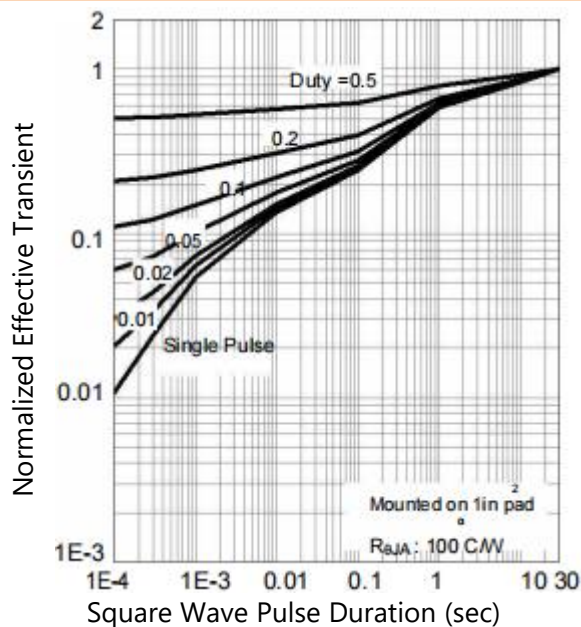


Figure 4. Transient Thermal Impedance





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 5. Output Characteristics

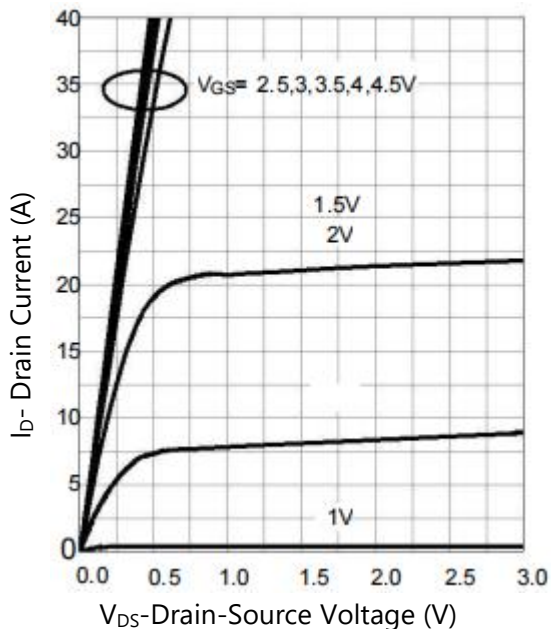


Figure 6. On Resistance

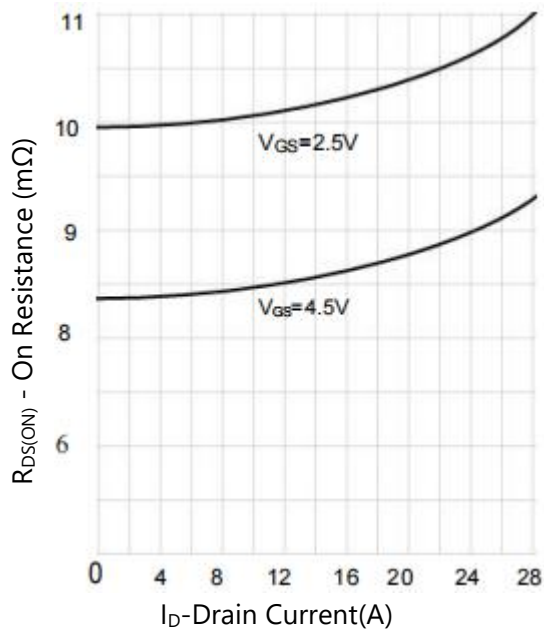


Figure 7. Transfer Characteristics

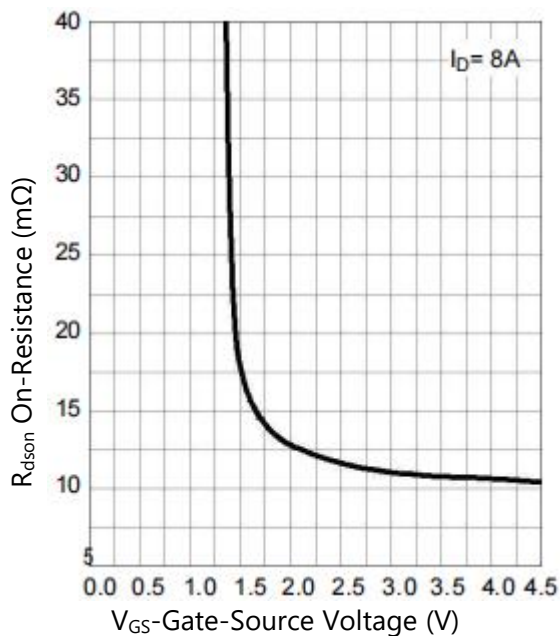
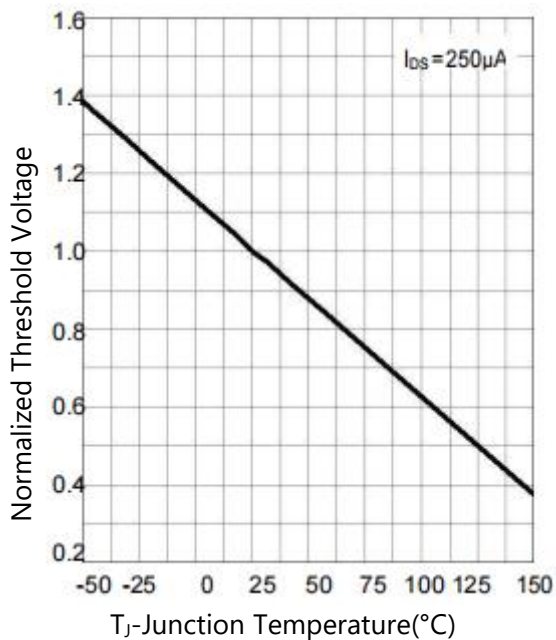


Figure 8. Normalized Threshold Voltage





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 9. Normalized On Resistance

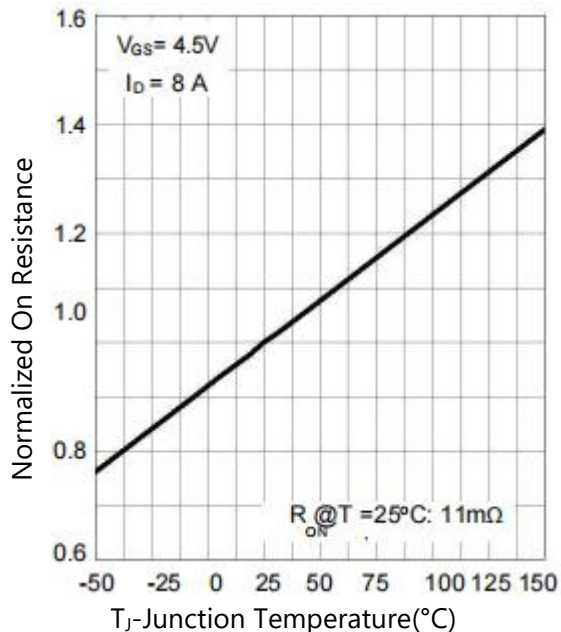


Figure 10. Diode Forward Current

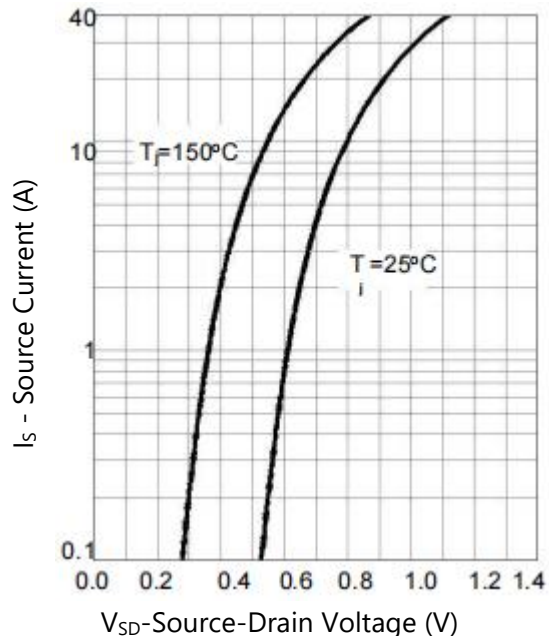


Figure 11. Capacitance

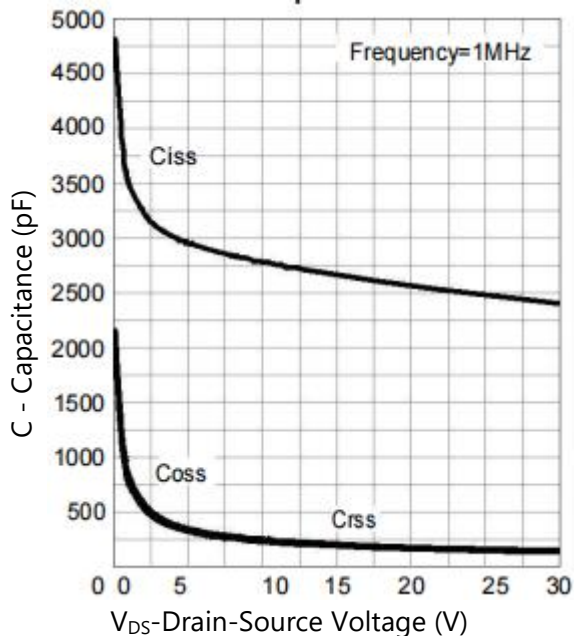
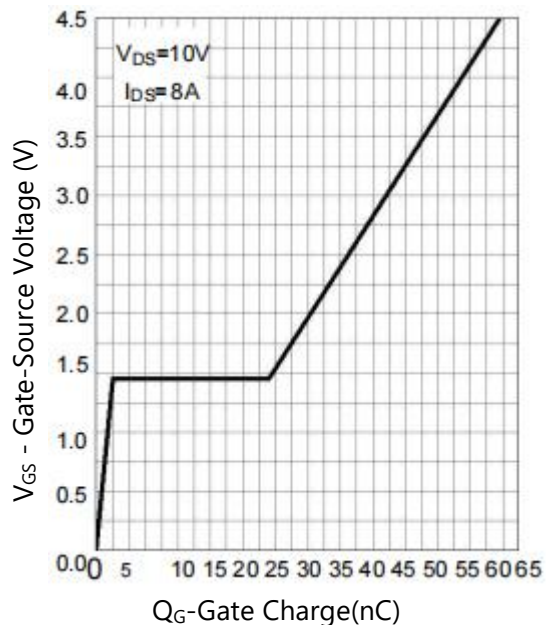
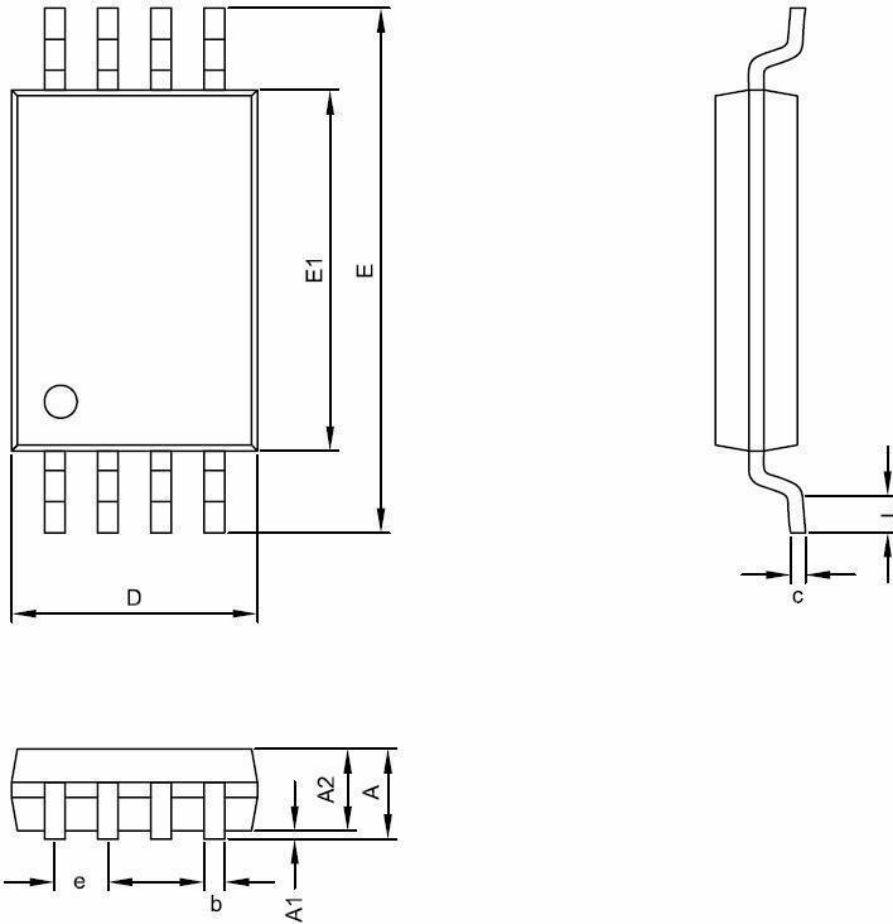


Figure 12. Gate Charge



 **PACKAGE INFORMATION**

TSSOP-8



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	-	1.20
A1	0.00	0.15
A2	0.85	1.05
D	2.90	3.10
E	6.20	6.60
E1	4.30	4.50
c	0.09	0.20
b	0.19	0.30
e	0.65 BSC	
L	0.45	0.75