DESCRIPTION

The MXN8640 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.

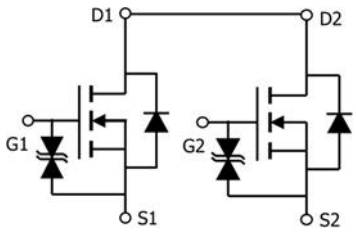
GENERAL FEATURES

- V_{DS}=18V, I_D=10A
  $R_{DS(ON)}$(Typ.)=9.5mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)=10mΩ @ V_{GS}=3.8V
  $R_{DS(ON)}$(Typ.)=11mΩ @ V_{GS}=3.1V
  $R_{DS(ON)}$(Typ.)=13.5mΩ @ V_{GS}=2.5V
  ESD Rating: 2000V HBM
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

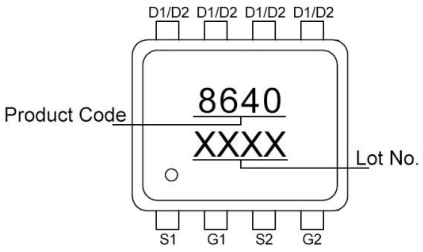
APPLICATION

- PWM applications
- Load switch
- Power management
- Battery protection

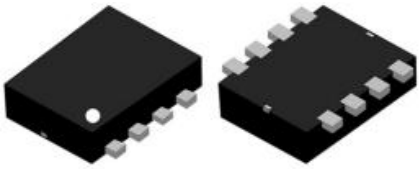
PINOUT



Schematic diagram



Marking


DFN3x3-8L top & bottom view

ORDERING INFORMATION

Part Number	Marking	StorageTemperature	Package	Devices Per Reel
MXN8640	8640	-55°C to 150°C	DFN3x3-8L	-

ABSOLUTE MAXIMUM RATINGS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	18	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	10	A
Drain Current-Continuous(T_A=70°C)	I_D	7.5	A
Pulsed Drain Current(Note1)	I_{DM}	40	A
Maximum Power Dissipation	P_D	2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient(Note2)	$R_{\theta JA}$	62.5	°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
Note 2. Surface Mounted on FR4 Board, t ≤ 10 sec.

ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	18	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V, V_{DS}=0V	-	-	±10	μA
On Characteristics(Note 1)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.45	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=6A	7.5	9.5	12	mΩ
		V_{GS}=3.8V, I_D=6A	8	10	13	mΩ
		V_{GS}=3.1V, I_D=6A	9	11	15.5	mΩ
		V_{GS}=2.5V, I_D=5.5A	11	13.5	20	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=7A	-	30	-	S
Dynamic Characteristics(Note2)						
Input Capacitance	C_{iss}	V_{DS}=10V, V_{GS}=0V, F=100KHz	-	350	-	pF
Output Capacitance	C_{oss}		-	180	-	pF
Reverse Transfer Capacitance	C_{rss}		-	100	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V,F=100KHz	-	2.4	-	KΩ
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V, R_L=1.35Ω, V_{GS}=5V, R_G=3Ω	-	8	-	nS
Turn-on Rise Time	t_r		-	17	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	60	-	nS
Turn-Off Fall Time	t_f		-	22	-	nS
Total Gate Charge	Q_g	V_{DS}=10V, I_D=7A, V_{GS}=4.5V	-	11	-	nC
Gate-Source Charge	Q_{gs}		-	1.4	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage(Note 1)	V_{SD}	V_{GS}=0V, I_S=1A	-	-	1.2	V

Note 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 2. Guaranteed by design, not subject to product.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

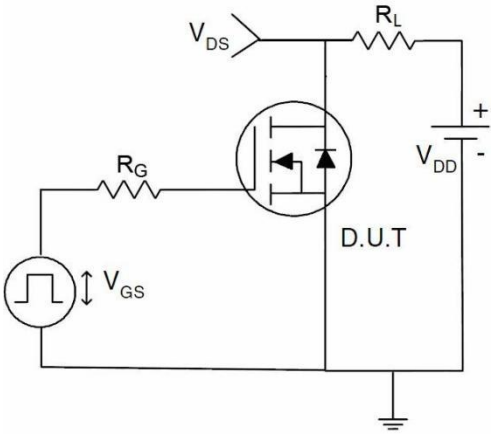


Figure 2. Switching Waveform

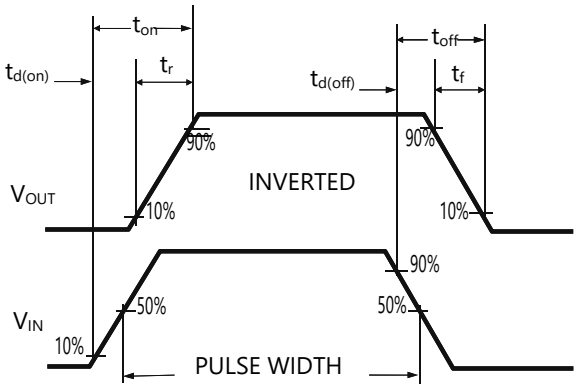


Figure 3. Power Dissipation

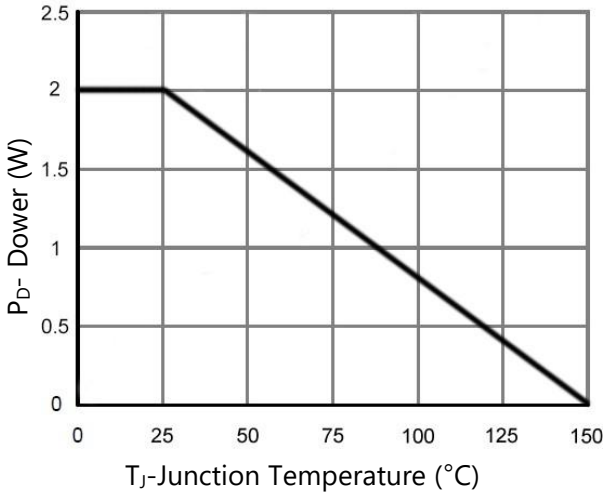


Figure 4. Drain Current

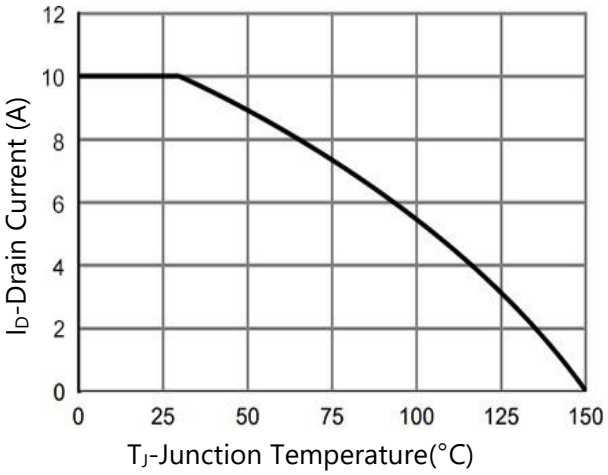


Figure 5. Output Characteristics

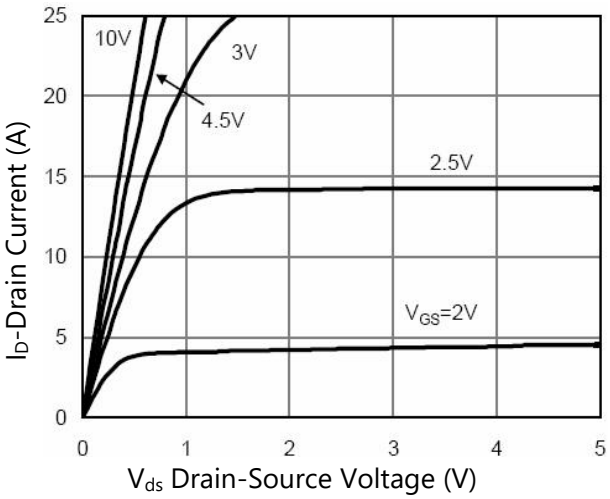
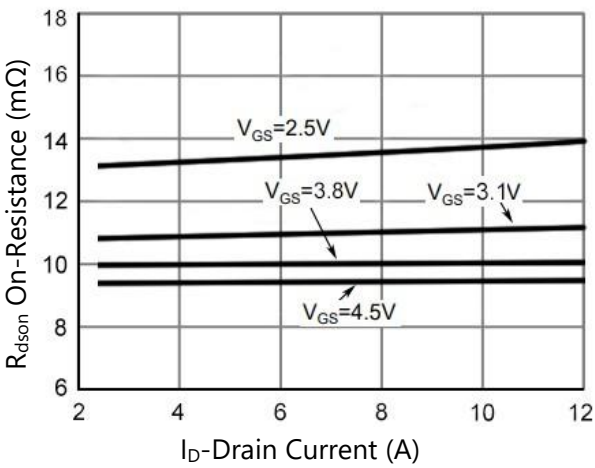


Figure 6. R_{dson} vs Drain Current



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

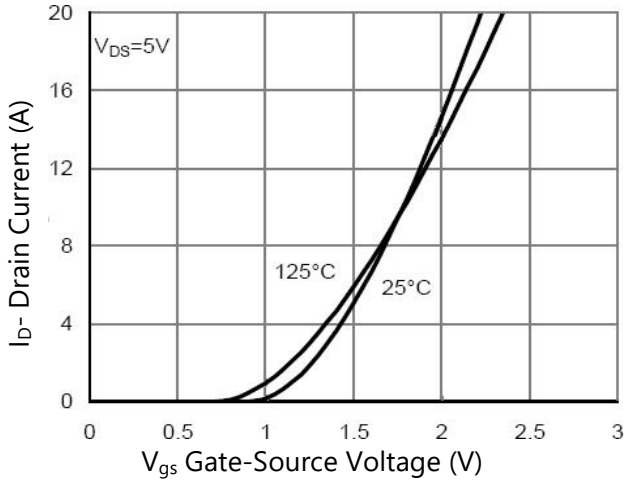


Figure 8. R_{dson} vs Junction Temperature

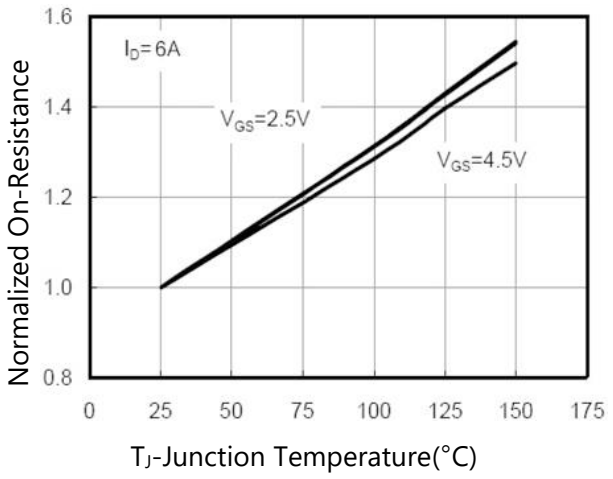


Figure 9. R_{dson} vs V_{gs}

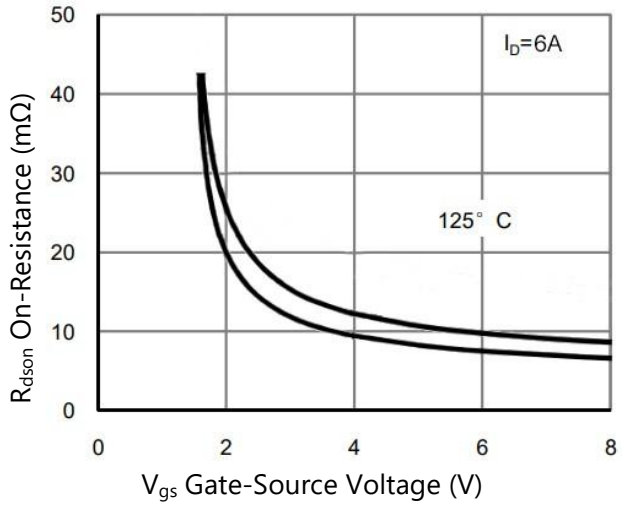


Figure 10. Capacitance vs V_{ds}

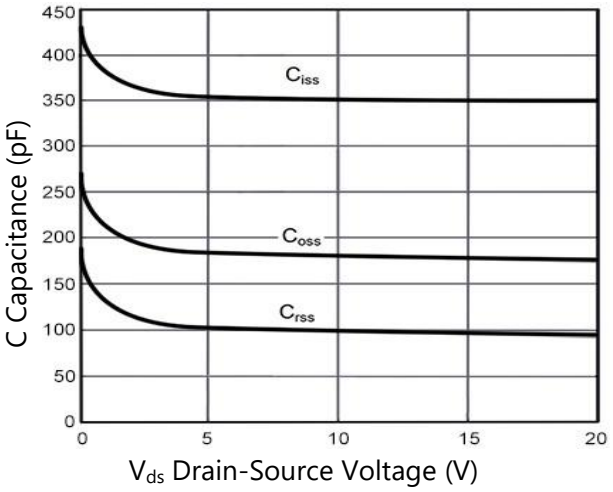


Figure 11. Gate Charge

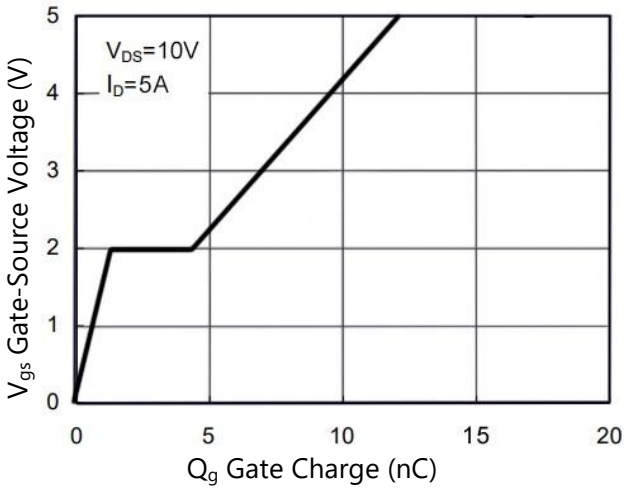
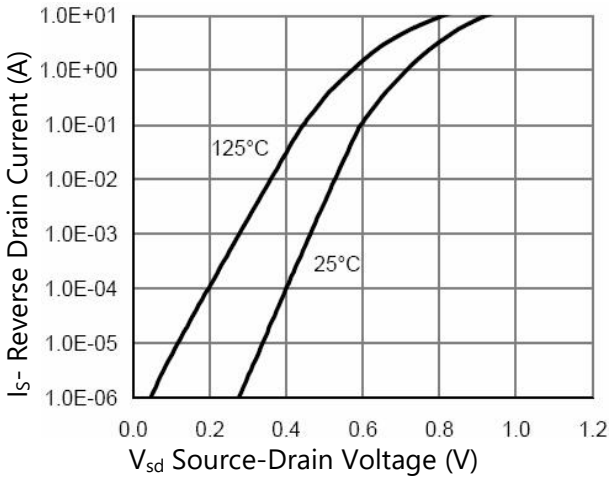


Figure 12. Source-Drain Diode Forward



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

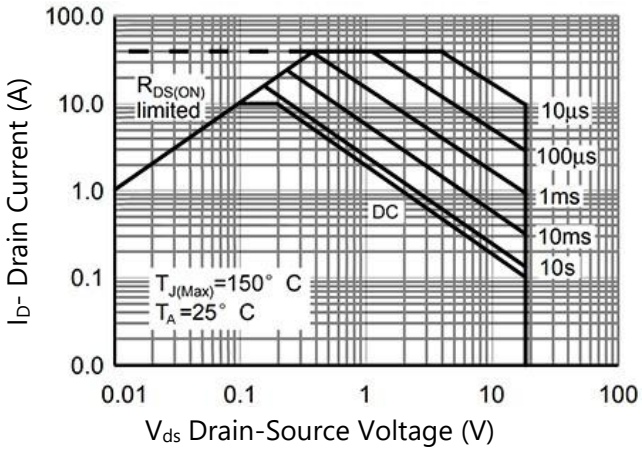
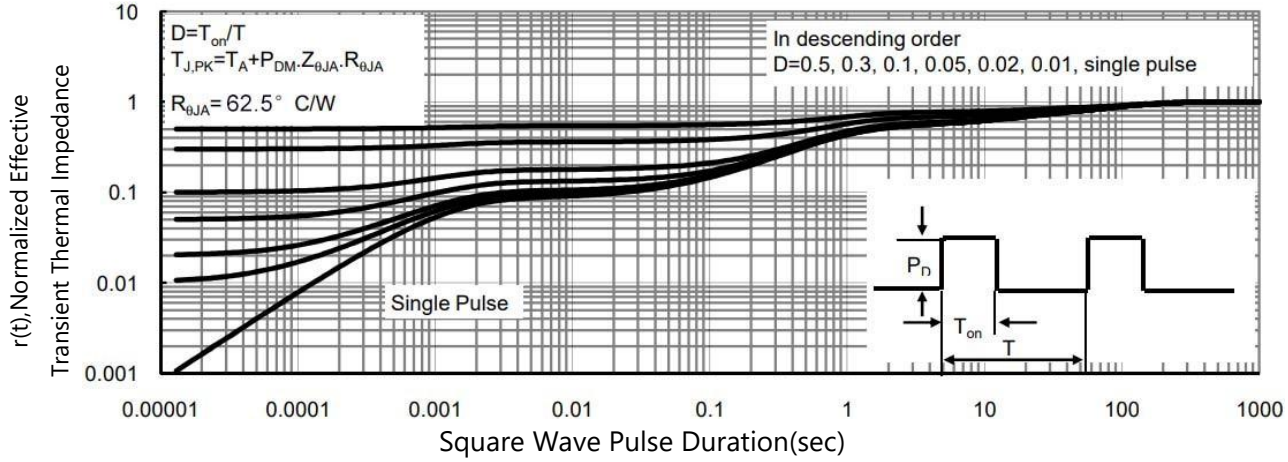
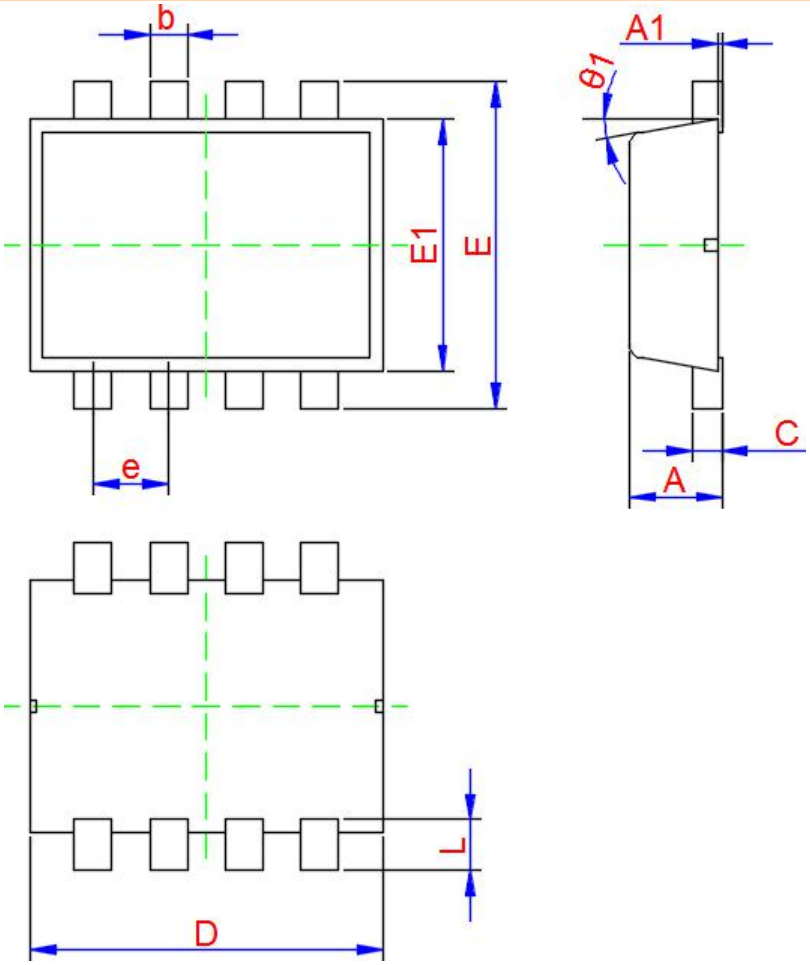


Figure 14. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

DFN3x3-8L



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.700	0.800	0.900
A1	0.000	-	0.050
b	0.240	0.300	0.350
c	0.080	0.150	0.250
D	2.800	2.900	3.000
E	2.700	2.800	2.900
E1	2.200	2.300	2.400
e	0.650TYP.		
L	0.200	0.380	0.450
θ1	0°	10°	12°