DESCRIPTION

The MXN65N04 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

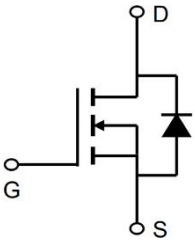
GENERAL FEATURES

- V_{DS}=40V, I_D=65A
  $R_{DS(ON)}$(Typ.)=10mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)=8.0mΩ @ V_{GS}=10V

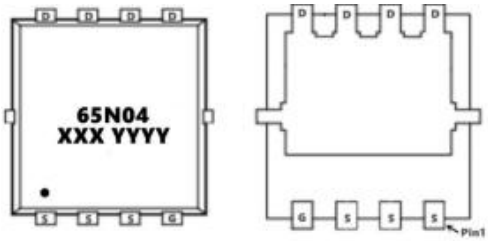
APPLICATION

- Battery protection
- Load switch
- Uninterruptible power supply

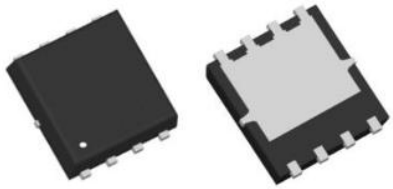
PINOUT



Schematic diagram



Marking and pin Assignment


DFN5*3-3 top & bottom view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MXN65N04	-55°C to 150°C	DFN3*3-8L	5000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous(V_{GS}=10V, T_C=25°C)(Note1)	I_D	65	A
Drain Current-Continuous(V_{GS}=10V, T_C=100°C)(Note1)	I_D	28	A
Pulsed Drain Current(Note2)	I_{DM}	180	A
Single Pulse Avalanche Energy(Note3)	E_{AS}	81	mJ
Avalanche Current	I_{AS}	10	A
Power Dissipation(Note4)	P_D	27.8	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance, Junction-to-Ambient(Note1)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction-to-Case(Note1)	$R_{\theta JC}$	4.5	°C/W

Note1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note3. The E_{AS} data shows Max. rating . The test condition is V_{DD}=36V,V_{GS}=10V,L=0.1mH,I_{AS}=10A
Note4. The power dissipation is limited by 150°C junction temperature

ELECTRICAL CHARACTERISTICS(T_J=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	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V	-	-	1	μA
		V_{DS}=40V,V_{GS}=0V,T_J=55°C	-	-	5	
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=15A	-	10	13	mΩ
		V_{GS}=10V, I_D=30A	-	8.0	10	mΩ
Forward Transconductance	g_{fs}	V_{DS}=5V, I_D=30A	-	22	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=20V, V_{GS}=0V, F=1.0MHz	-	2400	-	pF
Output Capacitance	C_{oss}		-	192	-	pF
Reverse Transfer Capacitance	C_{rss}		-	165	-	pF
Gate Resistance	R_g	V_{DS}=0V,V_{GS}=0V,F=1.0MHz	-	1.7	3.4	Ω
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V, I_D=25A, V_{GS}=10V,R_G=1Ω	-	12	-	nS
Turn-on Rise Time	t_r		-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	9	-	nS
Total Gate Charge	Q_g	V_{DS}=20V, I_D=25A, V_{GS}=10V	-	37	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	nC
Gate-Drain Charge	Q_{gd}		-	7	-	nC
Drain-Source Diode Characteristics						
Coninuous Source Current(Note1)(Note5)	I_S	V_G=V_D=0V, Force Current	-	-	50	A
Pulsed Source Current(Note2)(Note5)	I_{SM}		-	-	200	A
Diode Forward Voltage(Note2)	V_{SD}	V_{GS}=0V, I_S=1A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	I_F=30A, dI/dt=100A/μs	-	22	-	nS
Reverse Recovery Charge	Q_{rr}		-	11	-	nC

Note1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
Note2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
Note5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Output Characteristics

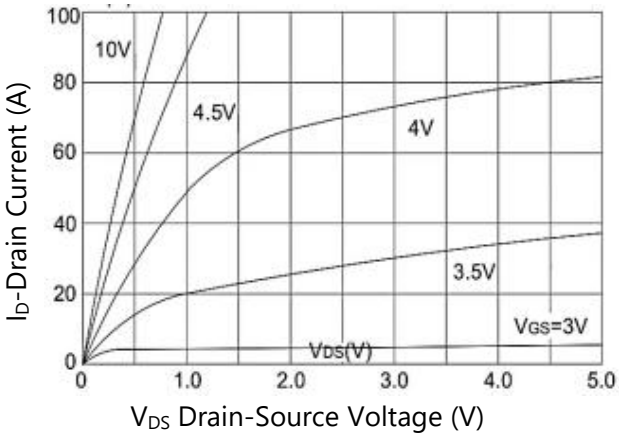


Figure 2. Transfer Characteristics

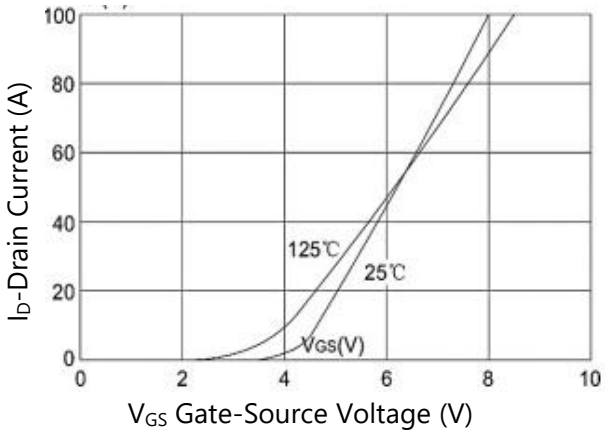


Figure 3. On-Resistance vs Drain Current

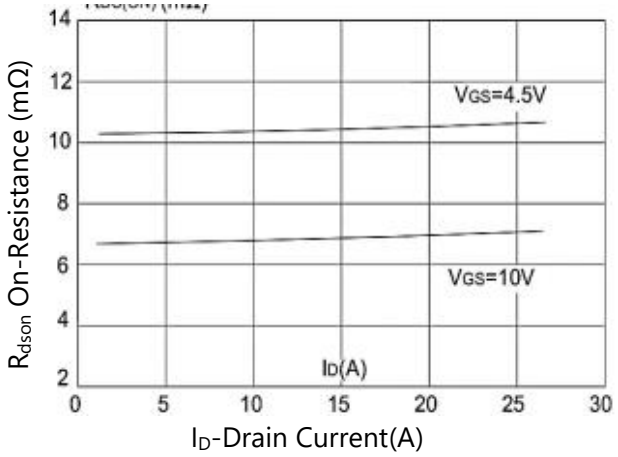


Figure 4. Body Diode Characteristics

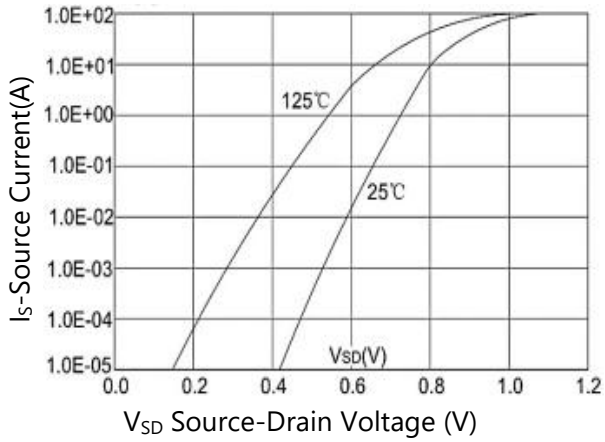


Figure 5. Gate Charge

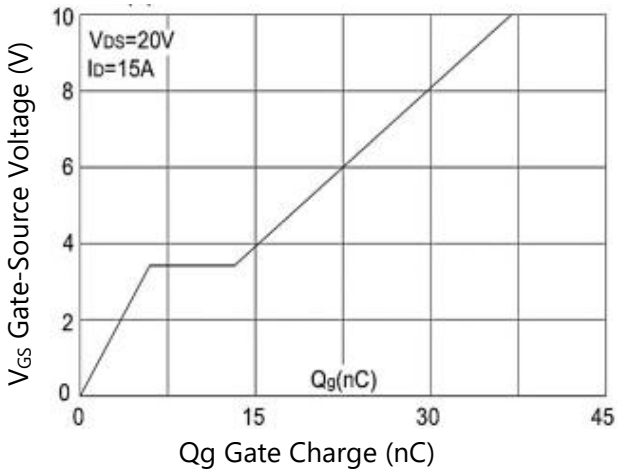
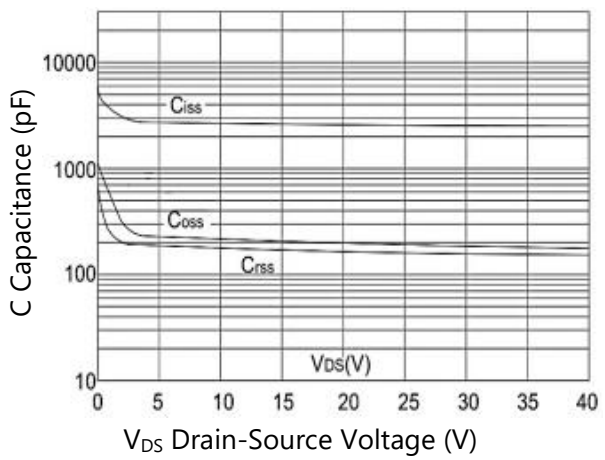


Figure 6. Capacitance vs V_{DS}



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. $V_{BR(DSS)}$ vs Junction Temperature

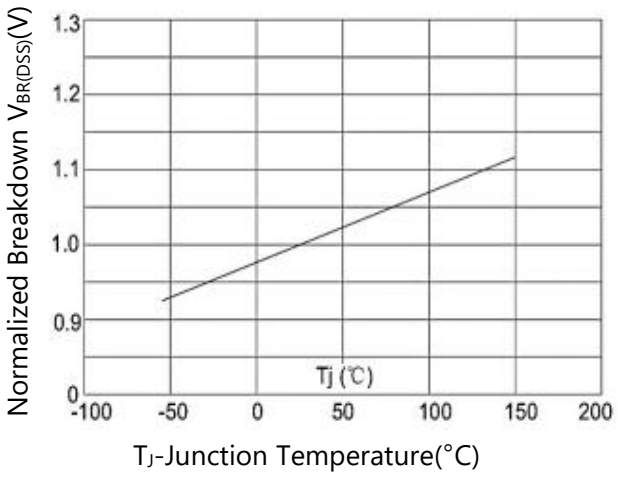


Figure 8. R_{DSON} vs Junction Temperature

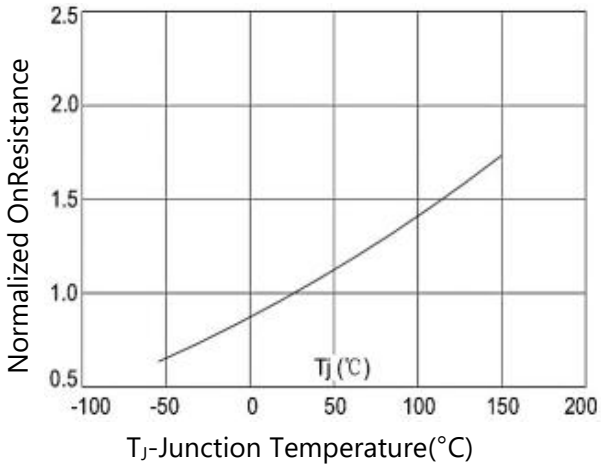


Figure 9. Drain Current vs Ambient Temperature

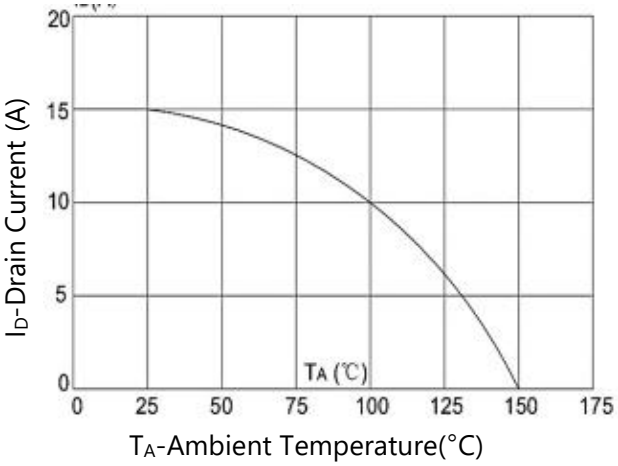


Figure 10. Safe Operation Area

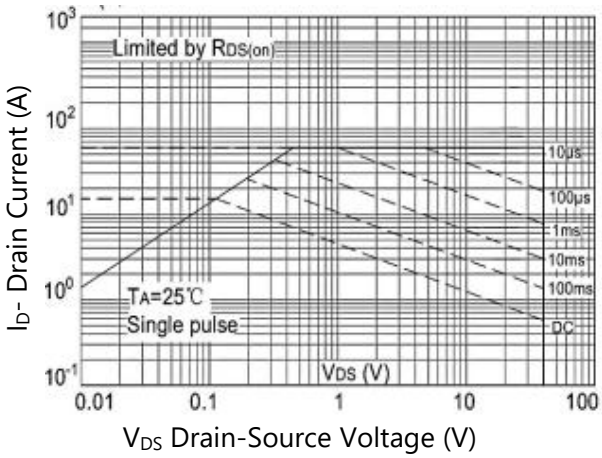
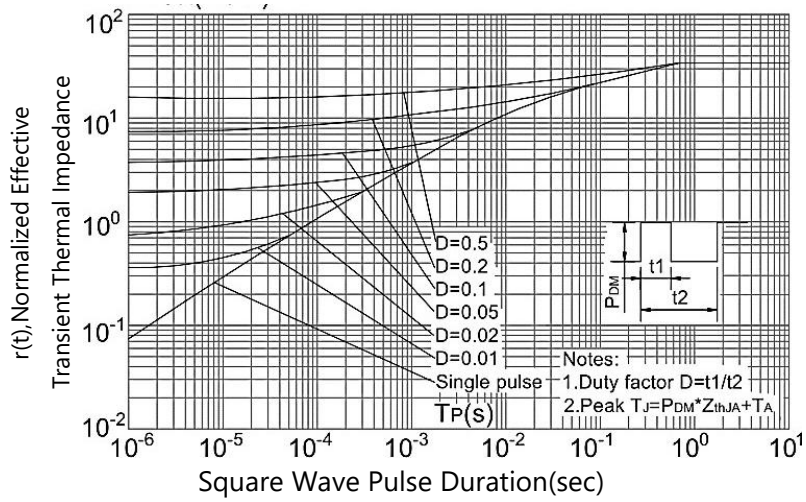
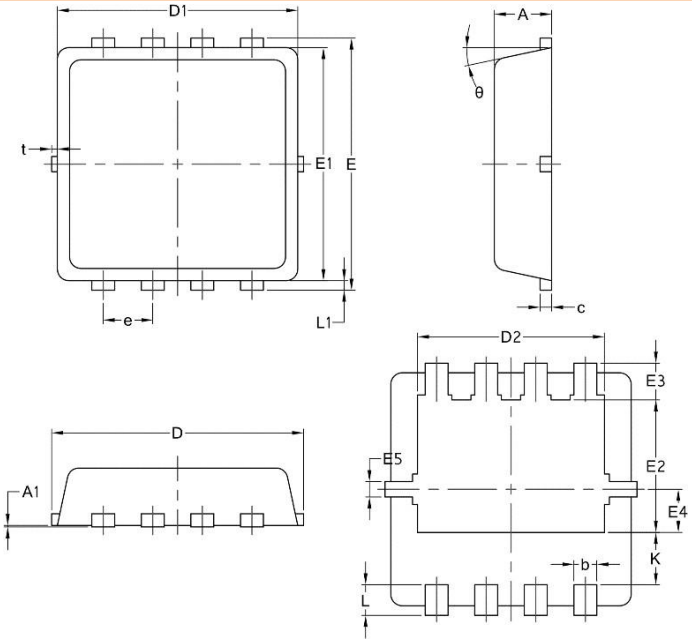


Figure 11. Normalized Maximum Transient Thermal Impedance



PACKAGE INFORMATION

DFN3*3-8L



Symbol	Dimensions In Millimeters		
	Min.	Max.	Min.
A	0.70	0.75	0.85
A1	-	-	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14