N-Channel Enhancement Mode Power MOSFET **MX3400**

DESCRIPTION

The MX3400 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

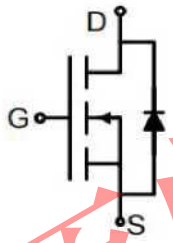
GENERAL FEATURES

- V_{DS}=30V, I_D=5.7A
  $R_{DS(ON)}$(Typ.)=30mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$(Typ.)=22mΩ @ V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)=20mΩ @ V_{GS}=10V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

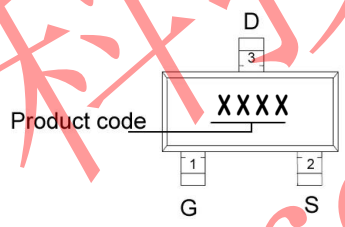
APPLICATION

- PWM applications
- Load switch
- Power management

PINOUT



Schematic diagram



Marking and pin Assignment

SOT-23-3L top view

ORDERING INFORMATION

Part Number	StorageTemperature	Package	Devices Per Reel
MX3400	-55°C to 150°C	SOT-23-3L	3000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	5.7	A
Pulsed Drain Current(Note1)	I_{DM}	25	A
Maximum Power Dissipation	P_D	1.4	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient(Note2)	$R_{\theta JA}$	89	°C/W

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

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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	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
On Characteristics(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.6	0.85	1.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=2.5V, I_D=2A	-	30	50	mΩ
		V_{GS}=4.5V, I_D=3A	-	22	33	mΩ
		V_{GS}=10V, I_D=5.7A	-	20	28	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=5A	10	-	-	S
Dynamic Characteristics(Note4)						
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, F=1.0MHz	-	820	-	pF
Output Capacitance	C_{oss}		-	99	-	pF
Reverse Transfer Capacitance(Note4)	C_{rss}		-	77	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, R_L=2.7Ω, V_{GS}=10V,R_G=3Ω	-	3.3	-	nS
Turn-on Rise Time	t_r		-	4.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	V_{DS}=15V, I_D=5A, V_{GS}=4.5V	-	9.5	-	nC
Gate-Source Charge	Q_{gs}		-	1.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	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		-	-	5.7	A

Note 2. Surface Mounted on FR4 Board, t ≤ 10 sec.
Note 3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
Note 4. Guaranteed by design, not subject to product.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

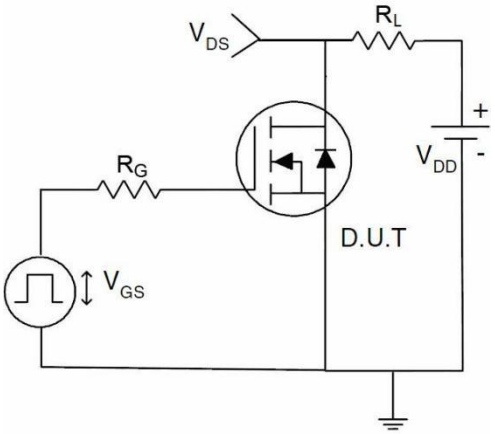


Figure 2. Switching Waveform

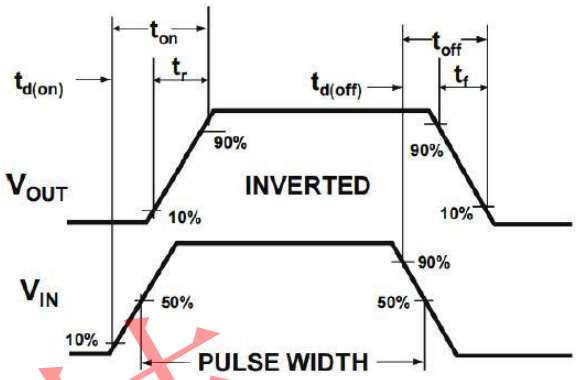


Figure 3. Power Dissipation

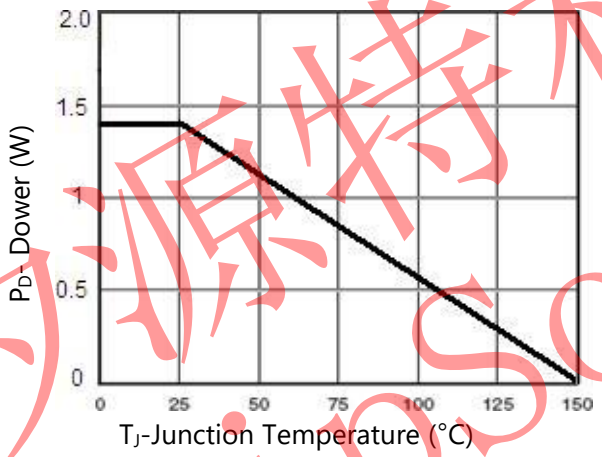


Figure 4. Drain Current

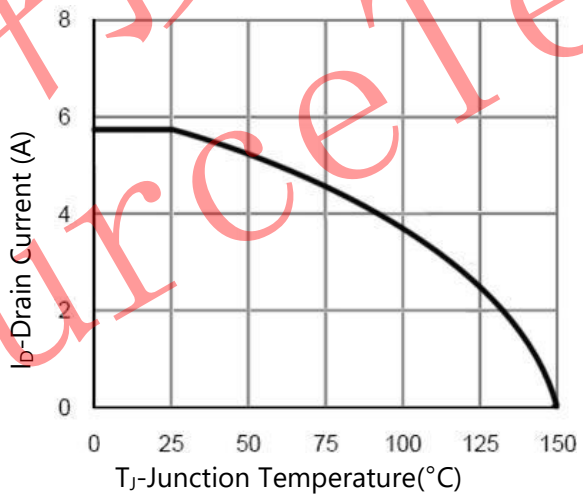


Figure 5. Output Characteristics

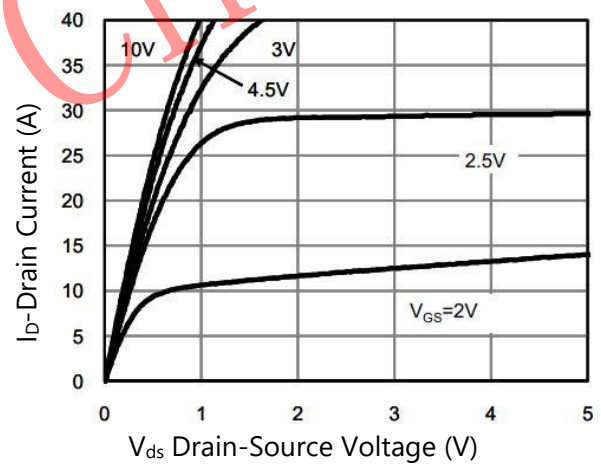
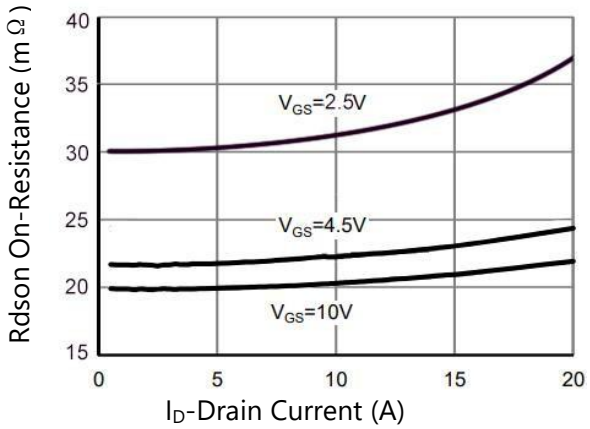


Figure 6. R_{dson} vs Drain Current



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

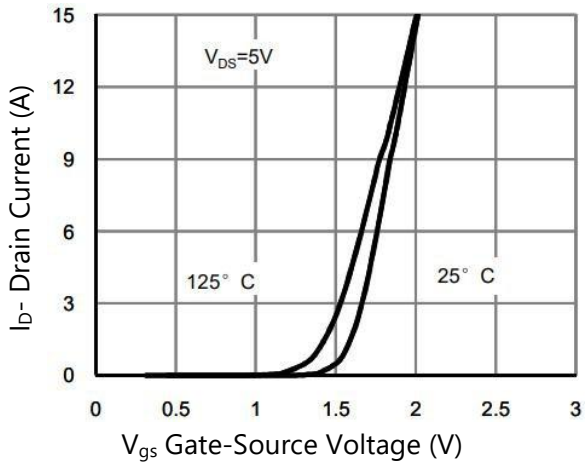


Figure 8. R_{dson} vs Junction Temperature

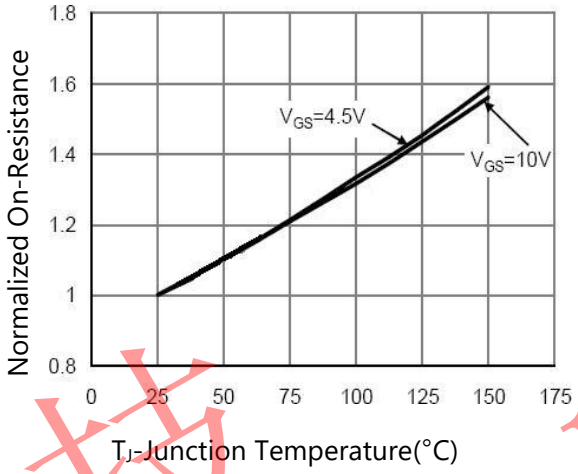


Figure 9. Rdson vs V_{gs}

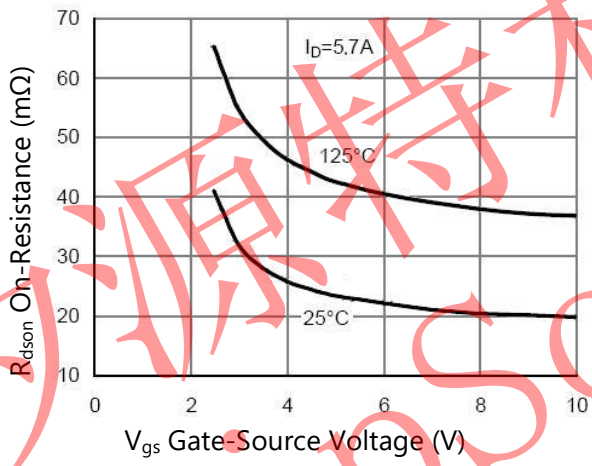


Figure 10. Capacitance vs V_{DS}

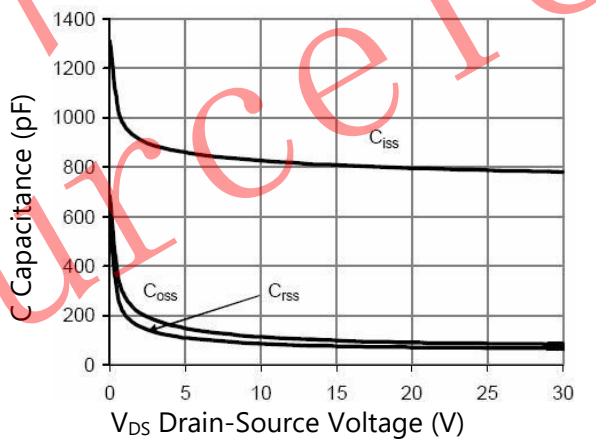


Figure 11. Gate Charge

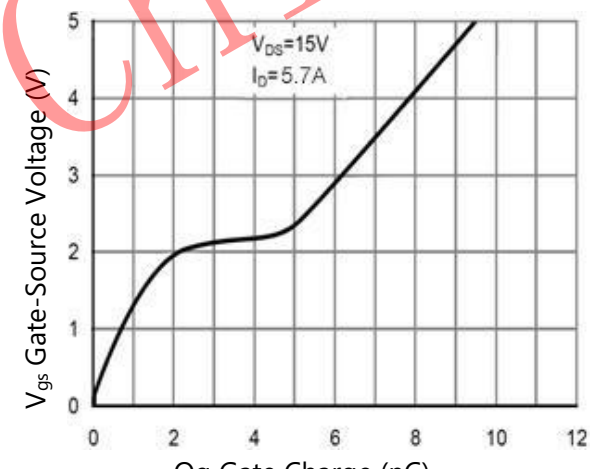
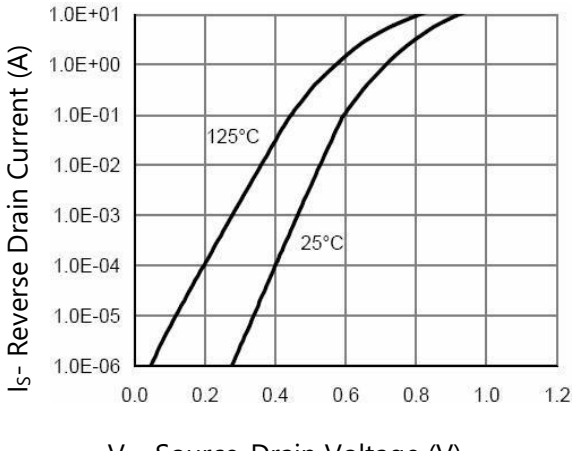


Figure 12. Source- Drain Diode Forward



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

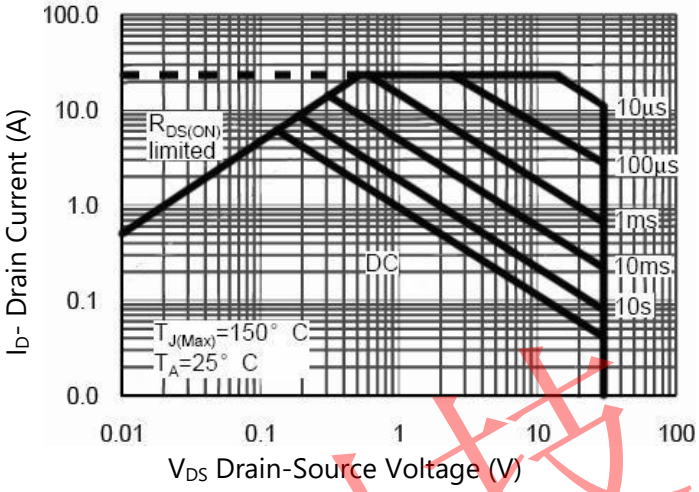
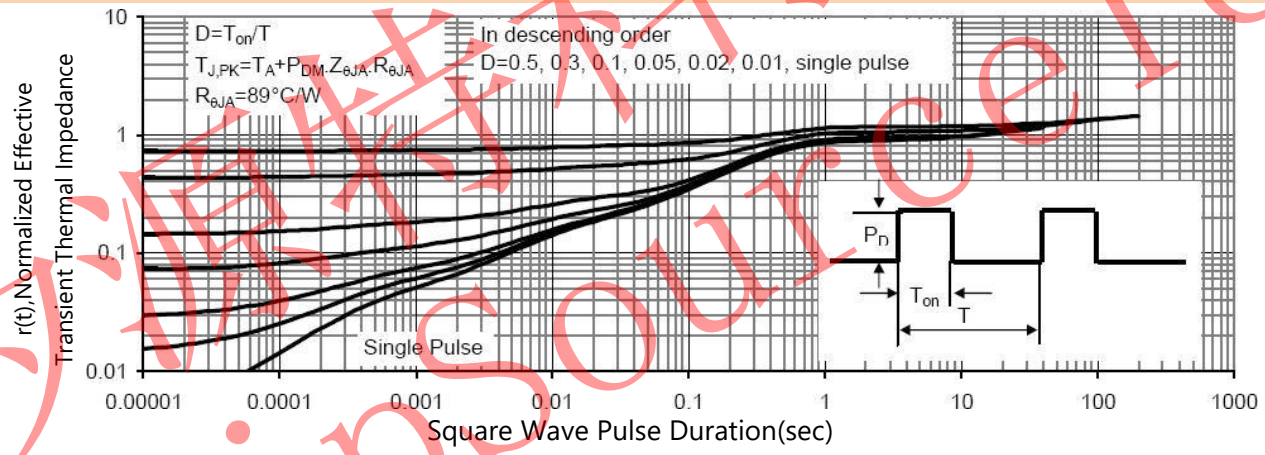


Figure 14. Normalized Maximum Transient Thermal Impedance



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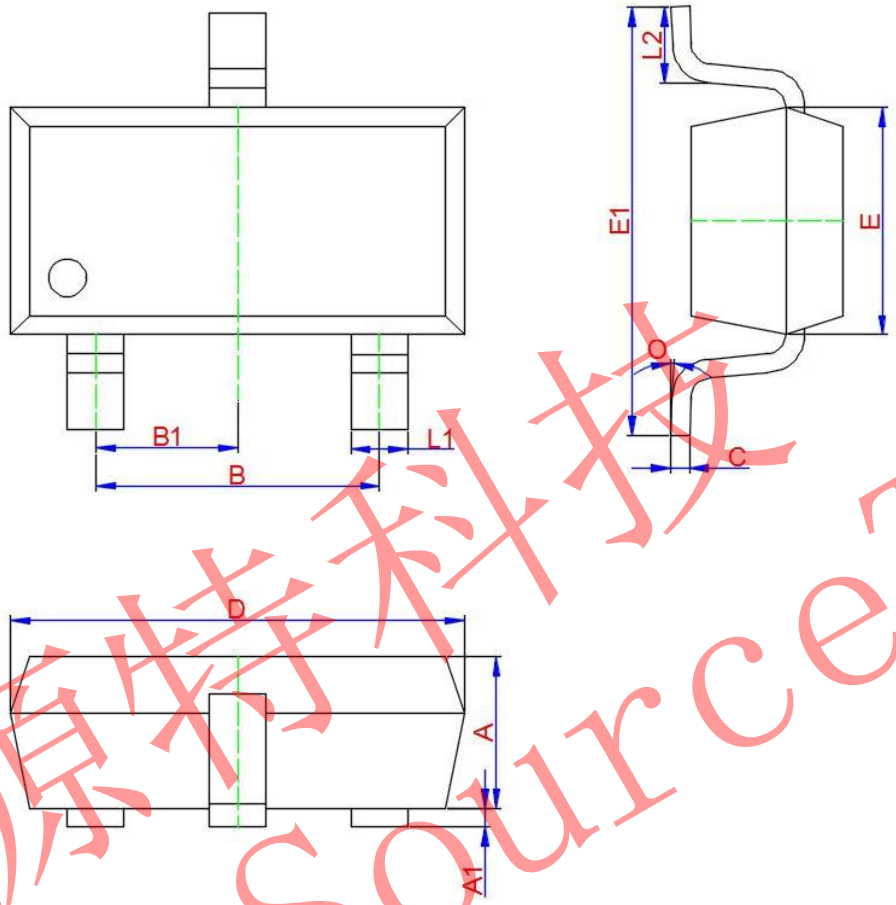
PACKAGE INFORMATION

SOT-23-3L



Symbol	Dimensions in Millimeters		
	Min	Typ.	Max
A	1.050	1.100	1.150
A1	0.000	0.050	0.100
L1	0.300	0.400	0.500
C	0.100	0.150	0.200
D	2.820	2.920	3.020
E	1.500	1.600	1.700
E1	2.650	2.800	2.950
B	1.800	1.900	2.000
B1	0.950 TYP.		
L2	0.300	0.450	0.600
O	0°	4°	8°

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