



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.

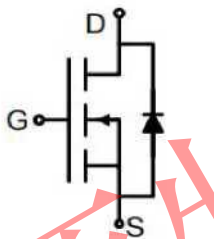
GENERAL FEATURES

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

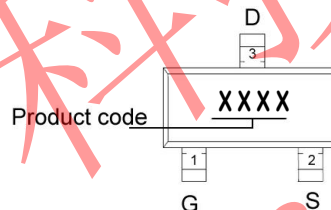
APPLICATION

- PWM applications
- Load switch
- Power management

PINOUT



Schematic diagram



Marking and pin Assignment



SOT-23-3L top view

ORDERING INFORMATION

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

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ 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
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Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

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



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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}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.6	0.85	1.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=2A$	-	30	50	m Ω
		$V_{GS}=4.5V, I_D=3A$	-	22	33	m Ω
		$V_{GS}=10V, I_D=5.7A$	-	20	28	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$	10	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	820	-	pF
Output Capacitance	C_{oss}		-	99	-	pF
Reverse Transfer Capacitance (Note 4)	C_{rss}		-	77	-	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, R_L=2.7\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	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, $t \leq 10$ sec.

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

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



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

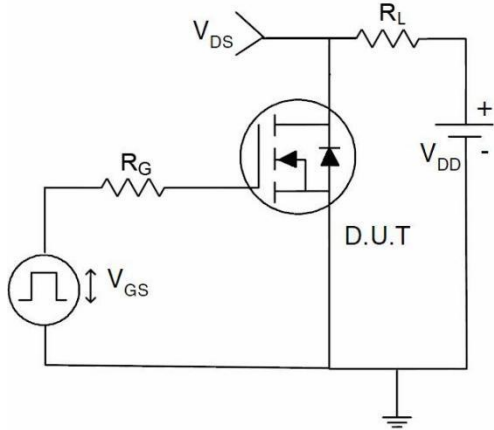


Figure 2. Switching Waveform

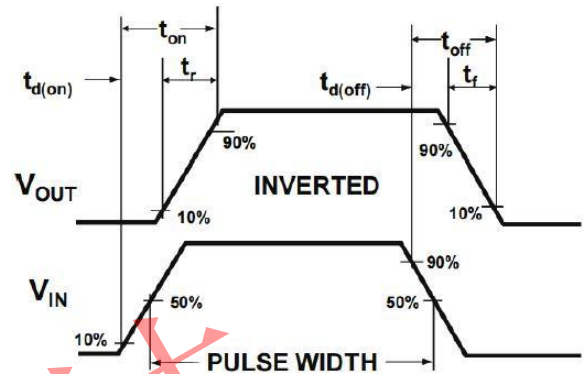


Figure 3. Power Dissipation

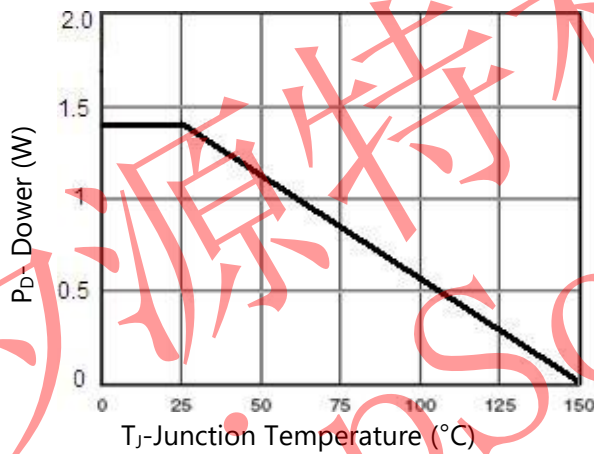


Figure 4. Drain Current

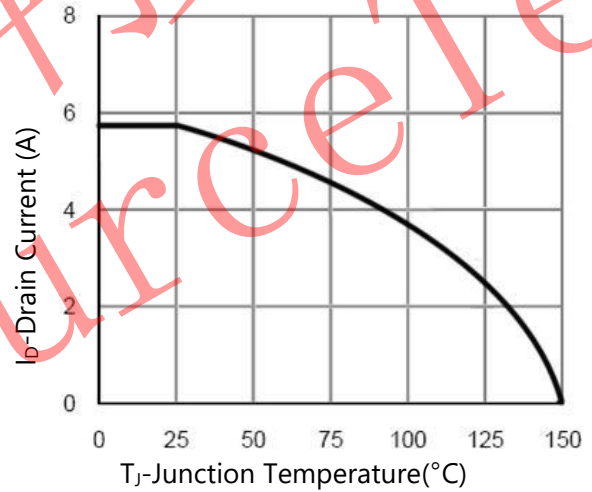


Figure 5. Output Characteristics

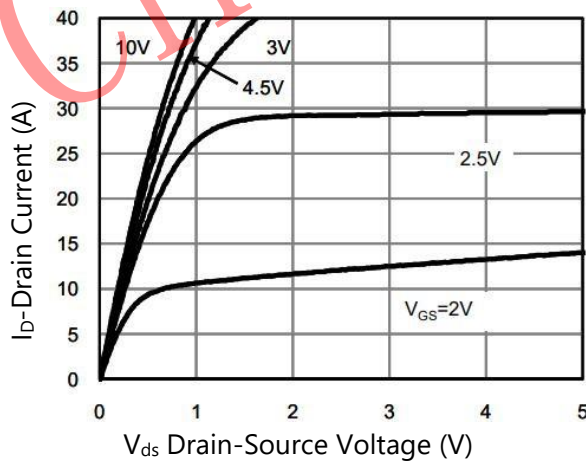
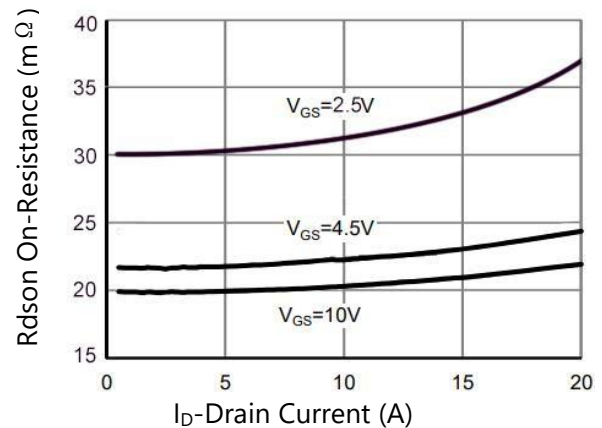


Figure 6. R_{dson} vs Drain Current





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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

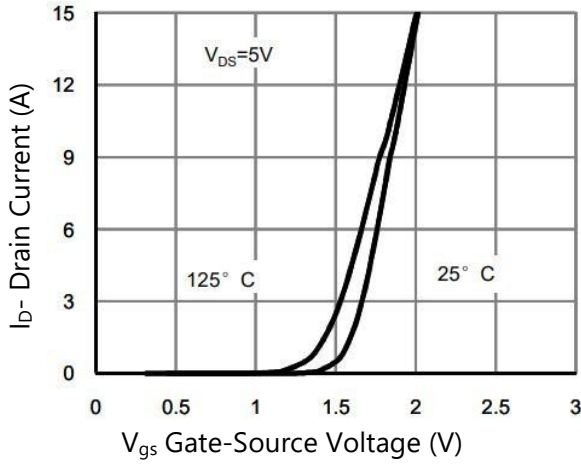


Figure 8. R_{dson} vs Junction Temperature

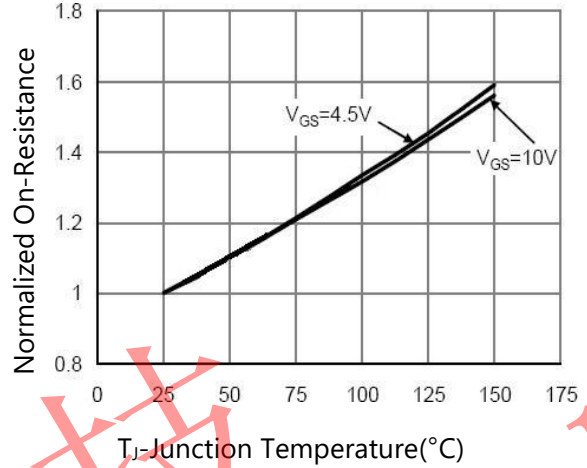


Figure 9. R_{dson} vs V_{gs}

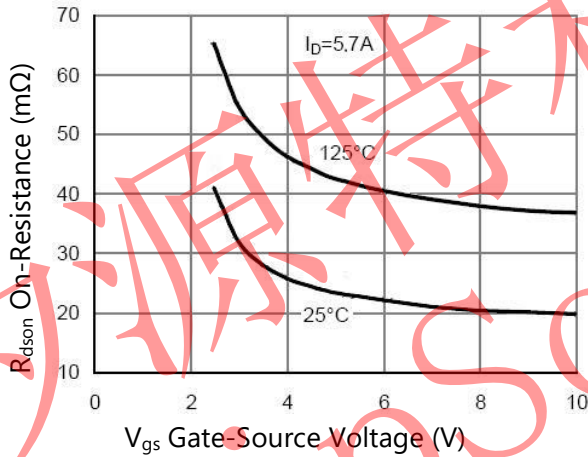


Figure 10. Capacitance vs V_{DS}

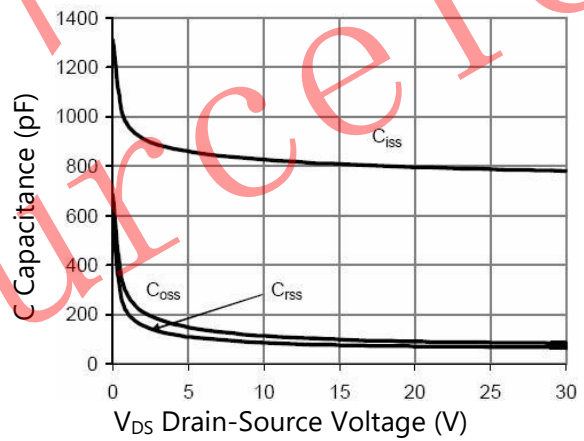


Figure 11. Gate Charge

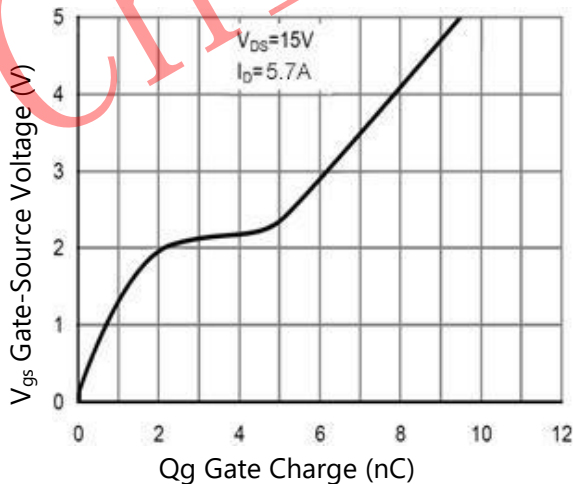
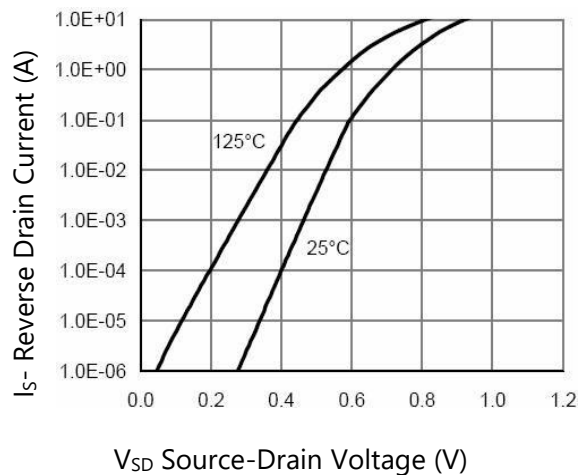


Figure 12. Source- Drain Diode Forward





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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 13. Safe Operation Area

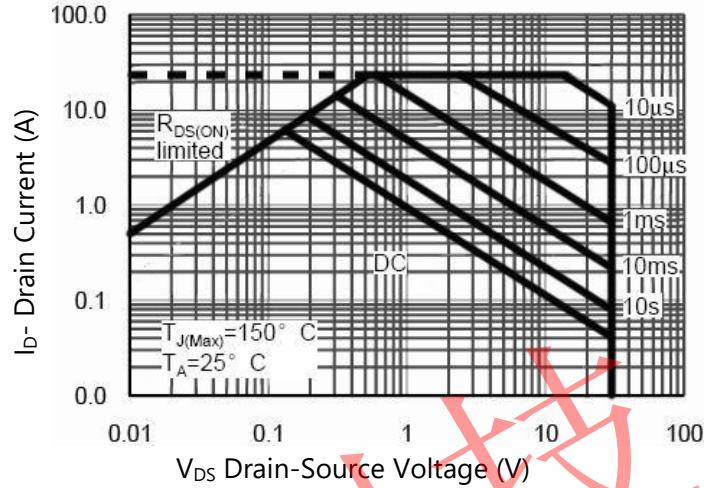
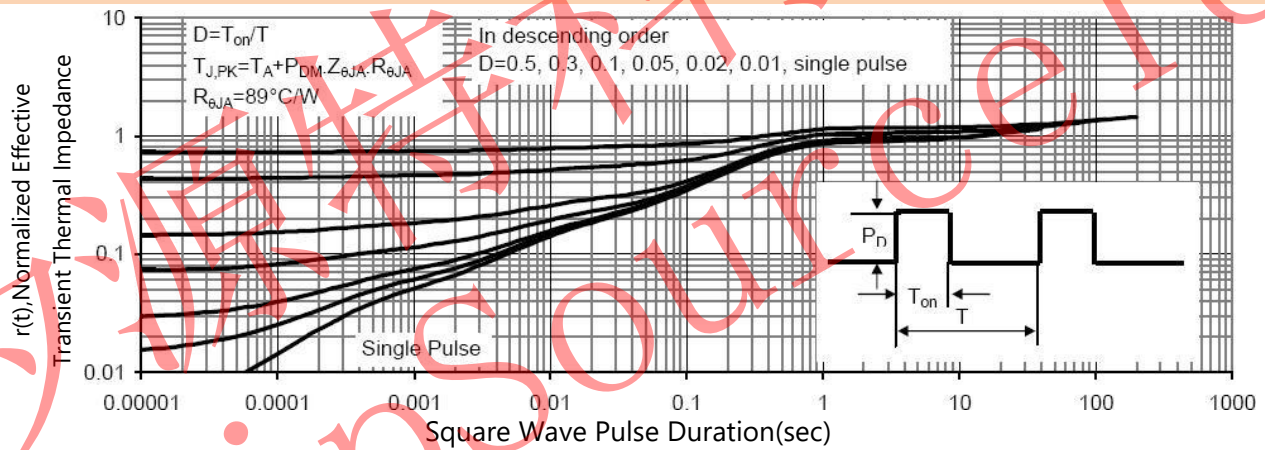


Figure 14. Normalized Maximum Transient Thermal Impedance

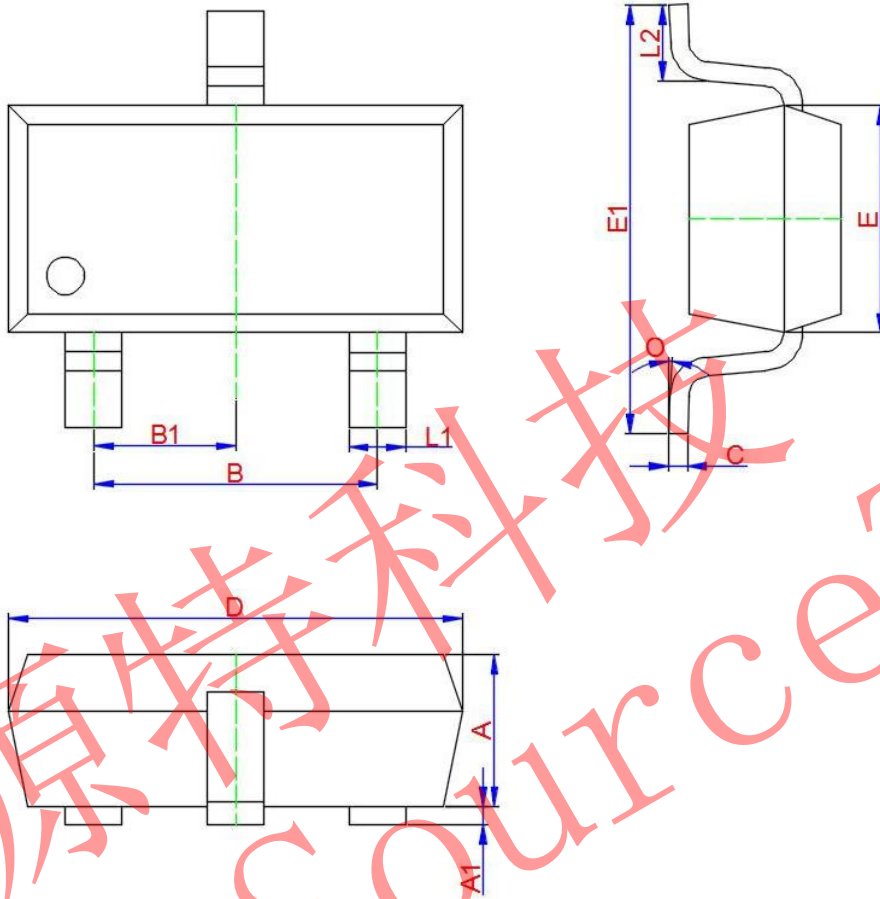




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 **PACKAGE INFORMATION**

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°