



P-Channel Enhancement Mode Power MOSFET **MX3117**

DESCRIPTION

The MX3117 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.

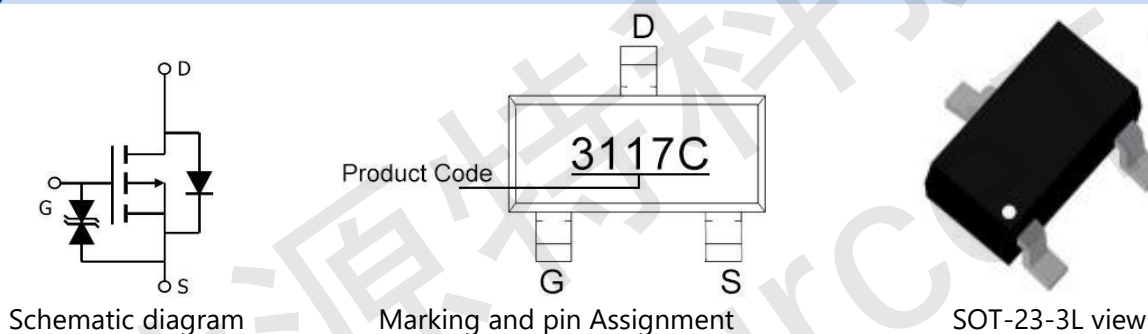
GENERAL FEATURES

- $V_{DS} = -30V$, $I_D = -7A$
 $R_{DS(ON)}(Typ.) = 23m\Omega$ @ $V_{GS} = -4.5V$
 $R_{DS(ON)}(Typ.) = 17m\Omega$ @ $V_{GS} = -10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

APPLICATION

- PWM applications
- Load switch
- Power management

PINOUT



ORDERING INFORMATION

Part Number	Marking	Storage Temperature	Package	Devices Per Reel
MX3117	3117C	-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}	± 20	V
Drain Current-Continuous	I_D	-7	A
Drain Current-Pulsed ^(Note1)	I_{DM}	-18	A
Maximum Power Dissipation	P_D	29	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

THERMAL RESISTANCE

Thermal Resistance, Junction-to-Ambient ^(Note2)	$R_{\theta JA}$	84	°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
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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}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 10	μA

On Characteristics(Note3)

Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.9	-1.5	-2.1	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-4A$	-	23	32	$m\Omega$
		$V_{GS}=-10V, I_D=-4.5A$	-	17	22	$m\Omega$
Forward Transconductance	g_{FS}	$V_{DS}=-10V, I_D=-4.1A$	20	-	-	S

Dynamic Characteristics(Note4)

Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, F=10KHz$	-	235	-	pF
Output Capacitance	C_{oss}		-	180	-	pF
Reverse Transfer Capacitance	C_{rss}		-	25	-	pF
Gate Resistance	R_g	$V_{DS}=0V, V_{GS}=0V, F=10KHz$	-	5	-	k Ω

Switching Characteristics(Note4)

Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=-15V, R_L=1\Omega, V_{GS}=-10V, R_G=3\Omega$	-	9	-	nS
Turn-on Rise Time	t_r		-	5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28	-	nS
Turn-Off Fall Time	t_f		-	13.8	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-4A, V_{GS}=-10V$	-	22	-	nC
Gate-Source Charge	Q_{gs}		-	3	-	nC
Gate-Drain Charge	Q_{gd}		-	7	-	nC

Drain-Source Diode Characteristics

Diode Forward Voltage ^(Note3)	V_{SD}	$V_{GS}=0V, I_S=-1A$	-	-	-1.2	V
Diode Forward Current ^(Note2)	I_S		-	-	-3	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 production



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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Switching Test Circuit

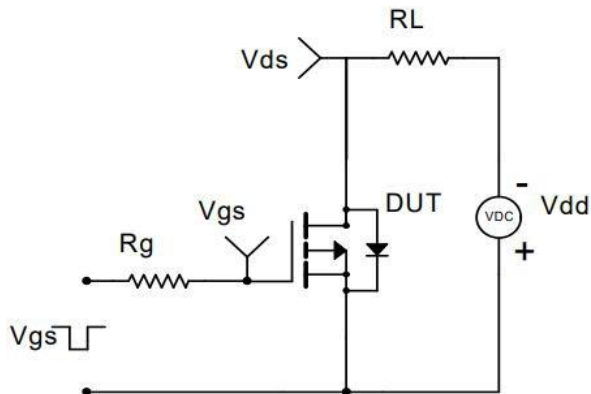


Figure 2. Switching Waveform

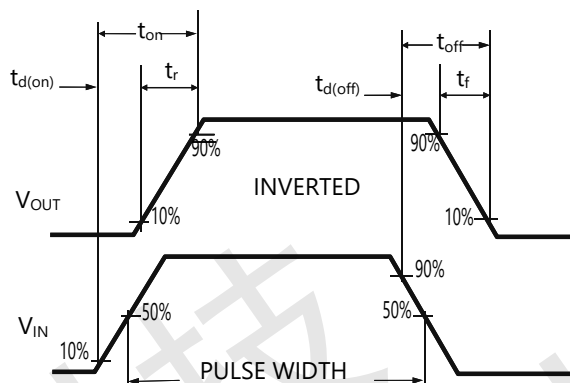


Figure 3. Power De-rating

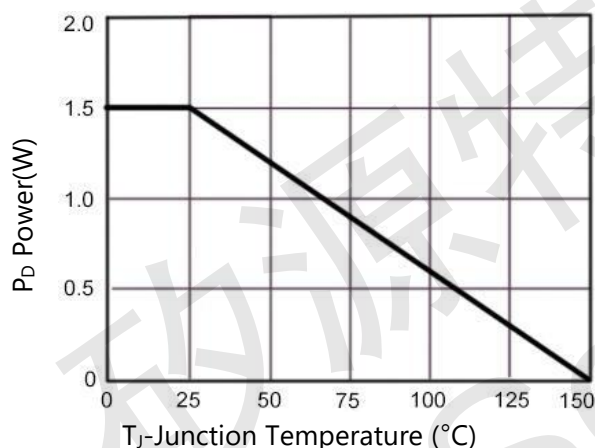


Figure 4. Drain Current

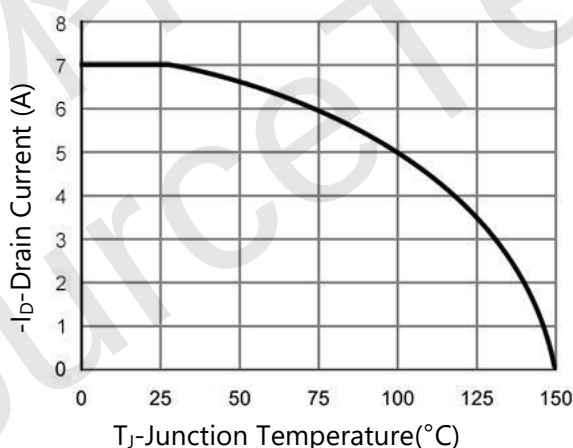


Figure 5. Output Characteristics

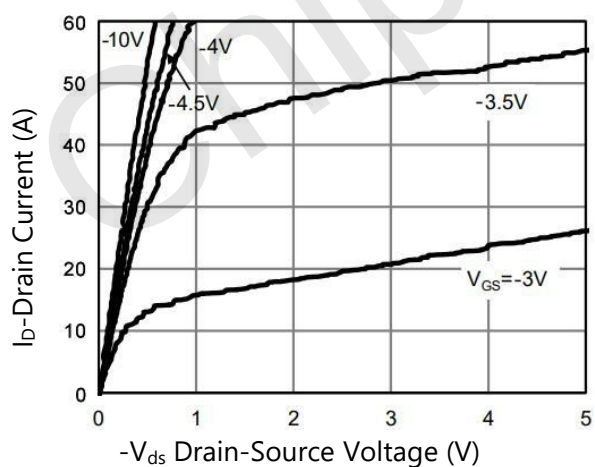
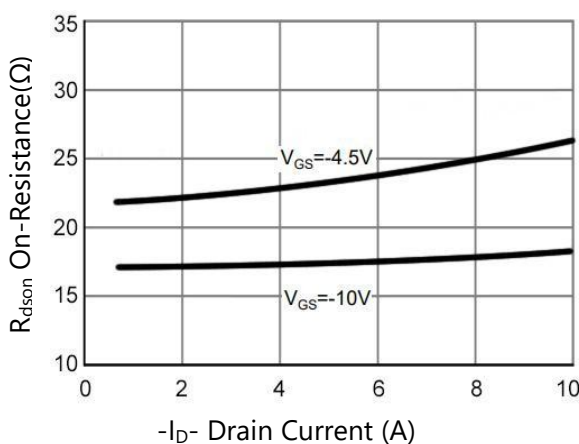


Figure 6. R_{ds(on)} vs Drain Current





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Transfer Characteristics

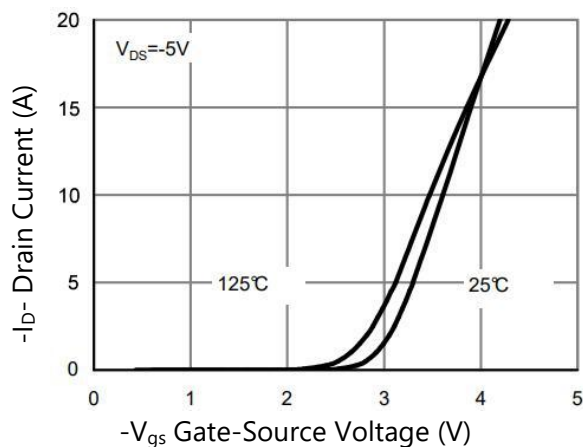


Figure 8. $R_{ds(on)}$ vs Junction Temperature

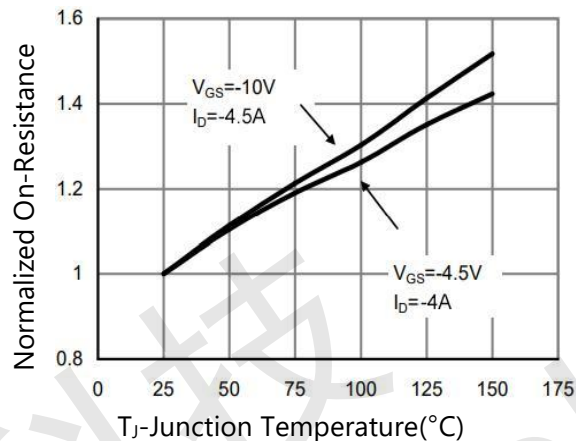


Figure 9. $R_{ds(on)}$ vs V_{GS}

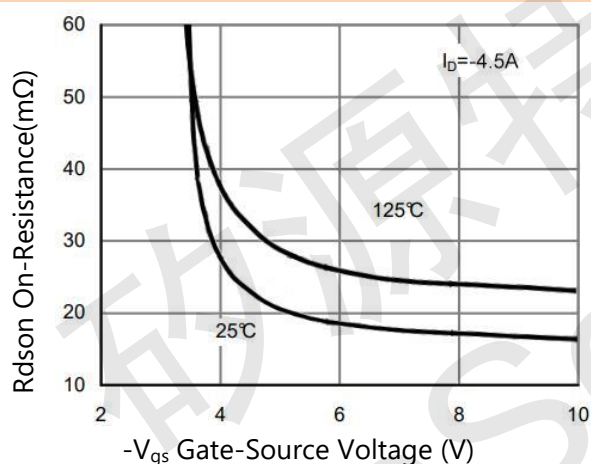


Figure 10. Capacitance vs V_{DS}

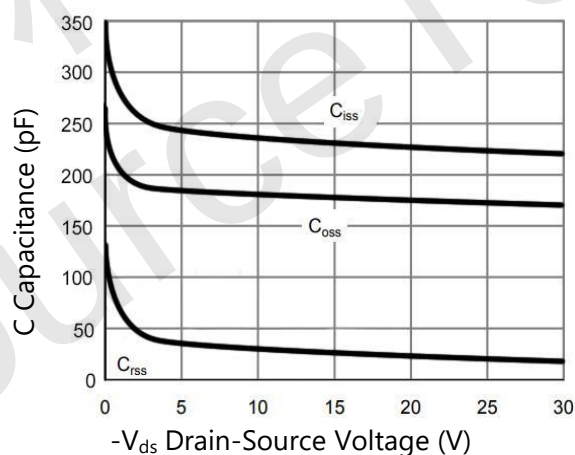


Figure 11. Gate Charge

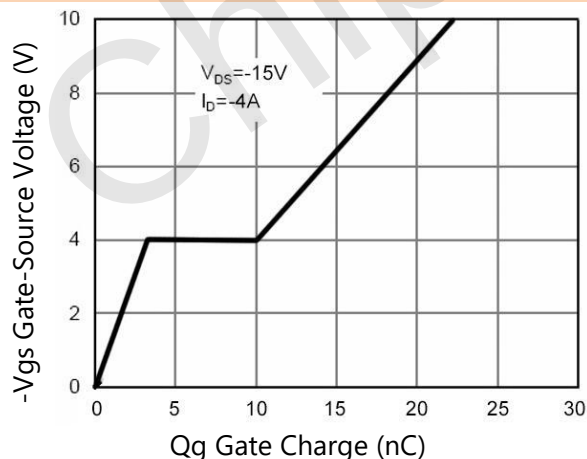
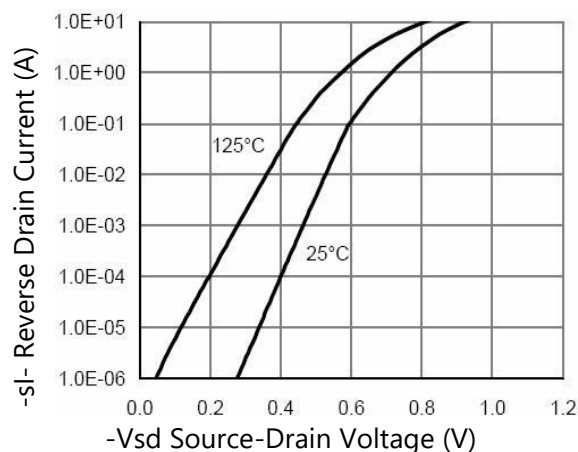


Figure 12. Source- Drain Diode Forward





TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 11. Safe Operation Area

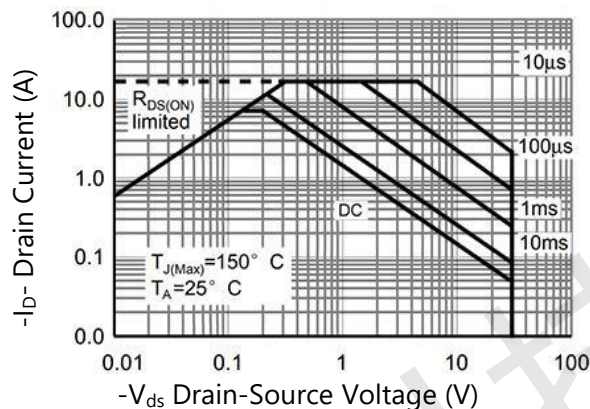
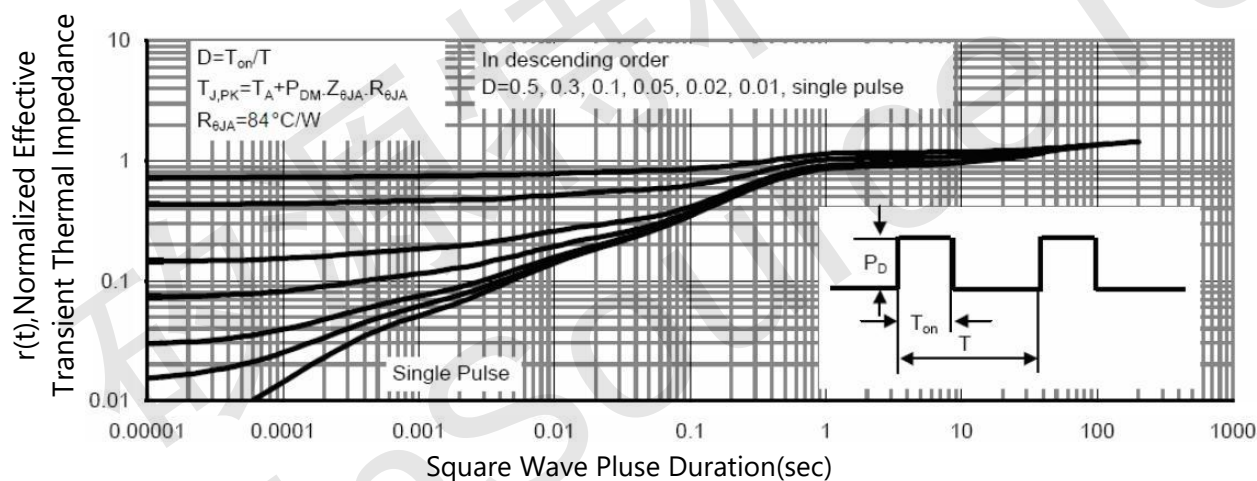


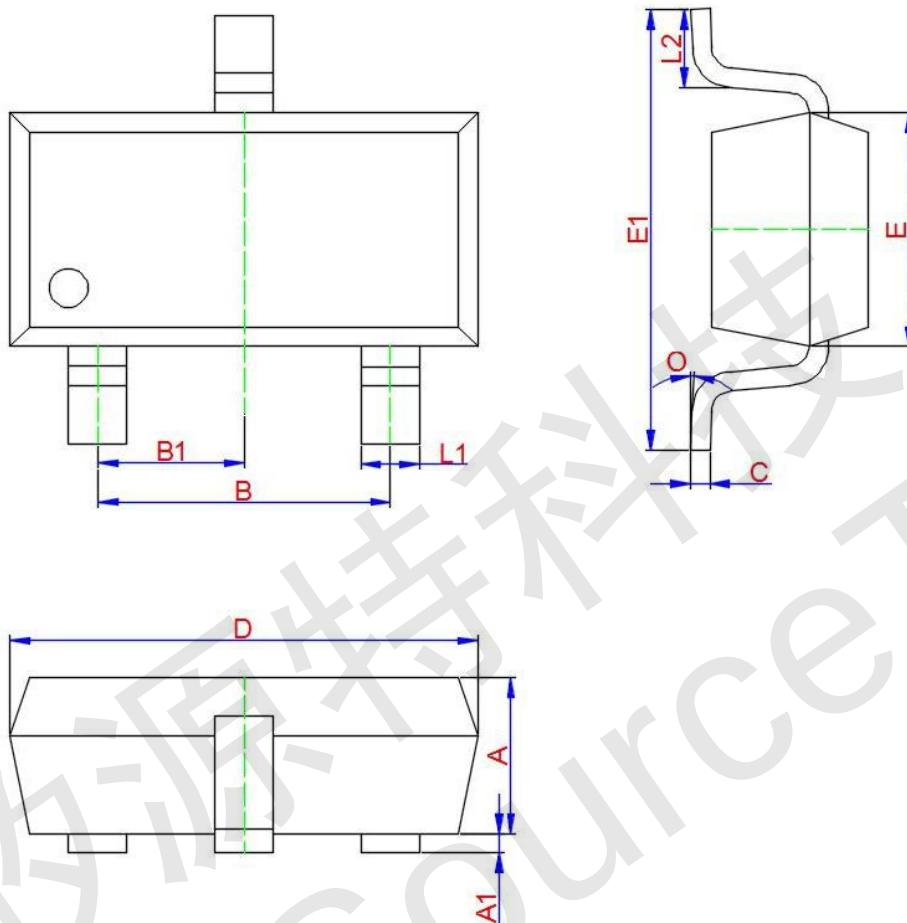
Figure 12. Normalized Maximum Transient Thermal Impedance





PACKAGE INFORMATION

SOT-23-3L



Symbol	Dimensions InMillimeters		
	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°