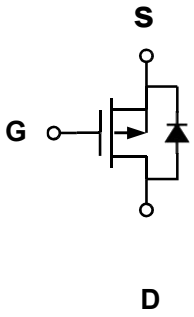
MX3401A

P-Channel Enhancement Mode Power MOSFET

Description

The MX3401A uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V.

This device is suitable for use as a load switch or in PWM applications.



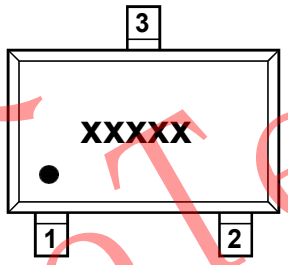
General Features

- V_{DS} =-30V，I_D =-4.2A
- @V_{GS}=-10V $R_{DS(ON)}$(Typ.)=45mΩ
- @V_{GS}=-4.5V $R_{DS(ON)}$(Typ.)=52mΩ
- @V_{GS}=-2.5V $R_{DS(ON)}$(Typ.)=70mΩ
- High power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power managent

Schematic diagram



Marking and pin assignment

SOT-23 (TOP VIEW)

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	-30	V
Gate-source voltage	V_{GS}	±12	V
Drain current-continuous[a]@Tj=125℃	I_D	-4.2	A
-pulse d[b]	I_{DM}	-30	A
Maximum power dissipation	P_D	1.2	W
Operating junction Temperature range	Tj	-55—150	℃

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Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	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}=-24V, V_{GS}=0V	-	-	-1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±10V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.7	-1	-1.3	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4.2A		40	50	mΩ
		V_{GS}=-4.5V, I_D=-4A	-	52	65	
		V_{GS}=-2.5V, I_D=-1A	-	70	100	
Forward transconductance	gfs	V_{GS}=-5V, I_D=-4.2A	-	10	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=-15V ,V_{GS}=0V f=1.0MHz	-	950	-	pF
Output capacitance	C_{OSS}		-	115	-	
Reverse transfer capacitance	C_{RSS}		-	75	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DD}=-15V I_D=-3.2A V_{GEN}=-10V R_{GEN}=6ohm	-	7	-	ns
Rise time	tr		-	3	-	
Turn-off delay time	$t_{D(OFF)}$		-	30	-	
Fall time	tf		-	12	-	
Total gate charge	Qg	V_{DS}=-15V,I_D=-4.0A V_{GS}=-4.5V	-	9.5	-	nC
Gate-source charge	Qgs		-	2	-	
Gate-drain charge	Qgd		-	3	-	
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V_{SD}	V_{GS}=0V,Is=-1A	-	-	-1.2	V

Notes:

a. surface mounted on FR4 board,t≤10sec
b. pulse test: pulse width≤300μs,duty≤2%
c. guaranteed by design, not subject to production testing

Thermal Characteristics

Thermal Resistance junction-to ambient	Rth JA	104	℃/W

Typical Electrical and Thermal Characteristics

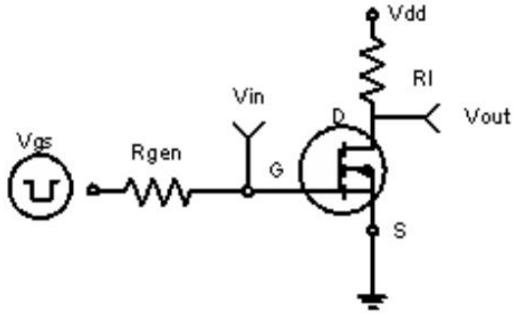


Figure 1:Switching Test Circuit

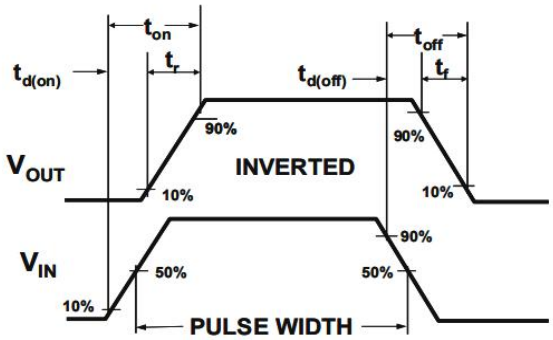


Figure 2:Switching Waveforms

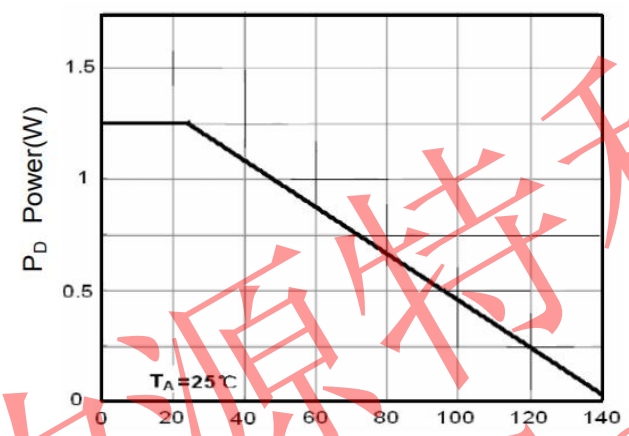


Figure 3 Power Dissipation

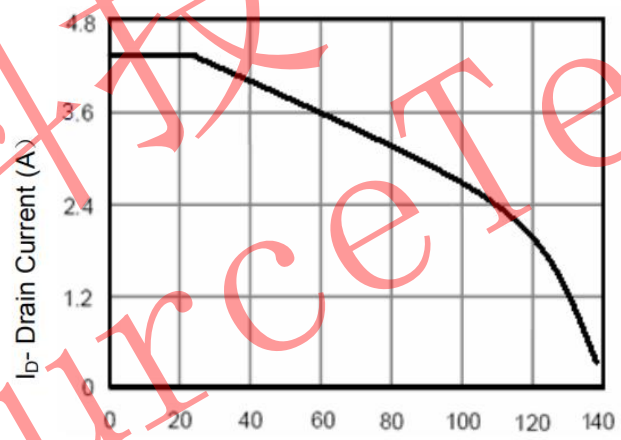


Figure 4 Drain Current

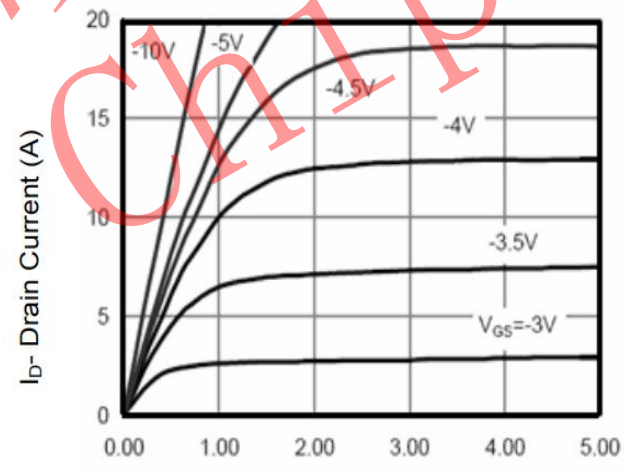


Figure 5 Output Characteristics

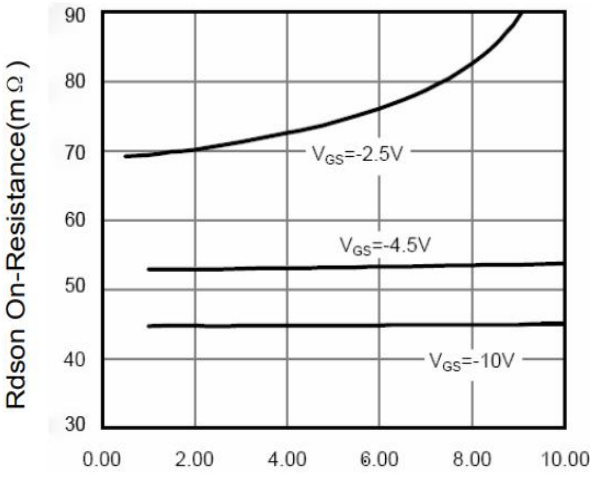


Figure 6 Drain-Source On-Resistance

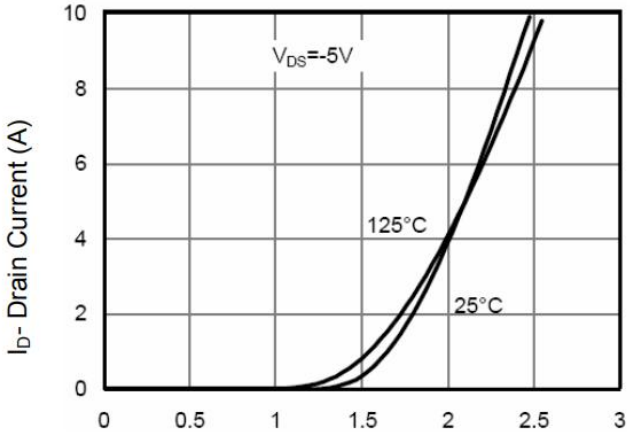


Figure 7 Transfer Characteristics

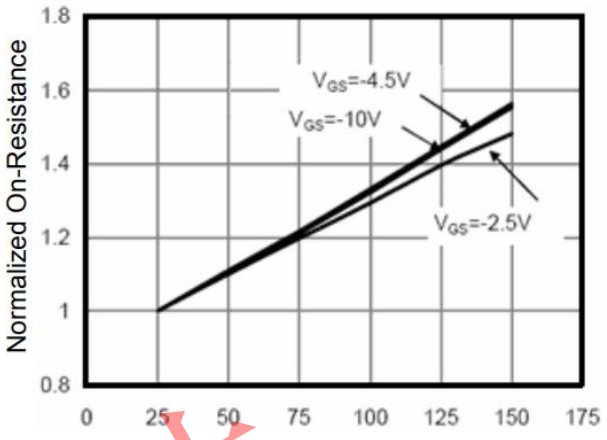


Figure 8 Drain-Source On-Resistance

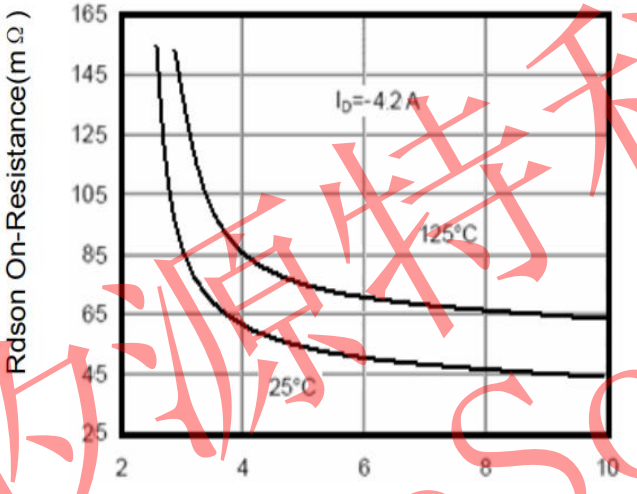


Figure 9 Rdson vs Vgs

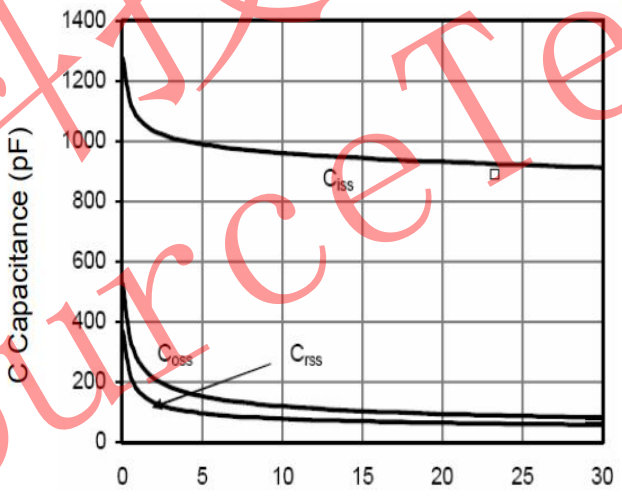


Figure 10 Capacitance vs Vds

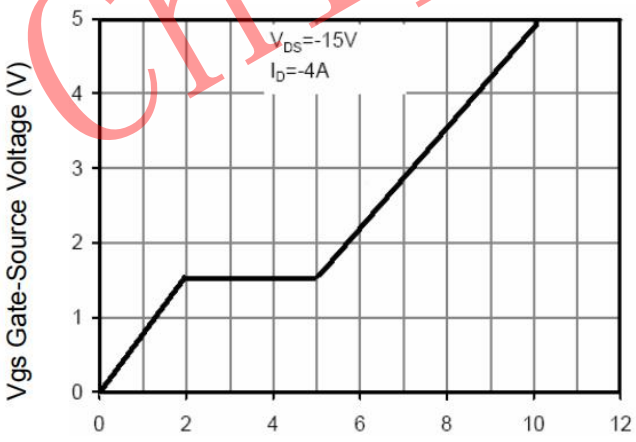


Figure 11 Gate Charge

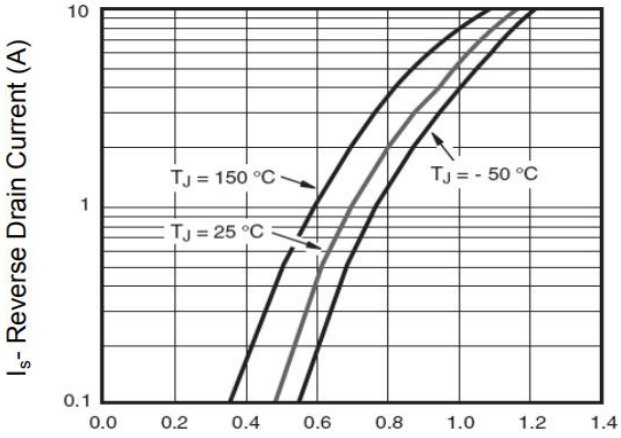


Figure 12 Source- Drain Diode Forward

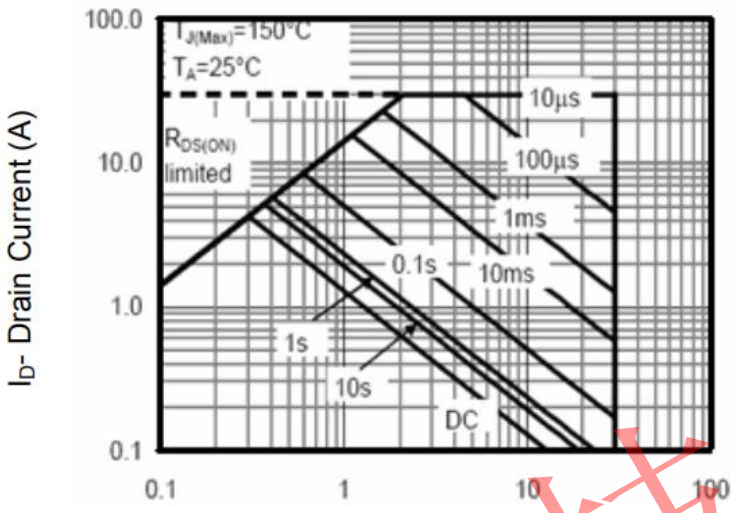


Figure 13 Safe Operation Area

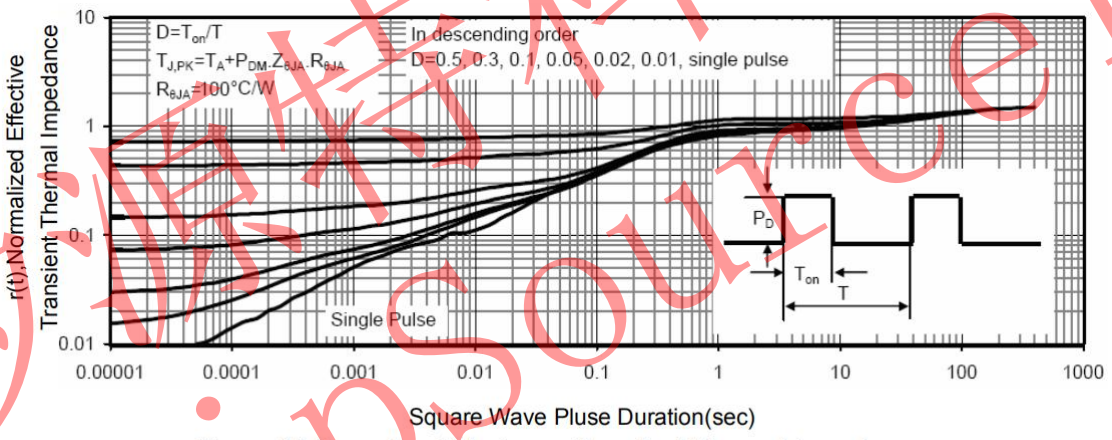
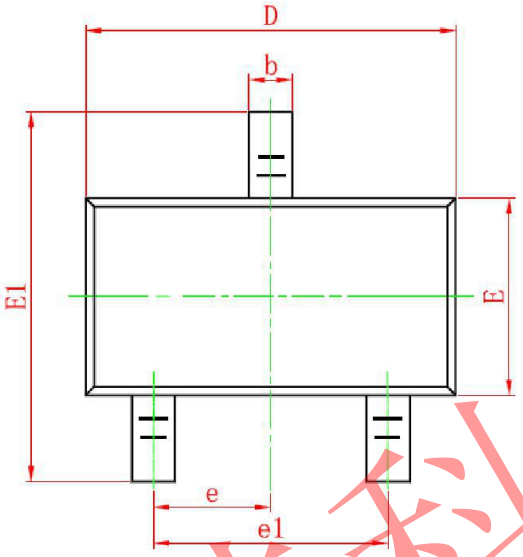
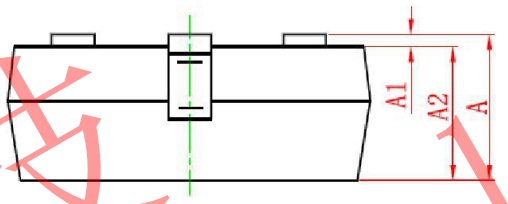
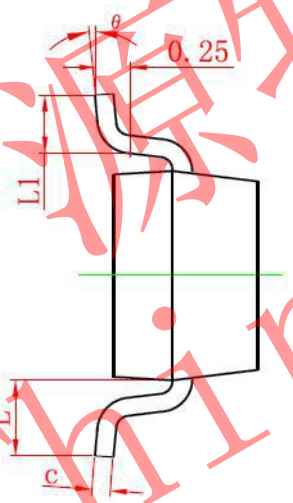


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information







Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°