

**Description**

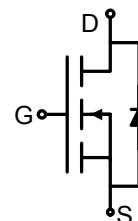
The 2312 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a battery protection or in other switching application.

**General Features**

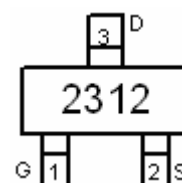
- $V_{DS} = 20V, I_D = 6.8A$
- $R_{DS(ON)} = 18m\Omega$  (TYP) @  $V_{GS} = 2.5V$
- $R_{DS(ON)} = 15m\Omega$  (TYP) @  $V_{GS} = 4.5V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

**Application**

- Battery protection
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



SOT-23 top view

**Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Continuous Drain Current	$I_D$	$T_A = 25^\circ\text{C}$	6.8
		$T_A = 70^\circ\text{C}$	5.4
Drain Current-Pulsed (Note 1)	$I_{DM}$	20	A
Maximum Power Dissipation	$P_D$	1.25	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$

**Thermal Characteristic**

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	100	$^\circ\text{C/W}$
--	-----------------	-----	--------------------

**Electrical Characteristics ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20	22	-	V

Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	0.3	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.65	0.9	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=2.5V, I_D=4.0 A$	-	18	30	m $\Omega$
		$V_{GS}=4.5V, I_D=4.5A$	-	15	21	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=4A$	-	10	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=8V, V_{GS}=0V,$ $F=1.0MHz$	-	500	-	PF
Output Capacitance	$C_{oss}$		-	300	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	140	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=10V, I_D=1A$ $V_{GS}=4.5V, R_{GEN}=6\Omega$	-	20	40	nS
Turn-on Rise Time	$t_r$		-	18	40	nS
Turn-Off Delay Time	$t_{d(off)}$		-	60	108	nS
Turn-Off Fall Time	$t_f$		-	28	56	nS
Total Gate Charge	$Q_g$	$V_{DS}=10V, I_D=3A, V_{GS}=4.5V$	-	10	15	nC
Gate-Source Charge	$Q_{gs}$		-	2.3	-	nC
Gate-Drain Charge	$Q_{gd}$		-	2.9	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	1	A

**Notes:**

1. Repetitive rating: pulse width limited by maximum junction temperature.
2. Surface mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

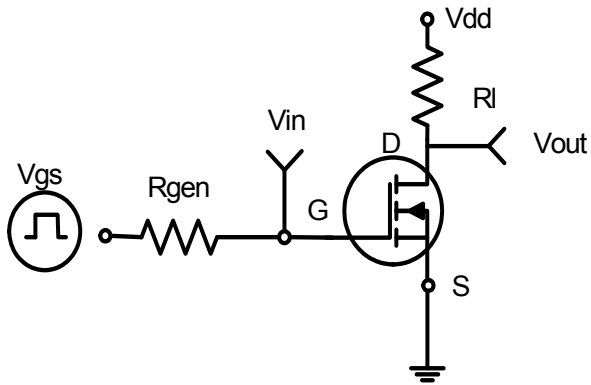


Figure 1: Switching Test Circuit

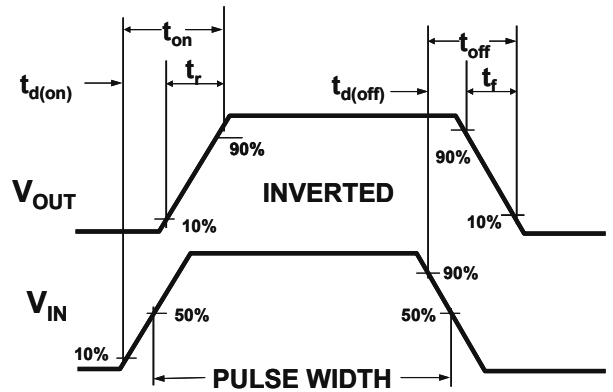


Figure 2: Switching Waveforms

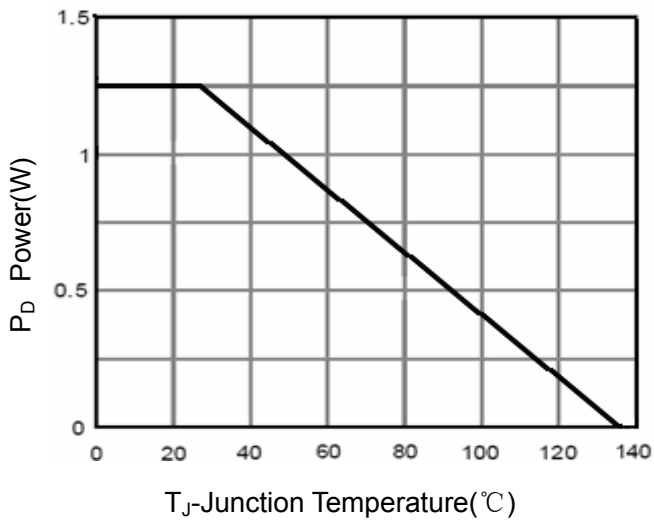


Figure 3 Power Dissipation

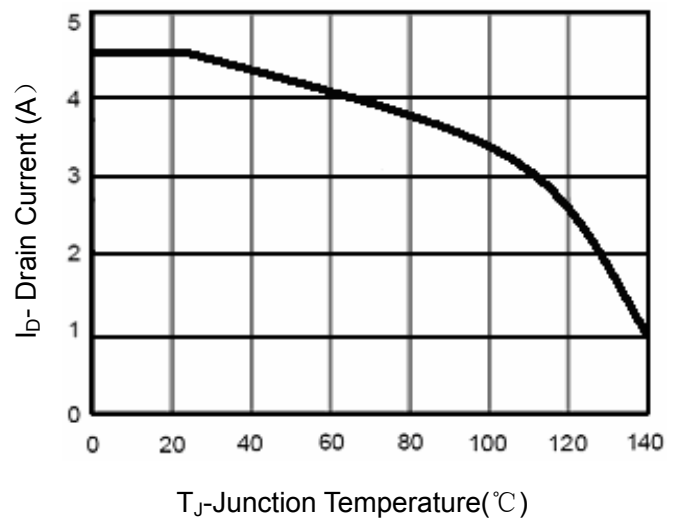


Figure 4 Drain Current

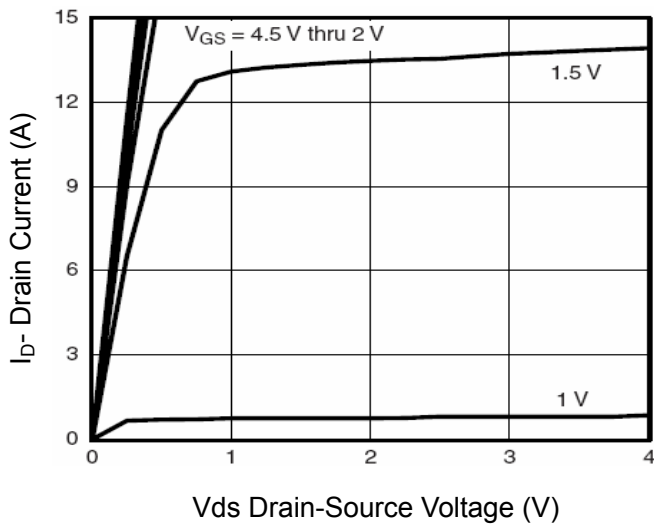


Figure 5 Output CHARACTERISTICS

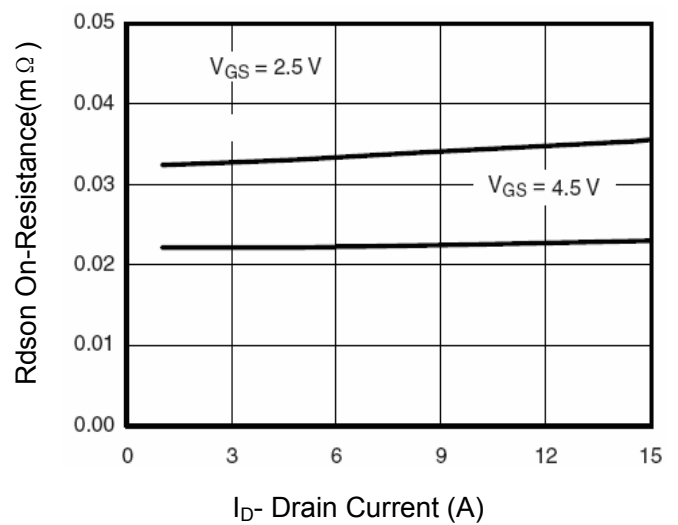


Figure 6 Drain-Source On-Resistance

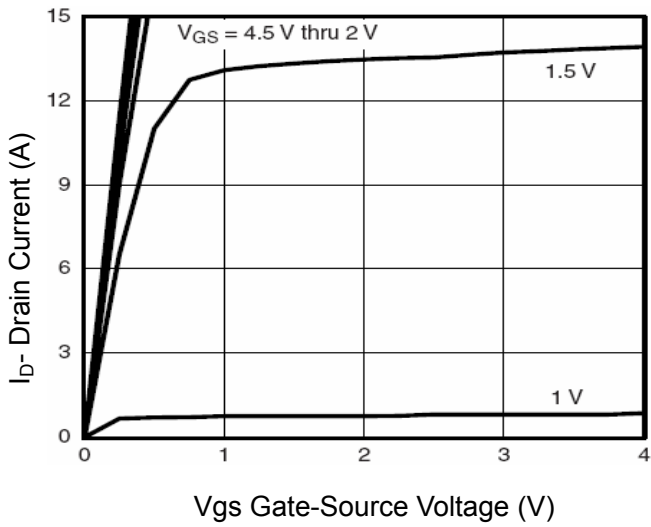


Figure 7 Transfer Characteristics

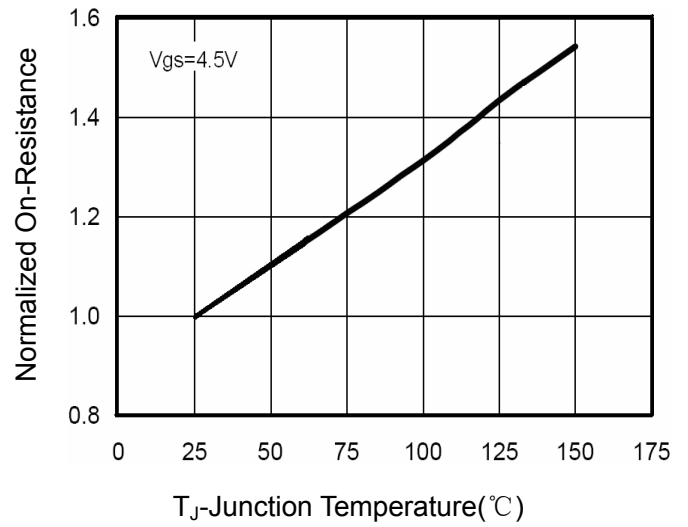


Figure 8 Drain-Source On-Resistance

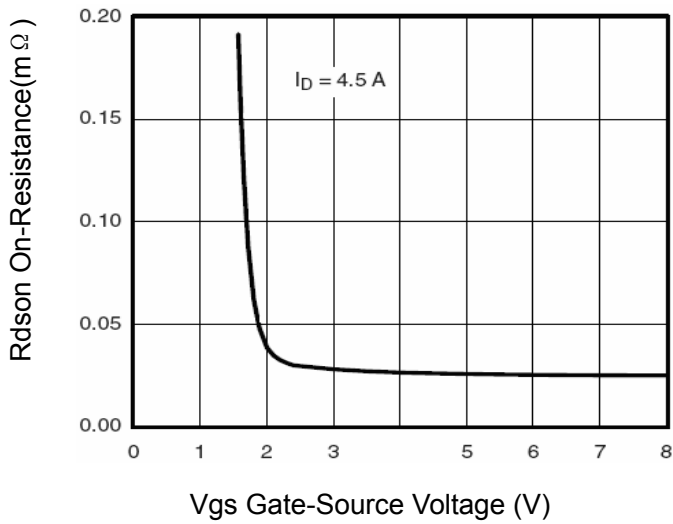


Figure 9 Rdson vs Vgs

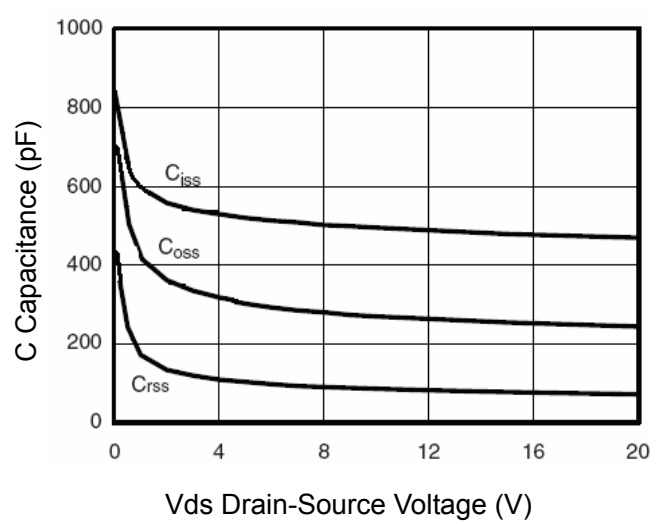


Figure 10 Capacitance vs Vds

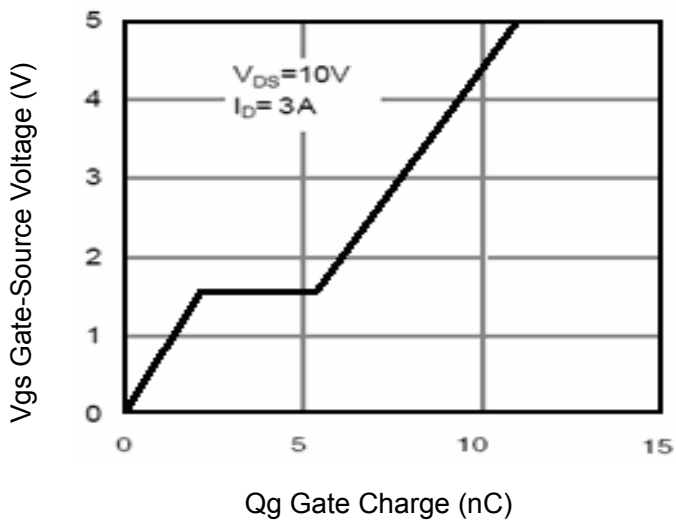


Figure 11 Gate Charge

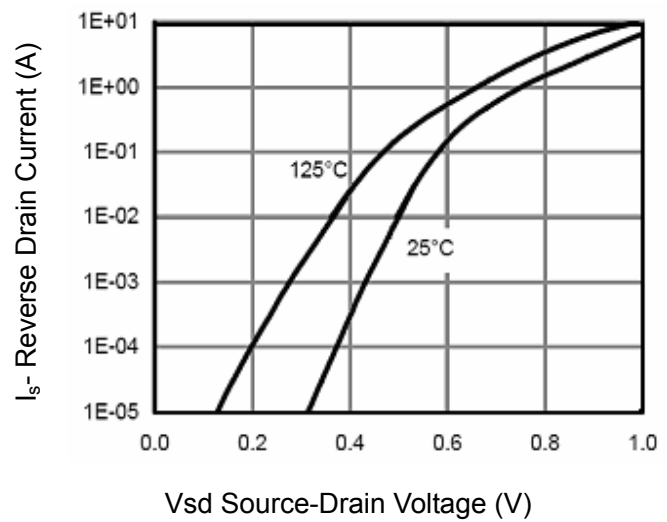
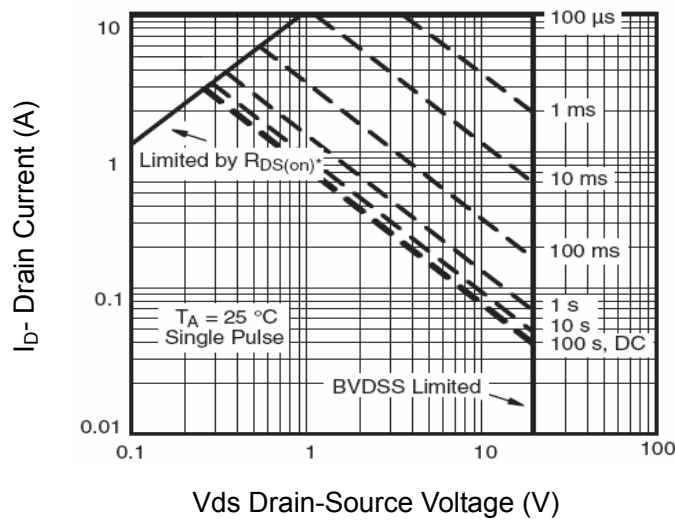
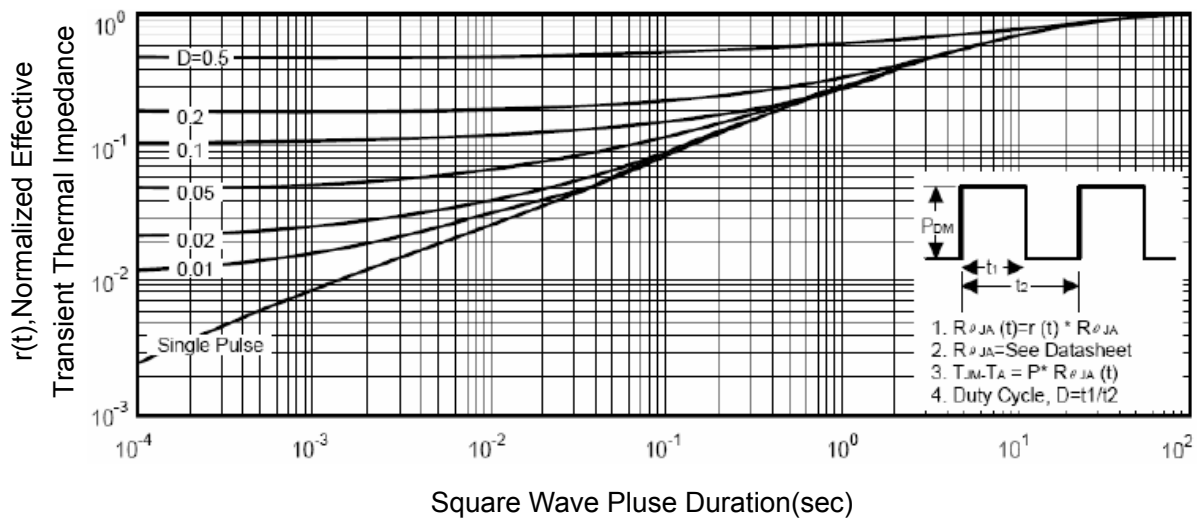


Figure 12 Source- Drain Diode Forward



**Figure 13 Safe Operation Area**



**Figure 14 Normalized Maximum Transient Thermal Impedance**

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFET](#) category:*

*Click to view products by [Luguang](#) manufacturer:*

Other Similar products are found below :

[614233C](#) [648584F](#) [D2003UK](#) [705463DB](#) [MCH6422-TL-E](#) [FW231A-TL-E](#) [APT5010JFLL](#) [NTNS3A92PZT5G](#) [IRF100S201](#) [JANTX2N5237](#)  
[2SK2464-TL-E](#) [2SK3818-DL-E](#) [FCA20N60\\_F109](#) [FDZ595PZ](#) [STD6600NT4G](#) [FQD4P40TM\\_AM002](#) [FSS804-TL-E](#) [FW217A-TL-2W](#)  
[APT10050JVFR](#) [2SJ277-DL-E](#) [2SK1691-DL-E](#) [2SK2545\(Q,T\)](#) [D1014UK](#) [D2294UK](#) [405094E](#) [423220D](#) [MCH6646-TL-E](#) [TPCC8103,L1Q\(CM](#)  
[IRF3710](#) [367-8430-0972-503](#) [VN1206L](#) [424134F](#) [026935X](#) [051075F](#) [SBVS138LT1G](#) [614234A](#) [715780A](#) [NTNS3166NZT5G](#) [751625C](#) [873612G](#)  
[IPS70R2K0CEAKMA1](#) [APT8015JVFR](#) [APT50M85JVR](#) [APT5010JVFR](#) [APT12031JFLL](#) [APT12040JVR](#) [NTE6400](#) [NVC3S5A51PLZT1G](#)  
[JANTX2N6796U](#) [JANTX2N6784U](#)