CONSONANCE

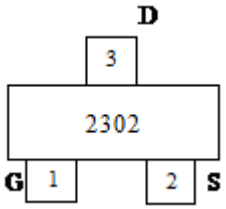
N-Channel Enhancement Mode Power MOSFET

CN2302

General Description:

The CN2302 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.

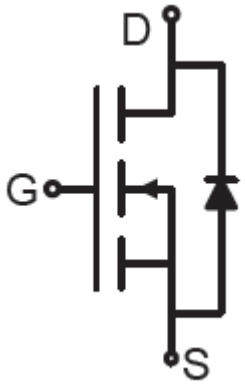
Pin Assignment



Applications:

- Battery protection
- Load switch
- Power management

Schematic diagram



Features:

- V_{DS} = 20V,I_D = 2.9A
  $R_{DS(ON)}$ < 59mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$ < 45mΩ @ V_{GS}=4.5V
- High power and current handing capability
- Available in 3 pin SOT23 Package
- Pb-free, rohs compliant and halogen free

Top view

Ordering Information

Part Number	Device Marking	Package	Operating Ambient Temperature
CN2302	2302	SOT-23	－40℃ to 85℃

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	2.9	A
Drain Current-Pulsed (Note 1)	I_{DM}	10	A
Maximum Power Dissipation	P_D	1	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 to 150	℃

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	125	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	B_{VDSS}	V_{GS}=0V I_D=250μA	20	22	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	uA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	VDS=VGS,ID=250μA	0.5	0.85	1.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	VGS=2.5V, ID=2.5A	-	37	59	mΩ
		V_{GS}=4.5V, I_D=2.9A	-	30	45	mΩ
Forward Transconductance	g_{FS}	VDS=5V,ID=2.9A	-	8	-	A/V
Dynamic Characteristics (Note4)						
Input Capacitance	$C_I$ss	VDS=10V,VGS=0V, F=1.0MHz	-	300	-	PF
Output Capacitance	Coss		-	120	-	PF
Reverse Transfer Capacitance	Crss		-	80	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	td(on)	VDD=10V,ID=2.9A VGS=4.5V,RGEN=6Ω	-	10	15	nS
Turn-on Rise Time	tr		-	50	85	nS
Turn-Off Delay Time	td(off)		-	17	45	nS
Turn-Off Fall Time	tf		-	10	20	nS
Total Gate Charge	Qg	VDS=10V,ID=2.9A, VGS=4.5V	-	4.0	10	nC
Gate-Source Charge	Qgs		-	0.65	-	nC
Gate-Drain Charge	Qgd		-	1.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	VGS=0V,IS=2.9A	-	0.75	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	2.9	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR4 board with 2oz. copper, in a still air environment with T_A=25℃，t ≤ 10 sec. The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

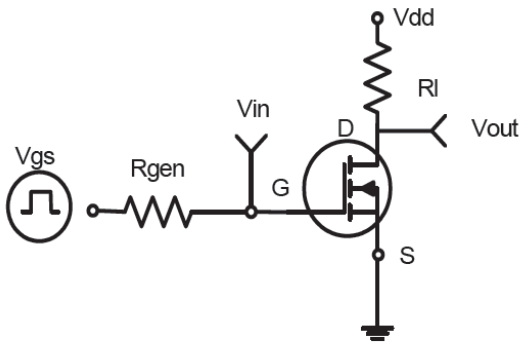


Figure 1 Switching Test Circuit

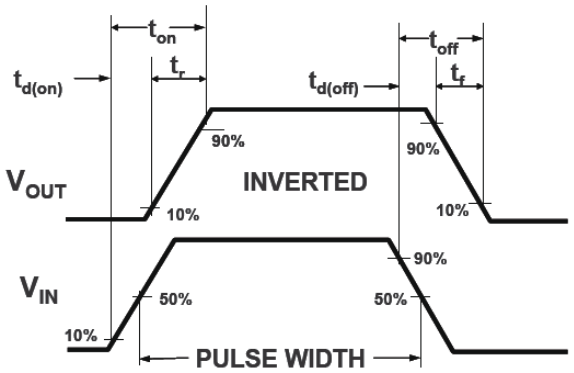


Figure 2 Switching Waveforms

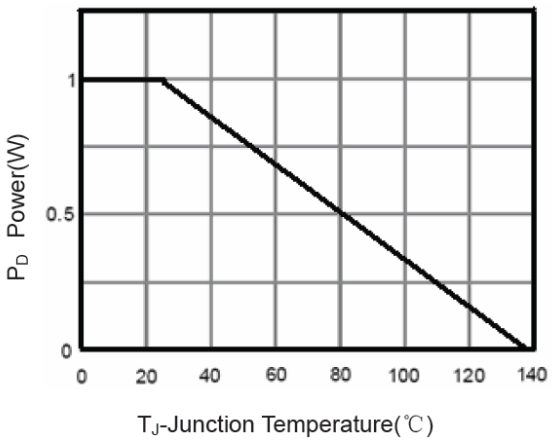


Figure 3 Power Dissipation

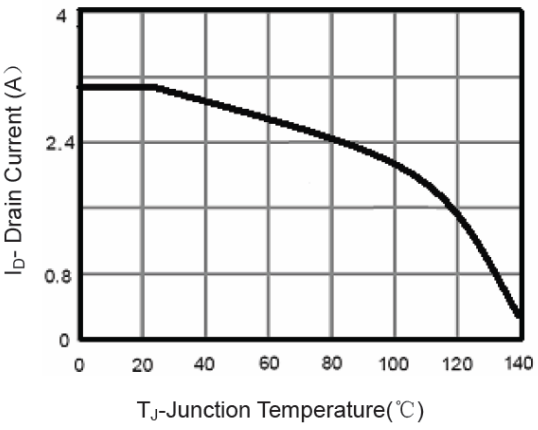


Figure 4 Drain Current

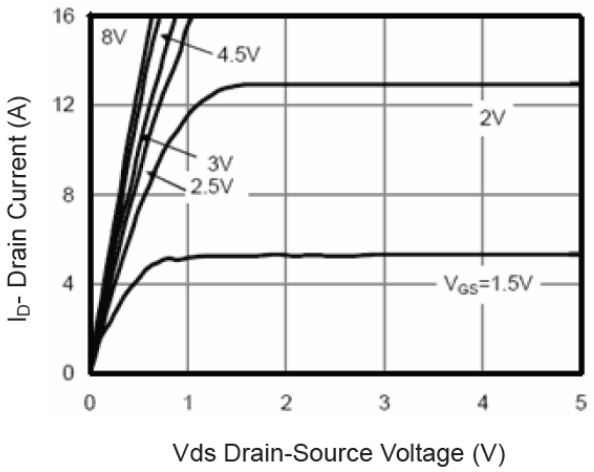


Figure 5 Output Characteristics

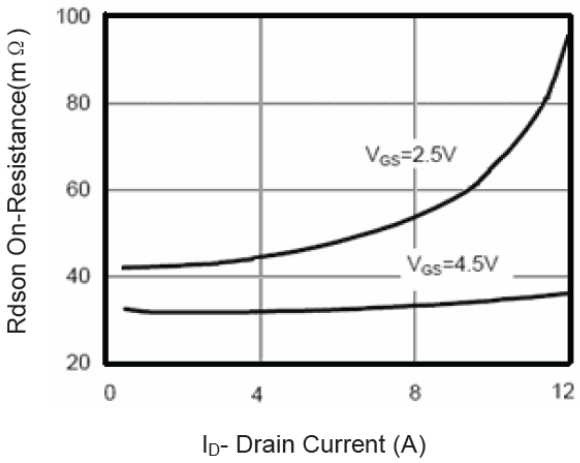


Figure 6 Drain-Source On-Resistance

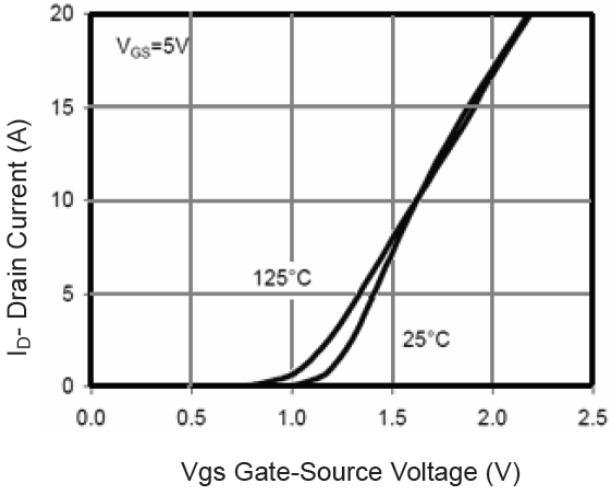


Figure 7 Transfer Characteristics

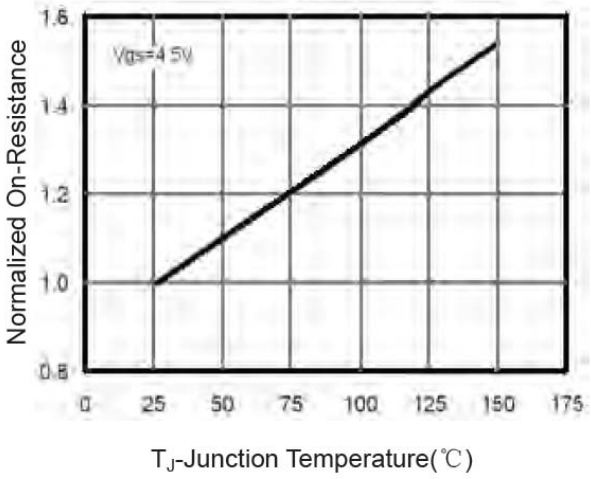


Figure 8 Drain-Source On-Resistance

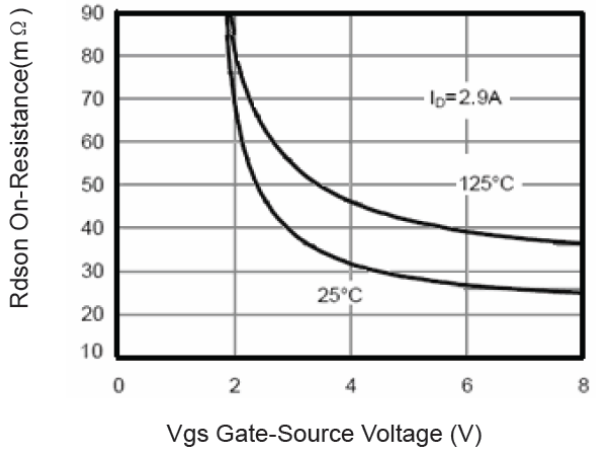


Figure 9 Rdson vs Vgs

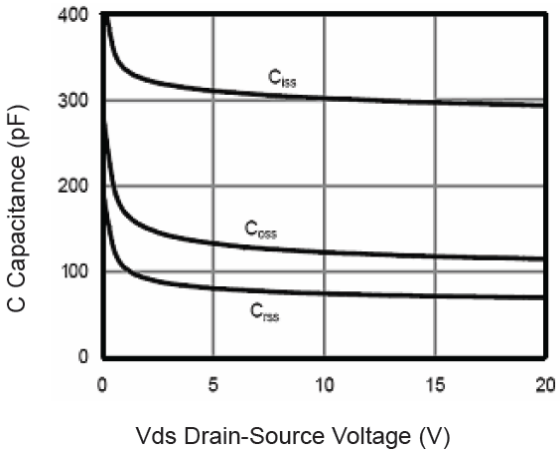


Figure 10 Capacitance vs Vds

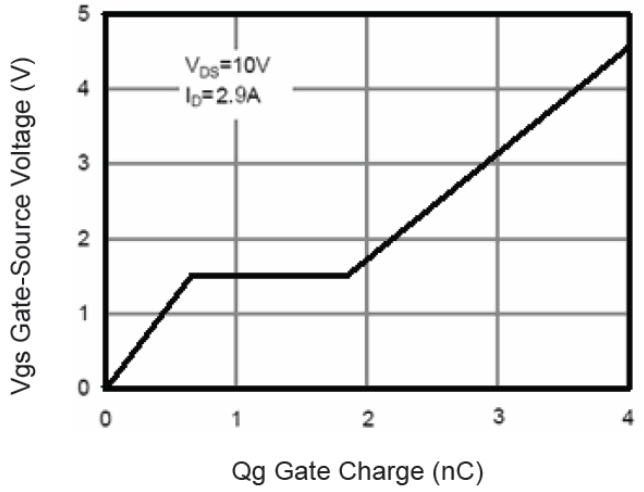


Figure 11 Gate Charge

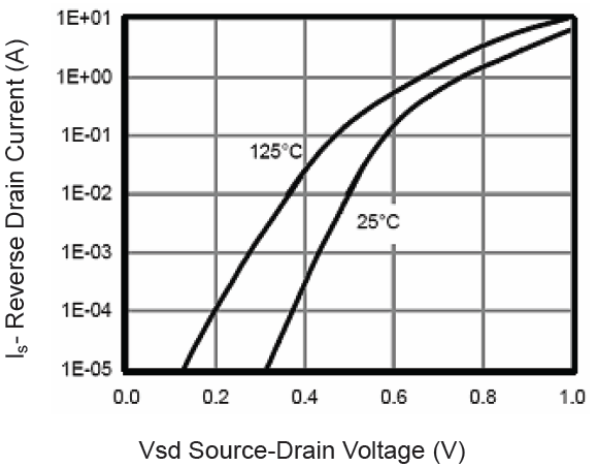


Figure 12 Source- Drain Diode Forward

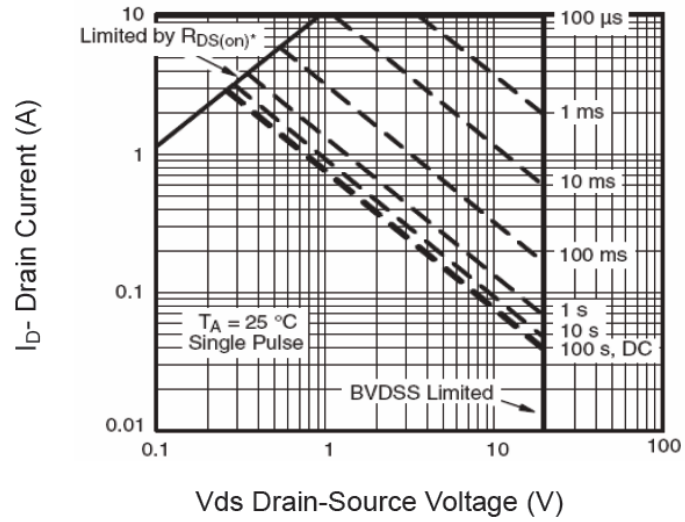


Figure 13 Safe Operation Area

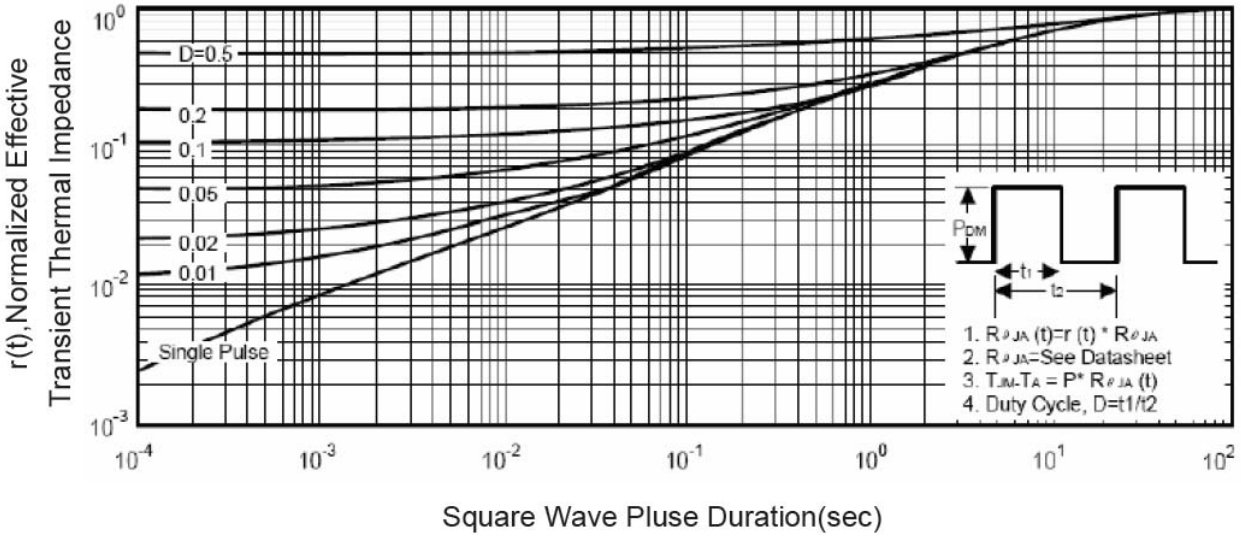
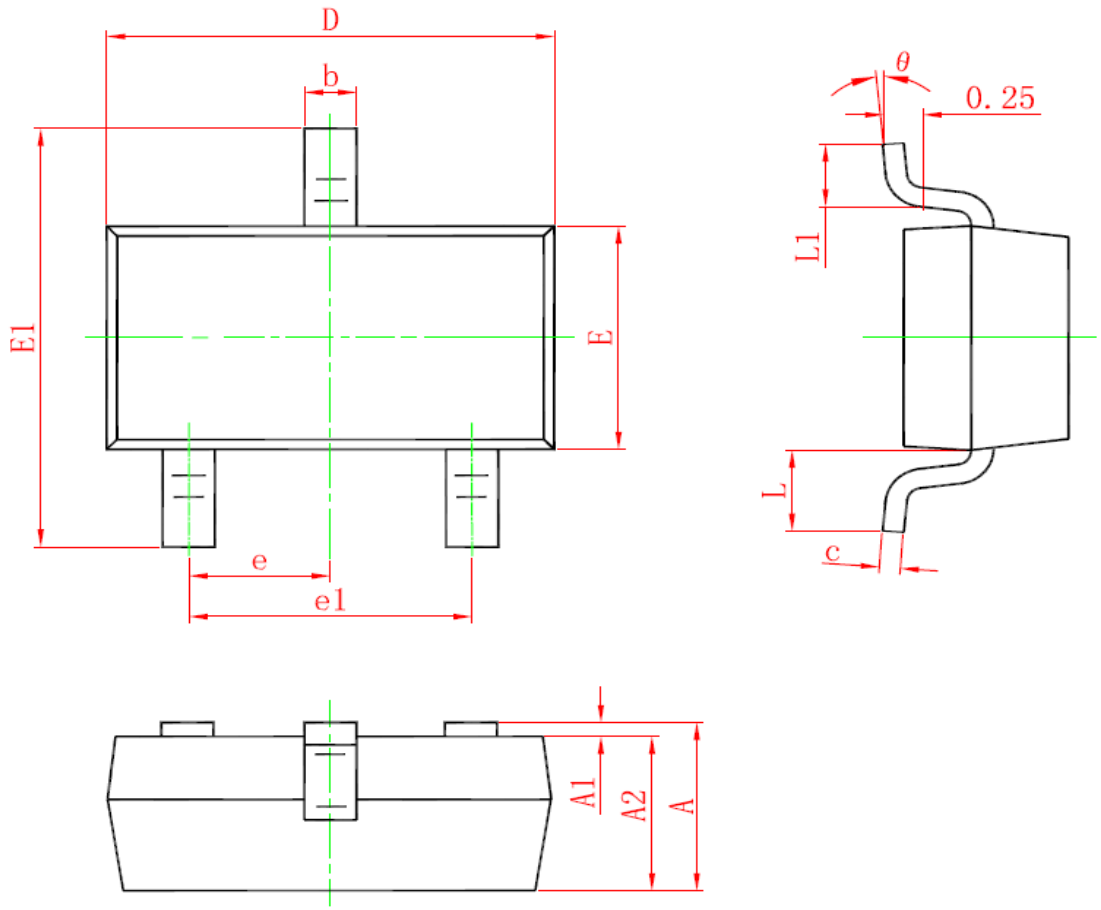


Figure 14 Normalized Maximum Transient Thermal Impedance

Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°