

General Description

The US2302 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the small power switching and load switch applications.

The US2302 meet the RoHS and Green Product requirement with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent C_{dv}/dt effect decline
- Green Device Available

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
V _{DSS}	Drain-Source Voltage		20	V
V _{GSS}	Gate-Source Voltage		±12	
I _D *	Continuous Drain Current	V _{GS} =4.5V	3	A
I _{DM} *	300μs Pulsed Drain Current		10	
I _S *	Diode Continuous Forward Current		1	A
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
P _D *	Maximum Power Dissipation	T _A =25°C	0.83	W
		T _A =100°C	0.3	
R _{θJA} *	Thermal Resistance-Junction to Ambient		150	°C/W

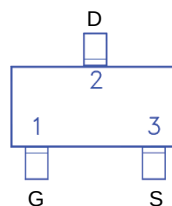
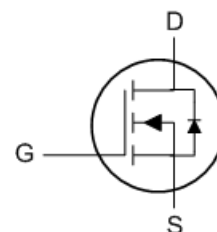
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
20V	120m Ω	3.0A

Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

SOT23 Pin Configuration



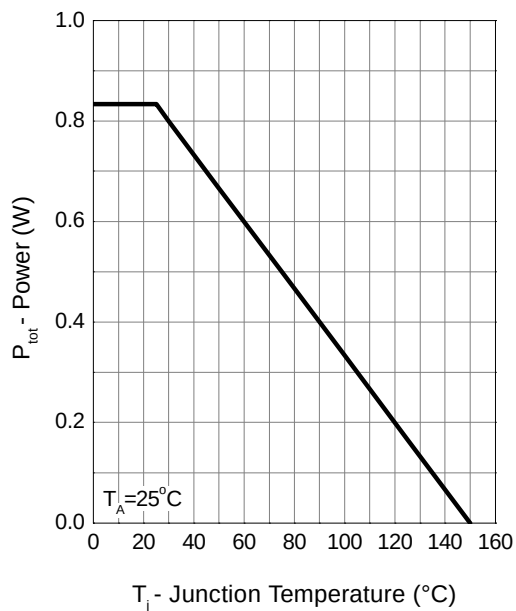
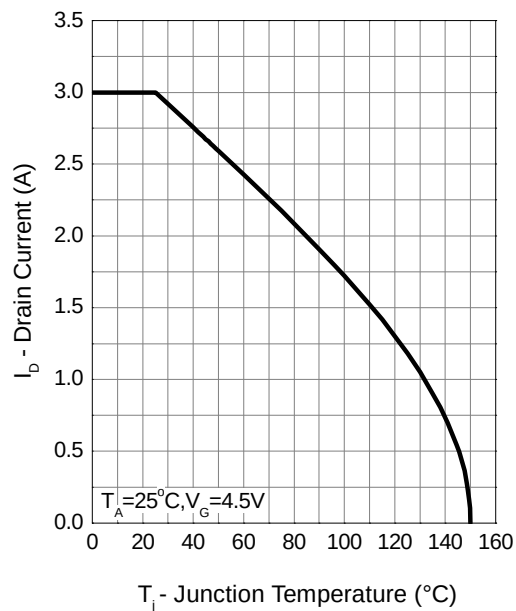
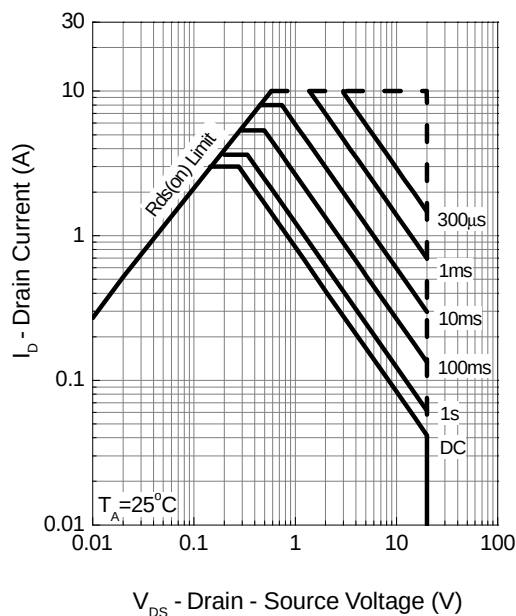
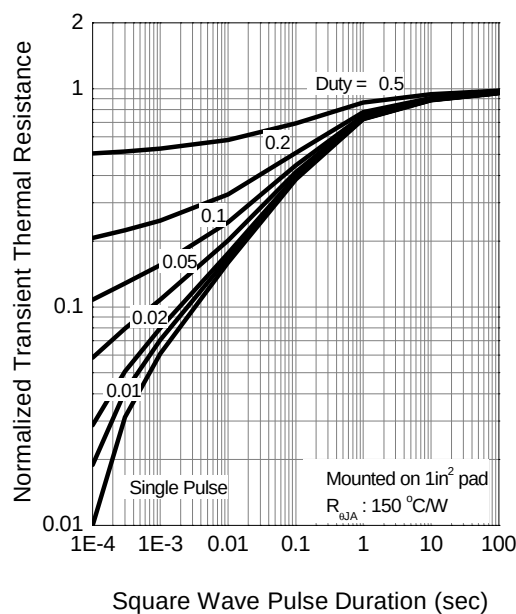
Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

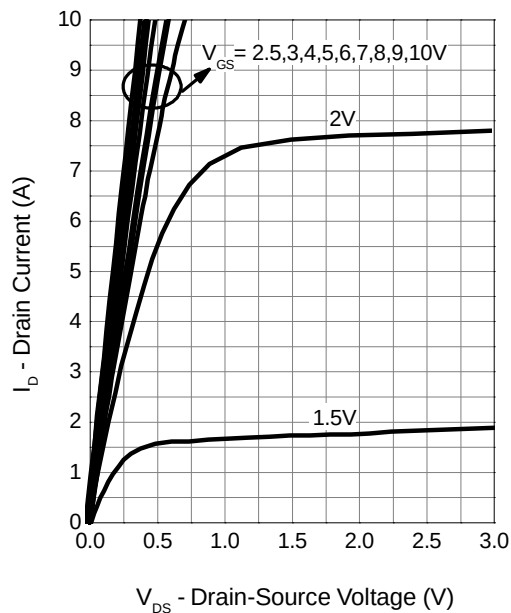
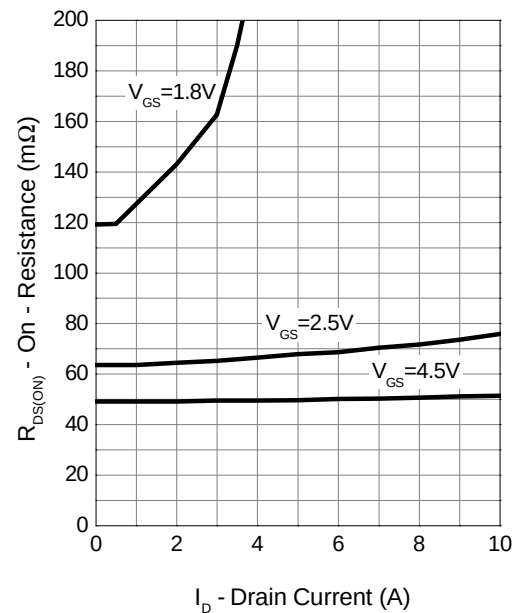
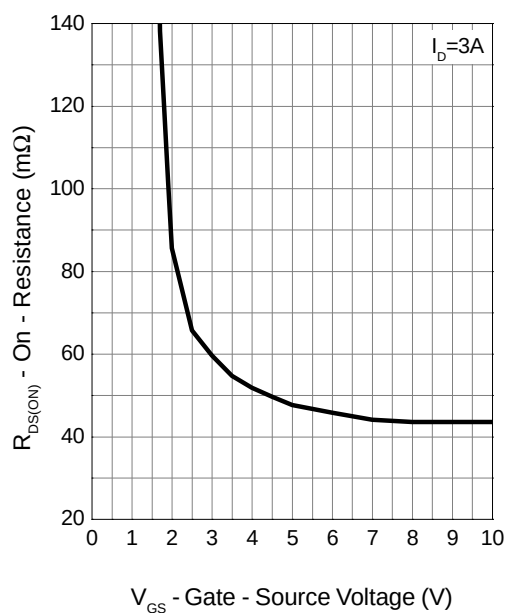
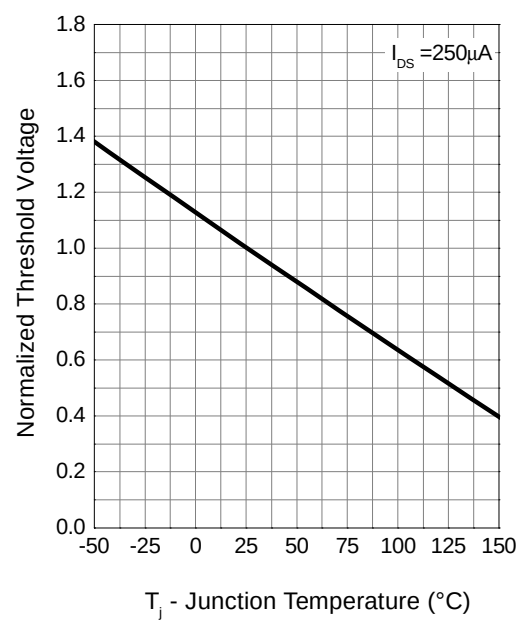
Symbol	Parameter	Test Conditions	US2302			Unit
			Min.	Typ.	Max.	
STATIC CHARACTERISTICS						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	20	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{GS} =±10V, V _{DS} =0V	-	-	±10	μA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =4.5V, I _{DS} =3A	-	50	65	mΩ
		V _{GS} =2.5V, I _{DS} =2A	-	65	90	
		V _{GS} =1.8V, I _{DS} =0.5A	-	120	200	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =1A, V _{GS} =0V	-	0.7	1.3	V
GATE CHARGE CHARACTERISTICS ^b						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _{DS} =3A	-	4.4	6	nC
Q _{gs}	Gate-Source Charge		-	0.5	-	
Q _{gd}	Gate-Drain Charge		-	1.6	-	

Symbol	Parameter	Test Conditions	US2302			Unit
			Min.	Typ.	Max.	
DYNAMIC CHARACTERISTICS ^b						
R _G	Gate Resistance	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	5	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =10V, Frequency=1.0MHz	-	320	-	pF
C _{oss}	Output Capacitance		-	70	-	
C _{rss}	Reverse Transfer Capacitance		-	50	-	
t _{d(ON)}	Turn-On Delay Time	V _{DD} =10V, R _L =10Ω, I _{DS} =1A, V _{GEN} =4.5V, R _G =6Ω	-	4	8	ns
t _r	Turn-On Rise Time		-	14	26	
t _{d(OFF)}	Turn-Off Delay Time		-	21	39	
t _f	Turn-Off Fall Time		-	5	10	
t _{rr}	Reverse Recovery Time	I _{SD} =3A, dI _{SD} /dt=100A/μs	-	15	-	ns
Q _{rr}	Reverse Recovery Charge		-	6	-	nC

Note a : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

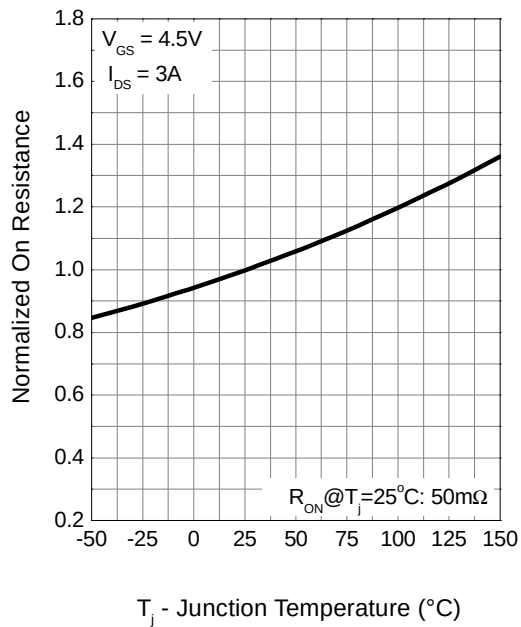
Note b : Guaranteed by design, not subject to production testing.

Typical Characteristics
Power Dissipation

Drain Current

Safe Operation Area

Thermal Transient Impedance


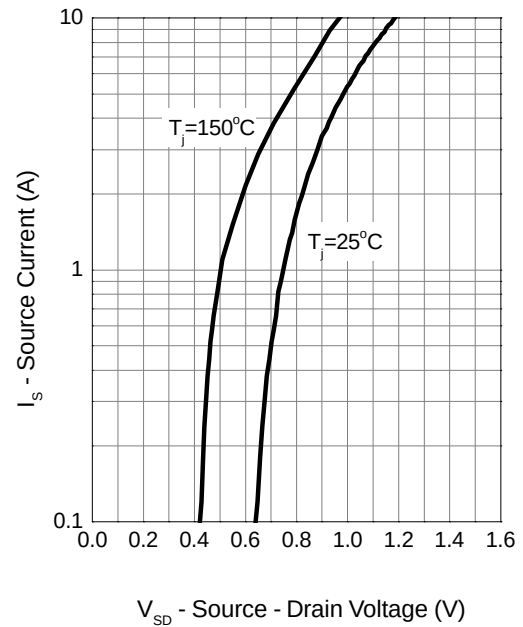
Typical Characteristics
Output Characteristics

Drain-Source On Resistance

Drain-Source On Resistance

Gate Threshold Voltage


Typical Characteristics

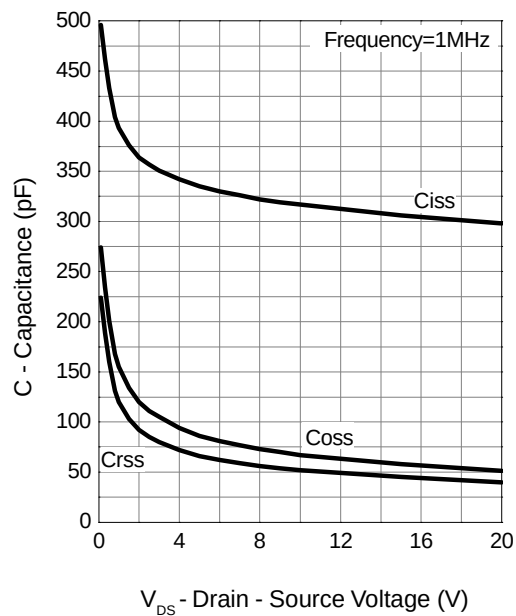
Drain-Source On Resistance



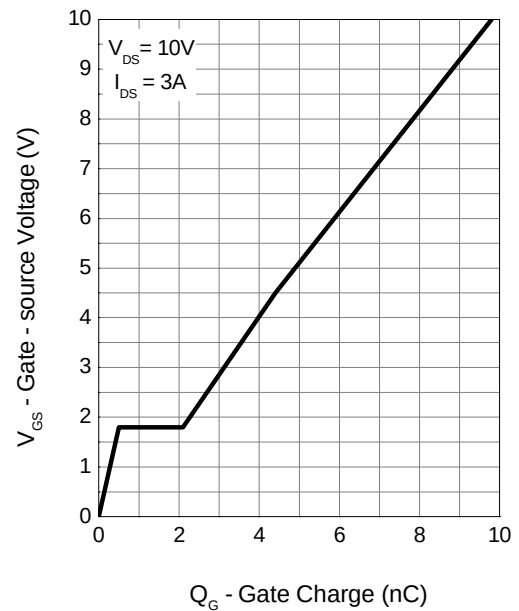
Source-Drain Diode Forward

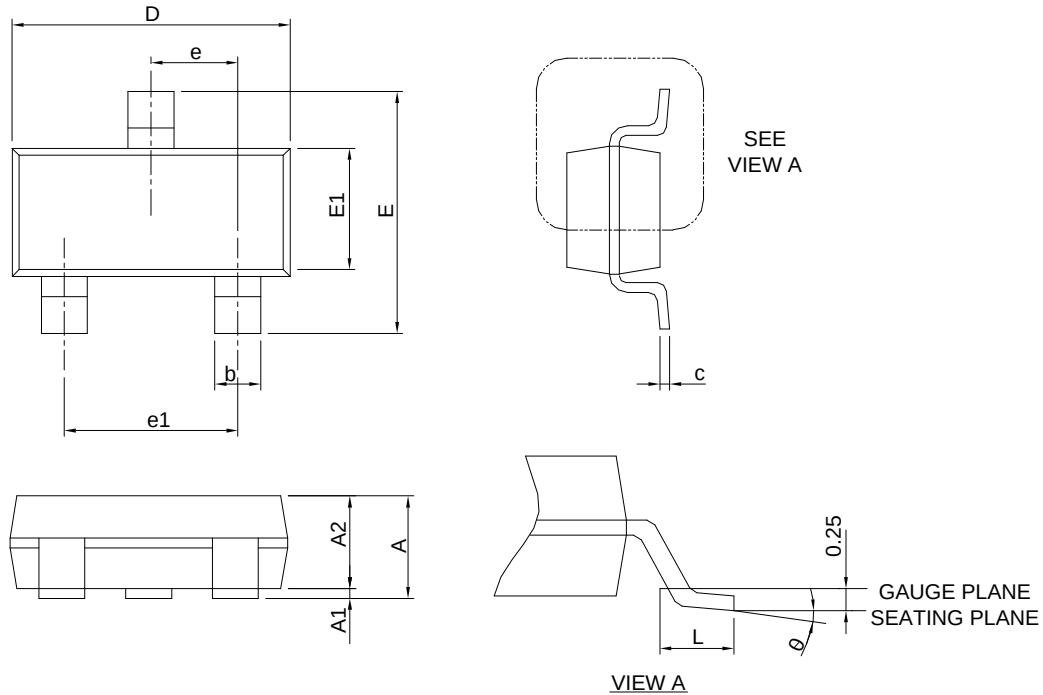


Capacitance



Gate Charge



Typical Characteristics
SOT-23


SYMBOL	SOT-23			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.45		0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.22	0.003	0.009
D	2.70	3.10	0.106	0.122
E	2.60	3.00	0.102	0.118
E1	1.40	1.80	0.055	0.071
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

Note : Dimension D and E1 do not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.