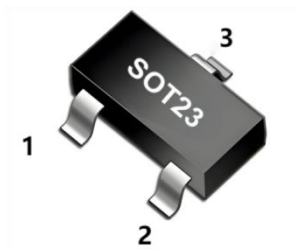


-3A, -20V P-CHANNEL ENHANCEMENT MODE POWER MOSFET

DESCRIPTION

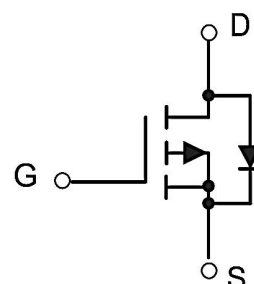
The 2301 is the high cell density trench P-channel MOSFETs, which provides excellent $R_{DS(on)}$ and efficiency for most of the small power switching and load switch applications.

The 2301 meet the RoHS and Green Product requirement with full function reliability approved.



1. GATE
2. SOURCE
3. DRAIN

Equivalent Circuit



FEATURE

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

ABSOLUTE MAXIMUM RATINGS($T_A=25^{\circ}\text{C}$, unless otherwise specified.)

SYMBOL	PARAMETER	VALUE	UNIT
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate Source Voltage	± 12	V
$I_{D@T_A=25^{\circ}\text{C}}$	Continuous Drain Current, $V_{GS} @ -4.5\text{V}$	-3	A
$I_{D@T_A=70^{\circ}\text{C}}$	Continuous Drain Current, $V_{GS} @ -4.5\text{V}$	-1.4	A
I_{DM}	Pulsed Drain Current	-8	A
$P_{D@T_A=25^{\circ}\text{C}}$	Total Power Dissipation	0.55	W
T_J	Storage Temperature	150	$^{\circ}\text{C}$
T_{STG}	Thermal Resistance From Junction To Ambient	-55~150	$^{\circ}\text{C}$

THERMAL DATA

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
$R_{\theta JA}$	Thermal Resistance Junction-ambient		227	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

SYMBOL	PARAMETER	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Off Characteristic						
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=-250μA	-20			V
IDSS	Zero Gate Voltage Drain Current	VDS=-19V, VGS=0V			-1	μA
IGSS	Gate to Body Leakage Current	VDS=0V, VGS=±12V			±100	nA
On Characteristics						
VGS(th)	Gate Threshold Voltage	VDS=VGS, ID=-250μA	-0.4	-0.7	-1.0	V
RDS(on)	Static Drain-Source on-Resistance note2	VGS=-4.5V, ID=-2A		50	65	mΩ
		VGS=-2.5V, ID=-1A		85	140	
Dynamic Characteristics						
Ciss	Input Capacitance	VDS=-10V, VGS=0V f =1.0MHz		185		pF
Coss	Output Capacitance			35		pF
Crss	Reverse Transfer Capacitance			25		pF
Qg	Total Gate Charge	VDS=-10V, ID=-2A VGS=-4.5V		2.2		nC
Qgs	Gate-Source Charge			0.5		nC
Qgd	Gate-Drain(“Miller”) Charge			0.5		nC
Switching Characteristics						
td(on)	Turn-on Delay Time	VDD=-10V, RL=5Ω RGEN=3Ω,VGS=-4.5V		10		ns
tr	Turn-on Rise Time			30		ns
td(off)	Turn-off Delay Time			63		ns
tf	Turn-off Fall Time			50		ns
Drain-Source Diode Characteristics and Maximum Ratings						
IS	Maximum Continuous Drain to Source Diode Forward Current				-2	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current				-3	A
VSD	Drain to Source Diode Forward Voltage	VGS=0V, IS=-1A			-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

■ TYPICAL CHARACTERISTICS

Figure1: Output Characteristics

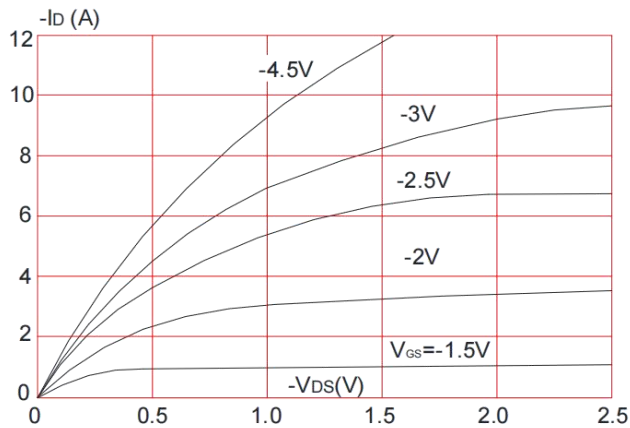


Figure 2: Typical Transfer Characteristics

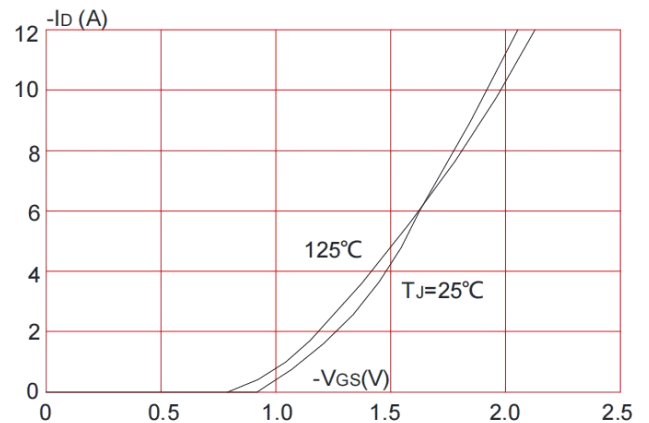


Figure 3: On-resistance vs. Drain Current

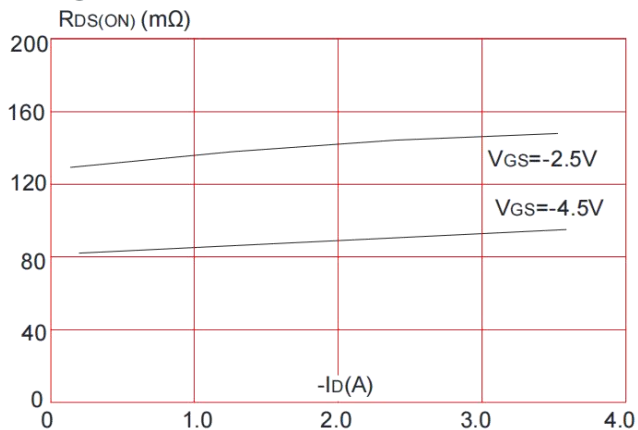


Figure 4: Body Diode Characteristics

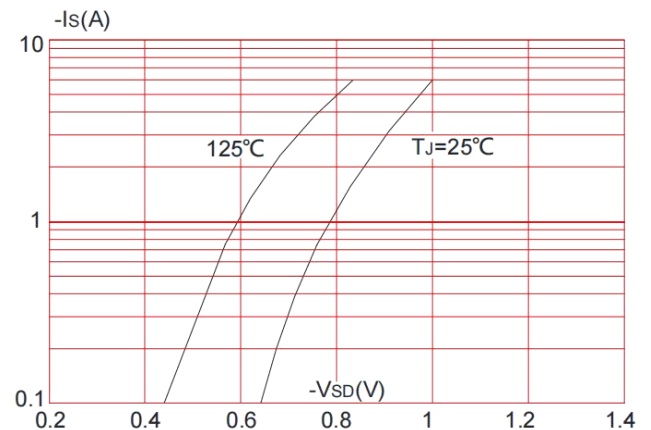


Figure 5: Gate Charge Characteristics

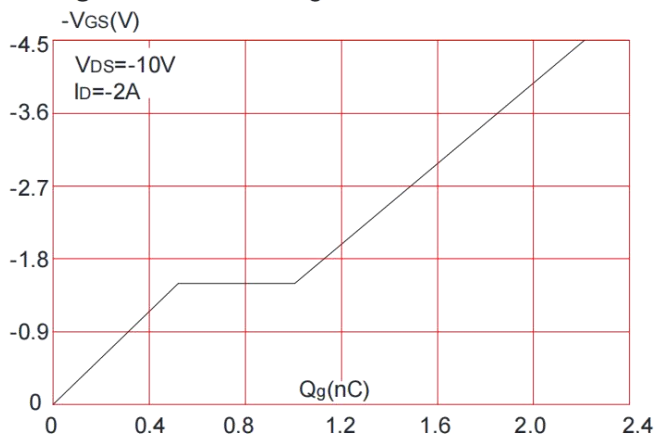
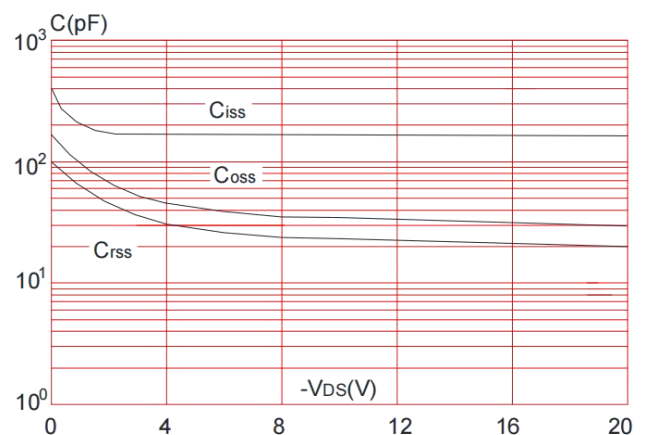


Figure 6: Capacitance Characteristics



■ TYPICAL CHARACTERISTICS

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

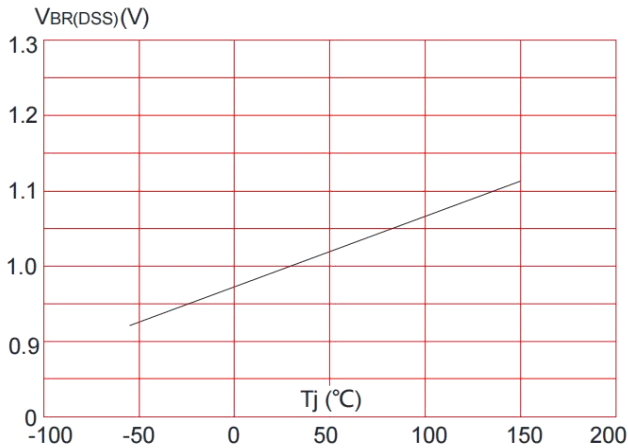


Figure 8: Normalized on Resistance vs. Junction Temperature

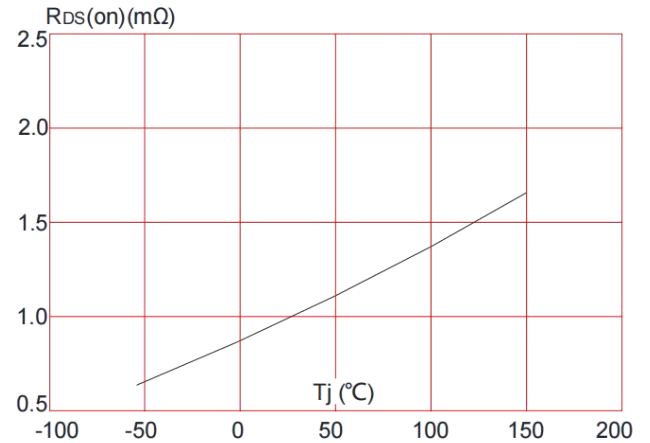


Figure 9: Maximum Safe Operating Area

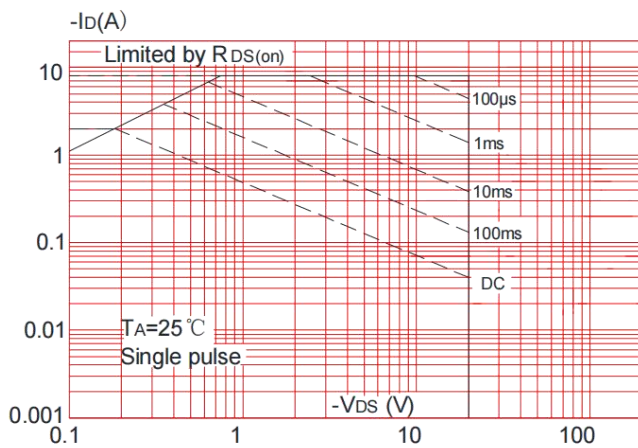


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

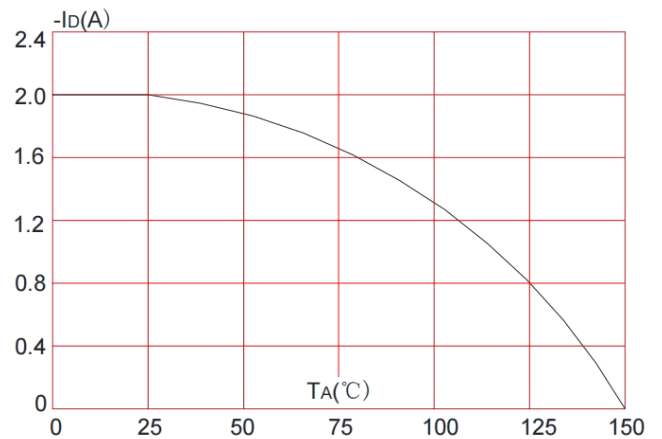


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

