

# G2301

## P-CHANNEL ENHANCEMENT MODE POWER MOSFET

BV <sub>DSS</sub>	-20V
R <sub>DS(ON)</sub>	130mΩ
I <sub>D</sub>	-2.6A

### Description

The G2301 provides the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The G2301 is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

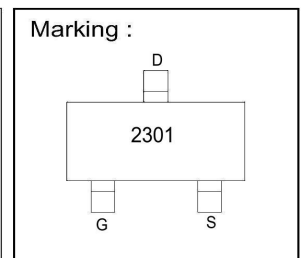
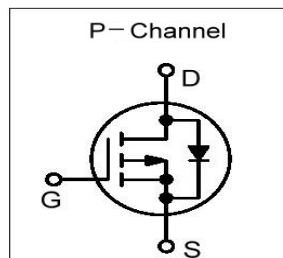
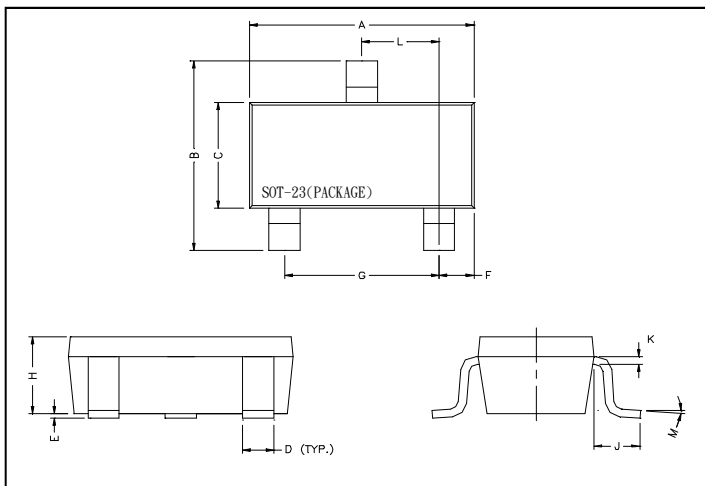
### Features

- Super High Dense Cell Design for Extremely Low R<sub>DS(ON)</sub>
- Reliable and Rugged

### Applications

- Power Management in Notebook Computer
- Portable Equipment
- Battery Powered System.

### Package Dimensions



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	1.90	REF.
B	2.40	2.80	H	1.00	1.30
C	1.40	1.60	K	0.10	0.20
D	0.35	0.50	J	0.40	-
E	0	0.10	L	0.85	1.15
F	0.45	0.55	M	0	10

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V <sub>DS</sub>	-20	V
Gate-Source Voltage	V <sub>GS</sub>	±12	V
Continuous Drain Current <sup>3</sup>	I <sub>D</sub> @TA=25°C	-2.6	A
Continuous Drain Current <sup>3</sup>	I <sub>D</sub> @TA=70°C	-2.1	A
Pulsed Drain Current	I <sub>DM</sub>	-10	A
Power Dissipation	P <sub>D</sub> @TA=25°C	1.38	W
Linear Derating Factor		0.01	W/°C
Operating Junction and Storage Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +150	°C

### Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient <sup>3</sup> Max.	R <sub>thj-a</sub>	90	°C/W

## Electrical Characteristics(Tj = 25°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =-250uA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	-	-0.1	-	V/°C	Reference to 25°C, I <sub>D</sub> =-1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.5	-	-	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =-250uA
Forward Transconductance	g <sub>fs</sub>	-	4.4	-	S	V <sub>DS</sub> =-5.0V, I <sub>D</sub> =-2.8A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±12V
Drain-Source Leakage Current(Tj=25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0
Drain-Source Leakage Current(Tj=70°C)		-	-	-10	uA	V <sub>DS</sub> =-16V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance <sup>2</sup>	R <sub>DS(on)</sub>	-	-	130	mΩ	I <sub>D</sub> =-2.8A, V <sub>GS</sub> =-5.0V
		-	-	190		I <sub>D</sub> =-2.0A, V <sub>GS</sub> =-2.8V
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	5.2	10	nC	I <sub>D</sub> =-2.8A
Gate-Source Charge	Q <sub>gs</sub>	-	1.36	-		V <sub>DS</sub> =-6.0V
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	0.6	-		V <sub>GS</sub> =-5.0V
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	5.2	-	ns	V <sub>DS</sub> =-15V I <sub>D</sub> =-1A V <sub>GS</sub> =-10V R <sub>G</sub> =6Ω R <sub>D</sub> =15Ω
Rise Time	T <sub>r</sub>	-	9.7	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	19	-		
Fall Time	T <sub>f</sub>	-	29	-		
Input Capacitance	C <sub>iss</sub>	-	295	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =-6V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	170	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	65	-		

## Source-Drain Diode

Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	-1.2	V	I <sub>S</sub> =-1.6A, V <sub>GS</sub> =0 Tj=25°C
Continuous Source Current(Body Diode)	I <sub>S</sub>	-	-	-1	A	V <sub>D</sub> = V <sub>G</sub> =0V, V <sub>S</sub> =-1.2V
Pulsed Source Current (Body Diode) <sup>1</sup>	I <sub>SM</sub>	-	-	-10	A	

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board;270°C/w when mounted on min. copper pad.

## Characteristics Curve

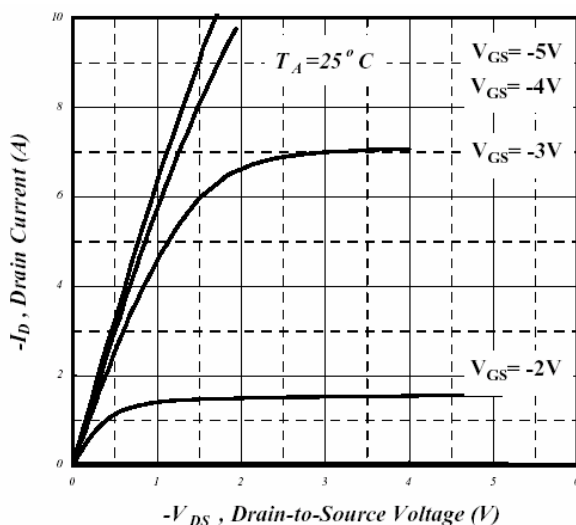


Fig 1. Typical Output Characteristics

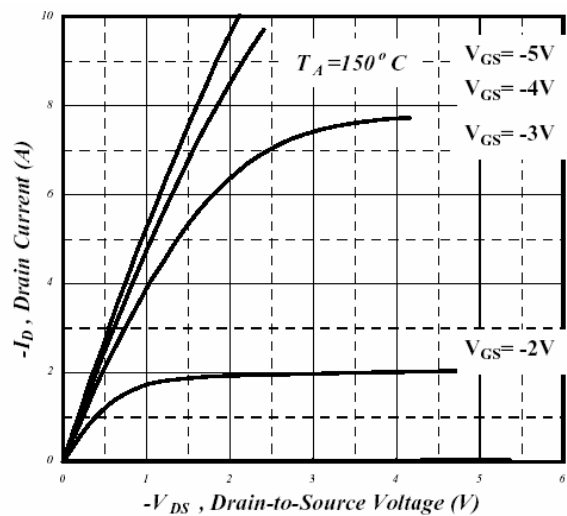
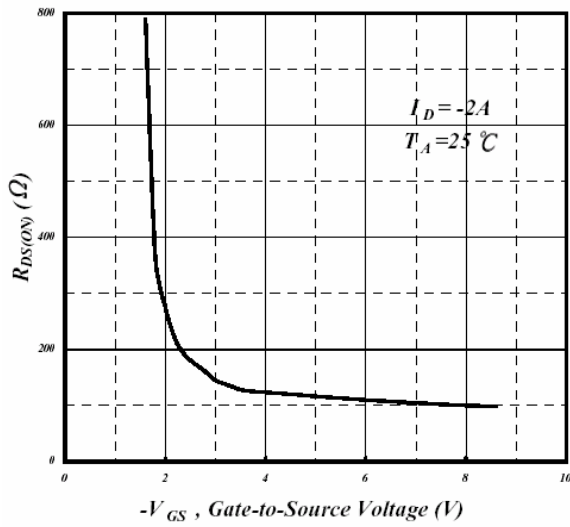
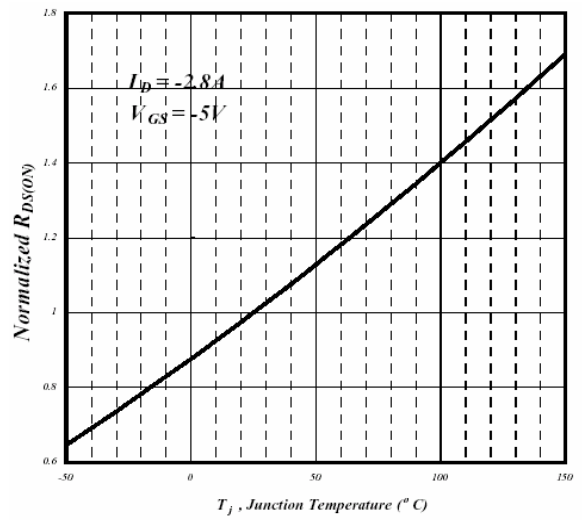


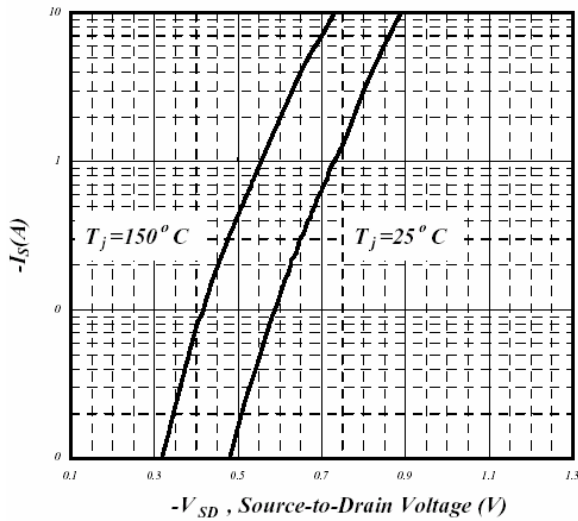
Fig 2. Typical Output Characteristics



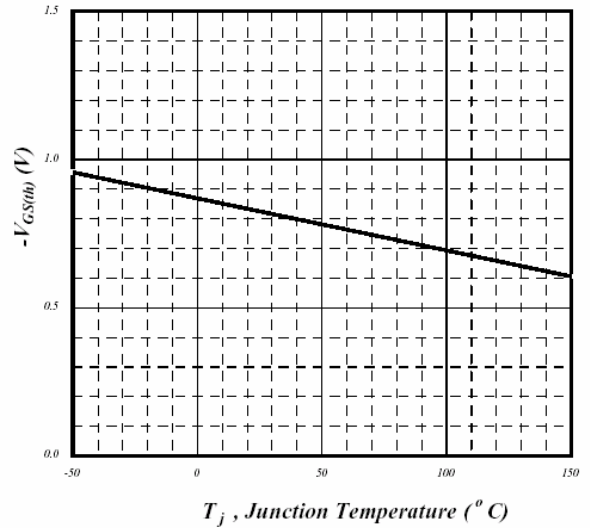
**Fig 3. On-Resistance v.s. Gate Voltage**



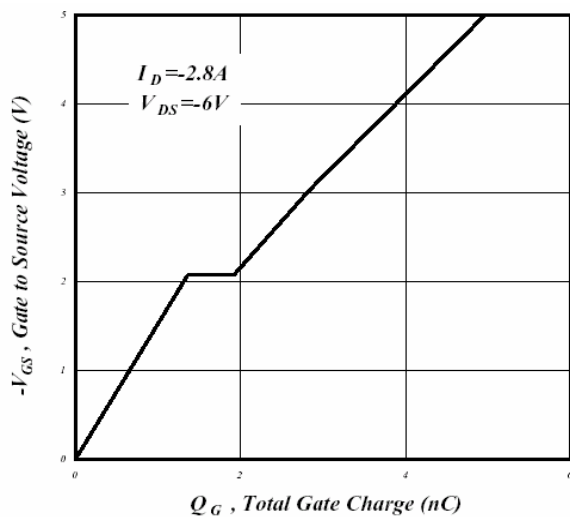
**Fig 4. Normalized On-Resistance**



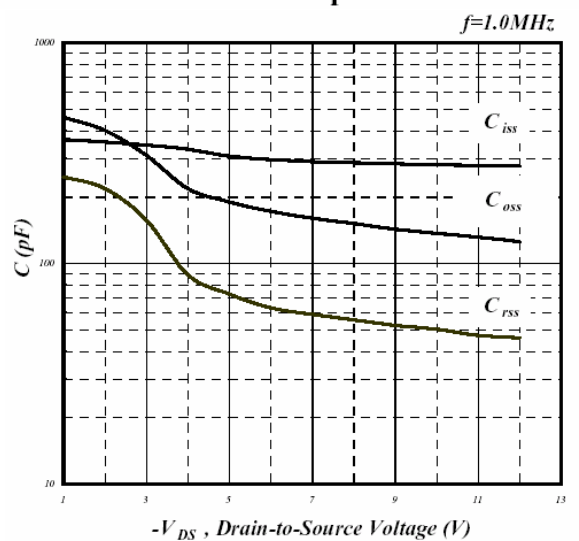
**Fig 5. Forward Characteristic of Reverse Diode**



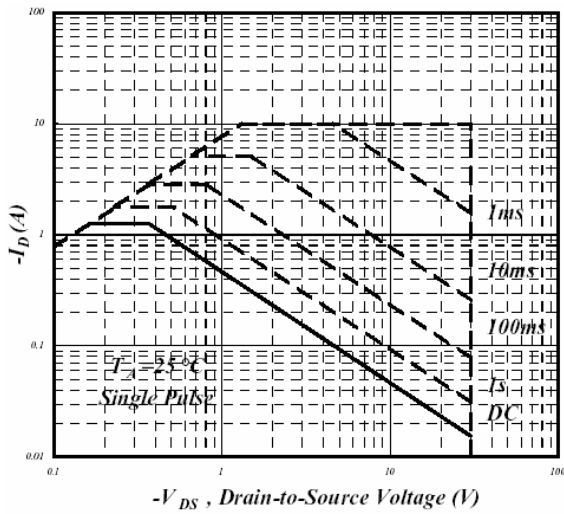
**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**



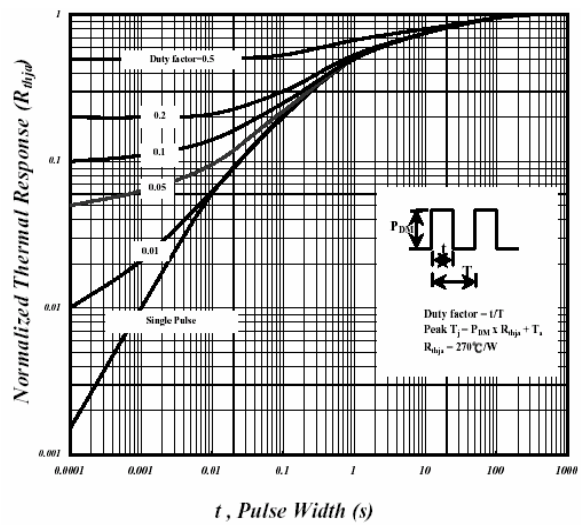
**Fig 7. Gate Charge Characteristics**



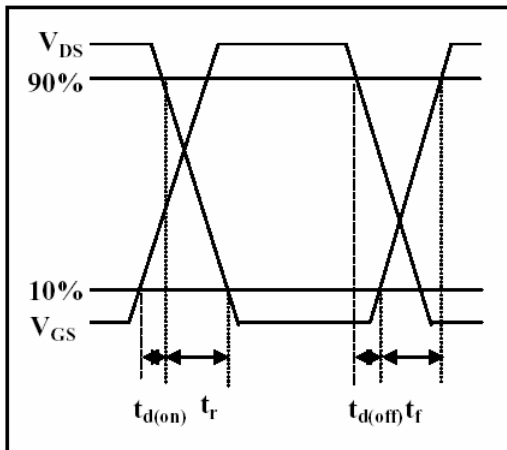
**Fig 8. Typical Capacitance Characteristics**



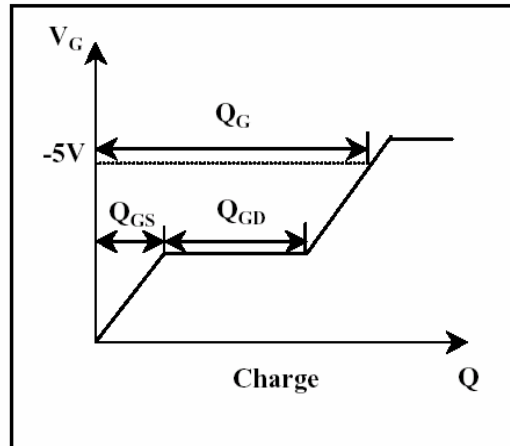
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**

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