

RoHS Compliant Product

A suffix of "-C" specifies halogen & RoHS compliant

## Description

The SMG2301 is universally preferred for all commercial industrial surface mount application and suited for low voltage applications such as DC/DC converters.

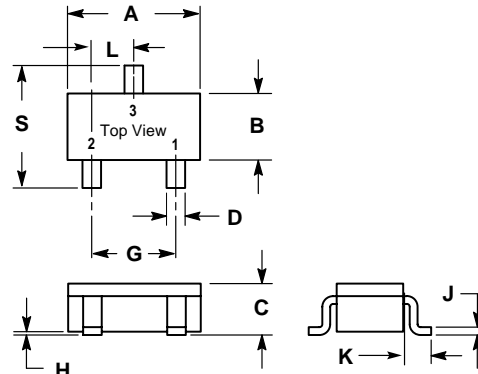
## Features

- \* Super high dense cell design for extremely low  $R_{DS(ON)}$
- \* Reliable and rugged

## Applications

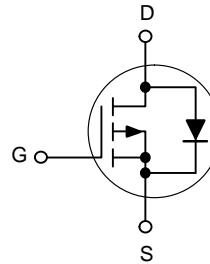
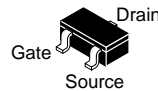
- \* Power Management in Notebook Computer
- \* Portable Equipment
- \* Battery Powered System

Marking : 2301



SC-59		
Dim	Min	Max
A	2.70	3.10
B	1.40	1.60
C	1.00	1.30
D	0.35	0.50
G	1.70	2.10
H	0.00	0.10
J	0.10	0.26
K	0.20	0.60
L	0.85	1.15
S	2.40	2.80

All Dimension in mm



## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>3</sup>	$I_D @ T_A = 25^\circ C$	-2.6	A
Continuous Drain Current <sup>3</sup>	$I_D @ T_A = 70^\circ C$	-2.1	A
Pulsed Drain Current	$I_{DM}$	-10	A
Total Power Dissipation	$P_D @ T_A = 25^\circ C$	1.38	W
Linear Derating Factor		0.01	W/ $^\circ C$
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55~+150	$^\circ C$

## Thermal Data

Parameter	Symbol	Ratings	Unit
Thermal Resistance Junction-ambient <sup>3</sup>	$R_{thj-a}$	90	$^\circ C/W$

**Electrical Characteristics( T<sub>j</sub>=25°C Unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA
Breakdown Voltage Temp. Coefficient	ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	-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
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> =±12V
Drain-Source Leakage Current (T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	-1	uA	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0
Drain-Source Leakage Current (T <sub>j</sub> =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	V <sub>GS</sub> =-5.0V, I <sub>D</sub> =-2.8A
		-	-	190		V <sub>GS</sub> =-2.8V, I <sub>D</sub> =-2A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	5.2	10	nC	I <sub>D</sub> =-2.8A V <sub>DS</sub> =-6.0V V <sub>GS</sub> =-5.0V
Gate-Source Charge	Q <sub>gs</sub>	-	1.36	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	0.6	-		
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	-		
Forward Transconductance	G <sub>fs</sub>	-	4.4	-	S	V <sub>DS</sub> =-5V, I <sub>D</sub> =-2.8A

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	-1.2	V	I <sub>S</sub> =-1.6A, V <sub>GS</sub> =0V.
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)	I <sub>SM</sub>	-	-	-10	A	

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

2.Pulse width ≤300us, dutycycle≤2%.

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

## Characteristics Curve

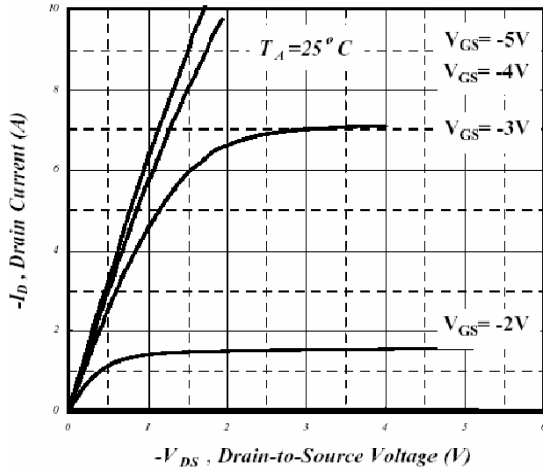


Fig 1. Typical Output Characteristics

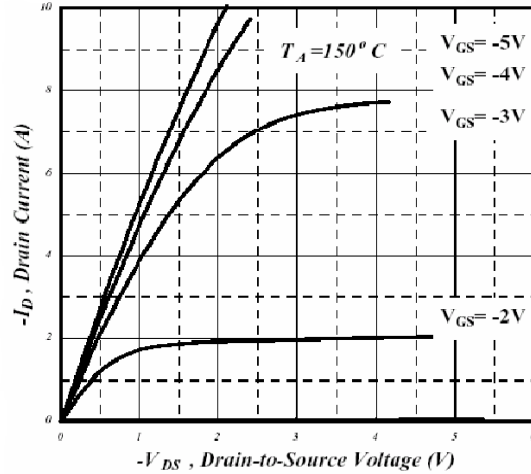


Fig 2. Typical Output Characteristics

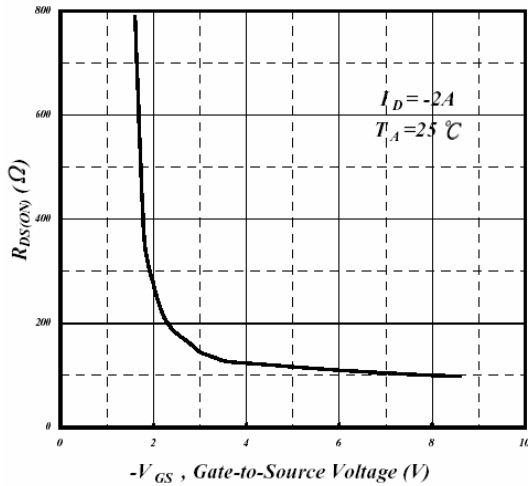


Fig 3. On-Resistance v.s. Gate Voltage

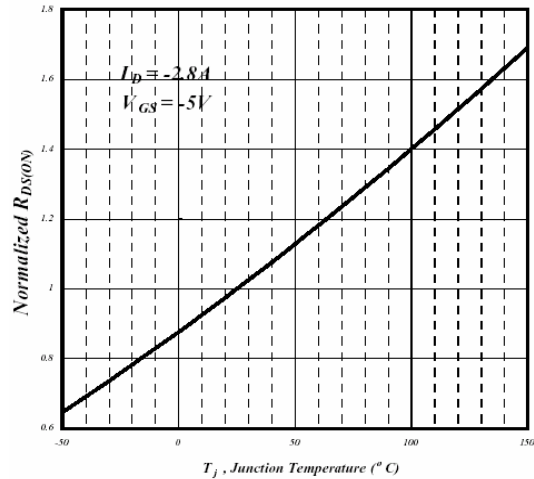


Fig 4. Normalized On-Resistance

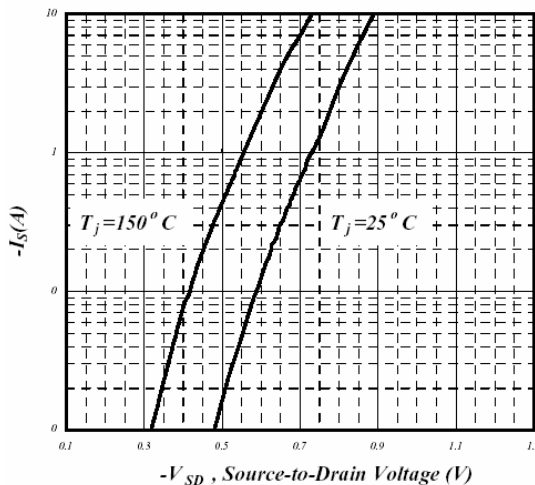


Fig 5. Forward Characteristic of Reverse Diode

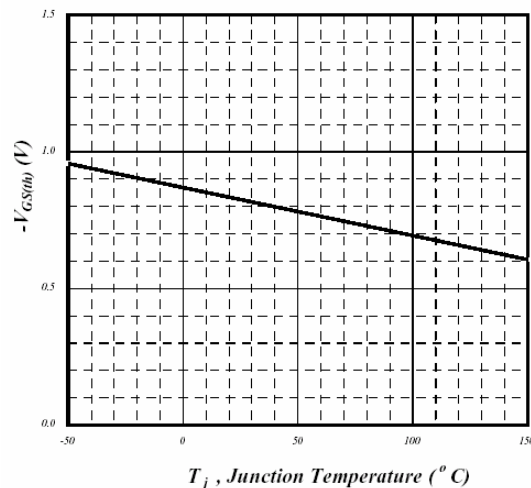


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

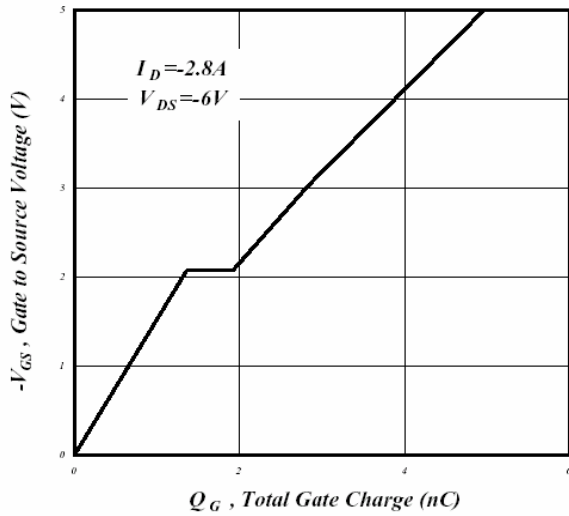


Fig 7. Gate Charge Characteristics

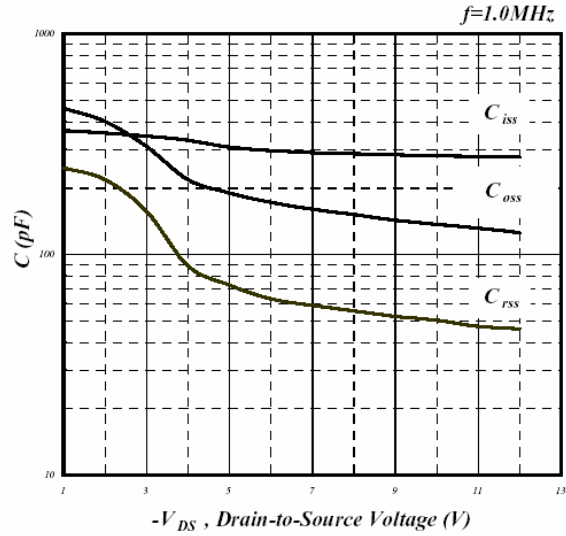


Fig 8. Typical Capacitance Characteristics

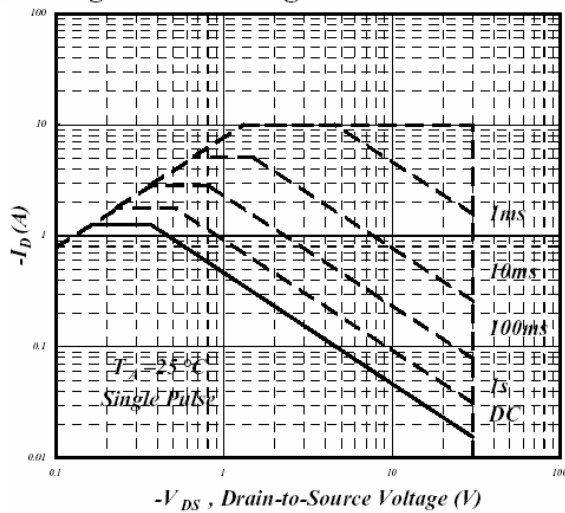


Fig 9. Maximum Safe Operating Area

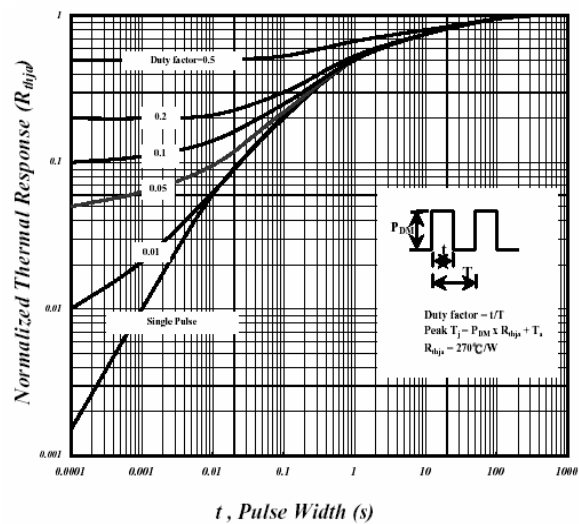


Fig 10. Effective Transient Thermal Impedance

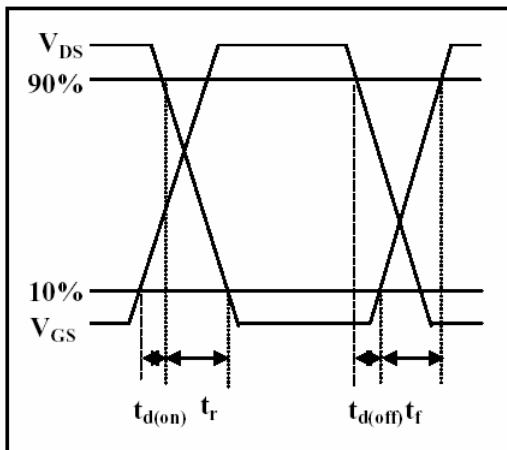


Fig 11. Switching Time Waveform

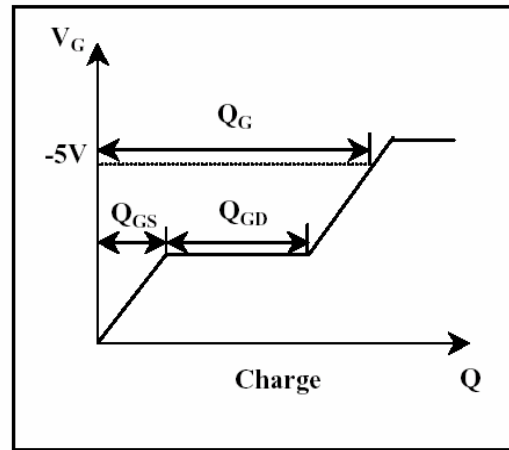


Fig 12. Gate Charge Waveform