Elektronische Bauelemente

SMS2301-C

-3.1A, -20V, $R_{DS(ON)}$ 75mΩ

P-Channel Enhancement Mode Power MOSFET

RoHS Compliant Product

A suffix of "-C" specifies halogen & lead-free

DESCRIPTION

The SMS2301-C is the highest performance trench P-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 SMS2301-C meet the RoHS and Green Product requirement with full function reliability approved.

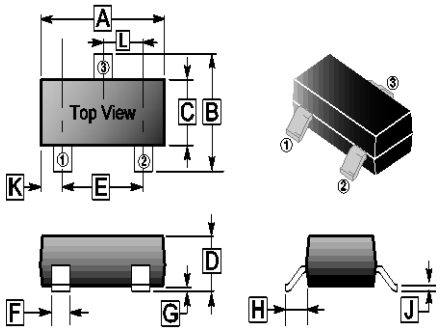
FEATURES

- Advanced High Cell Density Trench Technology
- Super low Gate Charge
- Green Device Available

MARKING

S1

SOT-23



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.65	3.10	G	0	0.18
B	2.10	3.00	H	0.55 REF.	
C	1.10	1.80	J	0.08	0.26
D	0.89	1.40	K	0.60 REF.	
E	1.70	2.30	L	0.95 TYP.	
F	0.28	0.55			

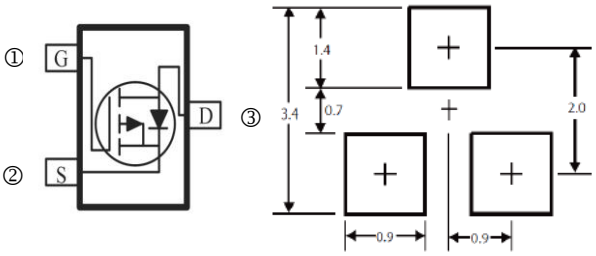
PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7 inch

ORDER INFORMATION

Part Number	Type
SMS2301-C	Lead (Pb)-free and Halogen-free

Mounting Pad Layout



*Dimensions in millimeters

ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise specified)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	-20	V
Continuous Gate-Source Voltage		V_{GS}	±12	V
Continuous Drain Current [1] @V_{GS}= -4.5V	T_A=25°C	I_D	-3.1	A
	T_A=70°C		-2.5	
Pulsed Drain Current [2]		I_{DM}	-15.5	A
Total Power Dissipation [1]	T_A=25°C	P_D	1	W
Operating Junction & Storage Temperature Range		T_J, T_{STG}	150, -55~150	°C
Thermal Resistance Rating				
Thermal Resistance from Junction-Ambient [1]	t≦5sec	$R_{\theta JA}$	125	°C/W
	Steady State		250	
Thermal Resistance from Junction-Ambient			300	

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P-Channel Enhancement Mode Power MOSFET

ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	-20	-	-	V	V_{GS}=0, I_D= -250μA
Drain-Source Leakage Current	T_J=25°C	I_{DSS}	-	-	-1	μA	V_{GS}=0, V_{DS}= -16V
	T_J=55°C		-	-	-5		
Gate-Source Leakage Current		I_{GSS}	-	-	±100	nA	V_{GS}=±12V, V_{DS}=0
Gate-Source Threshold Voltage		$V_{GS(th)}$	-0.5	-	-1.2	V	V_{DS}=V_{GS}, I_D= -250μA
Static Drain-Source On Resistance [3]		$R_{DS(ON)}$	-	-	75	mΩ	V_{GS}= -4.5V, I_D= -3A
			-	-	105		V_{GS}= -2.5V, I_D= -2A
Forward Transfer Conductance		g_{FS}	-	9	-	S	V_{DS}= -5V, I_D= -3A
Total Gate Charge		Q_g	-	9.7	-	nC	V_{DS}= -15V V_{GS}= -4.5V I_D= -3A
Gate-Source Charge		Q_{gs}	-	2.05	-		
Gate-Drain (“Miller”) Charge		Q_{gd}	-	2.43	-		
Turn-On Delay Time		$T_{d(ON)}$	-	4.8	-	nS	I_D= -3A V_{DS}= -10V V_{GS}= -4.5V R_G=3.3Ω
Rise Time		T_r	-	9.6	-		
Turn-Off Delay Time		$T_{d(OFF)}$	-	52	-		
Fall Time		T_f	-	8.4	-		
Input Capacitance		C_{iss}	-	686	-	pF	V_{DS}= -15V V_{GS}=0 f=1MHz
Output Capacitance		C_{oss}	-	90.8	-		
Reverse Transfer Capacitance		C_{rss}	-	80.4	-		
Source Drain Diode							
Continuous Source Current [1]		I_S	-	-	-3.1	A	
Pulsed Source Current [2]		I_{SM}	-	-	-15.5		
Forward On Voltage [3]		V_{SD}	-	-0.7	-1.2	V	I_S= -1A, V_{GS}=0
Reverse Recovery Time		t_{rr}	-	8.4	-	nS	I_F= -3A, dI/dt=100A/us, T_J=25°C
Reverse Recovery Charge		Q_{rr}	-	3.3	-	nC	

Notes:

1. Surface mounted on a 1 inch^2 FR-4 board with 2oz copper.
2. The power dissipation is limited by 150°C junction temperature.
3. The data tested by pulsed , pulse width≦300us, duty cycle≦2%.

TYPICAL CHARACTERISTIC CURVE

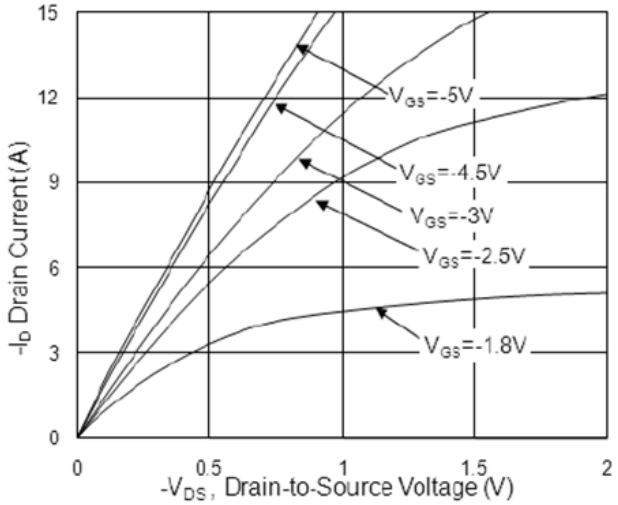

Fig.1 Typical Output Characteristics

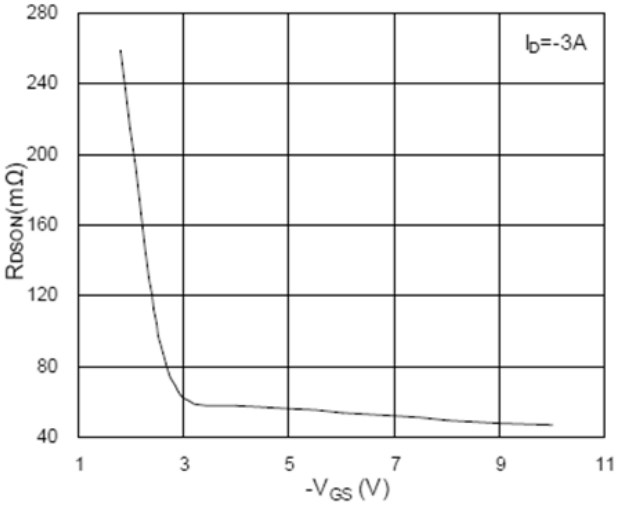

Fig.2 On-Resistance vs. Gate-Source

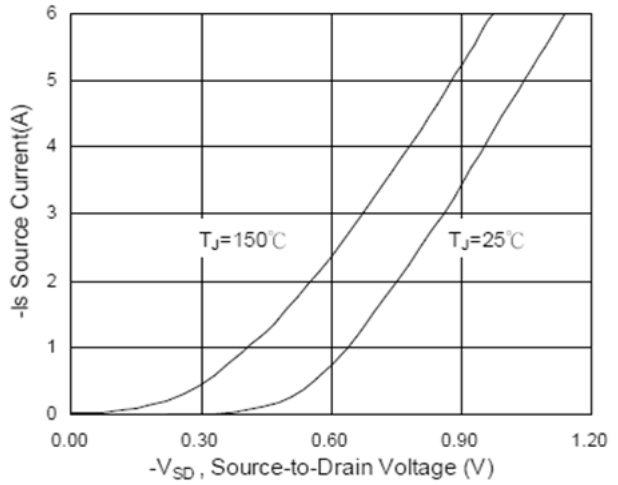

Fig.3 Forward Characteristics Of Reverse

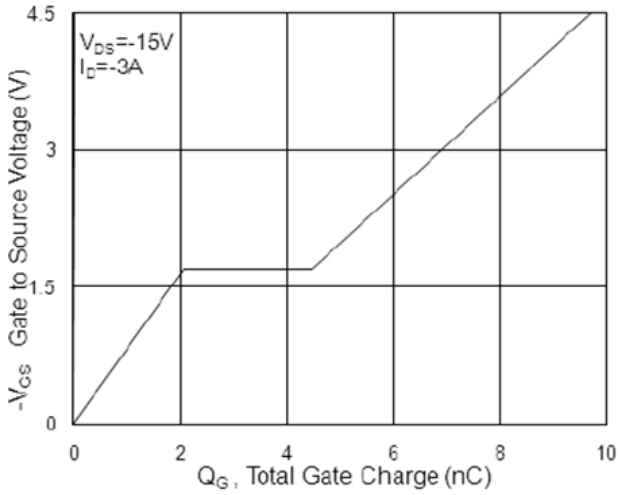

Fig.4 Gate-Charge Characteristics

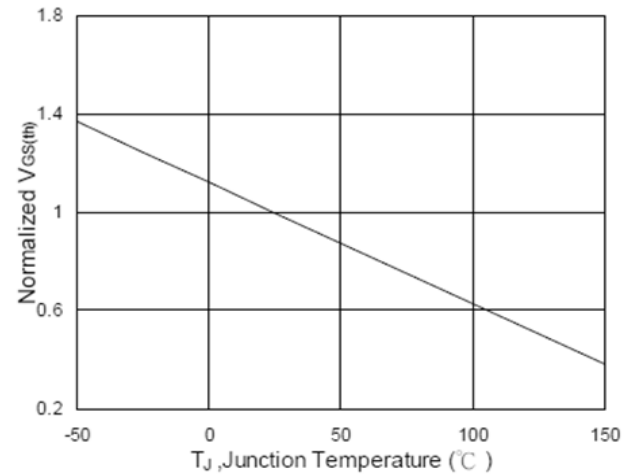

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

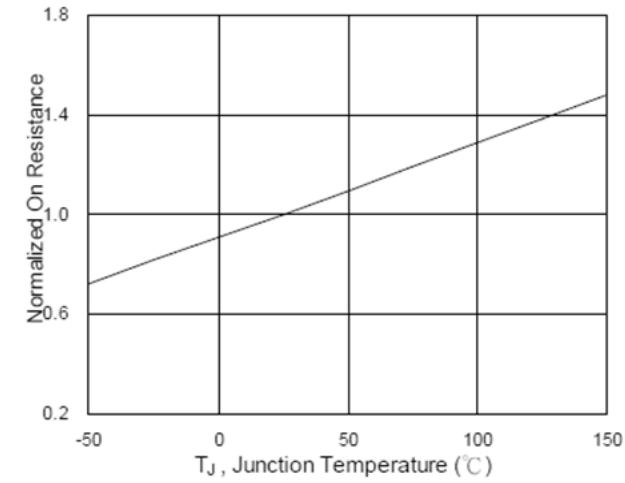

Fig.6 Normalized R_{DSON} vs. T_J

TYPICAL CHARACTERISTIC CURVE

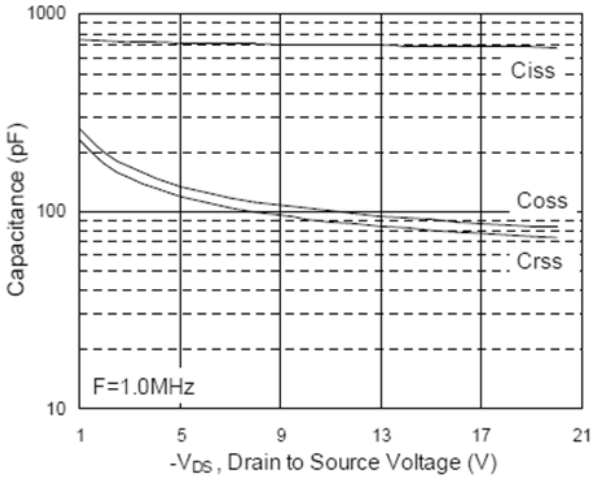

Fig.7 Capacitance

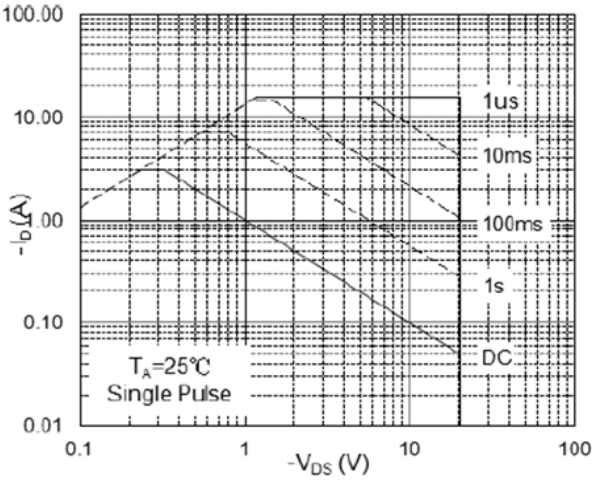

Fig.8 Safe Operating Area

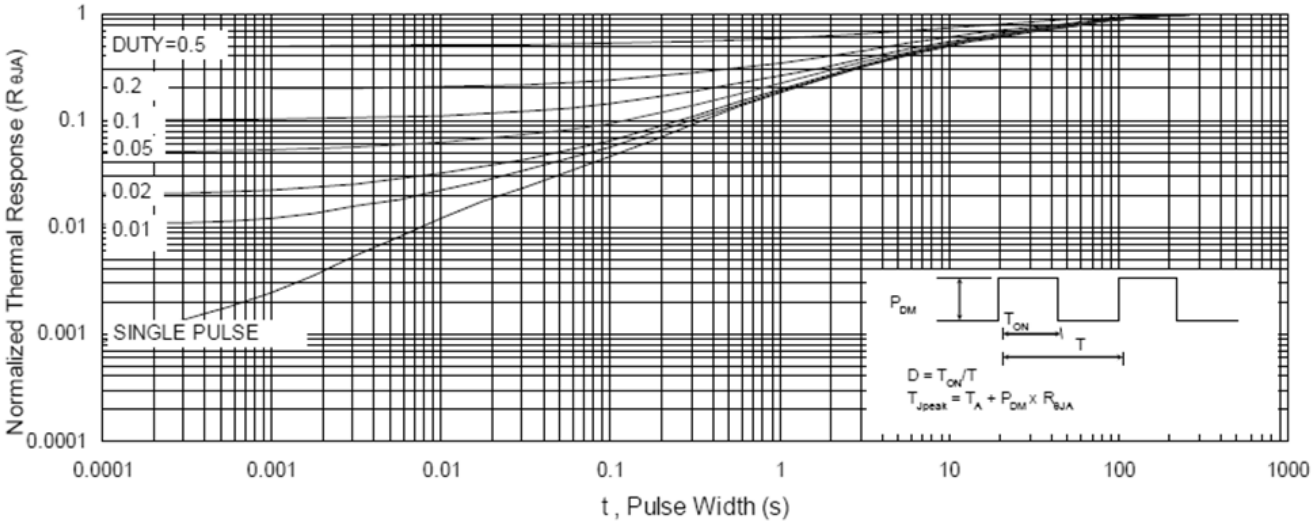

Fig.9 Normalized Maximum Transient Thermal Impedance

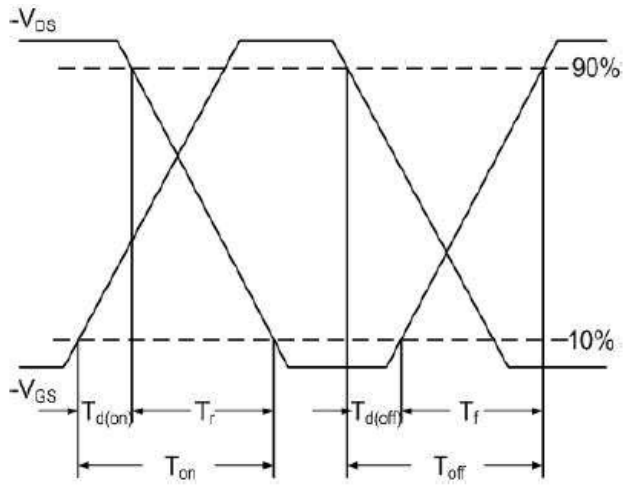

Fig.10 Switching Time Waveform

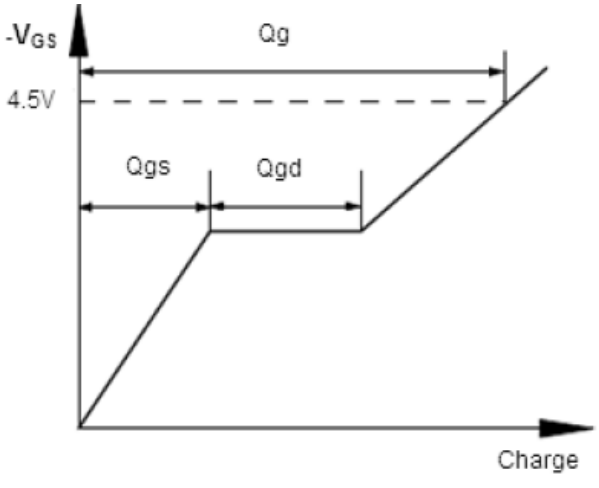

Fig.11 Gate Charge Waveform