

RoHS Compliant Product
A suffix of "-C" specifies halogen and lead-free

DESCRIPTION

The SMG2301-C is the highest performance trench P-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the small power switching and load switch applications.

The SMG2301-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

2301

PACKAGE INFORMATION

Package	MPQ	Leader Size
SC-59	3K	7 inch

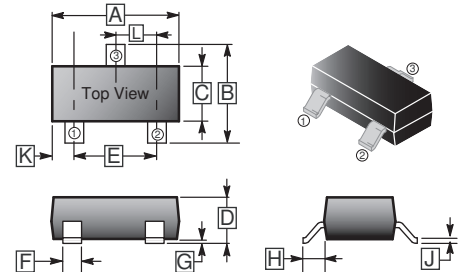
ORDER INFORMATION

Part Number	Type
SMG2301-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS

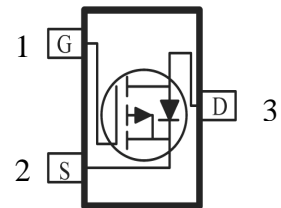
Parameter	Symbol	Ratings		Unit
		$\leq 10\text{sec}$	Steady State	
Drain-Source Voltage	V_{DS}	-20		V
Gate-Source Voltage	V_{GS}	± 12		V
Continuous Drain Current ¹ @ $V_{GS} = -4.5\text{V}$	$T_A = 25^\circ\text{C}$	-3.5	-3.1	A
	$T_A = 70^\circ\text{C}$	-2.8	-2.5	
Pulsed Drain Current ³	I_{DM}	-15.5		A
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D 1.38		W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~150		$^\circ\text{C}$
Thermal Resistance Rating				
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	$\leq 10\text{sec}, 90$		$^\circ\text{C/W}$
		Steady State, 125		
Thermal Resistance Junction-ambient ²		270		
Thermal Resistance Junction-case ¹	$R_{\theta JC}$	80		

SC-59



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.10	REF.
B	2.10	3.00	H	0.40	REF.
C	1.20	1.70	J	0.047	0.207
D	0.89	1.40	K	0.5	REF.
E	2.00	Typ.	L	0.95	REF.
F	0.30	0.50			

TOP VIEW



ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	BV_{DSS}	-20	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$	
Gate-Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.2	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	
Forward Transconductance	g_{fs}	-	9	-	S	$V_{DS} = -5\text{V}, I_D = -3\text{A}$	
Gate-Body Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 12\text{V}$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	-1	μA	$V_{DS} = -16\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	-5		$V_{DS} = -16\text{V}, V_{GS}=0$
Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	-	75	m Ω	$V_{GS} = -5\text{V}, I_D = -2.8\text{A}$	
		-	-	105		$V_{GS} = -2.8\text{V}, I_D = -2\text{A}$	
Total Gate Charge	Q_g	-	9.7	-	nC	$V_{DS} = -15\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -3\text{A}$	
Gate-Source Charge	Q_{gs}	-	2.05	-			
Gate-Drain Charge	Q_{gd}	-	2.43	-			
Turn-on Delay Time	$T_{d(on)}$	-	4.8	-	nS	$V_{DS} = -10\text{V}$ $V_{GS} = -4.5\text{V}$ $I_D = -3\text{A}$ $R_G = 3.3\Omega$	
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	$V_{GS}=0$ $V_{DS} = -15\text{V}$ $f=1.0\text{MHz}$	
Output Capacitance	C_{oss}	-	90.8	-			
Reverse Transfer Capacitance	C_{rss}	-	80.4	-			
Source-Drain Diode							
Diode Forward Voltage ⁴	V_{SD}	-	-	-1.2	V	$I_S = -1.6\text{A}, V_{GS}=0$	
Continuous Source Current ¹	I_S	-	-	-3.1	A		
Pulsed Source Current ³	I_{SM}	-	-	-15.5	A		
Reverse Recovery Time	t_{rr}	-	8.4	-	nS	$I_F = -3\text{A}, di/dt=100\text{A}/\mu\text{s}$	
Reverse Recovery Charge	Q_{rr}	-	3.3	-	nC	$T_J=25^\circ\text{C}$	

Notes:

1. Surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. When mounted on Min. copper pad.
3. Pulse width limited by maximum junction temperature.
4. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

CHARACTERISTIC CURVES

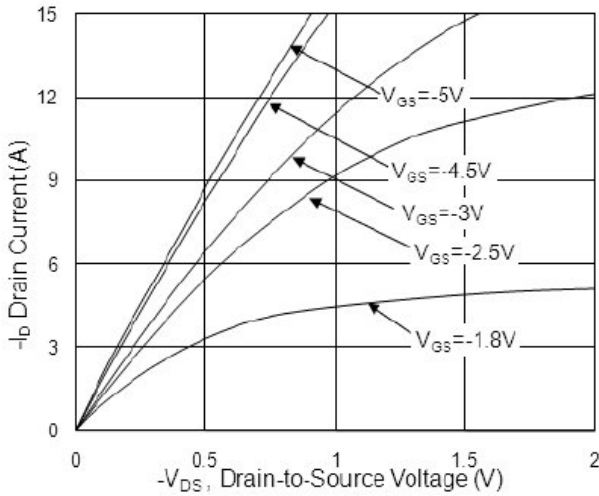


Fig.1 Typical Output Characteristics

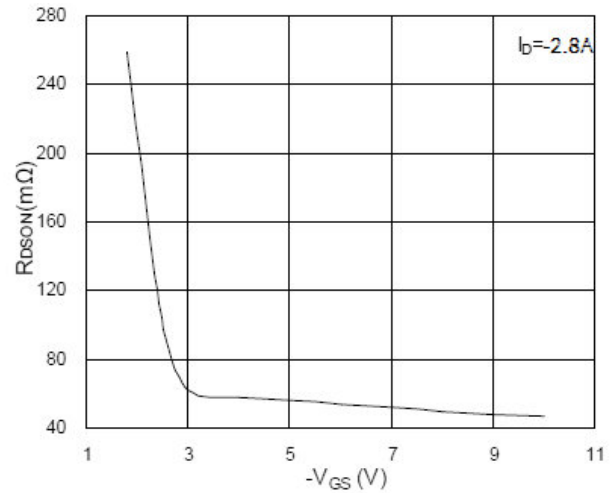


Fig.2 On-Resistance vs. Gate-Source

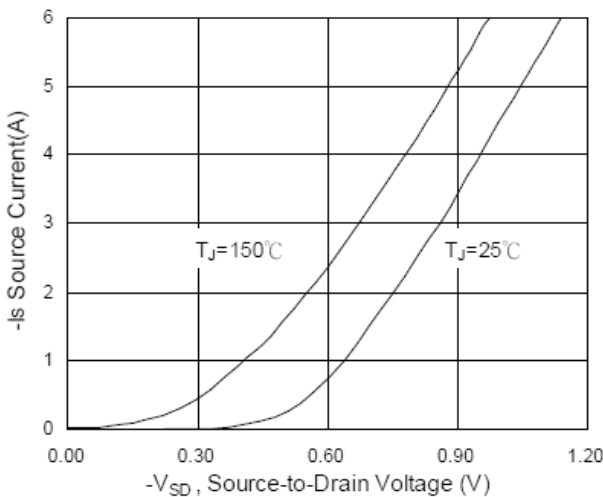


Fig.3 Forward Characteristics Of Reverse

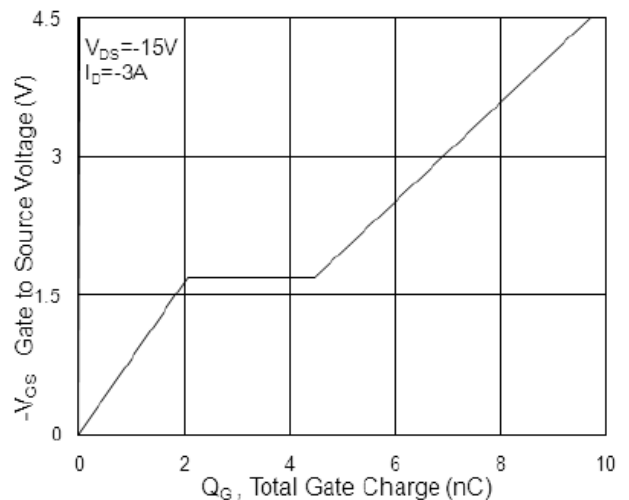


Fig.4 Gate-Charge Characteristics

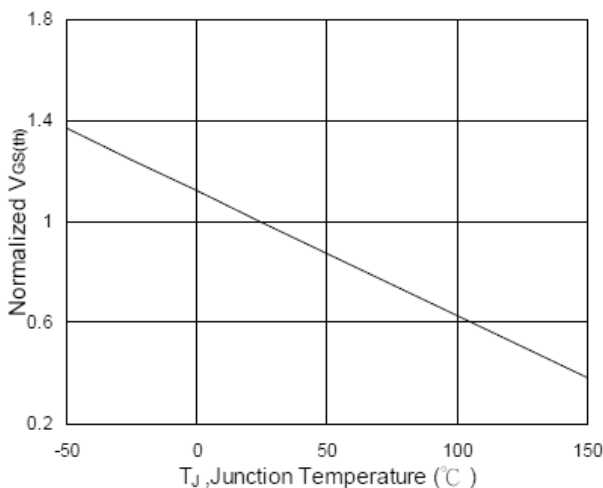


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

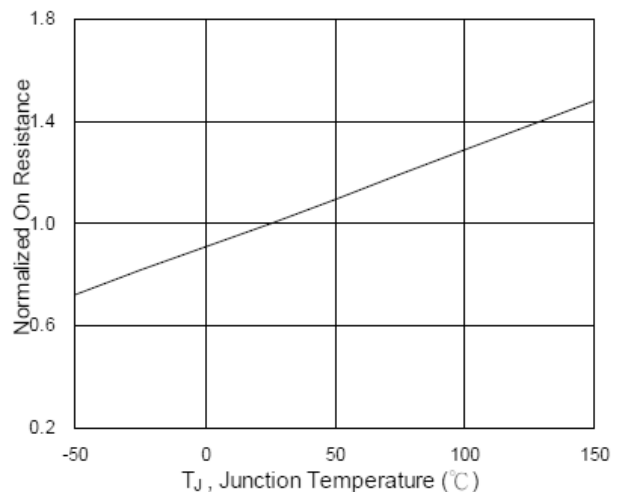


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

CHARACTERISTIC CURVES

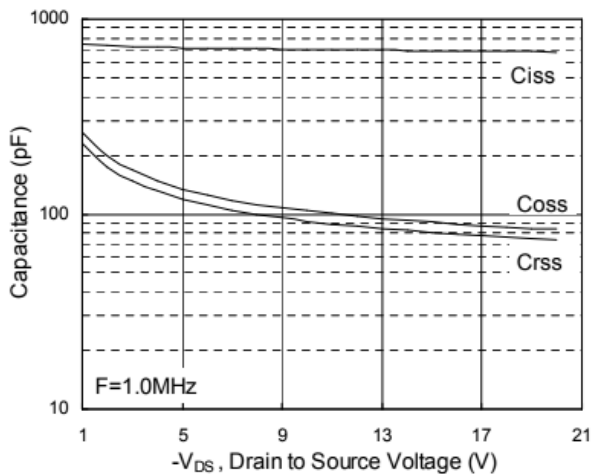


Fig.7 Capacitance

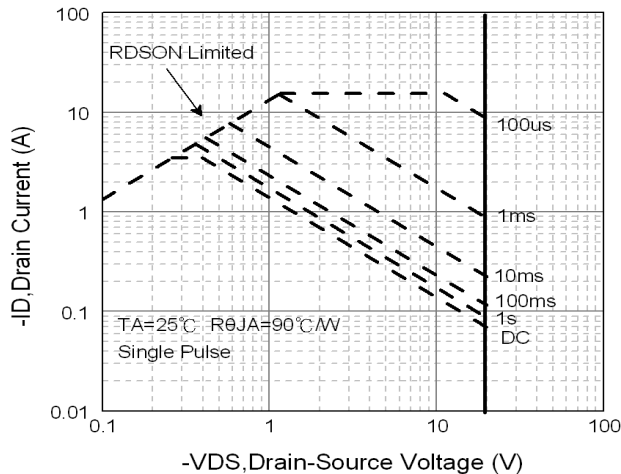


Fig.8 Safe Operating Area

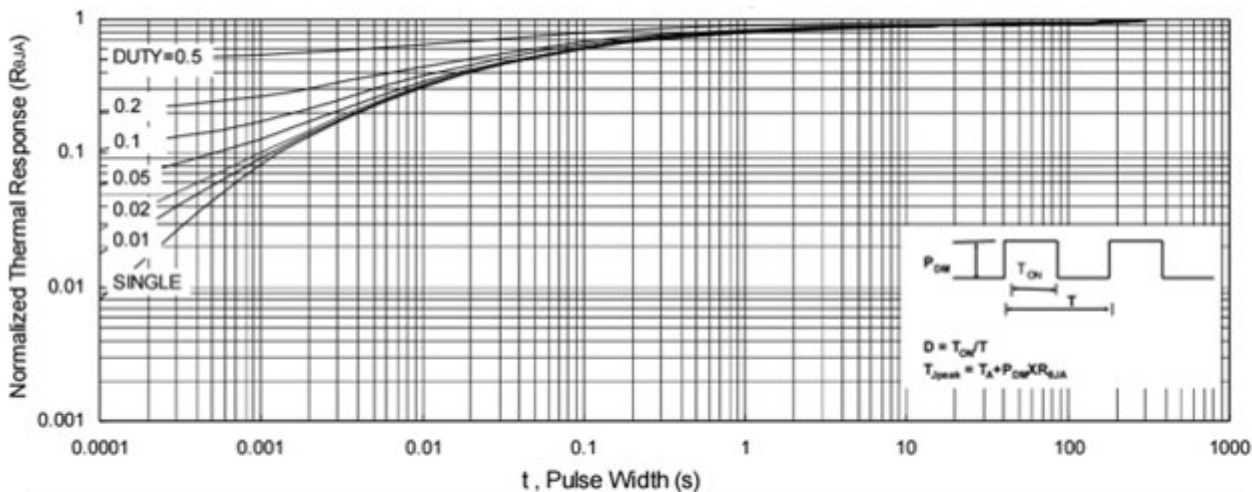


Fig.9 Normalized Maximum Transient Thermal Impedance

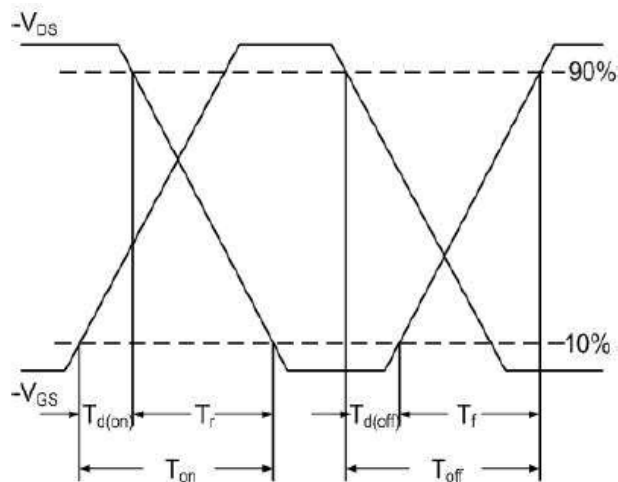


Fig.10 Switching Time Waveform

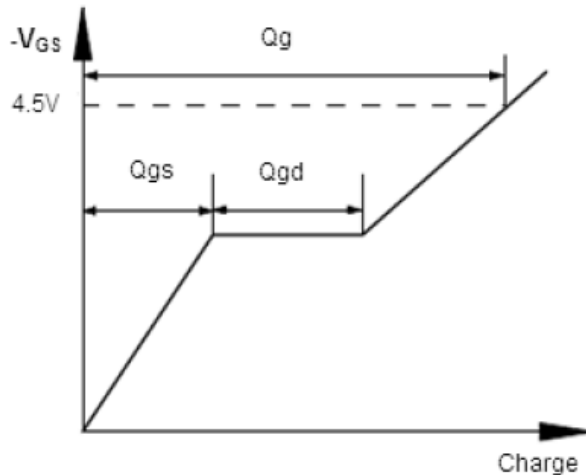


Fig.11 Gate Charge Waveform