

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

DESCRIPTION

The SMG2302-C is the highest performance trench N-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 SMG2302-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

2302

PACKAGE INFORMATION

Package	MPQ	Leader Size
SC-59	3K	7 inch

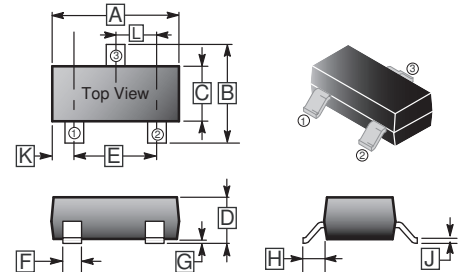
ORDER INFORMATION

Part Number	Type
SMG2302-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS

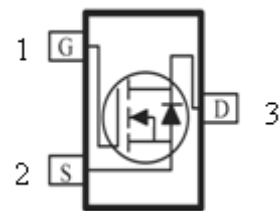
Parameter	Symbol	Ratings		Unit
		$\leq 10\text{sec}$	Steady State	
Drain-Source Voltage	V_{DS}	20		V
Gate-Source Voltage	V_{GS}	± 12		V
Continuous Drain Current ¹ @ $V_{GS}=4.5V$	$T_A=25^\circ C$	4.9	4.2	A
	$T_A=70^\circ C$	3.8	3.3	
Pulsed Drain Current ³	I_{DM}	17		A
Power Dissipation	$T_A=25^\circ C$	P_D 1.38		W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~150		$^\circ C$
Thermal Resistance Rating				
Thermal Resistance Junction-ambient ¹	$R_{\theta JA}$	$\leq 10\text{sec}, 90$		$^\circ C/W$
		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}	-	20	-	S	$V_{DS}=5\text{V}, I_D=4\text{A}$	
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	$R_{DS(ON)}$	-	-	37	m Ω	$V_{GS}=4.5\text{V}, I_D=3.6\text{A}$	
		-	-	45		$V_{GS}=2.5\text{V}, I_D=3.1\text{A}$	
Total Gate Charge	Q_g	-	8.6	-	nC	$V_{DS}=15\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=4\text{A}$	
Gate-Source Charge	Q_{gs}	-	1.37	-			
Gate-Drain Charge	Q_{gd}	-	2.3	-			
Turn-on Delay Time	$T_{d(on)}$	-	5.2	-	nS	$V_{DS}=10\text{V}$ $V_{GS}=4.5\text{V}$ $I_D=4\text{A}$ $R_G=3.3\Omega$	
Rise Time	T_r	-	34	-			
Turn-off Delay Time	$T_{d(off)}$	-	23	-			
Fall Time	T_f	-	9.2	-			
Input Capacitance	C_{iss}	-	635	-	pF	$V_{GS}=0$ $V_{DS}=15\text{V}$ $f=1.0\text{MHz}$	
Output Capacitance	C_{oss}	-	70	-			
Reverse Transfer Capacitance	C_{rss}	-	63	-			
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	-	-	4.2	A		
Pulsed Source Current ³	I_{SM}	-	-	17	A		
Reverse Recovery Time	t_{rr}	-	7.5	-	nS	$I_F=4\text{A}, dI/dt=100\text{A}/\mu\text{s}$ $T_J=25^\circ\text{C}$	
Reverse Recovery Charge	Q_{rr}	-	2.1	-	nC		

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

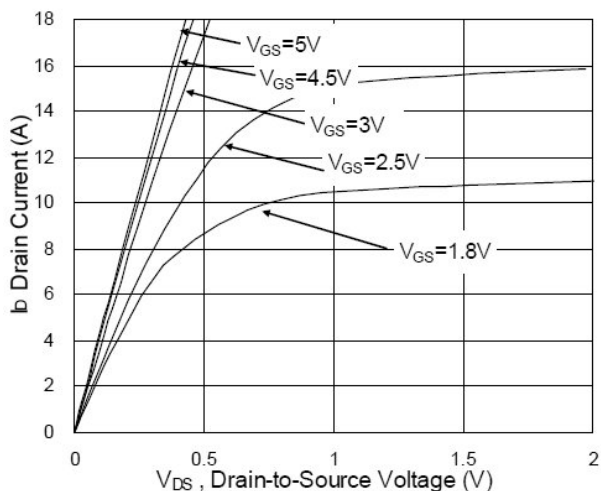


Fig.1 Typical Output Characteristics

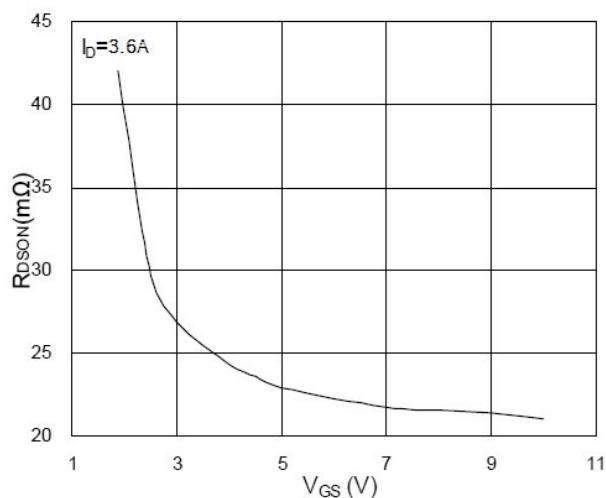


Fig.2 On-Resistance vs. Gate-Source

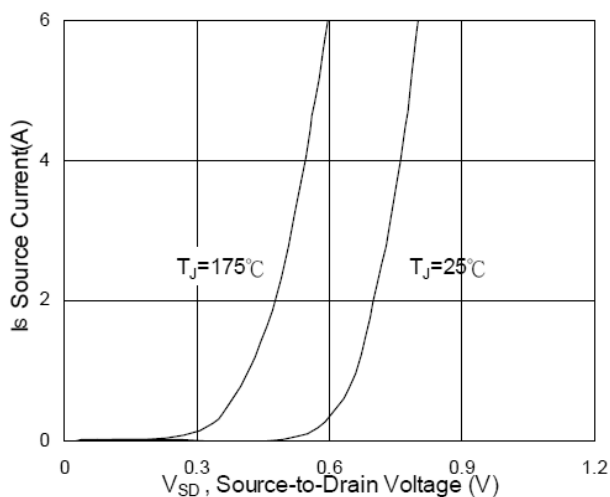


Fig.3 Forward Characteristics Of Reverse

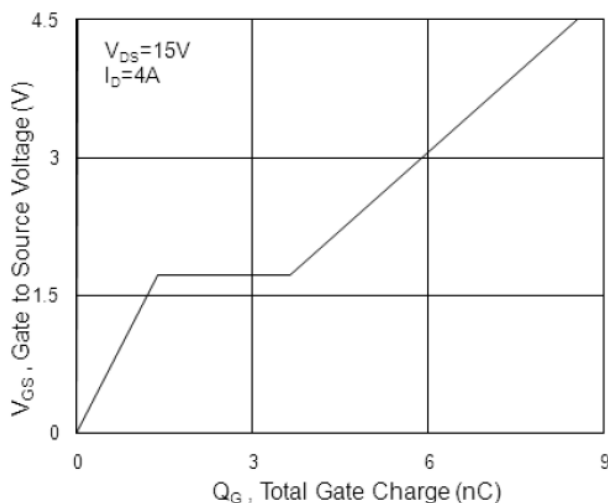


Fig.4 Gate-Charge Characteristics

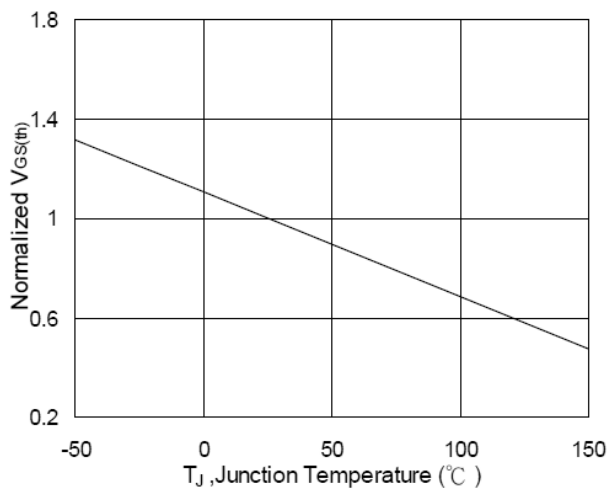


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

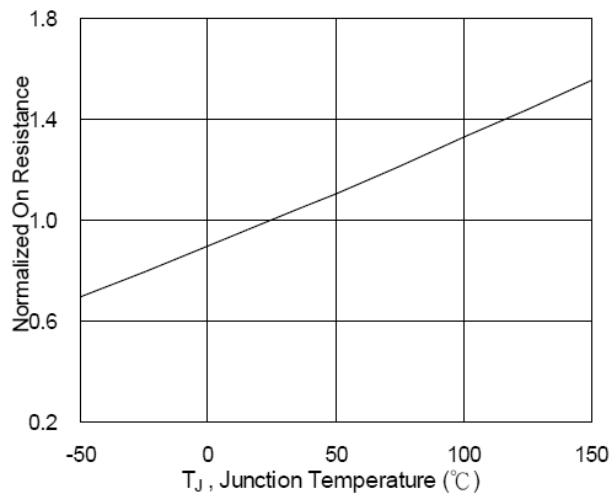


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

CHARACTERISTIC CURVES

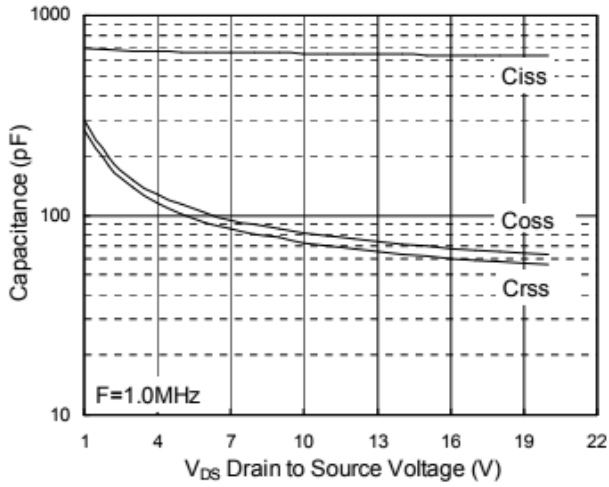


Fig.7 Capacitance

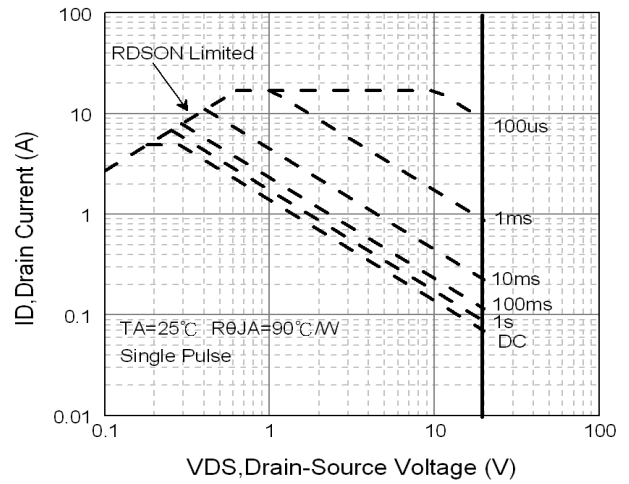


Fig.8 Safe Operating Area

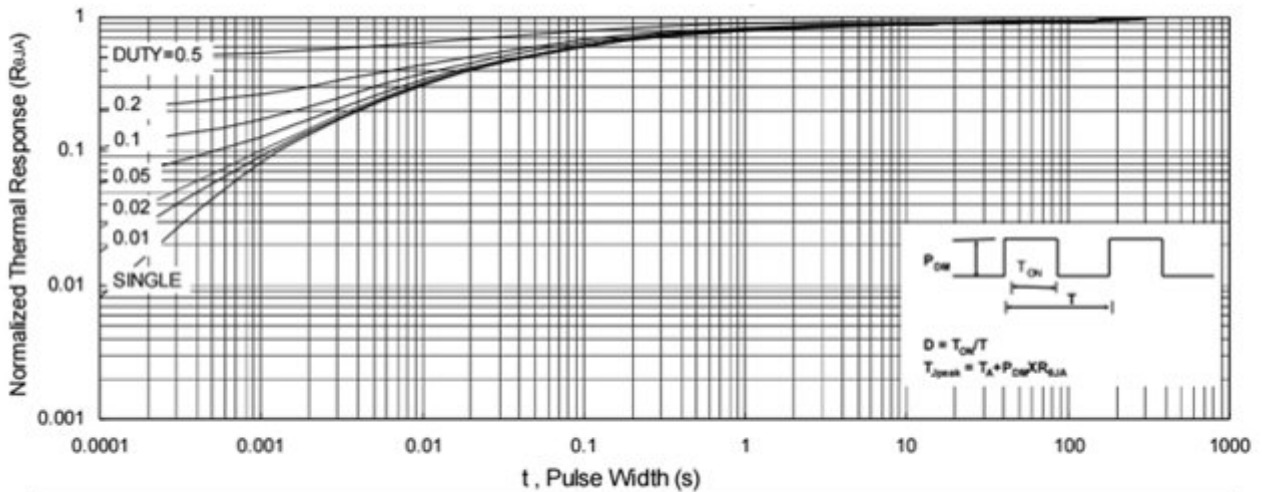


Fig.9 Normalized Maximum Transient Thermal Impedance

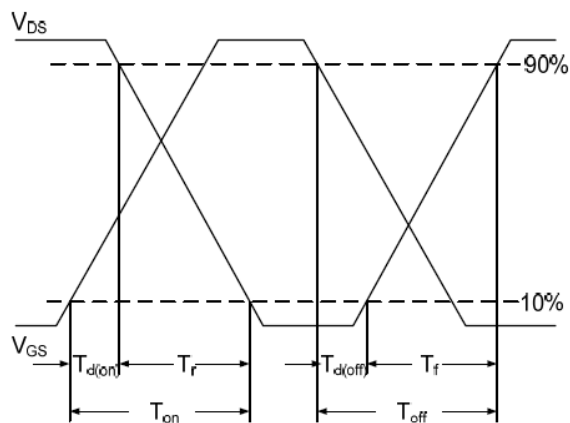


Fig.10 Switching Time Waveform

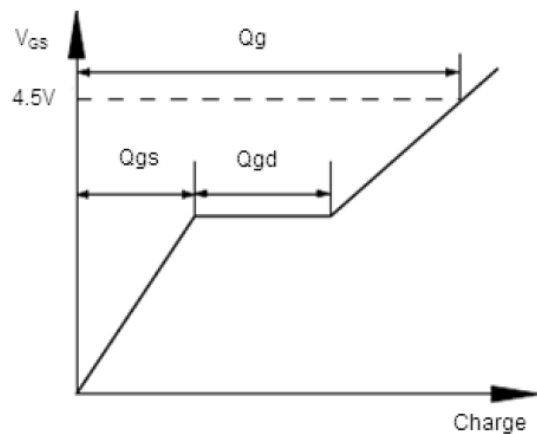


Fig.11 Gate Charge Waveform