

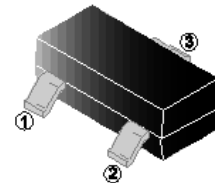
RoHS Compliant Product
A suffix of "-C" specifies halogen and lead-free

DESCRIPTION

The SMG3021-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 SMG3021-C meet the RoHS and Green Product requirement with full function reliability approved.

SC-59



FEATURES

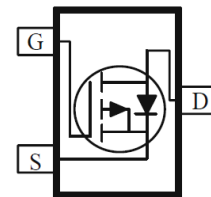
- Advanced High Cell Density Trench Technology
- Super Low Gate Charge
- Green Device Available

MARKING

3021

PACKAGE INFORMATION

Package	MPQ	Leader Size
SC-59	3K	7 inch



ORDER INFORMATION

Part Number	Type
SMG3021-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Ratings		Unit	
		t \leq 5sec	Steady		
Drain-Source Voltage	V_{DS}	-30		V	
Gate-Source Voltage	V_{GS}	\pm 20		V	
Continuous Drain Current ¹ @ $V_{GS} = -10\text{V}$	I_D	$T_A=25^\circ\text{C}$	-5.4	-4.7	A
		$T_A=70^\circ\text{C}$	-4.3	-3.8	
Pulsed Drain Current ³	I_{DM}	-24		A	
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	1.31	1	W
Operating Junction & Storage Temperature Range	T_J, T_{STG}	-55~150		$^\circ\text{C}$	
Thermal Resistance Rating					
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	95	125	$^\circ\text{C/W}$	
Thermal Resistance Junction-Ambient ²		313			

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}	-30	-	-	V	$V_{GS}=0V, I_D=-250\mu A$	
Gate-Threshold Voltage	$V_{GS(th)}$	-1	-	-2.5	V	$V_{DS}=V_{GS}, I_D=-250\mu A$	
Forward Transconductance	g_{fs}	-	15	-	S	$V_{DS}=-5V, I_D=-4A$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V$	
Drain-Source Leakage Current	$T_J=25^\circ\text{C}$	I_{DSS}	-	-	-1	μA	$V_{DS}=-24V, V_{GS}=0V$
	$T_J=55^\circ\text{C}$		-	-	-5		
Drain-Source On-Resistance ⁴	$R_{DS(ON)}$	-	-	32	m Ω	$V_{GS}=-10V, I_D=-4A$	
		-	-	45		$V_{GS}=-4.5V, I_D=-2A$	
Total Gate Charge	Q_g	-	9.7	-	nC	$V_{DS}=-15V$ $V_{GS}=-4.5V$ $I_D=-4A$	
Gate-Source Charge	Q_{gs}	-	2.5	-			
Gate-Drain ("Miller") Charge	Q_{gd}	-	3	-			
Turn-on Delay Time	$T_{d(on)}$	-	16.4	-	nS	$V_{DD}=-15V$ $V_{GS}=-10V$ $I_D=-4A$ $R_G=3.3\Omega$	
Rise Time	T_r	-	20.2	-			
Turn-off Delay Time	$T_{d(off)}$	-	55	-			
Fall Time	T_f	-	10	-			
Input Capacitance	C_{iss}	-	942	-	pF	$V_{GS}=0V$ $V_{DS}=-15V$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	165	-			
Reverse Transfer Capacitance	C_{rss}	-	137	-			
Source-Drain Diode							
Continuous Source Current ¹	I_S	-	-	-4.7	A		
Pulsed Source Current ³	I_{SM}	-	-	-24	A		
Diode Forward Voltage ⁴	V_{SD}	-	-	-1.2	V	$I_S=-1A, V_{GS}=0V, T_J=25^\circ\text{C}$	
Reverse Recovery Time	t_{rr}	-	18.3	-	nS	$I_F=-4A, dI/dt=100A/\mu s,$	
Reverse Recovery Charge	Q_{rr}	-	7.2	-	nC	$T_J=25^\circ\text{C}$	

Notes:

- Surface Mounted on 1" x 1" FR-4 Board with 2oz copper.
- When mounted on Min. copper pad.
- Pulse width limited by maximum junction temperature, Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

CHARACTERISTIC CURVES

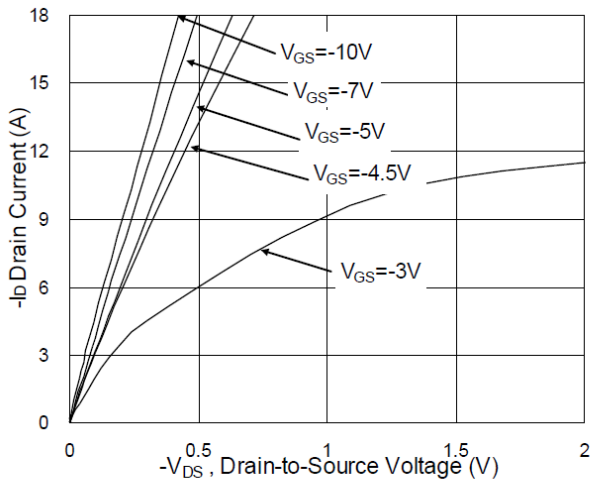


Fig.1 Typical Output Characteristics

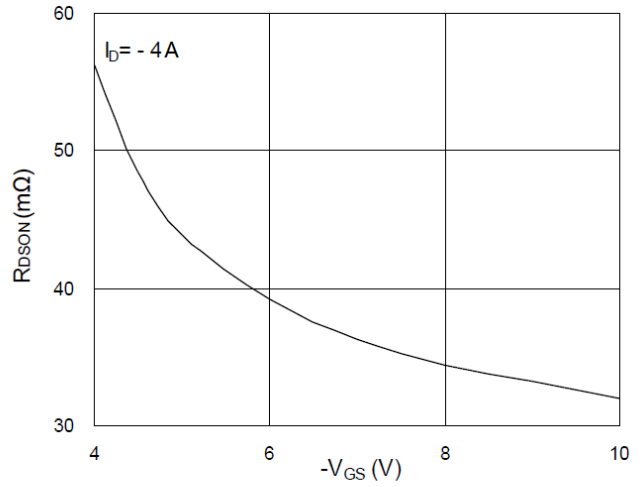


Fig.2 On-Resistance v.s Gate-Source

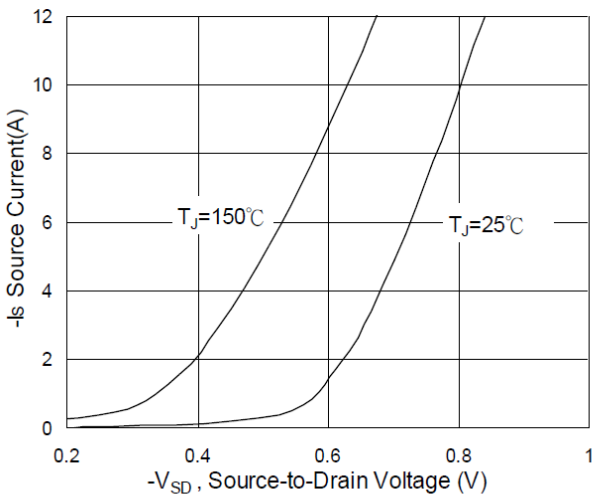


Fig.3 Forward Characteristics of Reverse

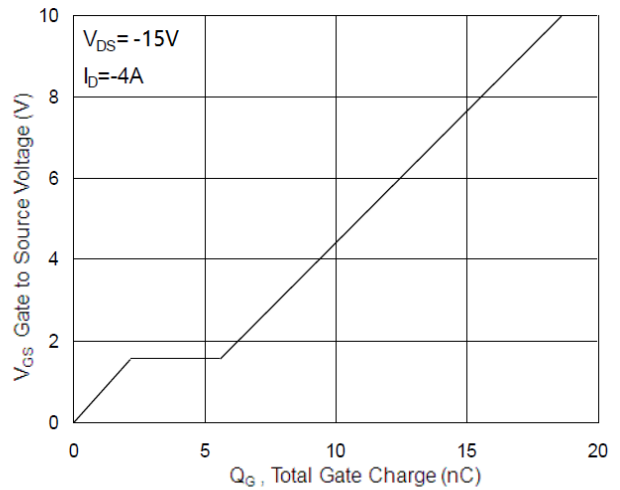


Fig.4 Gate-Charge Characteristics

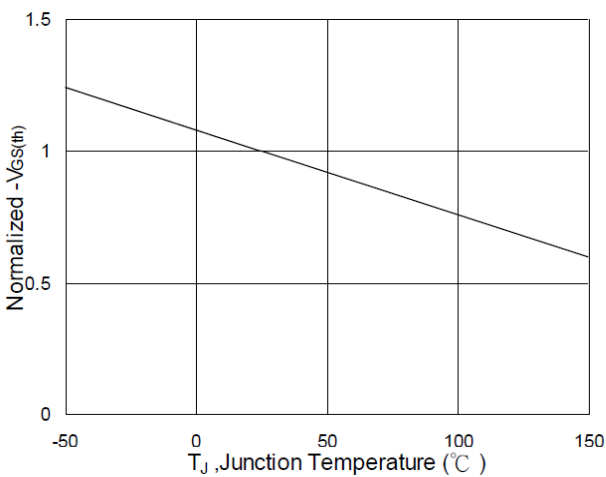


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

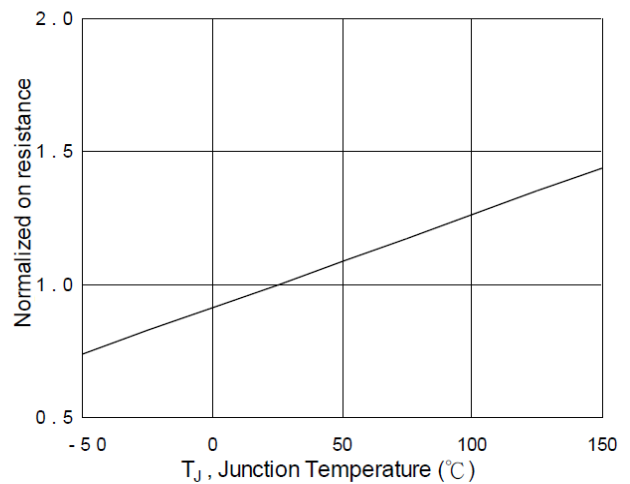


Fig.6 Normalized $R_{DS(ON)}$ vs. T_J

CHARACTERISTIC CURVES

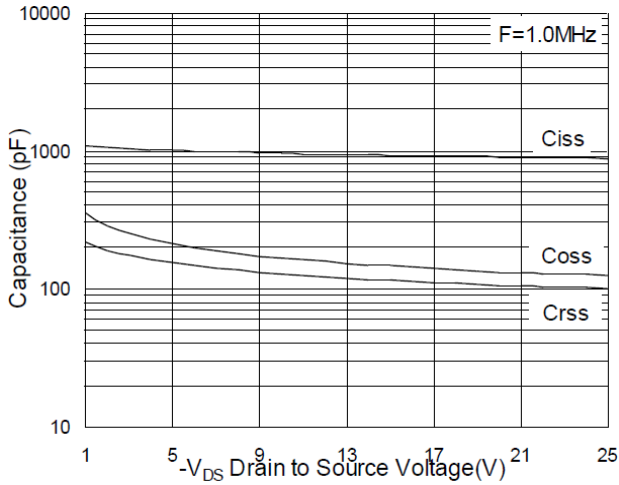


Fig.7 Capacitance

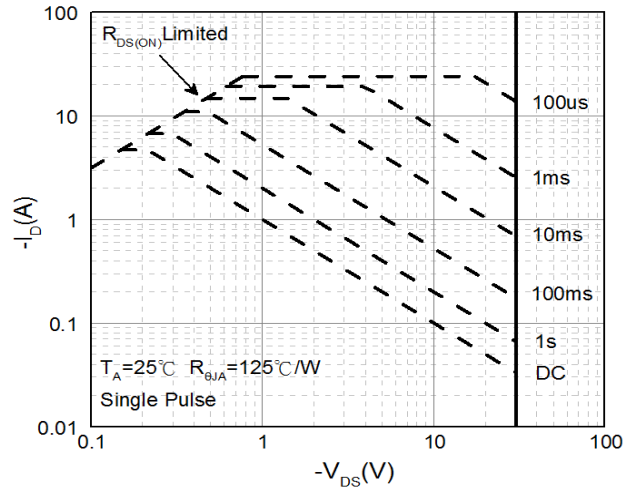


Fig.8 Safe Operating Area

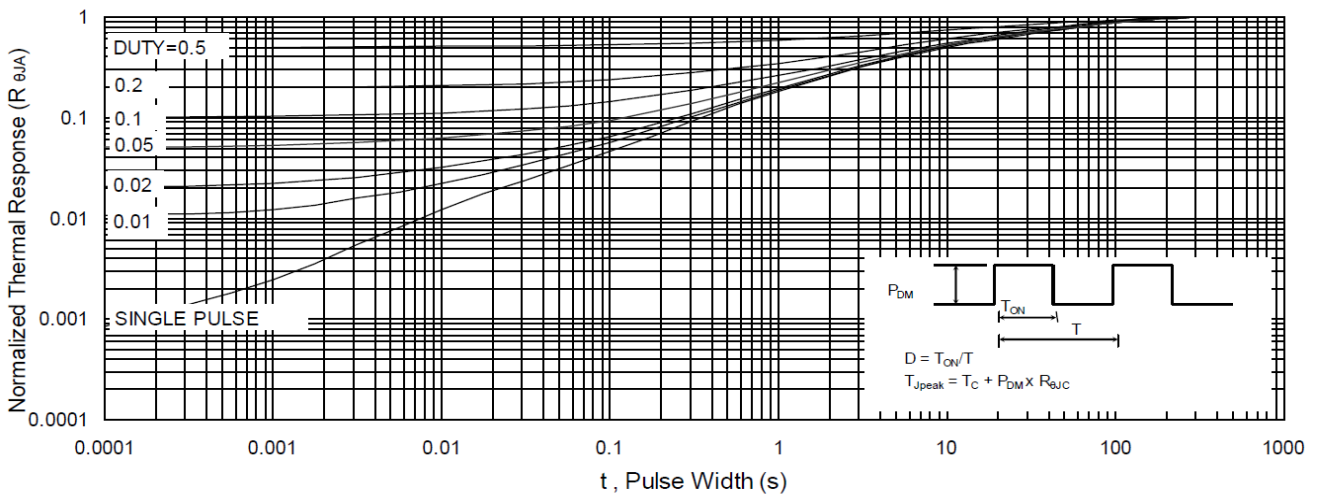


Fig.9 Normalized Maximum Transient Thermal Impedance

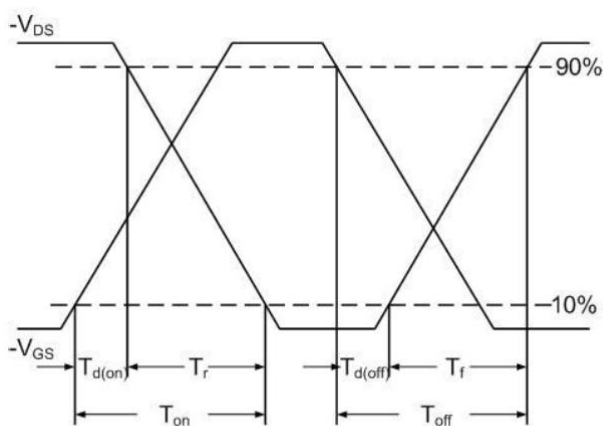


Fig.10 Switching Time Waveform

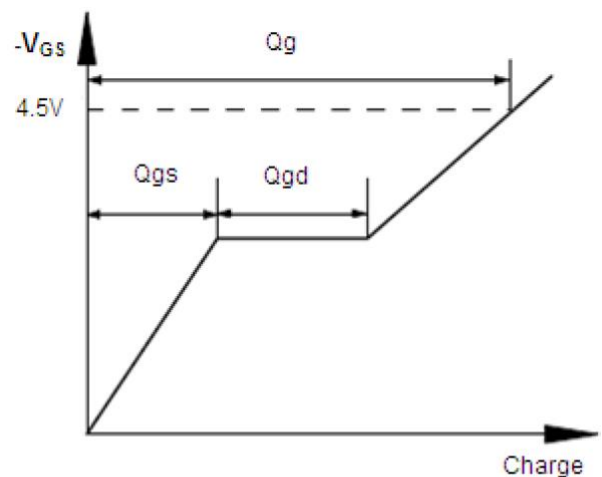
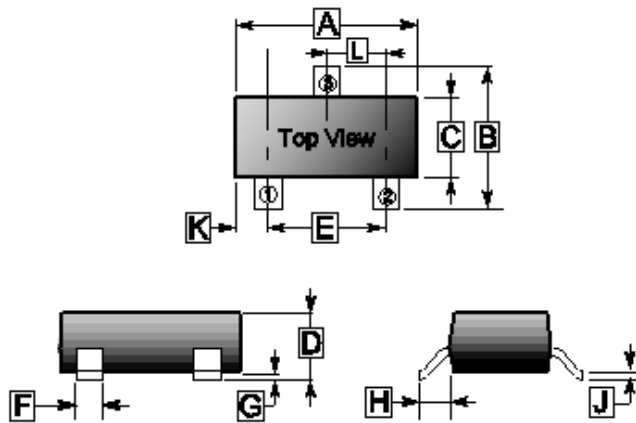


Fig.11 Gate Charge Waveform

PACKAGE OUTLINE DIMENSIONS

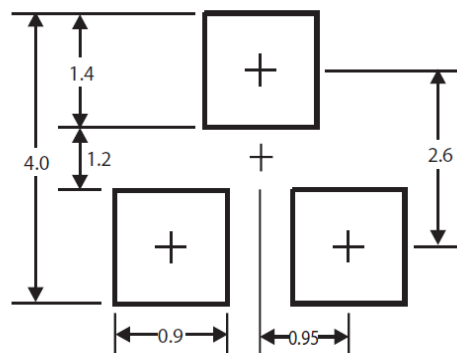
SC-59



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

MOUNTING PAD LAYOUT

SC-59



*Dimensions in millimeters