

RoHS Compliant Product  
A Suffix of "-C" specifies halogen & lead-free

### DESCRIPTIONS

The SMS2002-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 SMS2002-C meet the RoHS and Green Product requirement with full function reliability approved.

### FEATURES

- Reliable and Rugged
- Green Device Available
- ESD Protection

### MARKING

2002

### PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7 inch

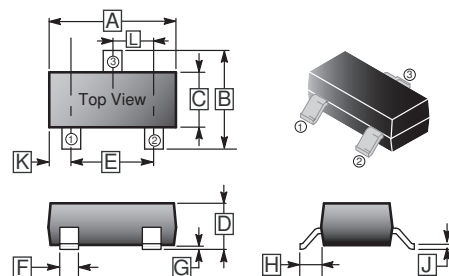
### ORDER INFORMATION

Part Number	Type
SMS2002-C	Lead (Pb)-free and Halogen-free

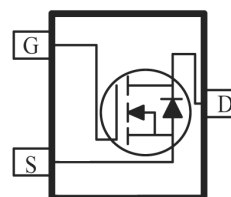
### MAXIMUM RATINGS

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current, @ $V_{GS}=4.5V$ <sup>1</sup>	$I_D$	$T_A=25^\circ C$	2.2
		$T_A=70^\circ C$	1.8
Pulsed Drain Current <sup>3</sup>	$I_{DM}$	8	A
Power Dissipation	$P_D$	1	W
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ C$
<b>Thermal Resistance Rating</b>			
Thermal Resistance Junction-ambient <sup>1</sup>	$R_{\theta JA}$	$t \leq 5Sec, 125$	$^\circ C / W$
		Steady state, 250	
Thermal Resistance Junction-ambient <sup>2</sup>	$R_{\theta JA}$	415	

### SOT-23



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0	0.18
B	2.10	2.95	H	0.55	REF.
C	1.20	1.7	J	0.08	0.20
D	0.89	1.3	K	0.6	REF.
E	1.70	2.3	L	0.95	BSC.
F	0.30	0.50			



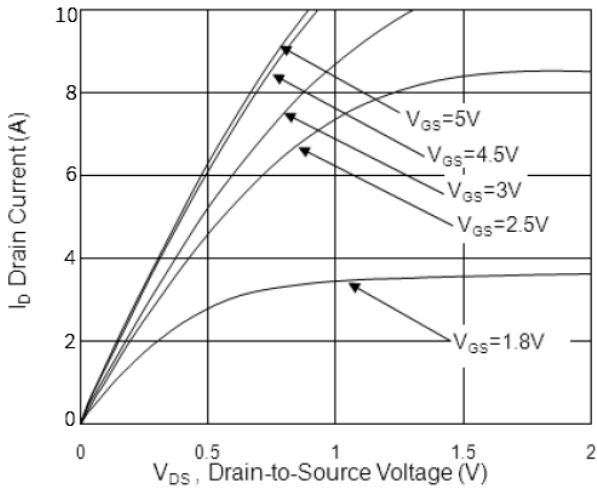
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate-Threshold Voltage	$V_{GS(TH)}$	0.45	-	1	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Forward Transconductance	$g_{fs}$	-	10	-	S	$V_{DS}=5V, I_D=2A$
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{DS}=0V, V_{GS}=\pm 12V$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS}=16V, V_{GS}=0V, T_J=25^\circ\text{C}$
		-	-	5		$V_{DS}=16V, V_{GS}=0V, T_J=55^\circ\text{C}$
Drain-Source On Resistance <sup>4</sup>	$R_{DS(ON)}$	-	-	100	m $\Omega$	$V_{GS}=4.5V, I_D=2A$
		-	-	140		$V_{GS}=2.5V, I_D=1A$
Total Gate Charge	$Q_g$	-	4.7	-	nC	$V_{DS}=15V$ $V_{GS}=4.5V$ $I_D=2A$
Gate-to-Source Charge	$Q_{gs}$	-	0.68	-		
Gate-to-Drain Charge	$Q_{gd}$	-	1.3	-		
Turn-on Delay Time	$T_{d(on)}$	-	1.4	-	nS	$V_{DS}=10V$ $I_D=2A$ $V_{GS}=4.5V$ $R_G=3.3\Omega$
Rise Time	$T_r$	-	40	-		
Turn-off Delay Time	$T_{d(off)}$	-	12.4	-		
Fall Time	$T_f$	-	5.6	-		
Input Capacitance	$C_{iss}$	-	220	-	pF	$V_{DS}=15V$ $V_{GS}=0V$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	38	-		
Reverse Transfer Capacitance	$C_{rss}$	-	32	-		
<b>Source-Drain Diode</b>						
Continuous Source Current <sup>1</sup>	$I_S$	-	-	2.2	A	
Pulsed Source Current <sup>3</sup>	$I_{SM}$	-	-	8	A	
Diode Forward Voltage <sup>4</sup>	$V_{SD}$	-	-	1.2	V	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$
Reverse Recovery Time	$t_{rr}$	-	8.9	-	nS	$I_F=2A, dI/dt=100A/\mu s,$ $T_J=25^\circ\text{C}$
Reverse Recovery Charge	$Q_{rr}$	-	1.7	-	nC	

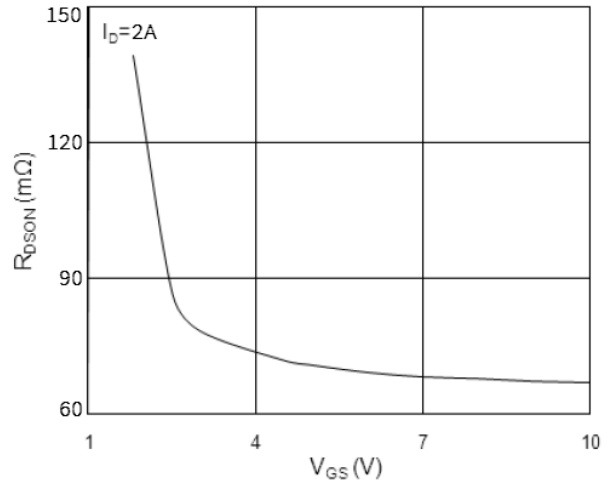
Notes:

- Surface Mounted on 1" x 1" FR4 Board with 20Z copper.
- When mounted on Min. copper pad.
- Pulse width limited by maximum junction temperature, Pulse Width  $\leq 10\mu s$ , Duty Cycle  $\leq 1\%$ .
- Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

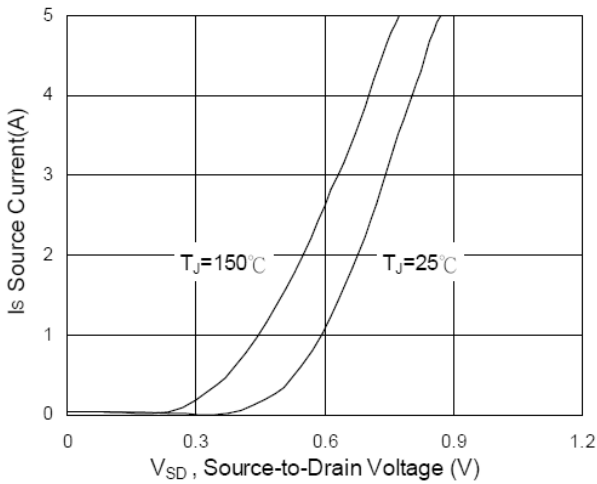
**CHARACTERISTIC CURVES**



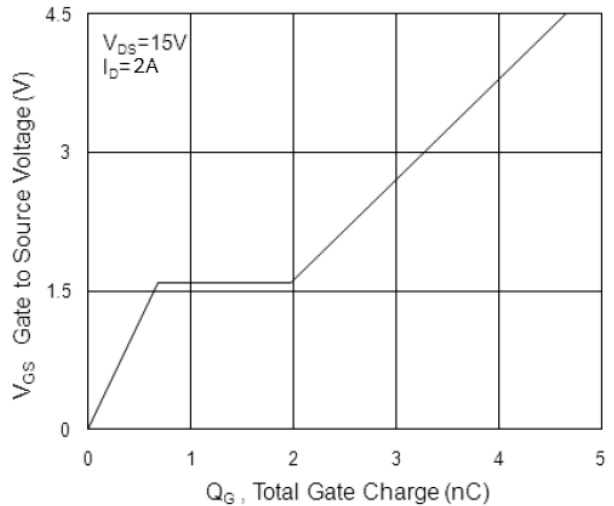
**Fig.1 Typical Output Characteristics**



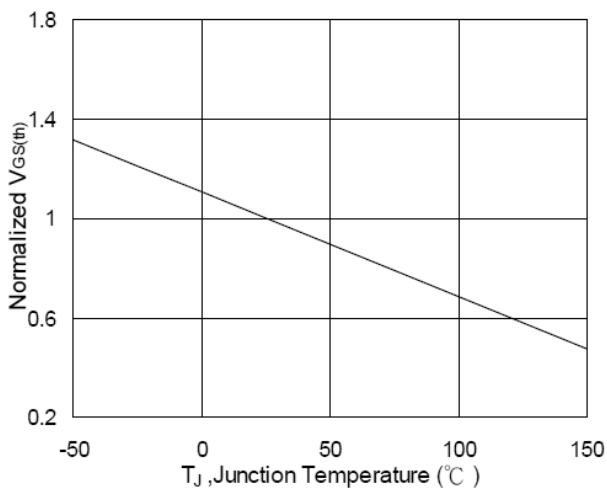
**Fig.2 On-Resistance vs. Gate-Source**



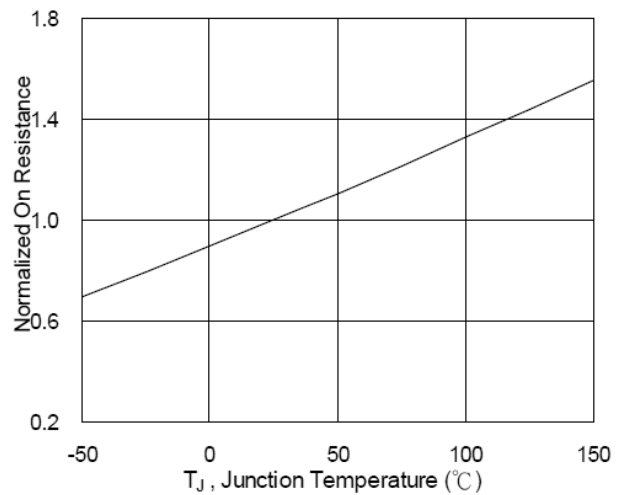
**Fig.3 Forward Characteristics Of Reverse**



**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**

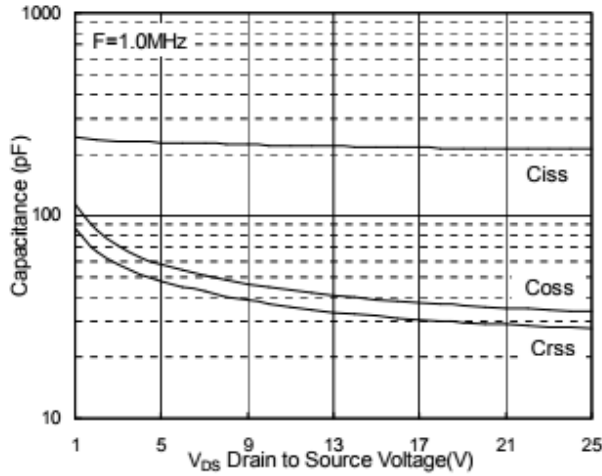


Fig.7 Capacitance

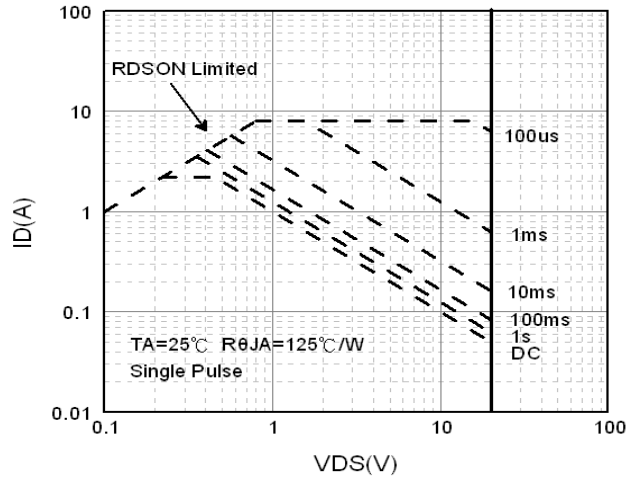


Fig.8 Safe Operating Area

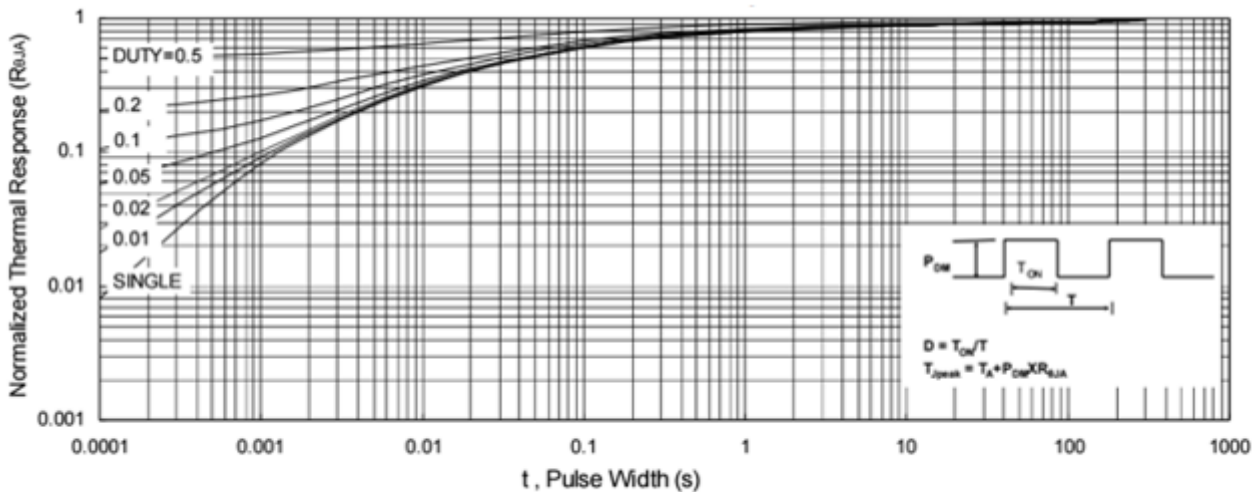


Fig.9 Normalized Maximum Transient Thermal Impedance

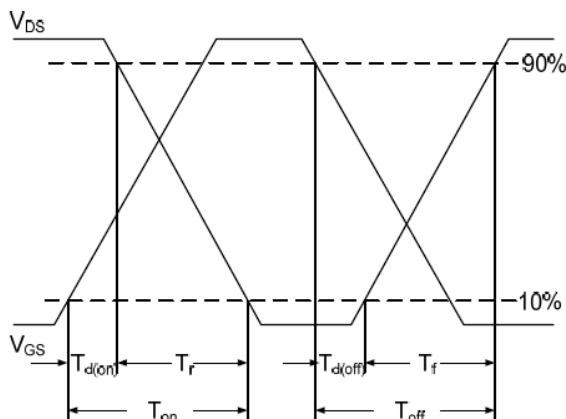


Fig.10 Switching Time Waveform

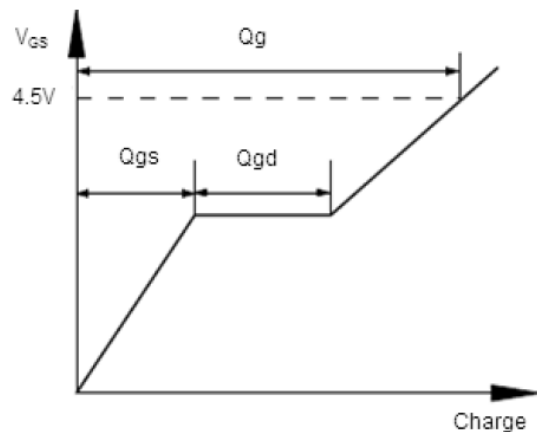


Fig.11 Gate Charge Waveform