

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

DESCRIPTIONS

The SMS2009E-C is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.

This device is suitable for use in DC-DC conversion, load switch and level shift.

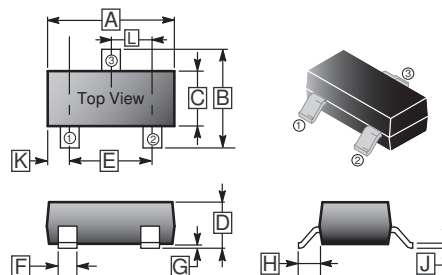
FEATURES

- Reliable and Rugged
- Green Device Available
- ESD Protection

MARKING



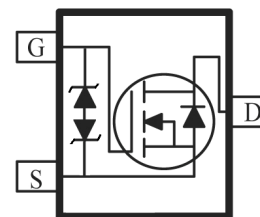
SOT-23



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0	0.18
B	2.10	3.00	H	0.55	REF.
C	1.20	1.80	J	0.08	0.26
D	0.89	1.3	K	0.6	REF.
E	1.70	2.3	L	0.95	BSC.
F	0.30	0.50			

PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7 inch



ORDER INFORMATION

Part Number	Type
SMS2009E-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ¹ , $V_{GS}=4.5V$	I_D	$T_A=25^\circ C$	0.8
		$T_A=70^\circ C$	0.64
Pulsed Drain Current ³	I_{DM}	3.2	A
Power Dissipation	P_D	0.35	W
Operating Junction & Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ C$
Thermal Data			
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	357	$^\circ C/W$
Thermal Resistance Junction-Ambient ²		500	
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	250	

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

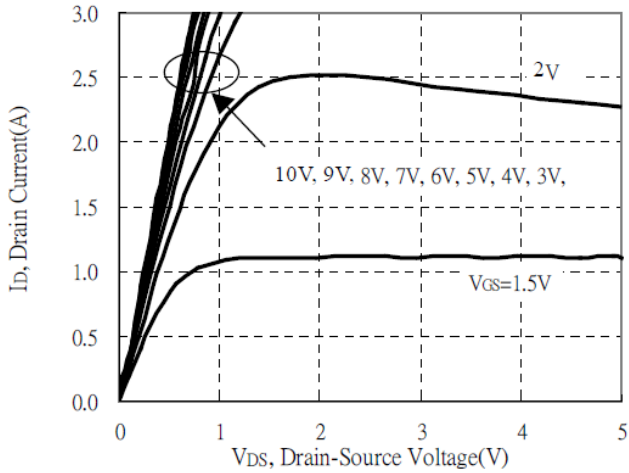
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	BV _{DSS}	20	-	-	V	V _{GS} =0, I _D =250μA	
Gate Threshold Voltage	V _{GS(TH)}	0.45	-	1	V	V _{DS} =V _{GS} , I _D =250μA	
Gate-Source Leakage Current	I _{GSS}	-	-	±10	μA	V _{GS} = ±10V	
Drain-Source Leakage Current	I _{DSS}	T _J =25°C	-	-	1	μA	V _{DS} =20V, V _{GS} =0
		T _J =70°C	-	-	25		V _{DS} =16V, V _{GS} =0
Static Drain-Source On-Resistance ⁴	R _{DS(ON)}	-	-	350	mΩ	V _{GS} =4.5V, I _D =650mA	
		-	-	660		V _{GS} =2.5V, I _D =500mA	
		-	-	1200		V _{GS} =1.8V, I _D =500mA	
Total Gate Charge	Q _g	-	1.3	-	nC	I _{DS} =0.5A V _{DS} =15V V _{GS} =4.5V	
Gate-Source Charge	Q _{gs}	-	0.5	-			
Gate-Drain ("Miller") Charge	Q _{gd}	-	0.1	-			
Turn-on Delay Time	T _{d(on)}	-	2.6	-	nS	V _{DD} =10V I _{DS} =0.5A V _{GS} =10V R _{GEN} =1Ω	
Rise Time	T _r	-	16	-			
Turn-off Delay Time	T _{d(off)}	-	29.8	-			
Fall Time	T _f	-	11	-			
Input Capacitance	C _{iss}	-	64	-	pF	V _{GS} =0 V _{DS} =10V f=1MHz	
Output Capacitance	C _{oss}	-	17	-			
Reverse Transfer Capacitance	C _{rss}	-	20	-			
Source-Drain Diode							
Continuous Source Current ¹	I _S	-	-	0.8	A		
Pulsed Source Current ³	I _{SM}	-	-	3.2	A		
Diode Forward Voltage ⁴	V _{SD}	-	0.75	1	V	V _{GS} =0, I _S =0.15A, T _J =25°C	
Reverse Recovery Time	t _{rr}	-	4.9	-	nS	I _F =0.5A, dI/dt=100A/μs T _J =25°C	
Reverse Recovery Charge	Q _{rr}	-	1	-	nC		

Notes:

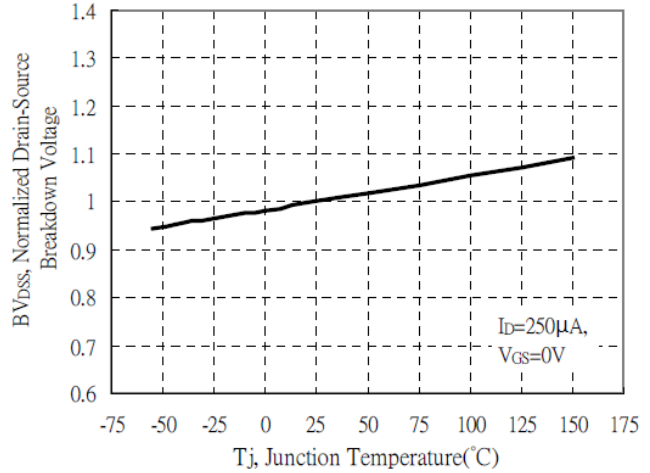
- Surface mounted on a 1 inch² FR-4 board with 20Z copper.
- Surface mounted on FR4 Board using the minimum recommended pad size.
- Pulse width limited by maximum junction temperature, Pulse Width ≤ 300μs, Duty Cycle ≤ 1%.
- The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%.

CHARACTERISTIC CURVES

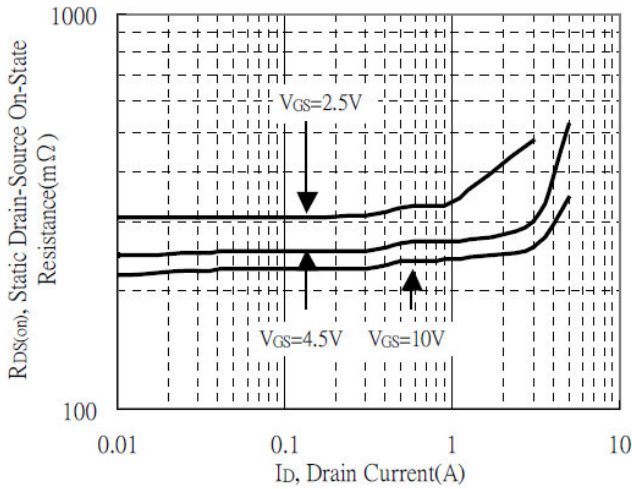
Typical Output Characteristics



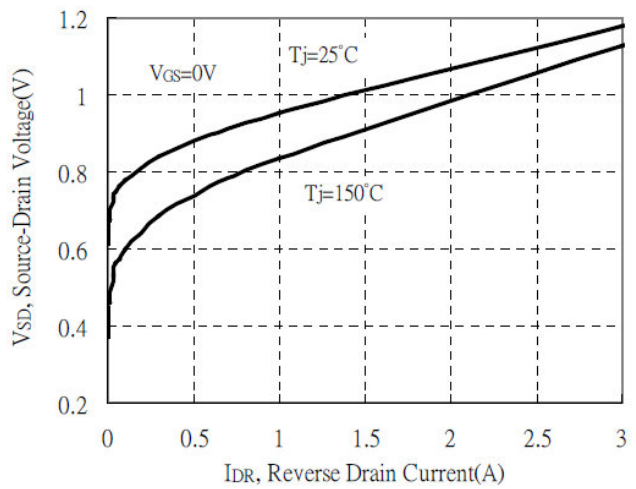
Brekdown Voltage vs Ambient Temperature



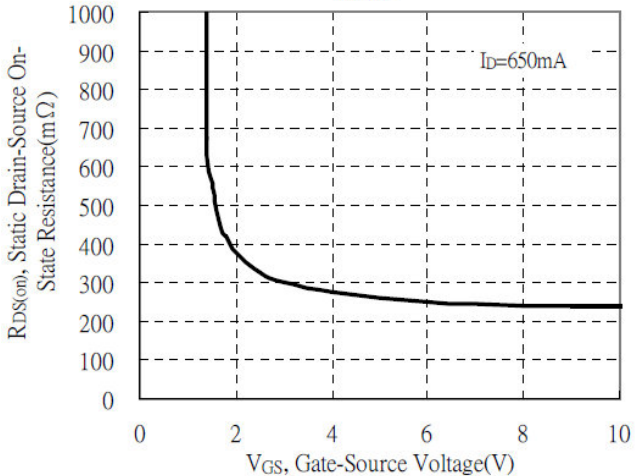
Static Drain-Source On-State resistance vs Drain Current



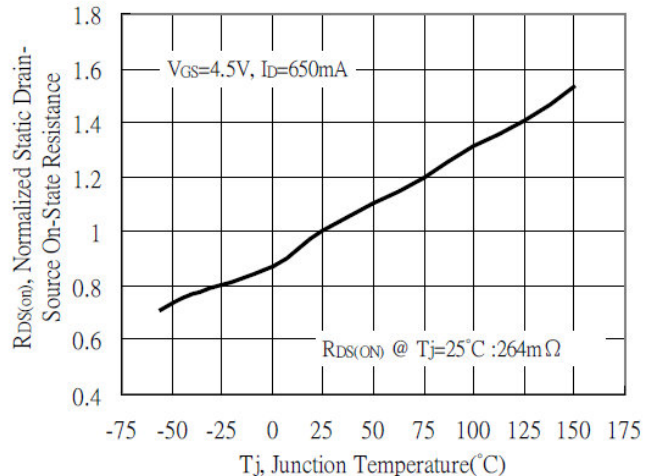
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

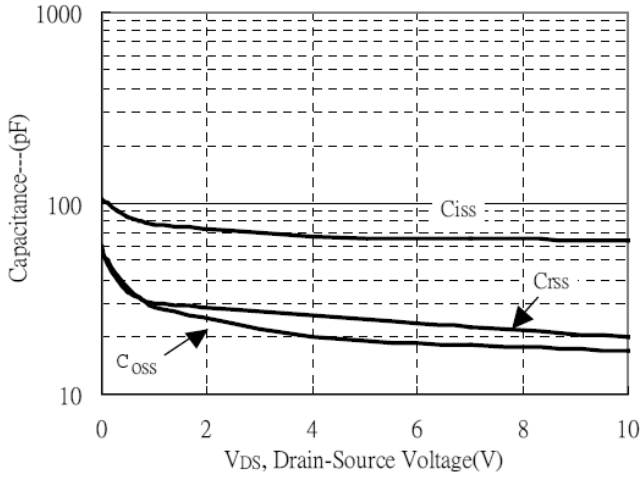


Drain-Source On-State Resistance vs Junction Temperature

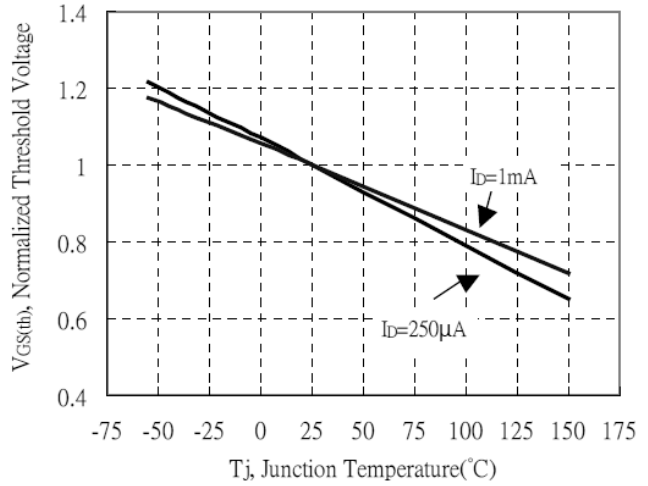


CHARACTERISTIC CURVES

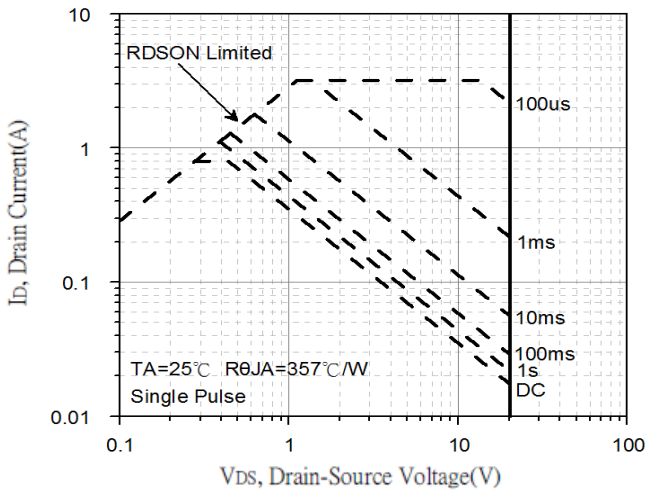
Capacitance vs Drain-to-Source Voltage



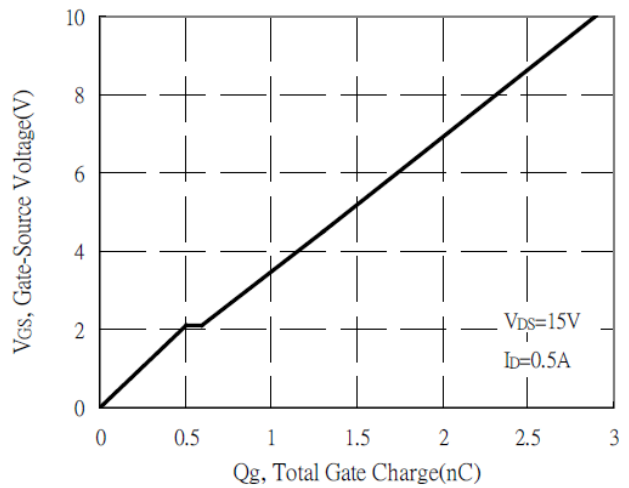
Threshold Voltage vs Junction Temperature



Maximum Safe Operating Area



Gate Charge Characteristics



Transient Thermal Response Curves

