

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

DESCRIPTION

The SSM9971-C is the highest performance trench dual N-Ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SSM9971-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

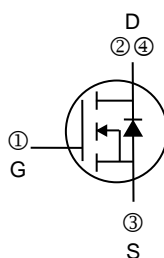


PACKAGE INFORMATION

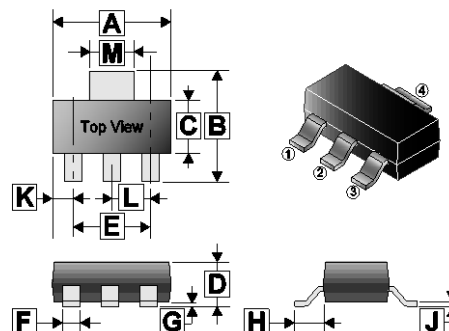
Package	MPQ	Leader Size
SOT-223	2.5K	13 inch

ORDER INFORMATION

Part Number	Type
SSM9971-C	Lead (Pb)-free and Halogen-free

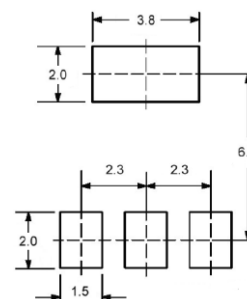


SOT-223



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.90	6.70	G	-	0.18
B	6.70	7.30	H	2.00	REF.
C	3.30	3.80	J	0.20	0.40
D	1.40	1.90	K	1.10	REF.
E	4.45	4.75	L	2.30	REF.
F	0.60	0.85	M	2.80	3.20

Mounting Pad Layout



*Dimensions in millimeters

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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹ @ $V_{GS}=10\text{V}$	$T_A=25^\circ\text{C}$	5	A
	$T_A=70^\circ\text{C}$	4	A
Pulsed Drain Current ³	I_{DM}	14	A
Power Dissipation	$T_A=25^\circ\text{C}$	1.5	W
Operating Junction & Storage Temperature	T_J, T_{STG}	-55~150	$^\circ\text{C}$
Thermal Resistance Ratings			
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	85	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient ²	$R_{\theta JA}$	125	
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	50	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	BV _{DSS}	60	-	-	V	V _{GS} =0, I _D =250μA	
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	-	0.063	-	V/°C	Reference to 25°C, I _D =1mA	
Gate-Threshold Voltage	V _{GS(th)}	1	-	2.5	V	V _{DS} =V _{GS} , I _D =250μA	
Forward Transfer Conductance	g _{fs}	-	20	-	S	V _{DS} =5V, I _D =5A	
Gate-Source Leakage Current	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V	
Drain-Source Leakage Current	I _{DSS}	T _J =25°C	-	-	1	mA	V _{DS} =48V, V _{GS} =0
		T _J =55°C	-	-	5		V _{DS} =48V, V _{GS} =0
Static Drain-Source On-Resistance ⁴	R _{DS(ON)}	-	-	36	mΩ	V _{GS} =10V, I _D =5A	
		-	-	45		V _{GS} =4.5V, I _D =2.5A	
Total Gate Charge	Q _g	-	11.74	-	nC	I _D =5A V _{DS} =48V V _{GS} =4.5V	
Gate-Source Charge	Q _{gs}	-	4.35	-			
Gate-Drain Change	Q _{gd}	-	4.12	-			
Turn-on Delay Time	T _{d(on)}	-	5.5	-	nS	V _{DD} =30V I _D =5A V _{GS} =10V R _G =3.3Ω R _L =6Ω	
Rise Time	T _r	-	21.2	-			
Turn-off Delay Time	T _{d(off)}	-	20.7	-			
Fall Time	T _f	-	16	-			
Input Capacitance	C _{iss}	-	1231	-	pF	V _{GS} =0 V _{DS} =25V f=1MHz	
Output Capacitance	C _{oss}	-	109	-			
Reverse Transfer Capacitance	C _{rss}	-	17	-			
Source-Drain Diode							
Continuous Source Current ¹	I _S	-	5	-	A		
Pulsed Source Current ³	I _{SM}	-	14	-			
Diode Forward Voltage ⁴	V _{SD}	-	-	1.2	V	I _S =1.6A, V _{GS} =0	

Notes:

- Surface mounted on a 1 inch² FR-4 board with 2oz copper.
- When mounted on Min. copper pad.
- The power dissipation is limited by 150°C junction temperature.
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.

CHARACTERISTIC CURVES

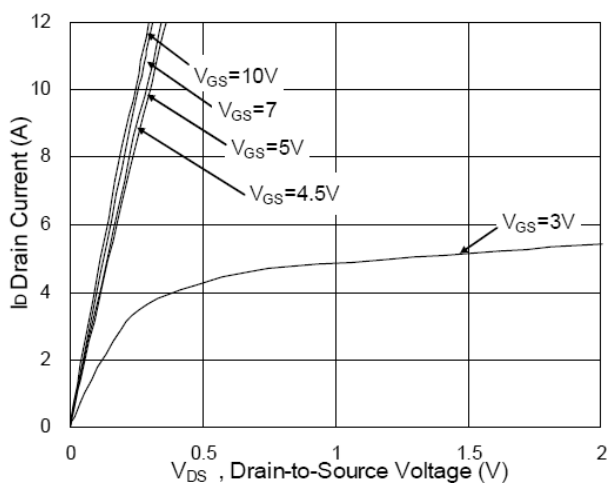


Fig.1 Typical Output Characteristics

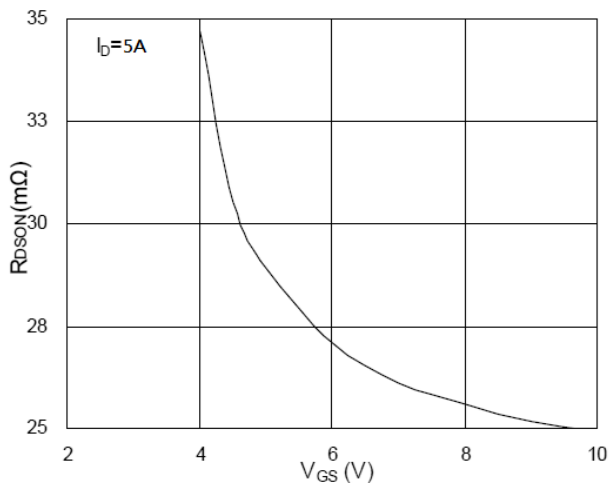


Fig.2 On-Resistance v.s Gate-Source

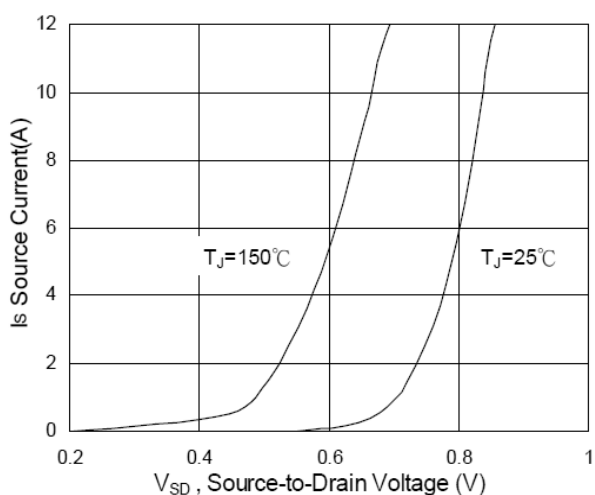


Fig.3 Forward Characteristics of Reverse

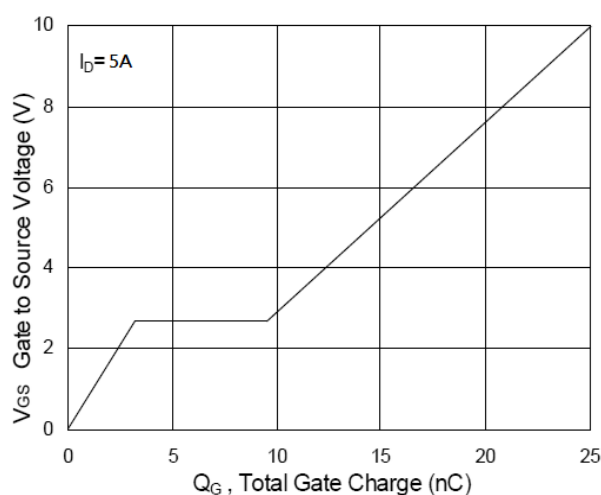


Fig.4 Gate-Charge Characteristics

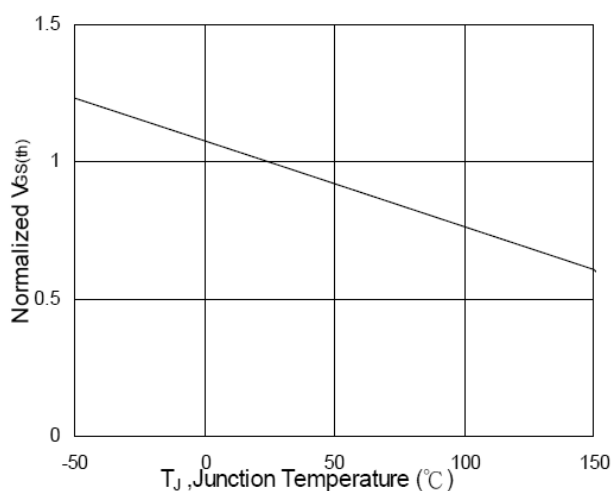


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

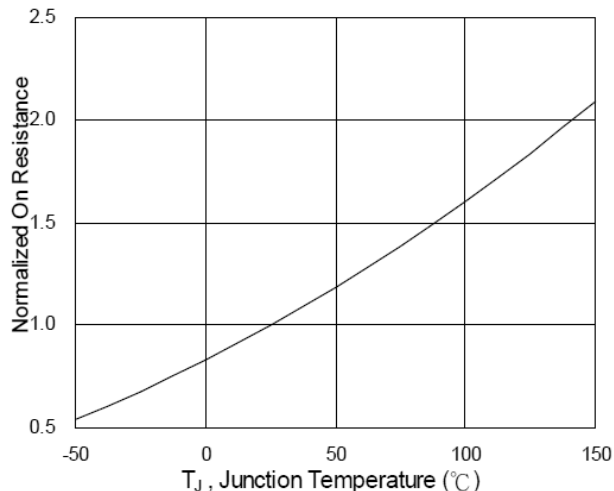


Fig.6 Normalized $R_{DS(ON)}$ v.s T_J

CHARACTERISTIC CURVES

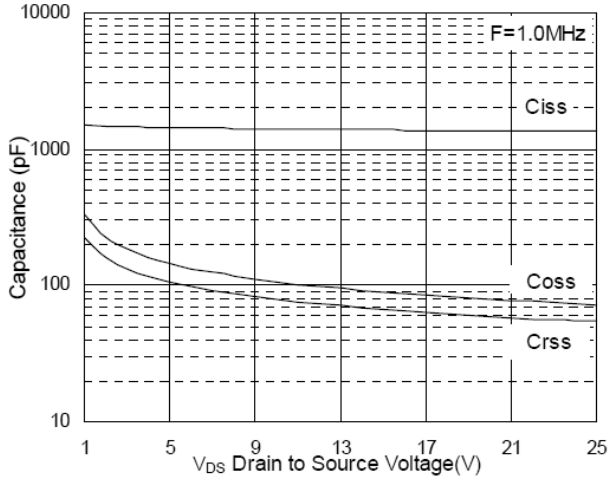


Fig.7 Capacitance

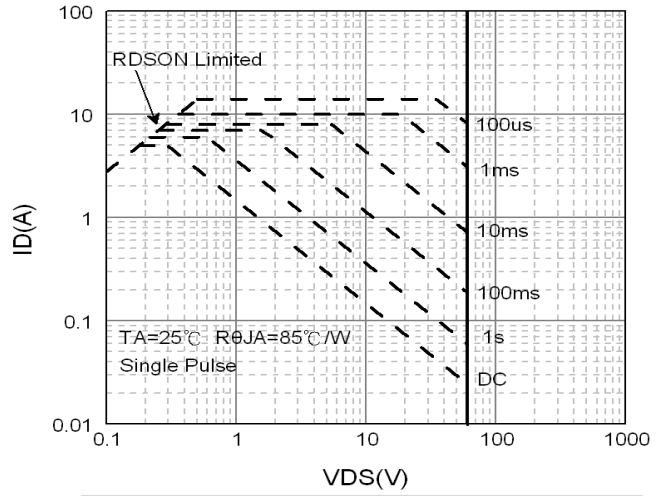


Fig.8 Safe Operating Area

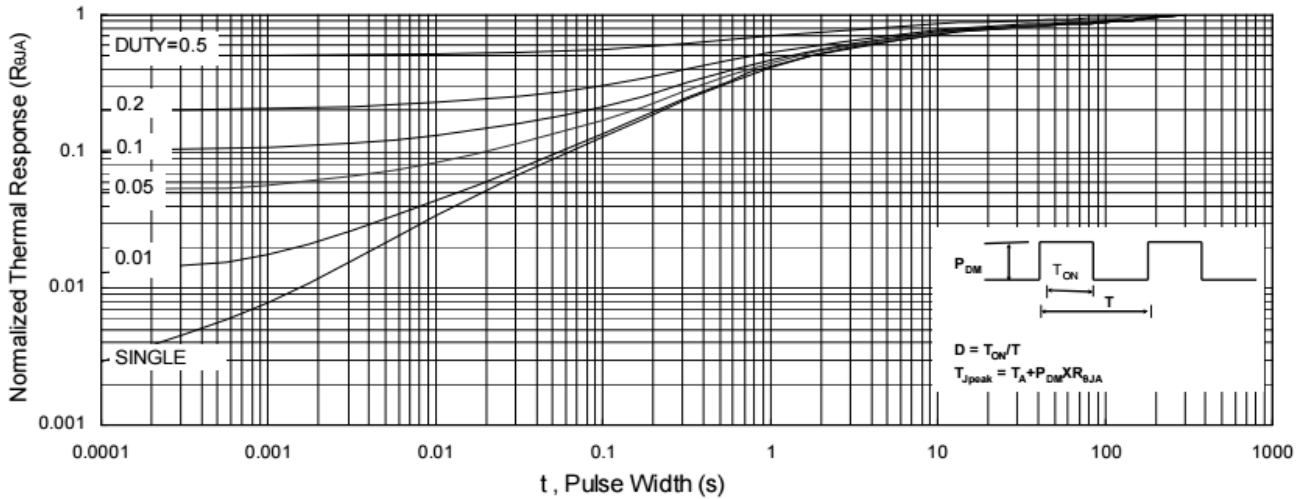


Fig.9 Normalized Maximum Transient Thermal Impedance

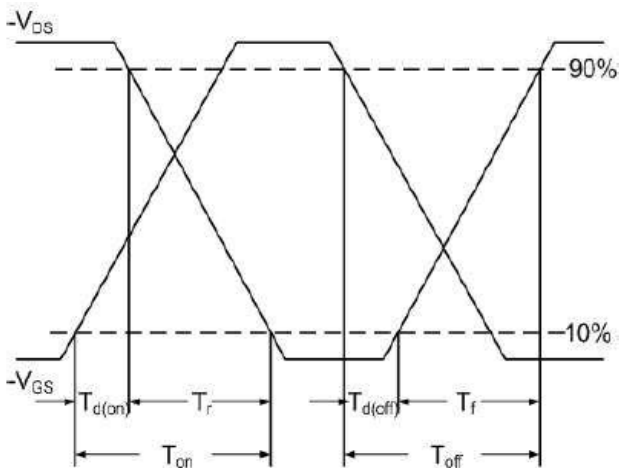


Fig.10 Switching Time Waveform

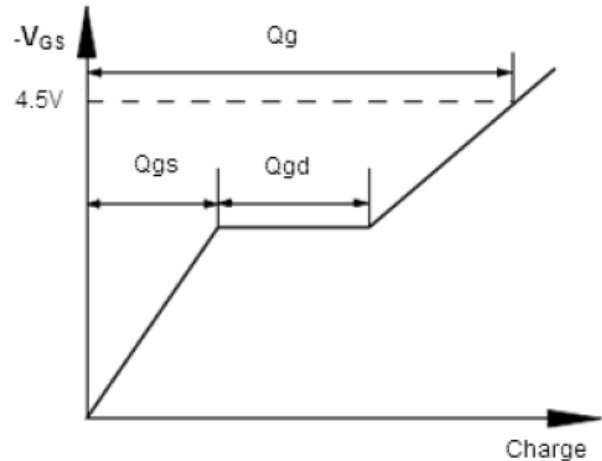


Fig.11 Gate Charge Waveform