

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

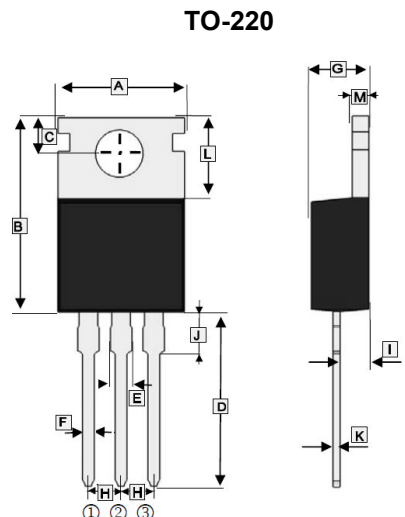
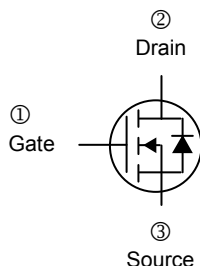
## DESCRIPTION

The SSQ109N12SG 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 synchronous buck converter applications. The SSQ109N12SG meet the RoHS and Green Product with Function reliability approved.

## FEATURES

- $R_{DS(on)} \leq 10m\Omega @ V_{GS}=10V$
- High speed power switching
- Enhanced Body diode dv/dt capability
- Enhanced Avalanche Ruggedness
- 100% UIS Tested, 100% Rg Tested
- TO-220 Package

## MARKING



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	9.96	10.36	H	2.54	BSC.
B	14.7	16	I	2.04	2.92
C	2.74 BSC.		J	3.745 REF.	
D	12.7	14.73	K	0.356	0.5
E	1.15	1.82	L	5.85	6.85
F	0.39	1.01	M	0.51	1.39
G	3.56	4.82			

## ABSOLUTE MAXIMUM RATINGS ( $T_J=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	120	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Silicon Limited)	$I_D$	$T_C=25^\circ C$	109
		$T_C=100^\circ C$	77
Pulsed Drain Current	$I_{DM}$	300	A
Avalanche Energy, Single Pulse, @L=0.4mH	$T_C=25^\circ C$	$E_{AS}$	320 mJ
Power Dissipation	$T_C=25^\circ C$	$P_D$	214 W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 ~ 175	$^\circ C$
<b>Thermal Resistance Ratings</b>			
Maximum Thermal Resistance Junction-Ambient	$R_{\theta JA}$	50	$^\circ C / W$
Maximum Thermal Resistance Junction-Case	$R_{\theta JC}$	0.7	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	120	-	-	V	$V_{GS}=0, I_D=250\mu A$	
Gate Threshold Voltage	$V_{GS(th)}$	2	3	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$	
Forward Transfer conductance	$g_{fs}$	-	65	-	S	$V_{DS}=5V, I_D=20A$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20V$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ C$	-	-	1	$\mu A$	$V_{DS}=120V, V_{GS}=0$
		$T_J=100^\circ C$	-	-	100		
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	8.6	10	m $\Omega$	$V_{GS}=10V, I_D=20A$	
Total Gate Charge	$Q_g$	-	56	-	nC	$I_D=20A$ $V_{DD}=60V$ $V_{GS}=10V$	
Gate-Source Charge	$Q_{gs}$	-	18	-			
Gate-Drain ("Miller") Change	$Q_{gd}$	-	6	-			
Turn-on Delay Time	$T_{d(on)}$	-	16	-	nS	$V_{DD}=60V$ $I_D=20A$ $V_{GS}=10V$ $R_G=10\Omega$	
Rise Time	$T_r$	-	21	-			
Turn-off Delay Time	$T_{d(off)}$	-	38	-			
Fall Time	$T_f$	-	19	-			
Input Capacitance	$C_{iss}$	-	4470	-	pF	$V_{GS}=0$ $V_{DS}=60V$ $f=1.0MHz$	
Output Capacitance	$C_{oss}$	-	235	-			
Reverse Transfer Capacitance	$C_{rss}$	-	9.5	-			
<b>Source-Drain Diode</b>							
Forward On Voltage	$V_{SD}$	-	0.9	1.2	V	$I_F=20A, V_{GS}=0$	
Reverse Recovery Time	$T_{rr}$	-	70	-	nS	$V_R=60V, I_F=20A, di/dt=500A/\mu s$	
Reverse Recovery Charge	$Q_{rr}$	-	600	-	nC		

**TYPICAL CHARACTERISTICS CURVE**

Fig 1. Typical Output Characteristics

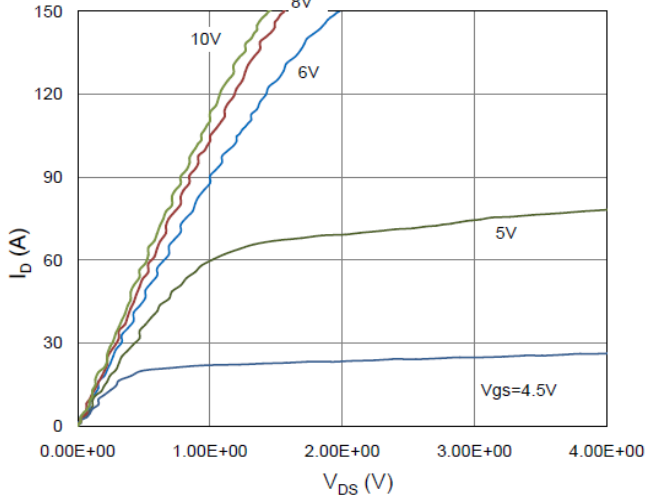


Figure 2. On-Resistance vs. Gate-Source Voltage

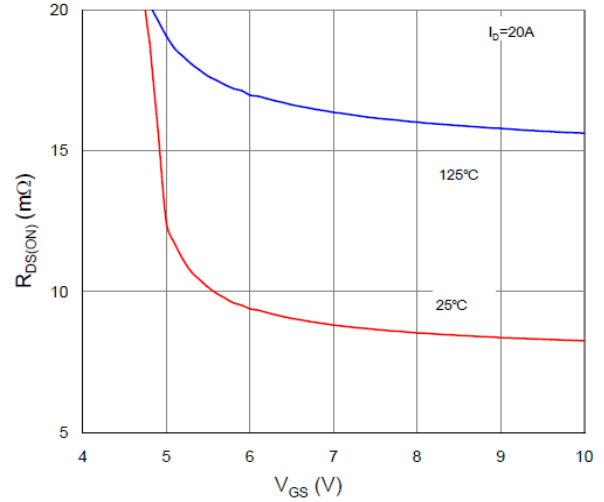


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

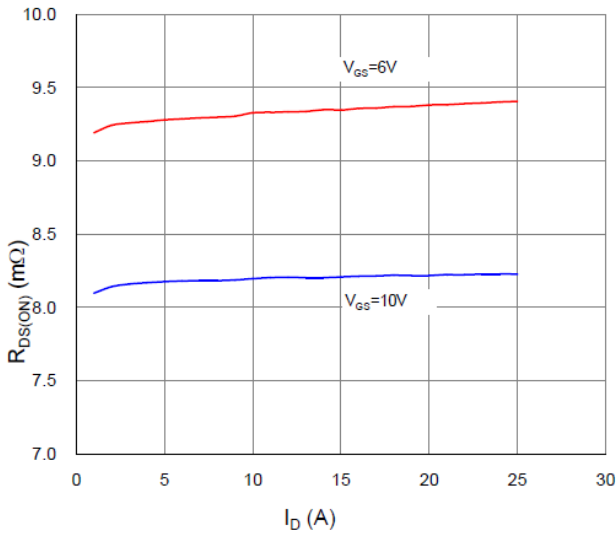


Figure 4. Normalized On-Resistance vs. Junction Temperature

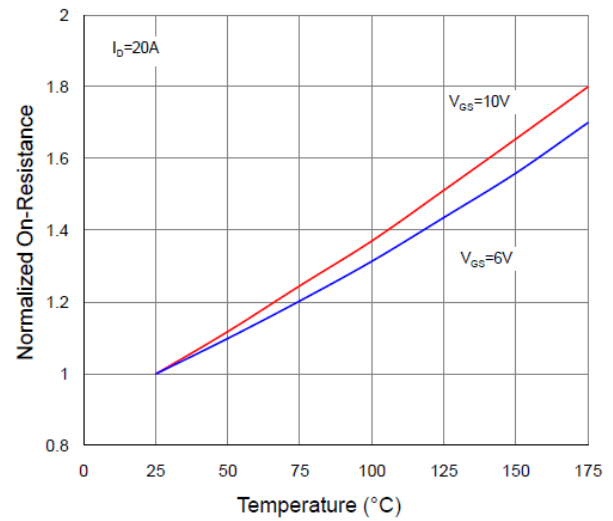


Figure 5. Typical Transfer Characteristics

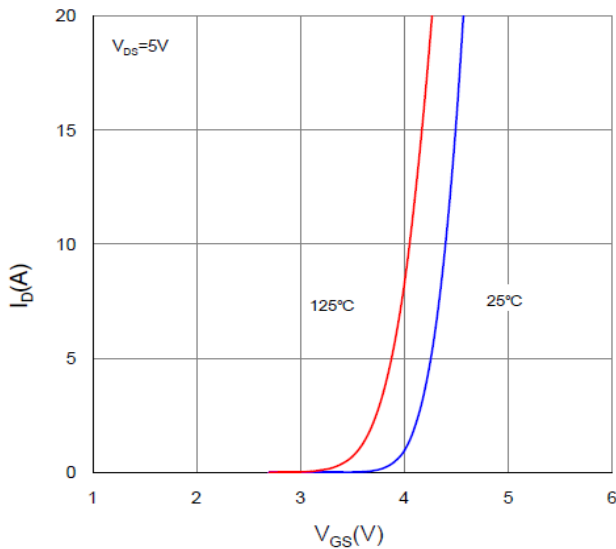
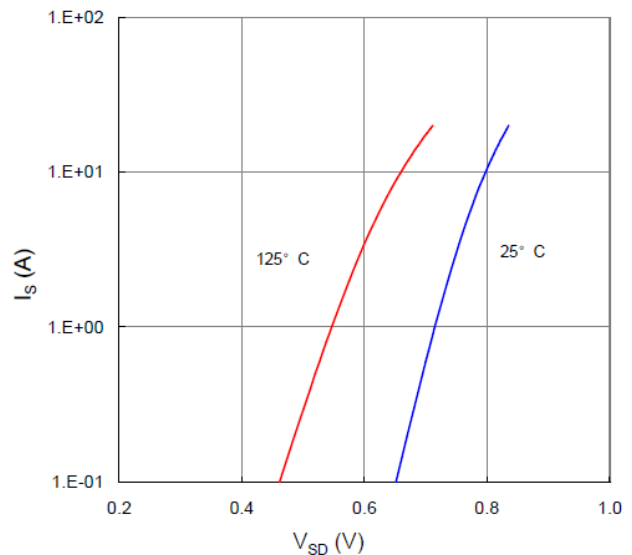


Figure 6. Typical Source-Drain Diode Forward Voltage



**TYPICAL CHARACTERISTICS CURVE**

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

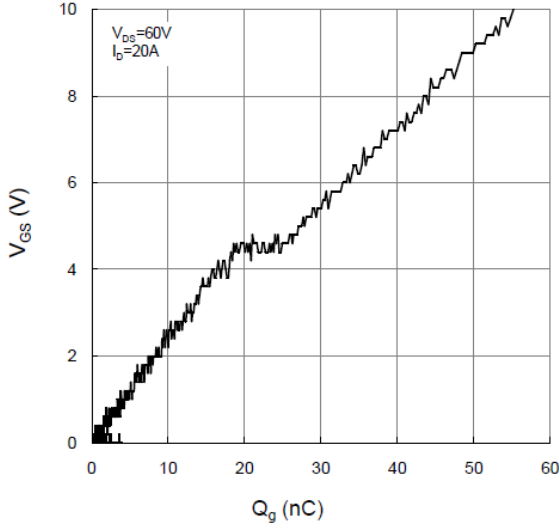


Figure 9. Maximum Safe Operating Area

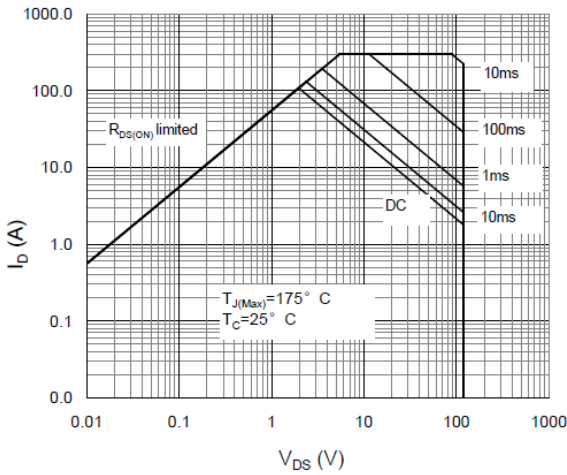


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

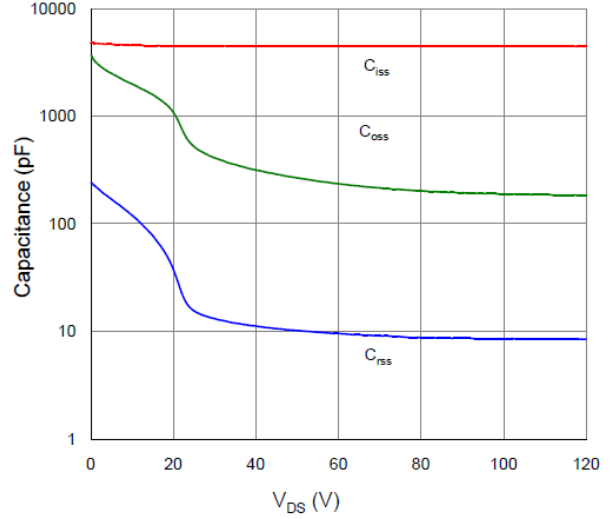


Figure 10. Maximum Drain Current vs. Case Temperature

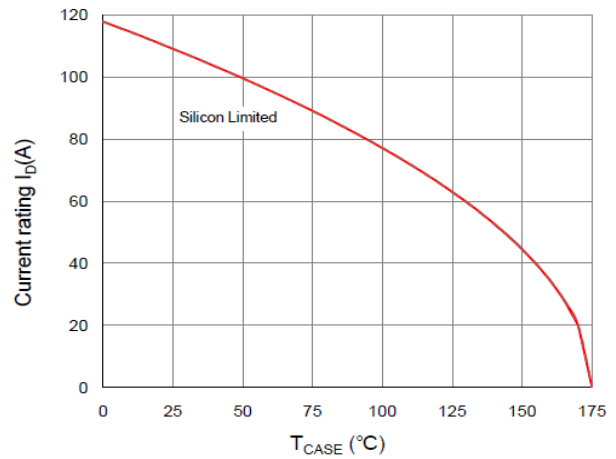


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

