

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

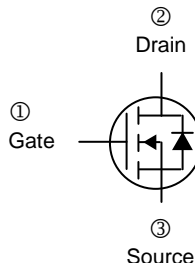
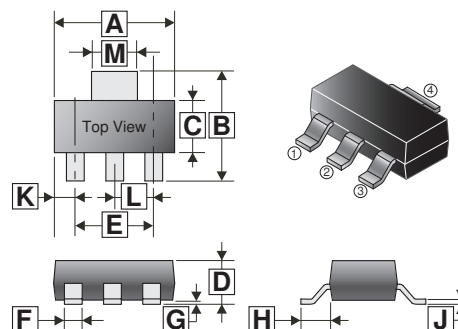
## DESCRIPTION

The SSM01N60SL 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 .

## FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent  $CdV/dt$  effect decline
- 100% EAS Guaranteed
- Green Device Available

## 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	1.42	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

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	1
		$T_C=100^\circ\text{C}$	0.6
Pulsed Drain Current	$I_{DM}$	4	A
Total Power Dissipation	$P_D$	$T_C=25^\circ\text{C}$	22
		Derate above $25^\circ\text{C}$	0.18
Single Pulse Avalanche Energy <sup>1</sup>	$E_{AS}$	52	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$
<b>Thermal Resistance Rating</b>			
Maximum Thermal Resistance Junction-Ambient	$R_{\theta JA}$	60	$^\circ\text{C} / \text{W}$
Maximum Thermal Resistance Junction-Case	$R_{\theta JC}$	5.68	$^\circ\text{C} / \text{W}$

Notes:

1.  $L=30\text{mH}, I_{AS}=1.74\text{A}, V_{DB}=110\text{V}, R_G=25\Omega$ , Starting  $T_J = 25^\circ\text{C}$

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	600	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$
Gate-Threshold Voltage	$V_{GS(th)}$	2	-	4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	-	-	±100	nA	$V_{GS}= \pm 30\text{V}, V_{DS}=0$
Drain-Source Leakage Current	$I_{DSS}$	-	-	1	μA	$V_{DS}=600\text{V}, V_{GS}=0$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	6.8	8.1	Ω	$V_{GS}=10\text{V}, I_D=0.5\text{A}$
Total Gate Charge <sup>1,2</sup>	$Q_g$	-	3.37	-	nC	$I_D=1\text{A}$ $V_{DS}=480\text{V}$ $V_{GS}=10\text{V}$
Gate-Source Charge <sup>1,2</sup>	$Q_{gs}$	-	1.16	-		
Gate-Drain Change <sup>1,2</sup>	$Q_{gd}$	-	1.04	-		
Turn-on Delay Time <sup>1,2</sup>	$T_{d(on)}$	-	6.1	-	nS	$V_{DD}=300\text{V}$ $I_D=1\text{A}$ $R_G=25\ \Omega$
Rise Time <sup>1,2</sup>	$T_r$	-	11.9	-		
Turn-off Delay Time <sup>1,2</sup>	$T_{d(off)}$	-	8.3	-		
Fall Time <sup>1,2</sup>	$T_f$	-	15.3	-		
Input Capacitance	$C_{iss}$	-	139	-	pF	$V_{GS}=0$ $V_{DS}=25\text{V}$ $f=1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	23.4	-		
Reverse Transfer Capacitance	$C_{rss}$	-	0.6	-		
<b>Source-Drain Diode</b>						
Diode Forward Voltage	$V_{SD}$	-	-	1.5	V	$I_S=1\text{A}, V_{GS}=0$
Continuous Source Current	$I_S$	-	-	1	A	Integral Reverse P-N Junction Diode in the MOSFET
Pulsed Source Current	$I_{SM}$	-	-	4	A	
Reverse Recovery Time	$T_{rr}$	-	190	-	ns	$I_S=1\text{A}, V_{GS}=0,$ $di_f/dt=100\text{A}/\mu\text{S}$
Reverse Recovery Charge	$Q_{rr}$	-	0.53	-	μC	

Notes:

1. Pulse Test: Pulse width  $\leq 300\mu\text{S}$ , Duty cycle  $\leq 2\%$
2. Essentially independent of operating temperature.

**CHARACTERISTIC CURVES**

Figure 1. On-Region Characteristics

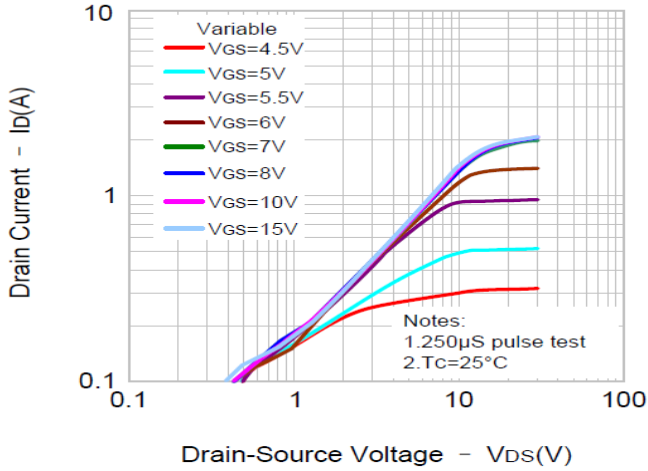


Figure 2. Transfer Characteristics

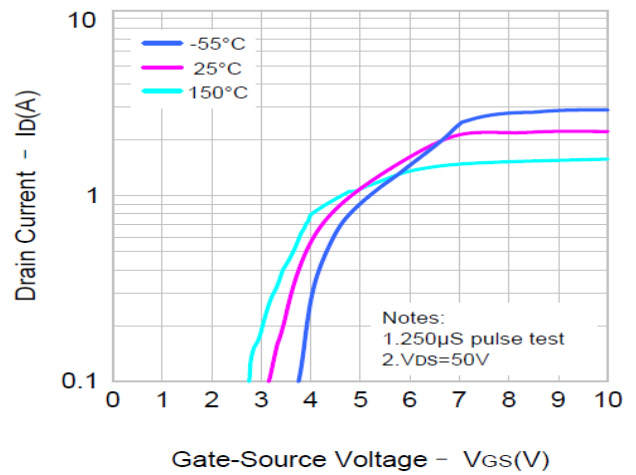


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

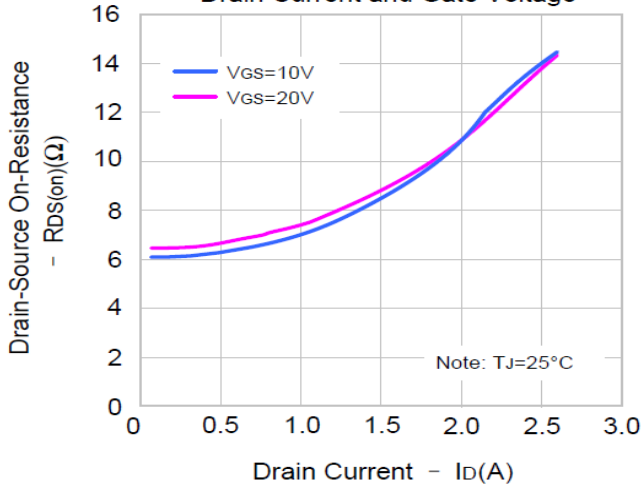


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

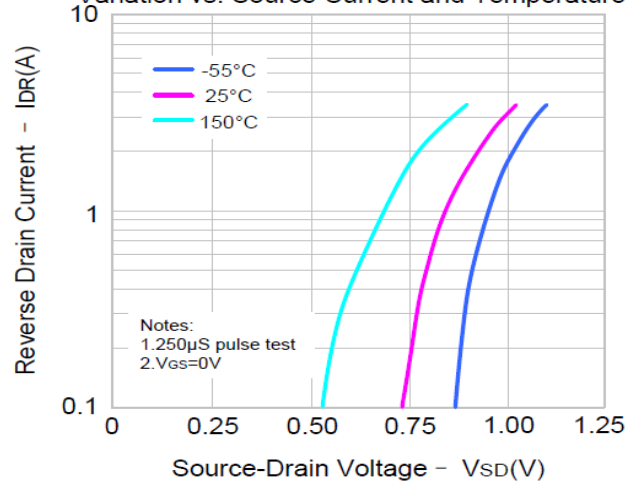


Figure 5. Capacitance Characteristics

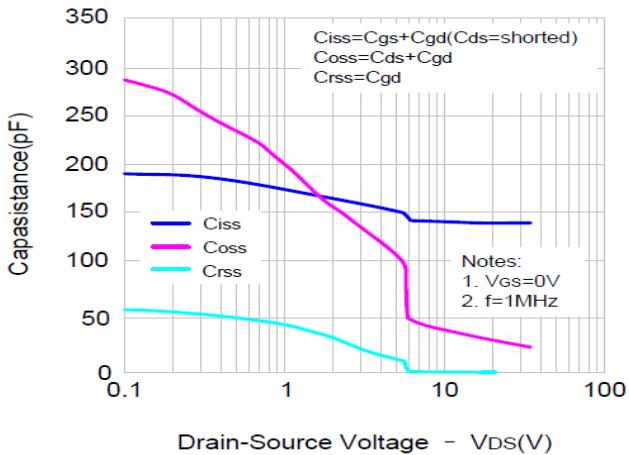
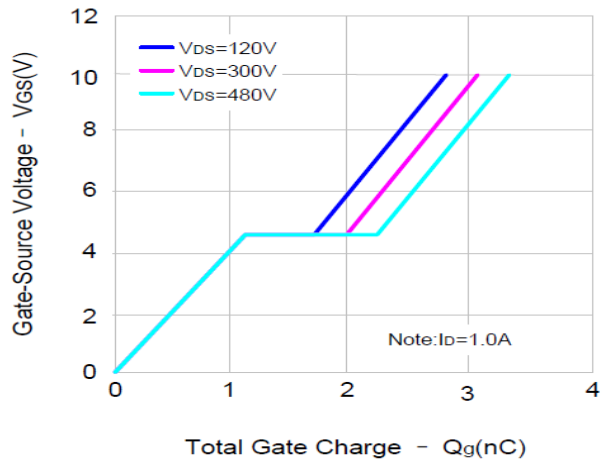


Figure 6. Gate Charge Characteristics



**CHARACTERISTIC CURVES**

Figure 7. Breakdown Voltage Variation vs. Temperature

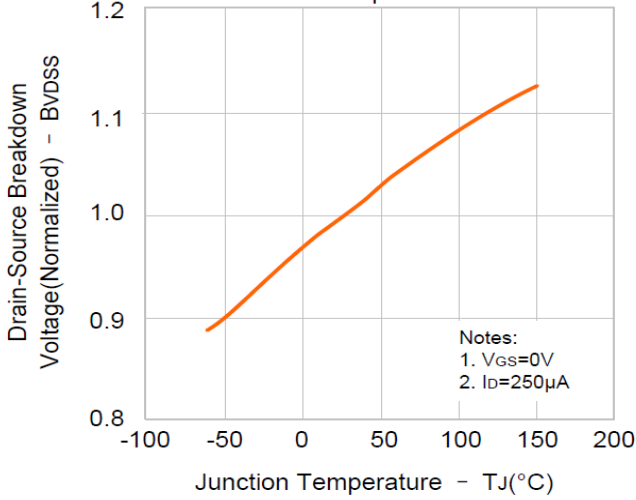


Figure 8. On-resistance Variation vs. Temperature

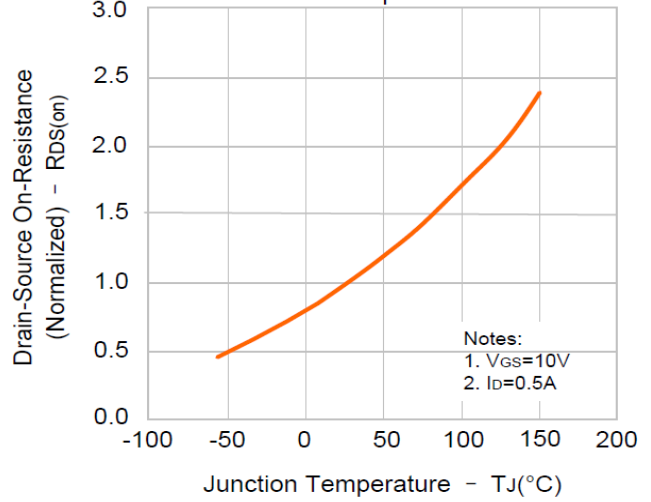


Figure 9-4. Max. Safe Operating Area

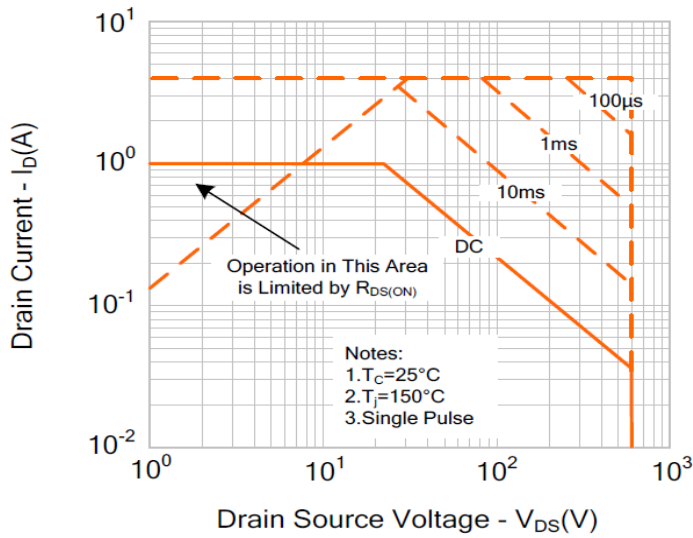
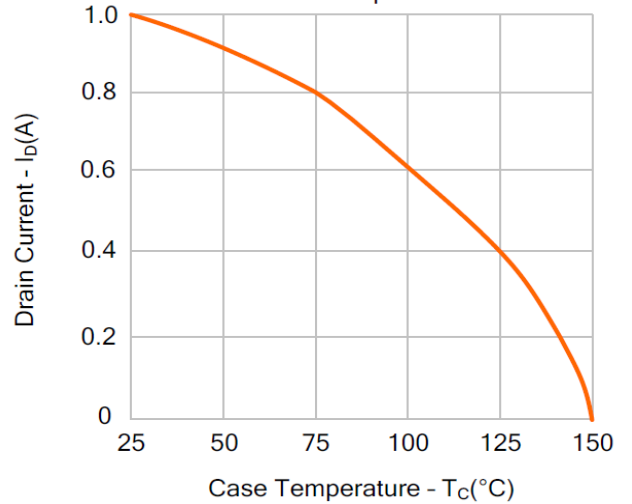
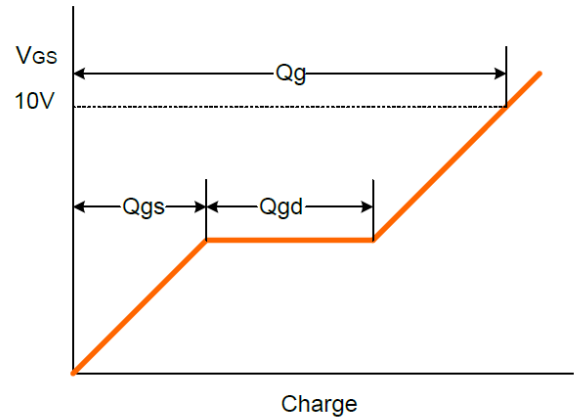
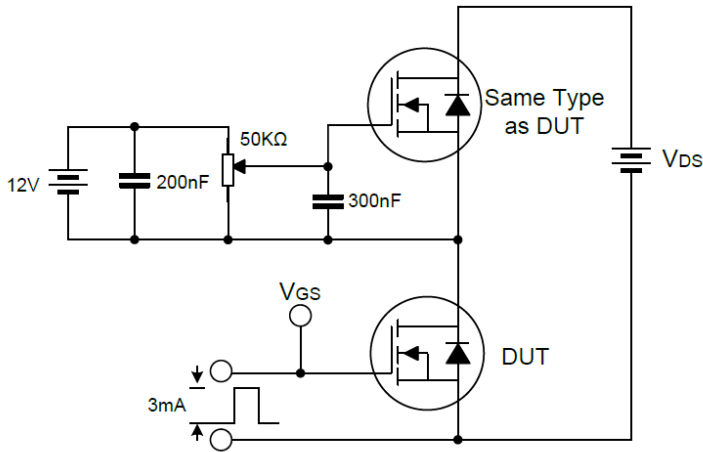


Figure 10. Maximum Drain Current vs. Case Temperature

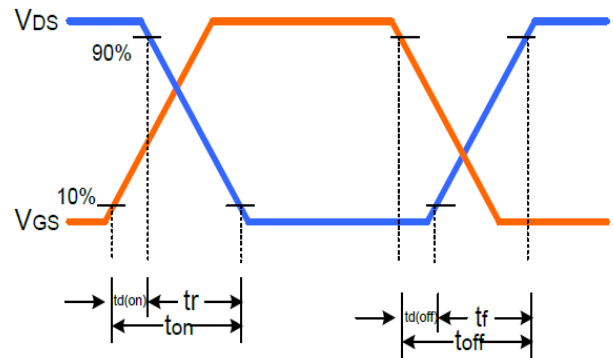
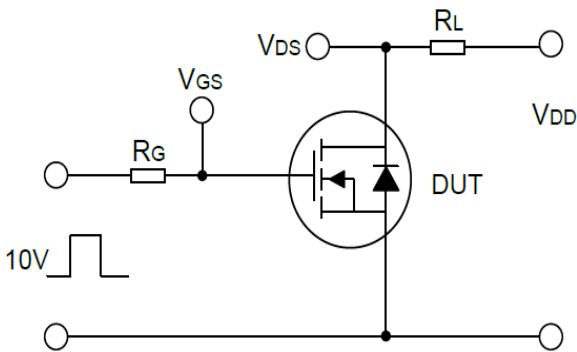


**TYPICAL TEST CURVES**

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

