

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

## DESCRIPTION

The SSE133N12SV-C is the Shielded Gate Technology 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 SSE133N12SV-C meet the RoHS and Green Product requirement with full function reliability approved.

## FEATURES

- Shielded Gate Trench Technology
- Super Low Gate Charge
- Green Device Available

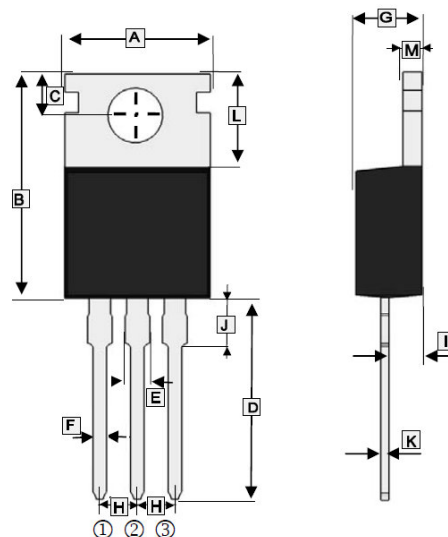
## MARKING



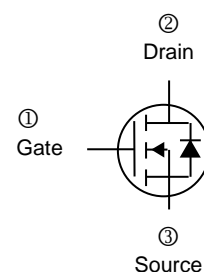
## ORDER INFORMATION

Part Number	Type
SSE133N12SV-C	Lead (Pb)-free and Halogen-free

## TO-220



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	9.70	10.60	H	2.54 TYP.	
B	14.22	16.50	I	2.03	2.92
C	2.54	3.40	J	2.70	4.00
D	12.70	14.70	K	0.33	0.65
E	1.17	1.78	L	5.50	7.00
F	0.40	1.00	M	1.15	1.40
G	3.60	4.82			



## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ 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 <sup>1</sup> @ $V_{GS}=10\text{V}$	$I_D$	$T_C=25^\circ\text{C}$	133
		$T_C=100^\circ\text{C}$	94
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	320	A
Total Power Dissipation	$P_D$	214	W
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55~175	$^\circ\text{C}$
Thermal Resistance Ratings			
Maximum Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	60	$^\circ\text{C/W}$
Maximum Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	0.7	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	120	-	-	V	$V_{GS}=0V, I_D=250\mu A$	
Gate Threshold Voltage	$V_{GS(th)}$	2	-	4	V	$V_{DS}=V_{GS}, I_D=250\mu A$	
Forward Transfer Conductance <sup>2</sup>	$g_{fs}$	-	80	-	S	$V_{DS}=5V, I_D=20A$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20V, V_{DS}=0$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	1	$\mu A$	$V_{DS}=120V, V_{GS}=0$
		$T_J=100^\circ\text{C}$	-	-	100		$V_{DS}=120V, V_{GS}=0$
Static Drain-Source On-Resistance <sup>3</sup>	$R_{DS(ON)}$	-	6	7	m $\Omega$	$V_{GS}=10V, I_D=20A$	
Gate Resistance	$R_g$	-	2.5	-	$\Omega$	$f=1\text{MHz}$	
Total Gate Charge	$Q_g$	-	38	-	nC	$I_D=20A$ $V_{DD}=60V$ $V_{GS}=10V$	
Gate-Source Charge	$Q_{gs}$	-	12	-			
Gate-Drain ("Miller") Charge	$Q_{gd}$	-	5	-			
Turn-on Delay Time	$T_{d(on)}$	-	16	-	nS	$V_{DD}=60V$ $I_D=20A$ $V_{GS}=10V$ $R_G=10\Omega$	
Rise Time	$T_r$	-	9	-			
Turn-off Delay Time	$T_{d(off)}$	-	27	-			
Fall Time	$T_f$	-	12	-			
Input Capacitance	$C_{iss}$	-	3382	-	pF	$V_{GS}=0V$ $V_{DS}=60V$ $f=1\text{MHz}$	
Output Capacitance	$C_{oss}$	-	438	-			
Reverse Transfer Capacitance	$C_{rss}$	-	8	-			
<b>Source-Drain Diode</b>							
Diode Forward Voltage <sup>3</sup>	$V_{SD}$	-	0.9	1.2	V	$I_F=20A, V_{GS}=0V$	
Reverse Recovery Time	$t_{rr}$	-	50	-	nS	$I_F=20A, V_R=60V,$ $di/dt=500A/\mu s$	
Reverse Recovery Charge	$Q_{rr}$	-	300	-	nC		

Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2oz copper.
2. The Pulse width limited by maximum junction temperature, Pulse Width $\leq 10\mu s$ , Duty Cycle $\leq 2\%$ .
3. The Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ .

**TYPICAL CHARACTERISTICS CURVE**

Fig 1. Typical Output Characteristics

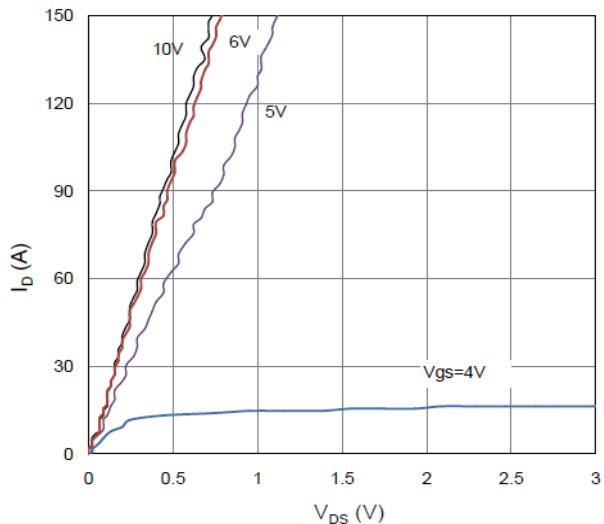


Figure 2. On-Resistance vs. Gate-Source Voltage

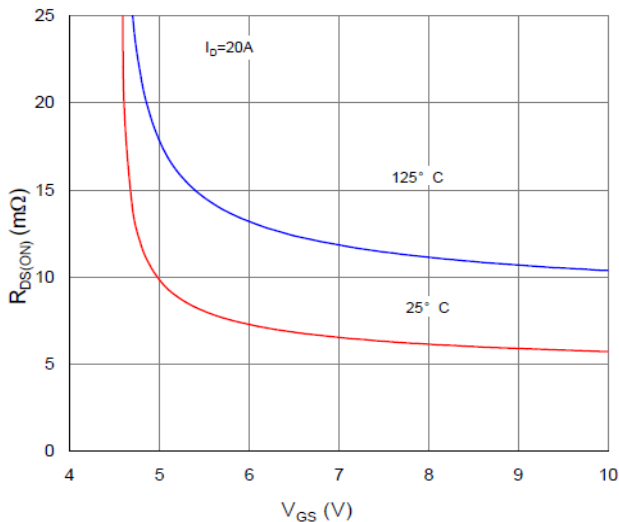


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

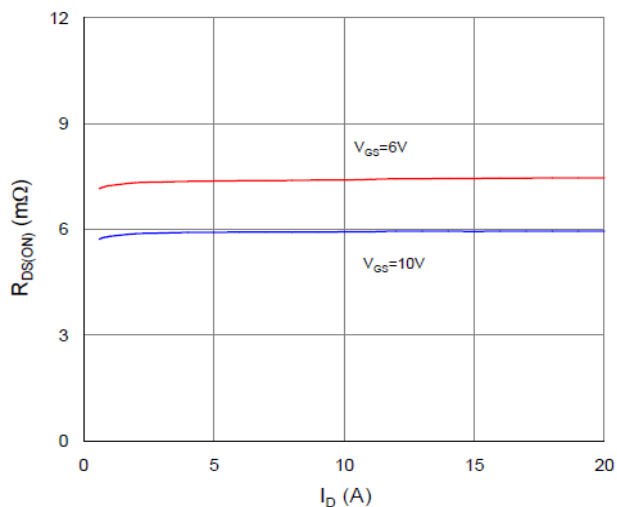


Figure 4. Normalized On-Resistance vs. Junction Temperature

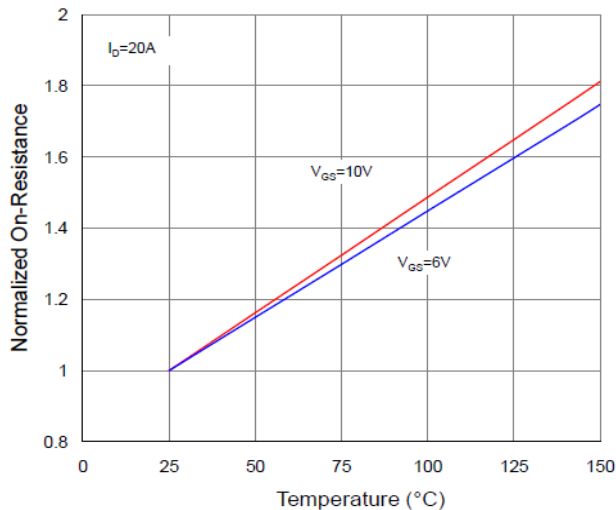


Figure 5. Typical Transfer Characteristics

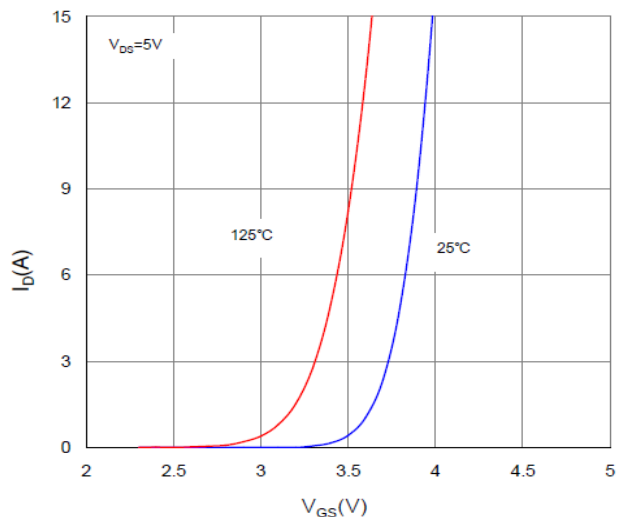
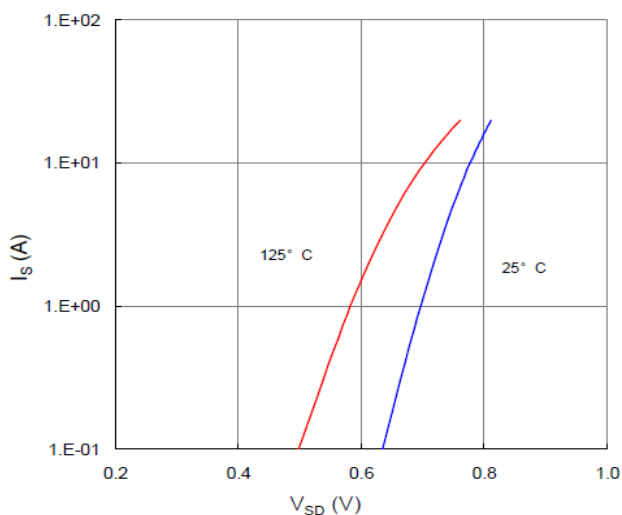


Figure 6. Typical Source-Drain Diode Forward Voltage



**TYPICAL CHARACTERISTICS CURVE**

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

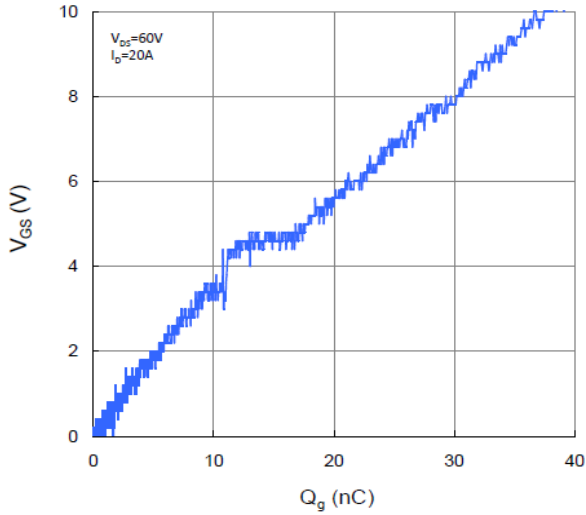


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

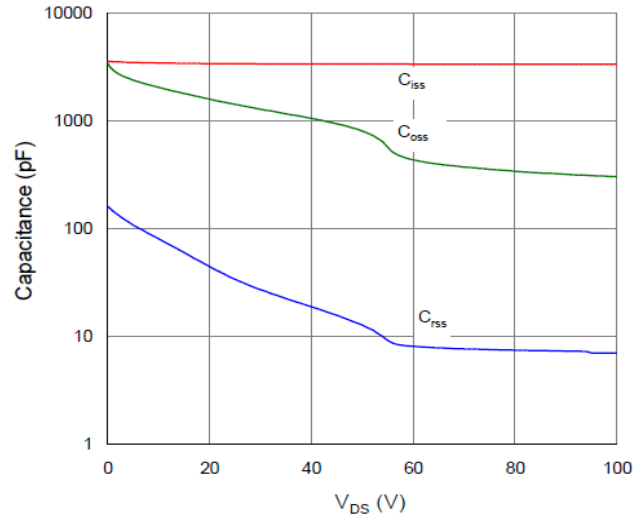


Figure 9. Maximum Safe Operating Area

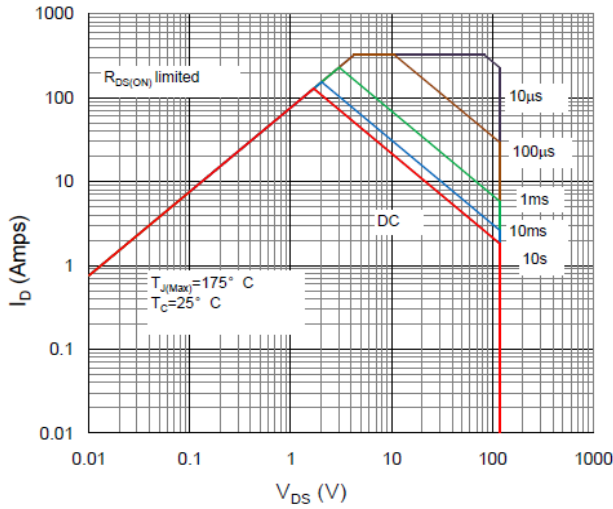


Figure 10. Maximum Drain Current vs. Case Temperature

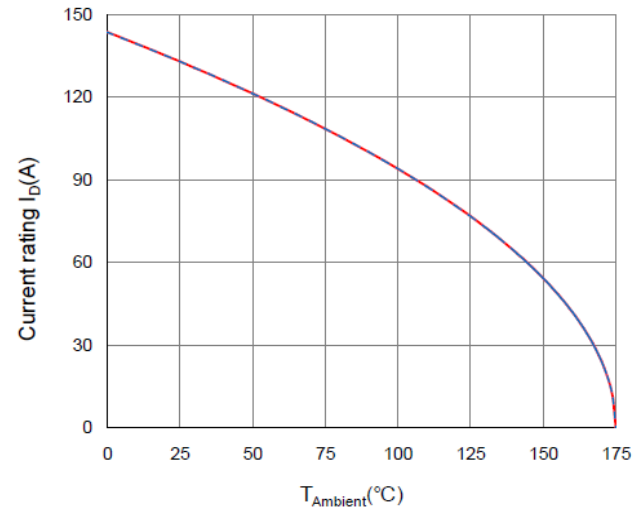


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

