

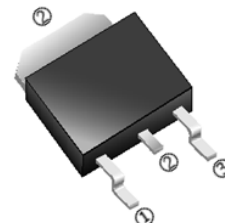
RoHS Compliant Product
A suffix of "-C" specifies halogen free

DESCRIPTION

The SSD81N12S-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 SSD81N12S-C meet the RoHS and Green Product requirement with full function reliability approved.

TO-252(D-Pack)



FEATURES

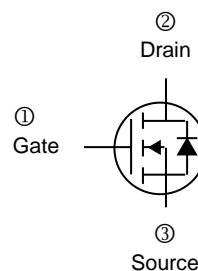
- Shielded Gate Trench Technology
- Super Low Gate Charge
- Green Device Available

MARKING



PACKAGE INFORMATION

Package	MPQ	Leader Size
TO-252	2.5K	13 inch



ORDER INFORMATION

Part Number	Type
SSD81N12S-C	Lead (Pb)-free and Halogen-free

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

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	V_{DS}	120	V	
Gate-Source Voltage	V_{GS}	± 20	V	
Continuous Drain Current @ $V_{GS}=10\text{V}$ ¹	I_D	$T_C=25^{\circ}\text{C}$	81	A
		$T_C=100^{\circ}\text{C}$	57	A
Pulsed Drain Current ²	I_{DM}	250	A	
Total Power Dissipation	P_D	143	W	
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~175	$^{\circ}\text{C}$	
Thermal Resistance Rating				
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	46	$^{\circ}\text{C}/\text{W}$	
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	1.05		

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	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate-Threshold Voltage	$V_{GS(th)}$	1.4	-	2.4	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Forward Transconductance	g_{fs}	-	70	-	S	$V_{DS}=5\text{V}, I_D=20\text{A}$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20\text{V}$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	μA	$V_{DS}=120\text{V}, V_{GS}=0$
		$T_J=100^\circ\text{C}$	-	-	100		
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	-	7.5	9.3	m Ω	$V_{GS}=10\text{V}, I_D=20\text{A}$	
		-	9.3	12.5		$V_{GS}=4.5\text{V}, I_D=10\text{A}$	
Gate Resistance	R_g	-	1	-	Ω	$V_{GS}=0, V_{DS}$ Open, $f=1\text{MHz}$	
Total Gate Charge (4.5V)	Q_g	-	18	-	nC	$I_D=20\text{A}$ $V_{DS}=60\text{V}$ $V_{GS}=10\text{V}$	
Total Gate Charge		-	38	-			
Gate-Source Charge		-	7	-			
Gate-Drain ("Miller") Change		-	5	-			
Turn-on Delay Time	$T_{d(on)}$	-	13	-	nS	$V_{DD}=60\text{V}$ $I_D=20\text{A}$ $V_{GS}=10\text{V}$ $R_G=10\Omega$	
Rise Time	T_r	-	7	-			
Turn-off Delay Time	$T_{d(off)}$	-	22	-			
Fall Time	T_f	-	9	-			
Input Capacitance	C_{iss}	-	2626	-	pF	$V_{GS}=0$ $V_{DS}=60\text{V}$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	329	-			
Reverse Transfer Capacitance	C_{rss}	-	11	-			
Source-Drain Diode							
Diode Forward Voltage ³	V_{SD}	-	0.9	1.2	V	$I_F=20\text{A}, V_{GS}=0$	
Reverse Recovery Time	T_{rr}	-	53	-	nS	$I_F=20\text{A}, V_R=60\text{V},$ $di_F/dt=100\text{A}/\mu\text{S}$	
Reverse Recovery Charge	Q_{rr}	-	58	-	nC		

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2oz copper.
2. The Pulse width limited by maximum junction temperature, Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
3. The Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

CHARACTERISTIC CURVES

Fig 1. Typical Output Characteristics

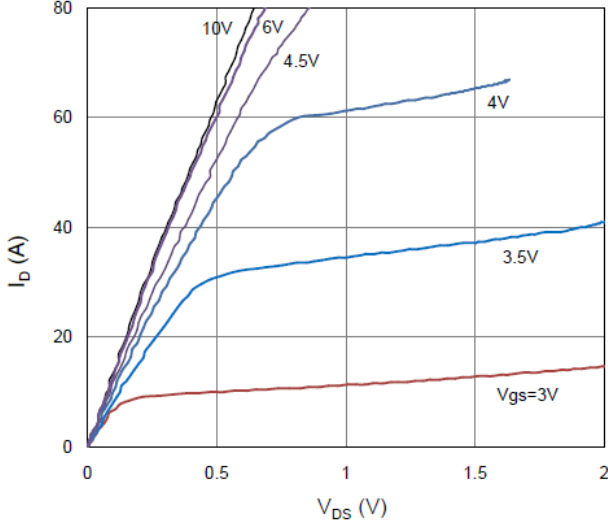


Figure 2. On-Resistance vs. Gate-Source Voltage

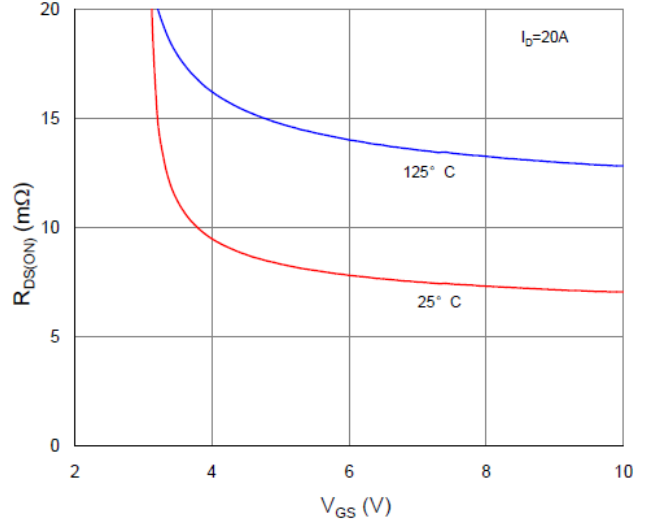


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

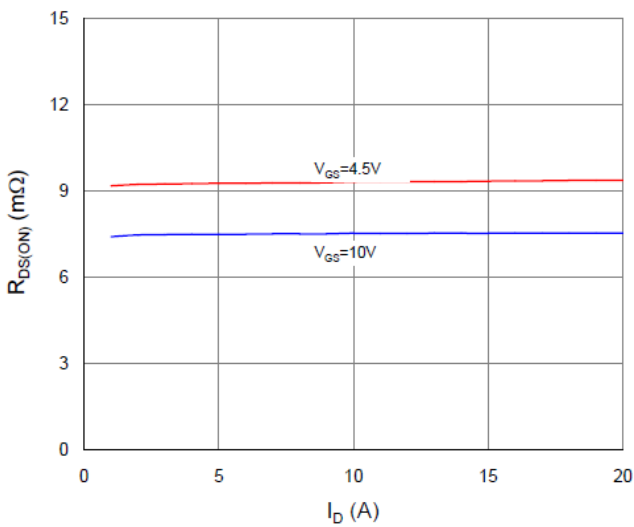


Figure 4. Normalized On-Resistance vs. Junction Temperature

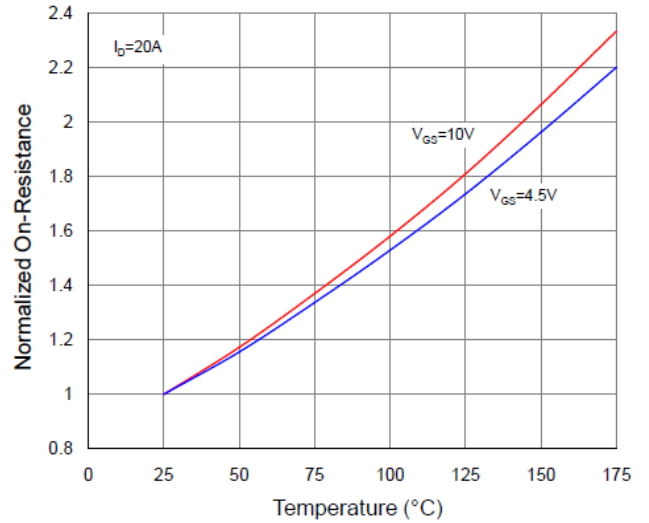


Figure 5. Typical Transfer Characteristics

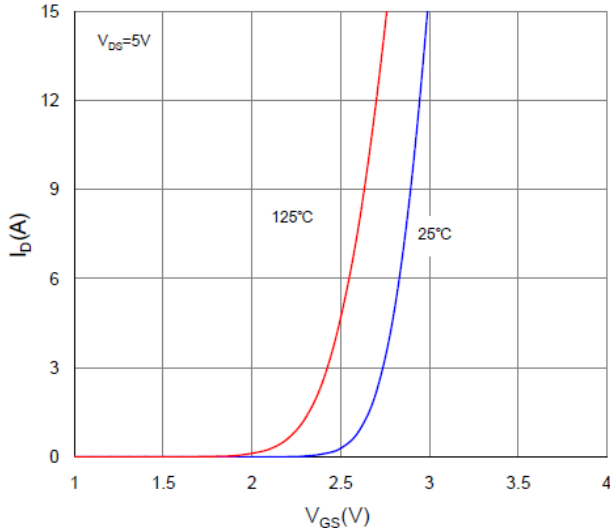
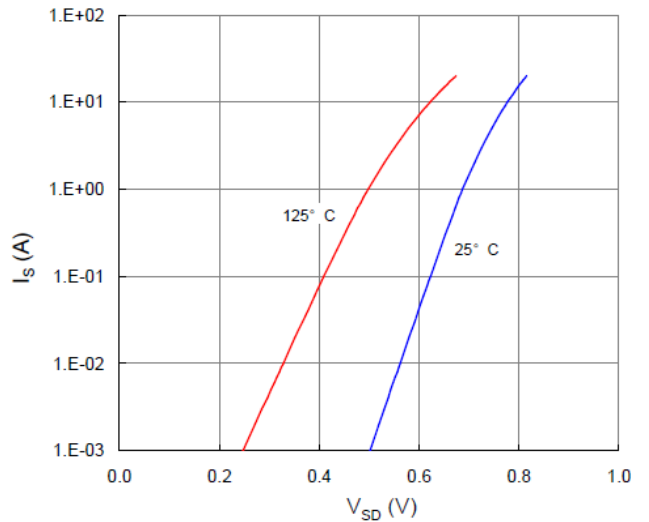


Figure 6. Typical Source-Drain Diode Forward Voltage



CHARACTERISTIC CURVES

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

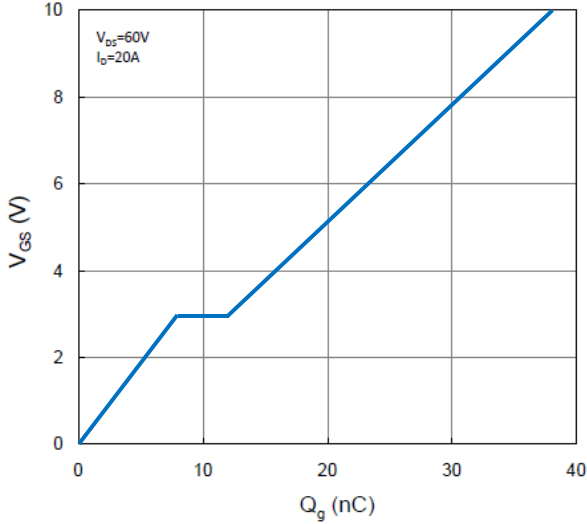


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

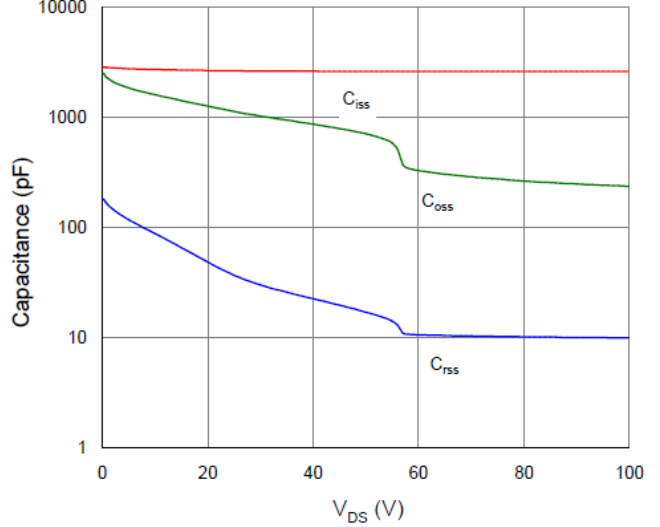


Figure 9. Maximum Safe Operating Area

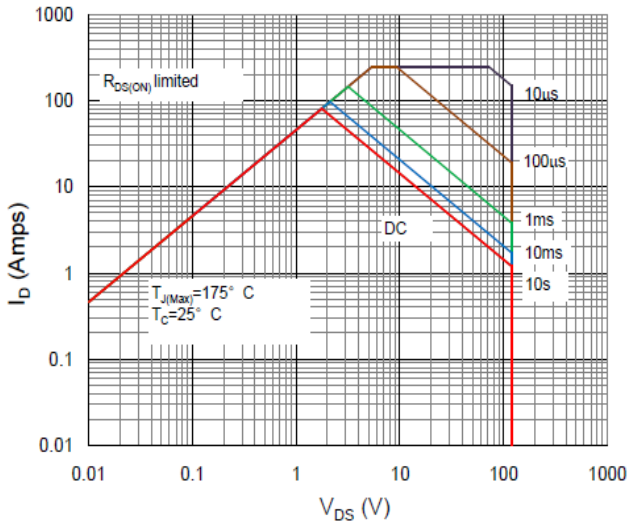


Figure 10. Maximum Drain Current vs. Case Temperature

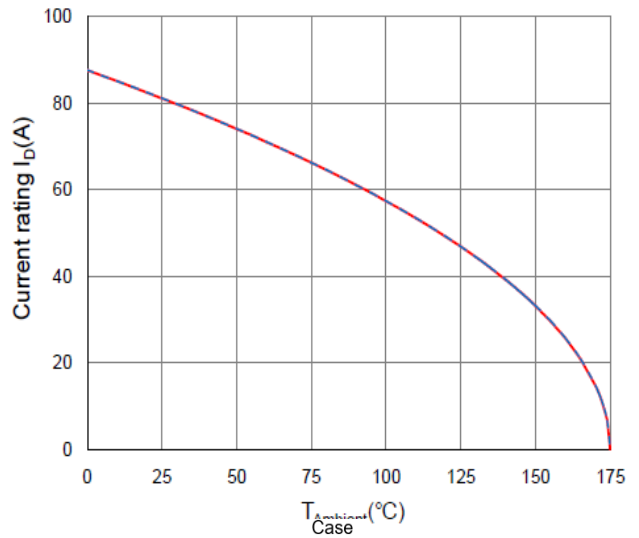
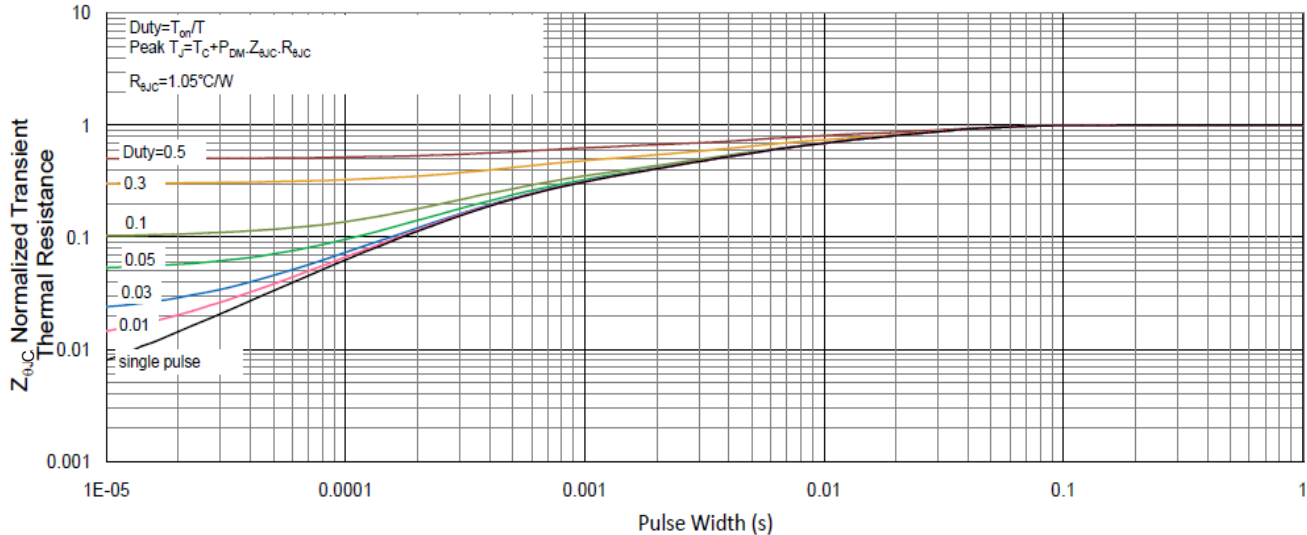
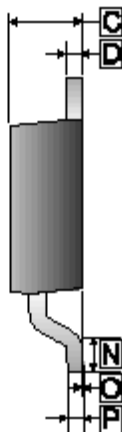
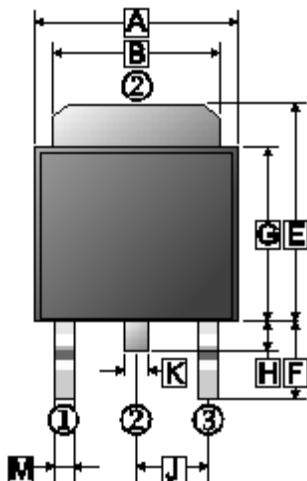


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



PACKAGE OUTLINE DIMENSIONS

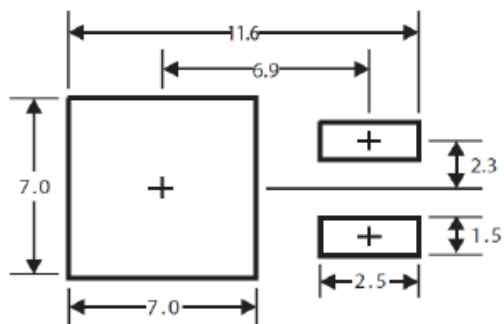
TO-252



REF.	Millimeter	
	Min.	Max.
A	6.30	6.90
B	4.95	5.53
C	2.10	2.50
D	0.40	0.90
E	6.00	7.70
F	2.90 REF.	
G	5.40	6.40
H	0.60	1.20
J	2.30 REF.	
K	0.89 REF.	
M	0.45	1.14
N	1.55 TYP.	
O	0	0.15
P	0.58 REF.	

MOUNTING PAD LAYOUT

TO-252



*Dimensions in millimeters