

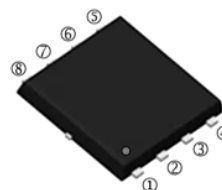
RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

DESCRIPTION

The SPR120N03S-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 SPR120N03S-C meet the RoHS and Green Product requirement with full function reliability approved.

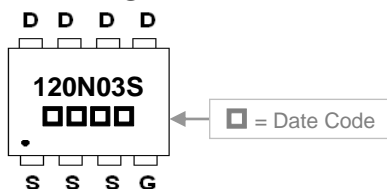
PR-8PP



FEATURES

- Shielded Gate Trench Technology
- Lower Gate Charge
- Green Device Available

MARKING

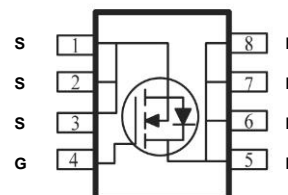


PACKAGE INFORMATION

Package	MPQ	Leader Size
PR-8PP	3K	13 inch

ORDER INFORMATION

Part Number	Type
SPR120N03S-C	Lead (Pb)-free and Halogen-free



ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current ¹ @V _{GS} =10V	I _D	T _C =25°C	120
		T _C =100°C	77
Pulsed Drain Current ^{2,3}	I _{DM}	240	A
Power Dissipation ¹	P _D	44.6	W
Operating Junction & Storage Temperature	T _J , T _{STG}	-55~150	°C
Thermal Resistance Ratings			
Thermal Resistance Junction-Ambient ¹	R _{θJA}	50	°C/W
Thermal Resistance Junction-Case ¹	R _{θJC}	2.8	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	30	-	-	V	$V_{GS}=0V, I_D=250\mu A$	
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	uA	$V_{DS}=24V, V_{GS}=0V$
		$T_J=55^\circ\text{C}$	-	-	5		$V_{DS}=24V, V_{GS}=0V$
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	-	1.8	2.2	m Ω	$V_{GS}=10V, I_D=20A$	
		-	2.5	3.6		$V_{GS}=4.5V, I_D=20A$	
Transconductance	g_{fs}	-	91	-	S	$V_{DS}=5V, I_D=20A$	
Total Gate Charge	Q_g	-	31	-	nC	$I_D=20A$ $V_{DS}=15V$ $V_{GS}=4.5V$	
Gate-Source Charge	Q_{gs}	-	12.5	-			
Gate-Drain Change	Q_{gd}	-	14.5	-			
Turn-on Delay Time	$T_{d(on)}$	-	12	-	nS	$V_{DD}=15V$ $I_D=20A$ $V_{GS}=10V$ $R_G=3.3\Omega$	
Rise Time	T_r	-	6	-			
Turn-off Delay Time	$T_{d(off)}$	-	38.5	-			
Fall Time	T_f	-	11.5	-			
Input Capacitance	C_{iss}	-	3032	-	pF	$V_{GS}=0V$ $V_{DS}=15V$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	1588	-			
Reverse Transfer Capacitance	C_{rss}	-	207	-			
Source-Drain Diode							
Diode Forward Voltage ³	V_{SD}	-	-	1.2	V	$I_S=1A, V_{GS}=0V$	
Continuous Source Current ¹	I_S	-	-	120	A		
Pulsed Source Current ^{2,3}	I_{SM}	-	-	240	A		
Reverse Recovery Time	T_{rr}	-	50	-	nS	$I_F=20A, di/dt=100A/\mu s,$	
Reverse Recovery Charge	Q_{rr}	-	60	-	nC	$T_J=25^\circ\text{C}$	

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The power dissipation is limited by 150°C, junction temperature.
3. The data tested by pulsed, Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

CHARACTERISTIC CURVES

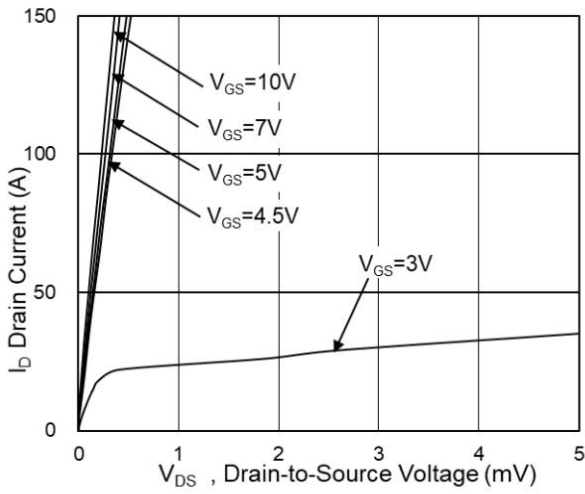


Fig.1 Typical Output Characteristics

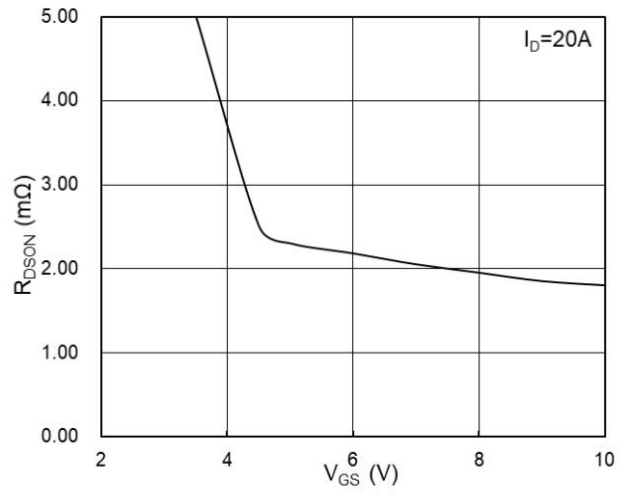


Fig.2 On-Resistance vs G-S Voltage

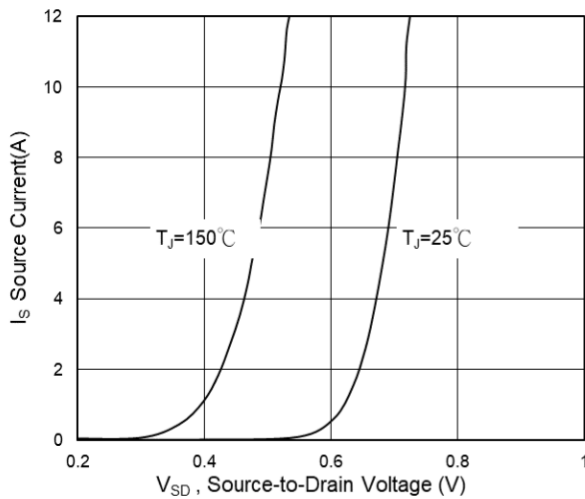


Fig.3 Source Drain Forward Characteristics

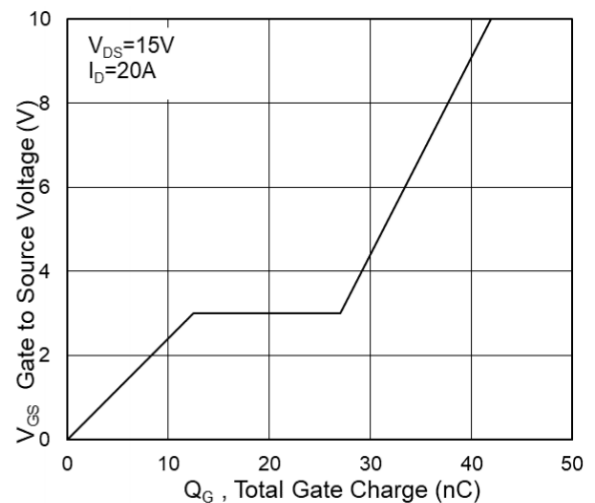


Fig.4 Gate-Charge Characteristics

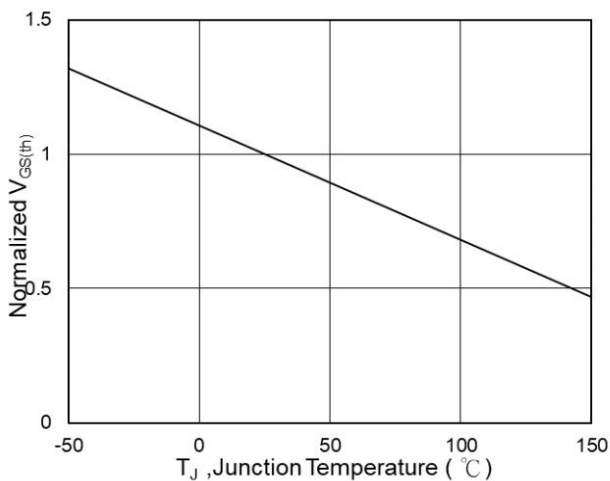


Fig.5 Normalized $V_{GS(th)}$ vs T_J

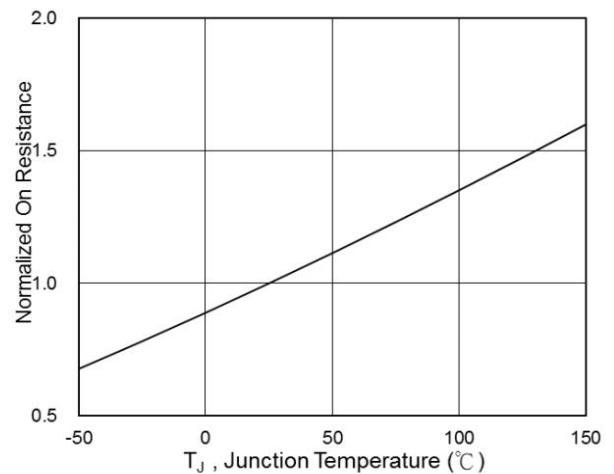


Fig.6 Normalized $R_{DS(ON)}$ vs T_J

CHARACTERISTIC CURVES

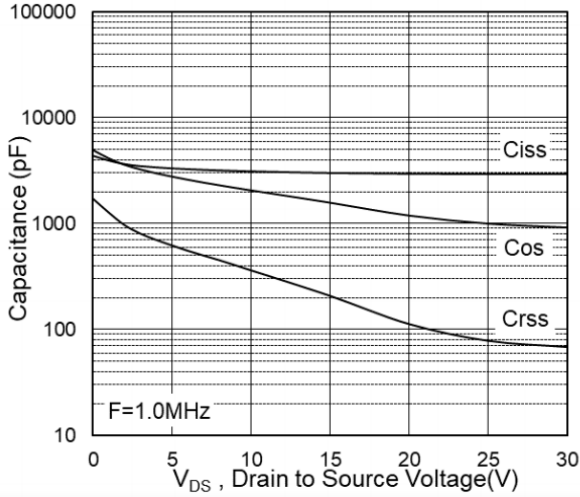


Fig.7 Capacitance

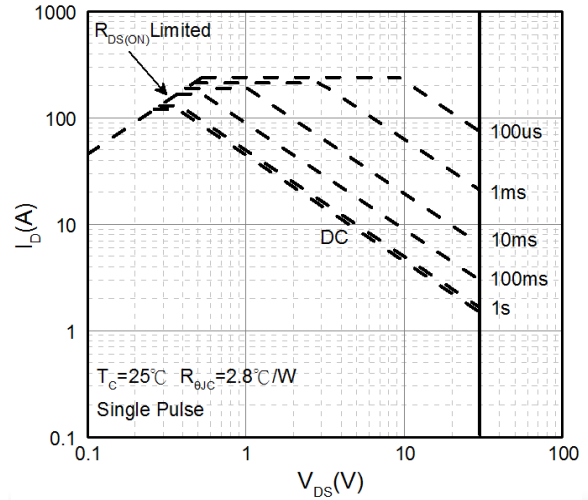


Fig.8 Safe Operating Area

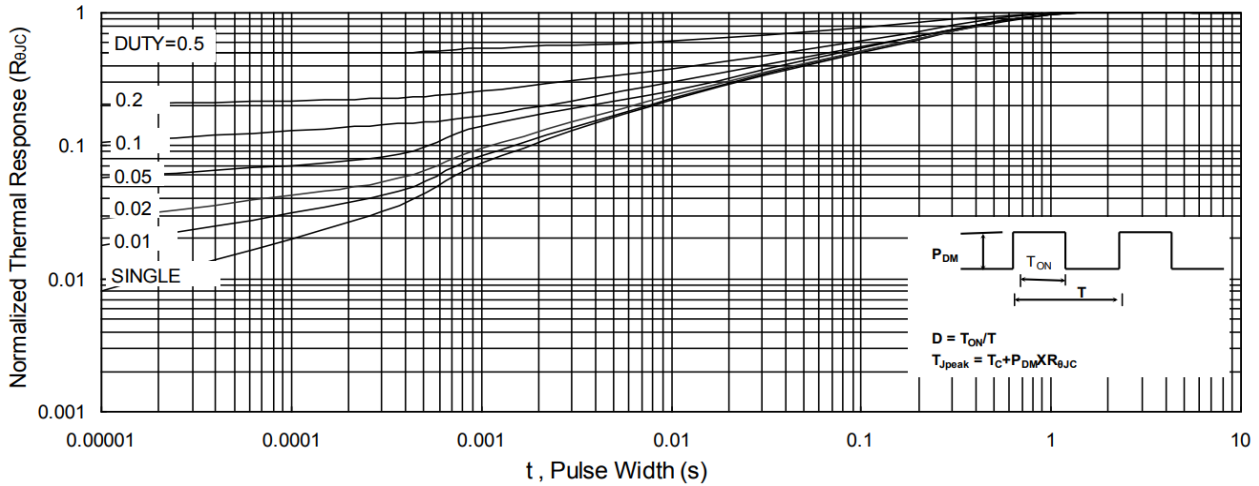


Fig.9 Normalized Maximum Transient Thermal Impedance

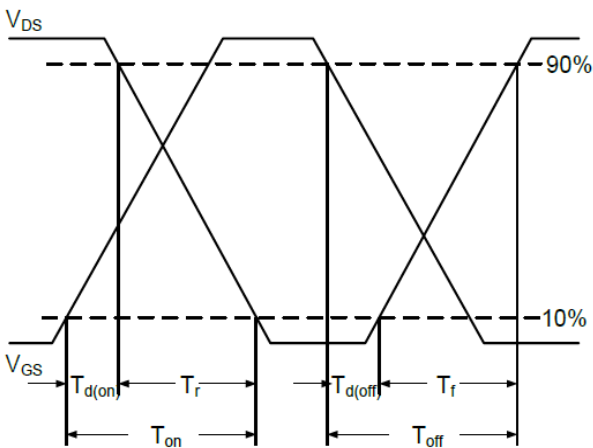


Fig.10 Switching Time Waveform

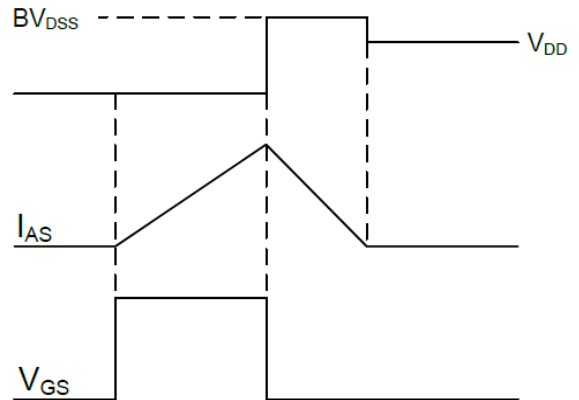
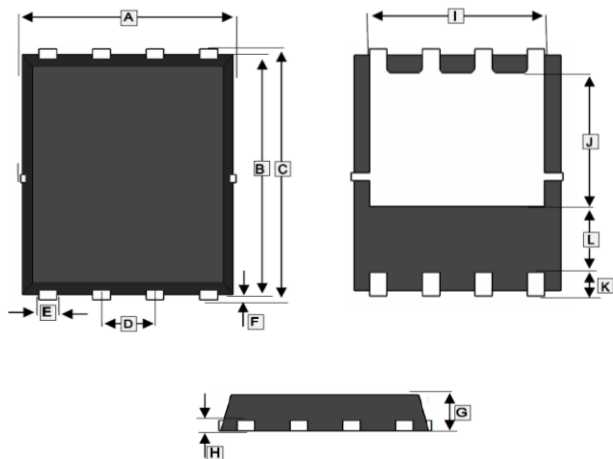


Fig.11 Unclamped Inductive Waveform

PACKAGE OUTLINE DIMENSIONS

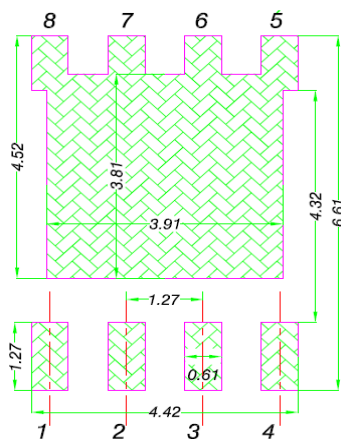
PR-8PP



REF.	Millimeter	
	Min.	Max.
A	4.90	5.10
B	5.70	5.90
C	5.90	6.20
D	1.27 BSC.	
E	0.33	0.51
F	0.06	0.20
G	0.80	1.10
H	0.254 REF.	
I	4.00 REF.	
J	3.40 REF.	
K	0.60 REF.	
L	1.40 REF.	

MOUNTING PAD LAYOUT

PR-8PP



*Dimensions in millimeters