

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

## DESCRIPTION

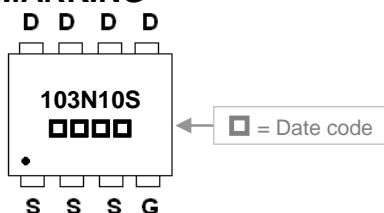
The SPR103N10S-C is the Shielded Gate Technology N-Ch MOSFETs with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the synchronous buck converter applications.

The SPR103N10S-C meet the RoHS and Green Product requirement with full function reliability approved.

## FEATURES

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

## MARKING

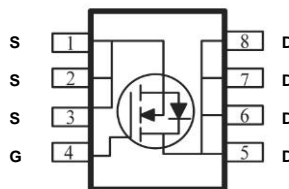


## PACKAGE INFORMATION

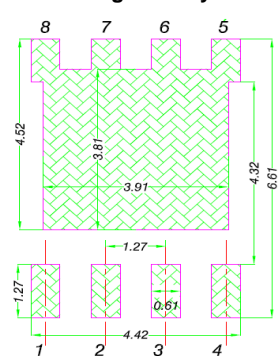
Package	MPQ	Leader Size
PR-8PP	3K	13 inch

## ORDER INFORMATION

Part Number	Type
SPR103N10S-C	Lead (Pb)-free and Halogen-free



## Mounting Pad Layout



\*Dimensions in millimeters

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup>	$I_D$	$T_C=25^\circ\text{C}$	103
		$T_C=100^\circ\text{C}$	65
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	300	A
Total Power Dissipation	$P_D$	104	W
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$
Thermal Data			
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	50	$^\circ\text{C/W}$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	1.2	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	100	-	-	V	$V_{GS}=0V, I_D=250\mu A$	
Gate-Threshold Voltage	$V_{GS(th)}$	1.4	-	2.4	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	$\mu A$	$V_{DS}=100V, V_{GS}=0V$
		$T_J=100^\circ C$	-	-	100		
Static Drain-Source On-Resistance <sup>3</sup>	$R_{DS(ON)}$	-	4.4	5	m $\Omega$	$V_{GS}=10V, I_D=20A$	
		-	5.7	7		$V_{GS}=4.5V, I_D=20A$	
Gate Resistance	$R_g$	-	1.2	-	$\Omega$	$V_{DS}=V_{GS}=0V, f=1MHz$	
Total Gate Charge (4.5V)	$Q_g$	-	27	-	nC	$I_D=20A$ $V_{DD}=50V$ $V_{GS}=10V$	
Total Gate Charge		-	50	-			
Gate-Source Charge	$Q_{gs}$	-	9	-			
Gate-Drain Change	$Q_{gd}$	-	10	-			
Turn-on Delay Time	$T_{d(on)}$	-	12	-	nS	$V_{DD}=50V$ $I_D=20A$ $V_{GS}=10V$ $R_G=10\Omega$	
Rise Time	$T_r$	-	8	-			
Turn-off Delay Time	$T_{d(off)}$	-	27	-			
Fall Time	$T_f$	-	6	-			
Input Capacitance	$C_{iss}$	-	2990	-	pF	$V_{GS}=0V$ $V_{DS}=50V$ $f=1MHz$	
Output Capacitance	$C_{oss}$	-	562	-			
Reverse Transfer Capacitance	$C_{rss}$	-	18	-			
<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	$T_{rr}$	-	40	-	nS	$V_R=50V, I_F=20A,$ $dI/dt=500A/\mu s$	
Reverse Recovery Charge	$Q_{rr}$	-	200	-	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 $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ .
3. The Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ .

**CHARACTERISTIC CURVES**

Fig 1. Typical Output Characteristics

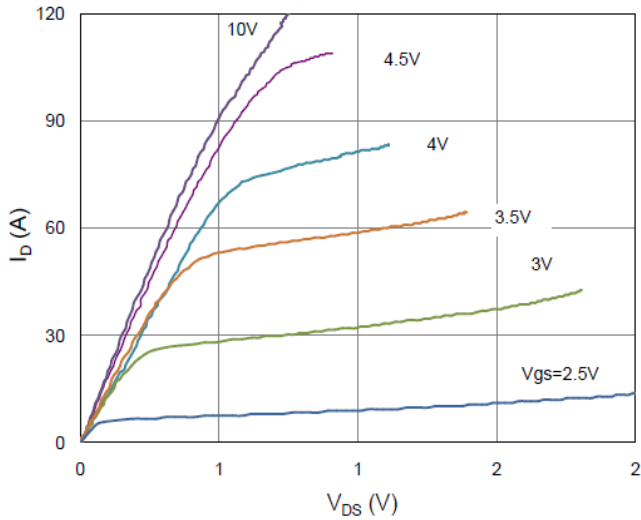


Figure 2. On-Resistance vs. Gate-Source Voltage

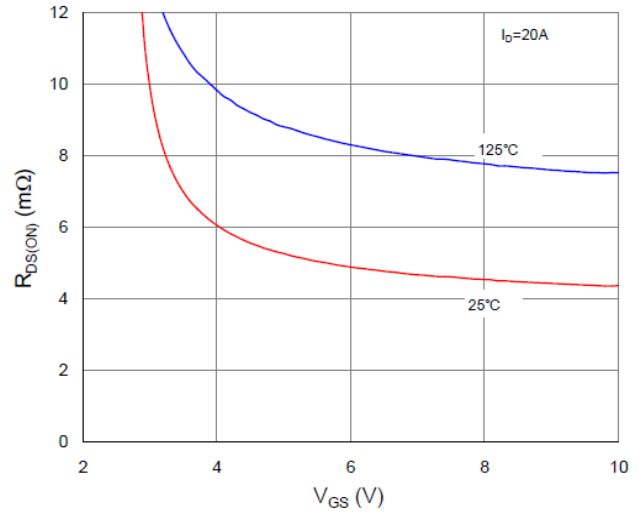


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

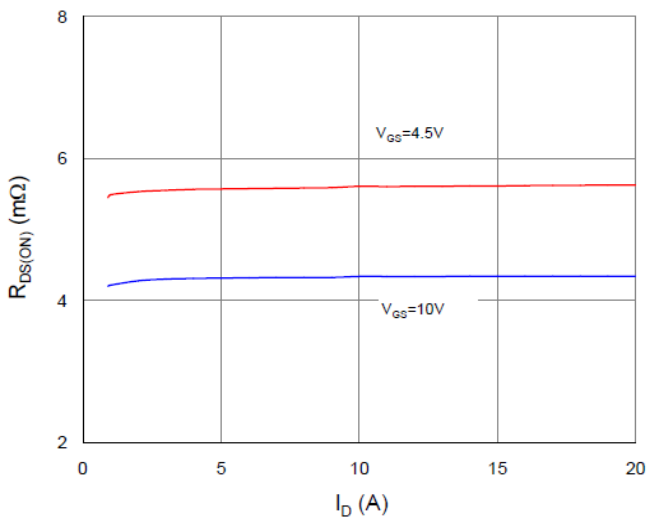


Figure 4. Normalized On-Resistance vs. Junction Temperature

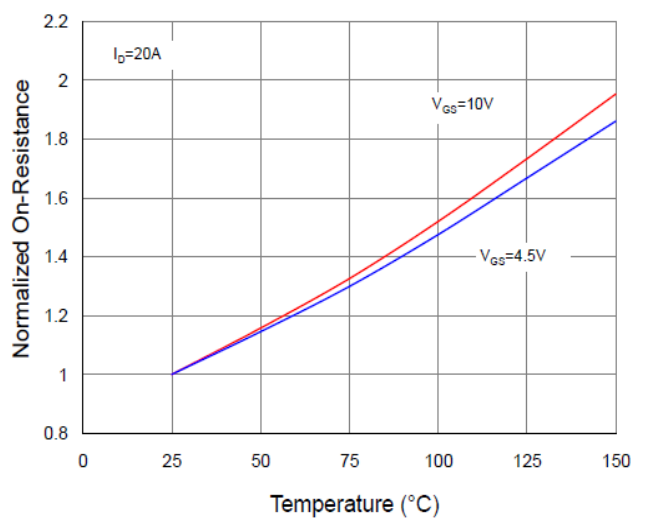


Figure 5. Typical Transfer Characteristics

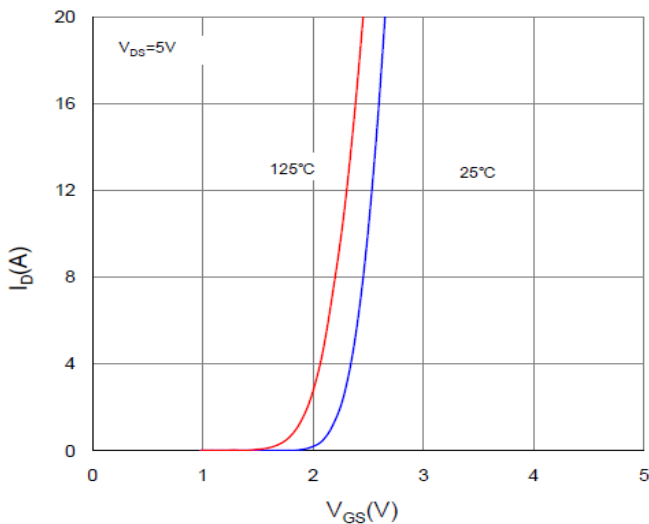
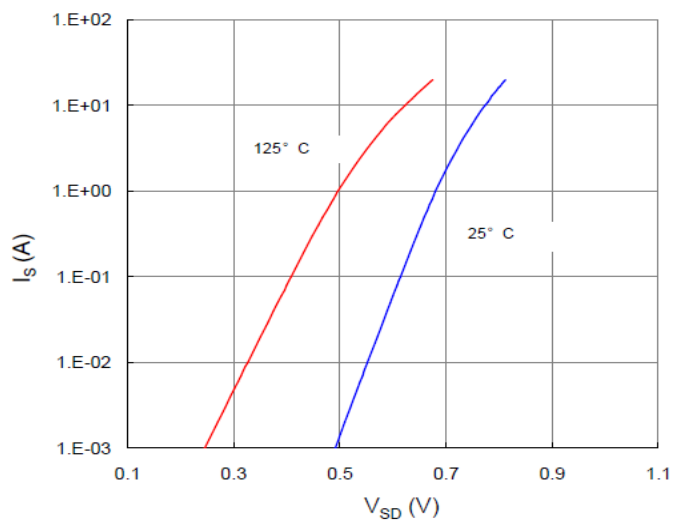


Figure 6. Typical Source-Drain Diode Forward Voltage



**CHARACTERISTIC CURVES**

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

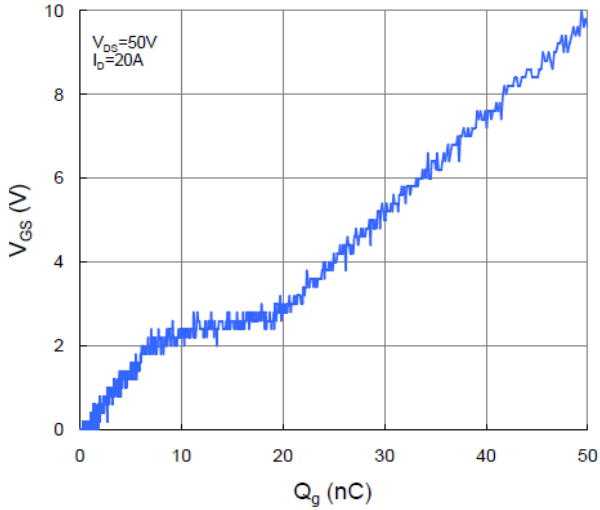


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

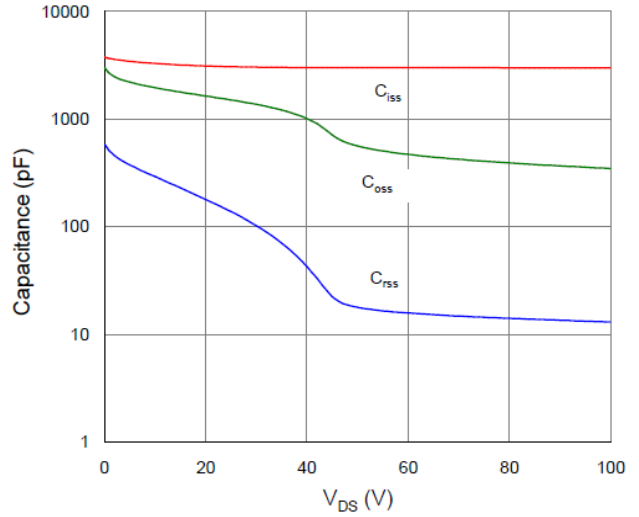


Figure 9. Maximum Safe Operating Area

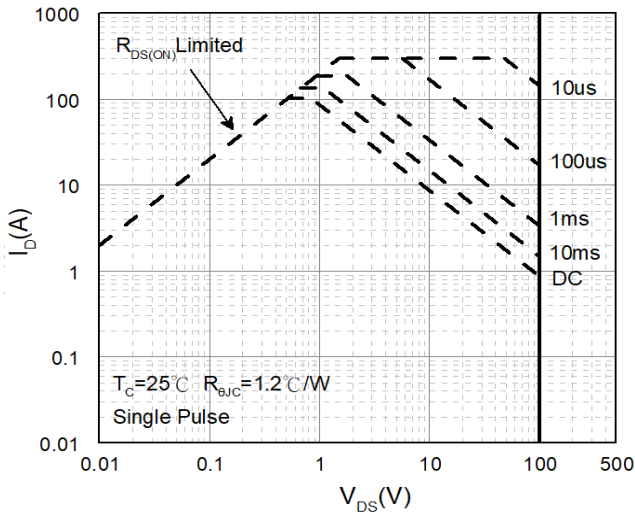


Figure 10. Maximum Drain Current vs. Case Temperature

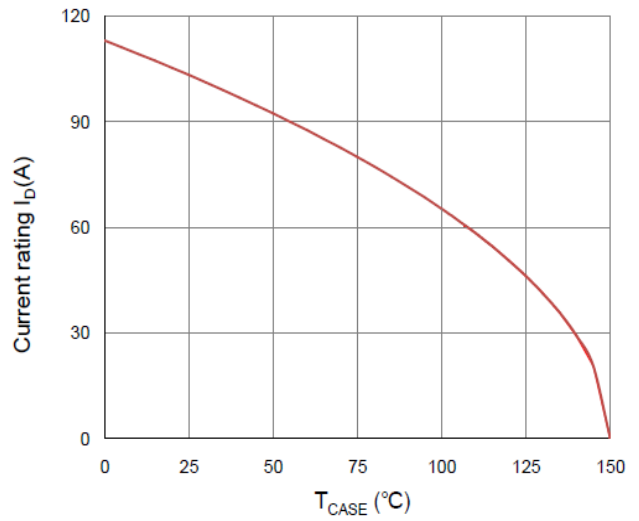


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

