

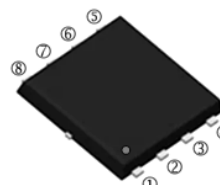
RoHS Compliant Product  
A suffix of "-C" specifies halogen & lead-free

## DESCRIPTION

The SPR30N03S-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 SPR30N03S-C meet the RoHS and Green Product requirement with full function reliability approved.

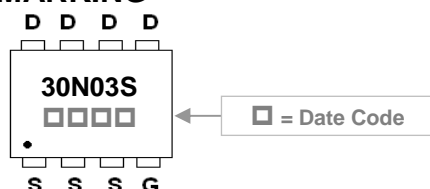
PR-8PP



## FEATURES

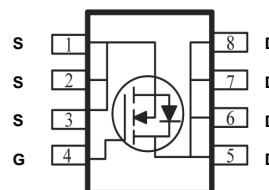
- Shielded Gate Trench Technology
- Lower Gate Charge
- Green Device Available

## MARKING



## PACKAGE INFORMATION

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



## ORDER INFORMATION

Part Number	Type
SPR30N03S-C	Lead (Pb)-free and Halogen-free

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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup> @ $V_{GS}=10\text{V}$	$T_C=25^{\circ}\text{C}$	30	A
	$T_C=100^{\circ}\text{C}$	24	
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	130	A
Power Dissipation <sup>3</sup>	$T_C=25^{\circ}\text{C}$	$P_D$	31 W
Operating Junction & Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^{\circ}\text{C}$
<b>Thermal Resistance Ratings</b>			
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	65	$^{\circ}\text{C/W}$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	4	

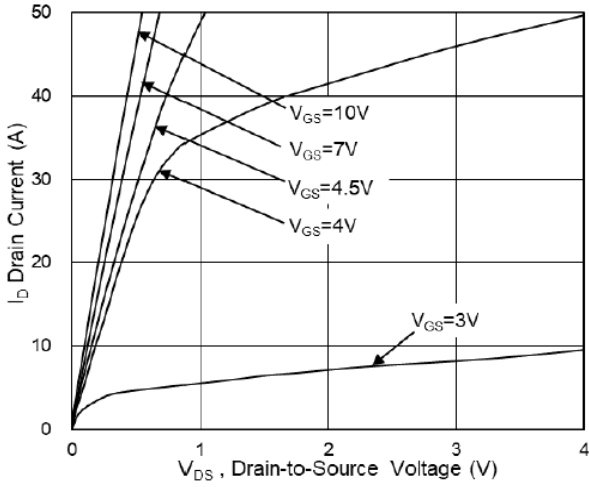
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

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	$V_{DS}=V_{GS}, I_D=250\mu A$	
Transconductance	$g_{fs}$	-	45	-	S	$V_{DS}=5V, I_D=12A$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20V$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	1	$\mu A$	$V_{DS}=24V, V_{GS}=0V$
		$T_J=55^\circ\text{C}$	-	-	5		
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	8	9.8	m $\Omega$	$V_{GS}=10V, I_D=12A$	
		-	12	15.8		$V_{GS}=4.5V, I_D=12A$	
Gate Resistance	$R_g$	-	3	-	$\Omega$	$f=1\text{MHz}$	
Total Gate Charge	$Q_g$	-	4.5	-	nC	$I_D=12A$ $V_{DS}=15V$ $V_{GS}=10V$	
Gate-Source Charge	$Q_{gs}$	-	2.4	-			
Gate-Drain Charge	$Q_{gd}$	-	1.6	-			
Turn-on Delay Time	$T_{d(on)}$	-	5	-	nS	$V_{DD}=15V$ $I_D=12A$ $V_{GS}=10V$ $R_G=3\Omega$	
Rise Time	$T_r$	-	3.7	-			
Turn-off Delay Time	$T_{d(off)}$	-	18.5	-			
Fall Time	$T_f$	-	3.2	-			
Input Capacitance	$C_{iss}$	-	562	-	pF	$V_{GS}=0V$ $V_{DS}=15V$ $f=1\text{MHz}$	
Output Capacitance	$C_{oss}$	-	274	-			
Reverse Transfer Capacitance	$C_{rss}$	-	28	-			
<b>Source-Drain Diode</b>							
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-	1	V	$I_S=1A, V_{GS}=0V, T_J=25^\circ\text{C}$	
Continuous Source Current <sup>1,4</sup>	$I_S$	-	-	30	A	$V_G=V_D=0V, \text{Force Current}$	

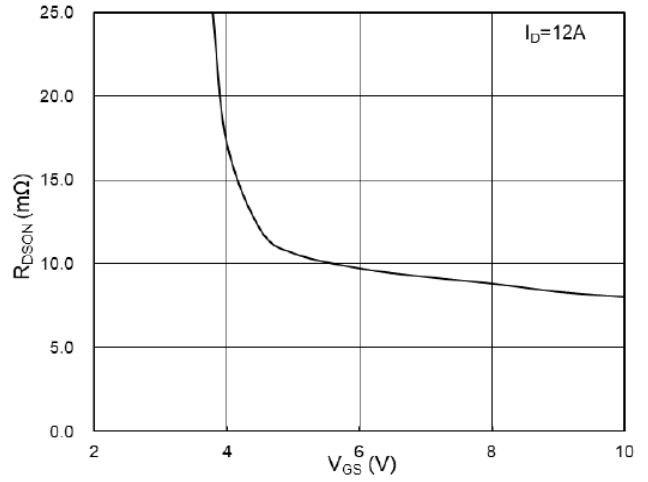
Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2oz copper.
2. The data tested by pulsed, Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
3. The power dissipation is limited by 150 $^\circ\text{C}$ , junction temperature.
4. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

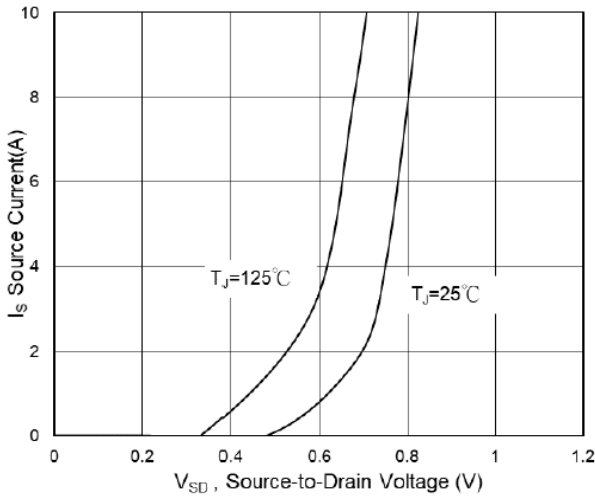
**CHARACTERISTIC CURVES**



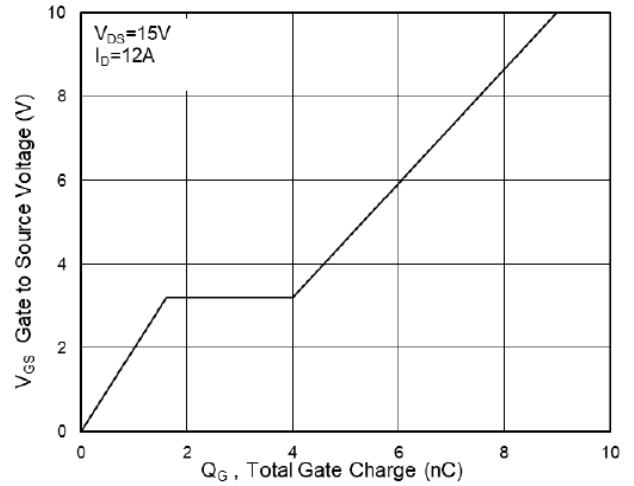
**Fig.1 Typical Output Characteristics**



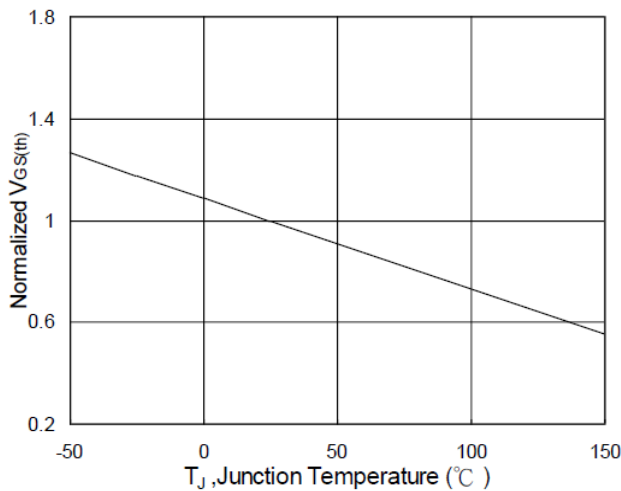
**Fig.2 On-Resistance vs G-S Voltage**



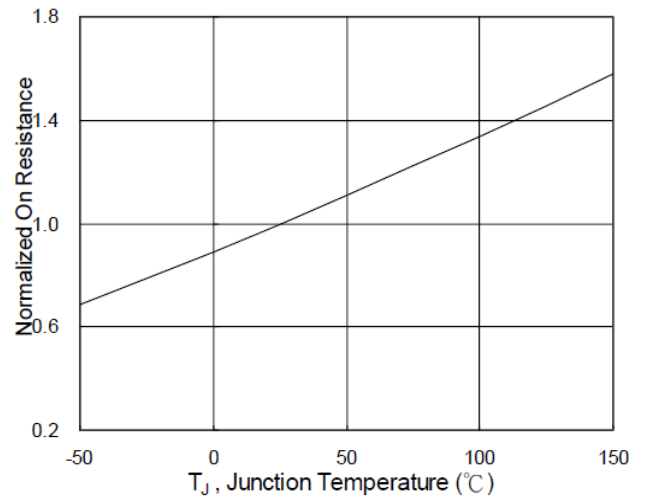
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**

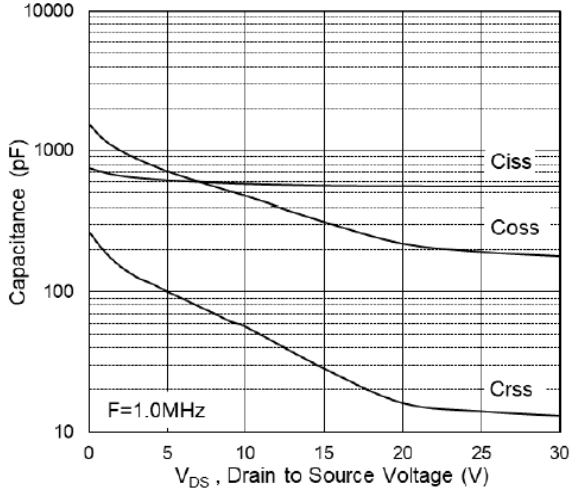


**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**

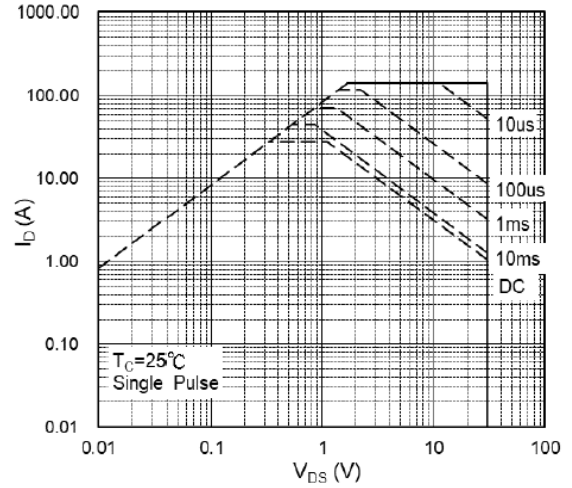


**Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$**

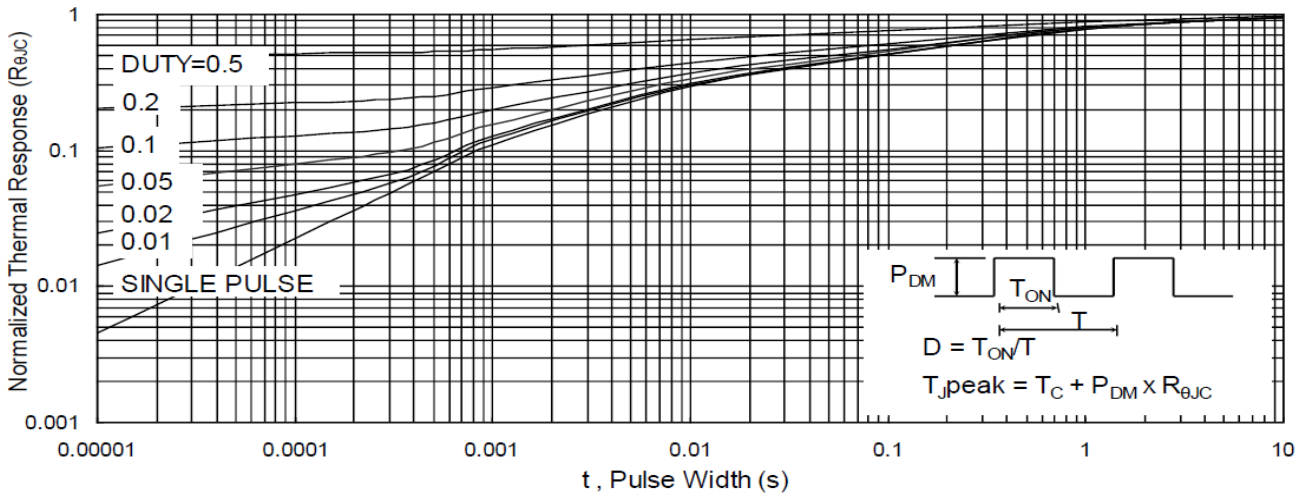
**CHARACTERISTIC CURVES**



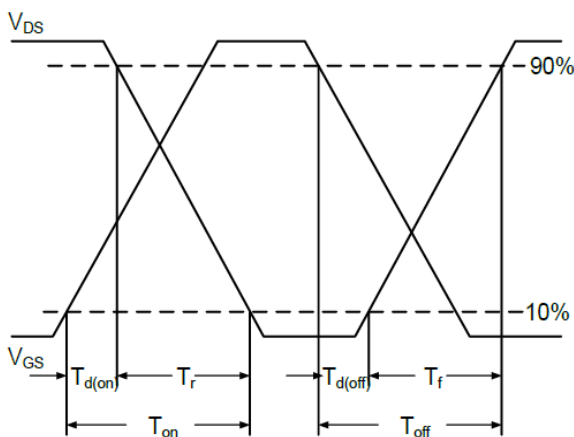
**Fig.7 Capacitance**



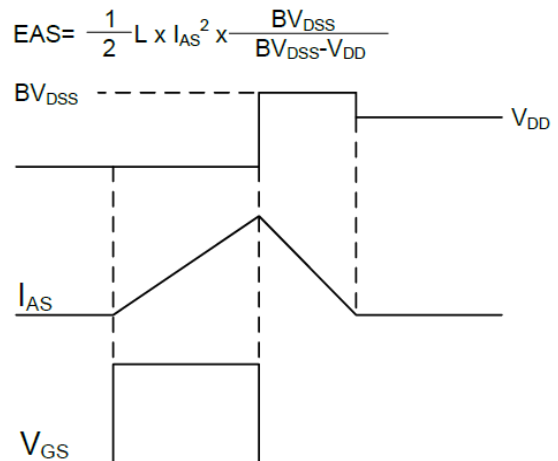
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



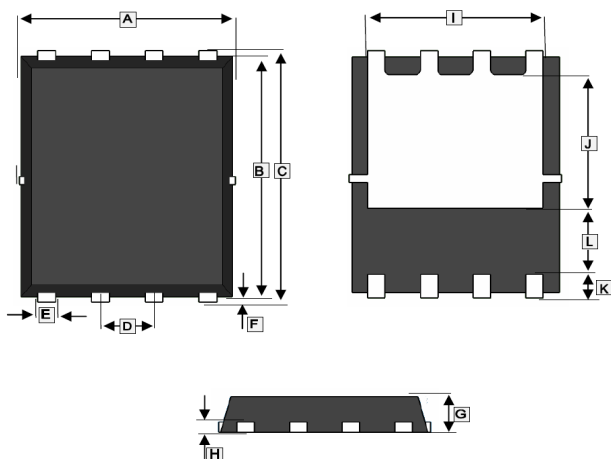
**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

**PACKAGE OUTLINE DIMENSIONS**

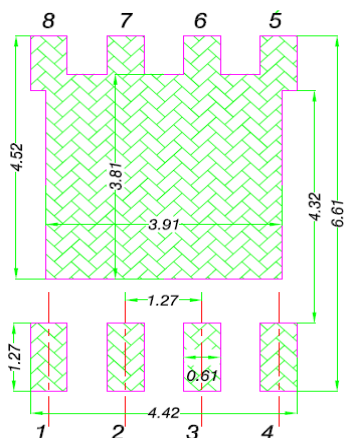
**PR-8PP**



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