

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

DESCRIPTION

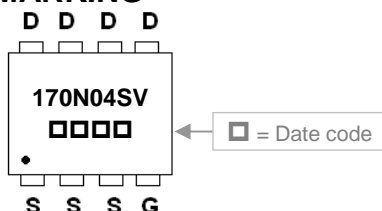
The SPR170N04SV-C is the Shielded Gate Technology N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous rectification applications.

The SPR170N04SV-C meet the RoHS and Green Product requirement with full function reliability approved.

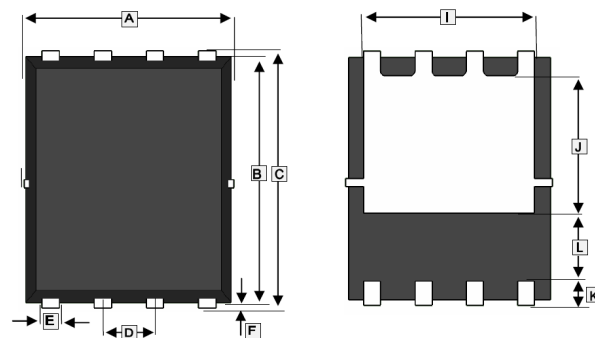
FEATURES

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

MARKING



PR-8PP



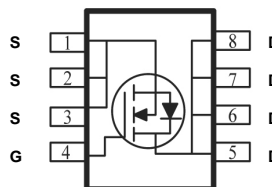
REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.90	5.10	G	0.80	1.00
B	5.70	5.90	H	0.254	REF.
C	5.95	6.20	I	4.00	REF.
D	1.27	BSC.	J	3.40	REF.
E	0.35	0.49	K	0.60	REF.
F	0.10	0.20	L	1.40	REF.

PACKAGE INFORMATION

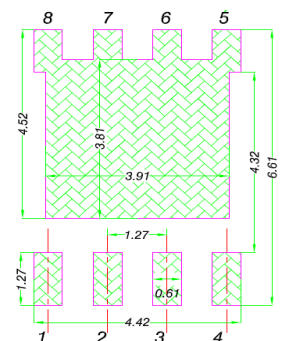
Package	MPQ	Leader Size
PR-8PP	3K	13 inch

ORDER INFORMATION

Part Number	Type
SPR170N04SV-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}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ¹ @ $V_{GS}=10\text{V}$	I_D	$T_C=25^\circ\text{C}$	170
		$T_C=100^\circ\text{C}$	94
Pulsed Drain Current ^{2 3}	I_{DM}	340	A
Single Pulse Avalanche Energy ⁴	E_{AS}	320	mJ
Total Power Dissipation ¹	P_D	83.3	W
Operating Junction & Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ\text{C}$
Thermal Data			
Thermal Resistance Junction-Ambient ¹	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	1.5	

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}	40	-	-	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	g_{fs}	-	53	-	S	$V_{DS}=5V, I_D=20A$	
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	μA	$V_{DS}=32V, V_{GS}=0V$
		$T_J=55^\circ\text{C}$	-	-	5		
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	-	1.4	1.8	m Ω	$V_{GS}=10V, I_D=20A$	
Total Gate Charge	Q_g	-	60	-	nC	$I_D=20A$ $V_{DS}=20V$ $V_{GS}=10V$	
Gate-Source Charge	Q_{gs}	-	14.7	-			
Gate-Drain Change	Q_{gd}	-	13.9	-			
Turn-on Delay Time	$T_{d(on)}$	-	11.4	-	nS	$V_{DD}=20V$ $I_D=20A$ $V_{GS}=10V$ $R_G=1.5\Omega$	
Rise Time	T_r	-	41.6	-			
Turn-off Delay Time	$T_{d(off)}$	-	42.8	-			
Fall Time	T_f	-	27.2	-			
Input Capacitance	C_{iss}	-	3739	-	pF	$V_{GS}=0V$ $V_{DS}=20V$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	1267	-			
Reverse Transfer Capacitance	C_{rss}	-	106	-			
Source-Drain Diode							
Diode Forward Voltage ³	V_{SD}	-	-	1.2	V	$I_S=1A, V_{GS}=0V$	
Continuous Source Current ¹	I_S	-	-	170	A		
Pulsed Source Current ^{2,3}	I_{SM}	-	-	340	A		

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2oz copper.
2. The power dissipation is limited by 150 $^\circ\text{C}$ junction temperature.
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. The E_{AS} data shows Max. rating. The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=80A$.

CHARACTERISTIC CURVES

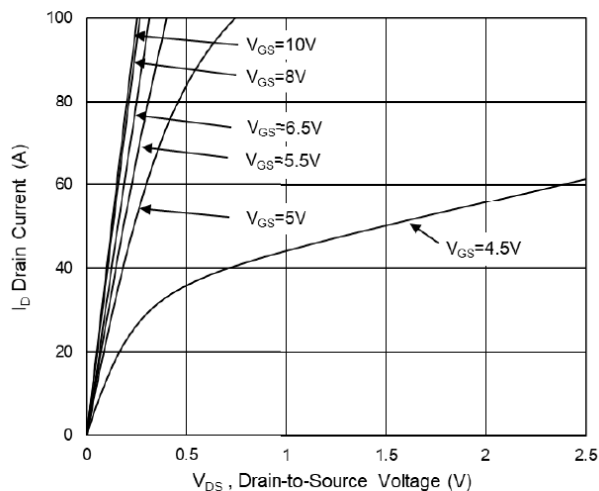


Fig.1 Typical Output Characteristics

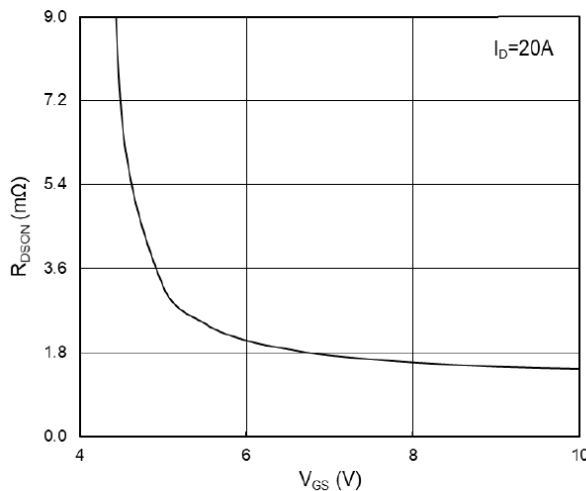


Fig.2 On-Resistance vs G-S Voltage

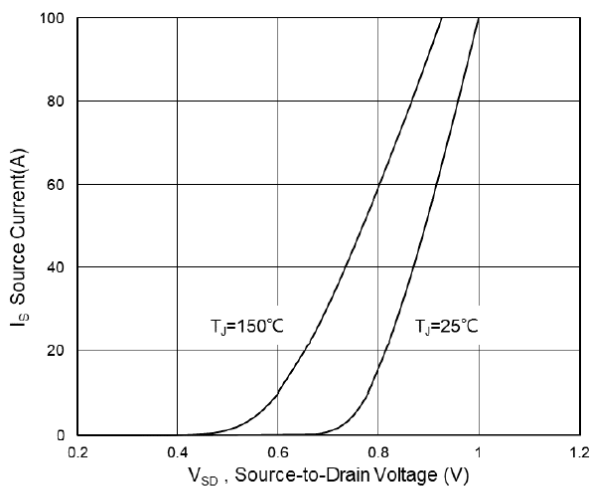


Fig.3 Source Drain Forward Characteristics

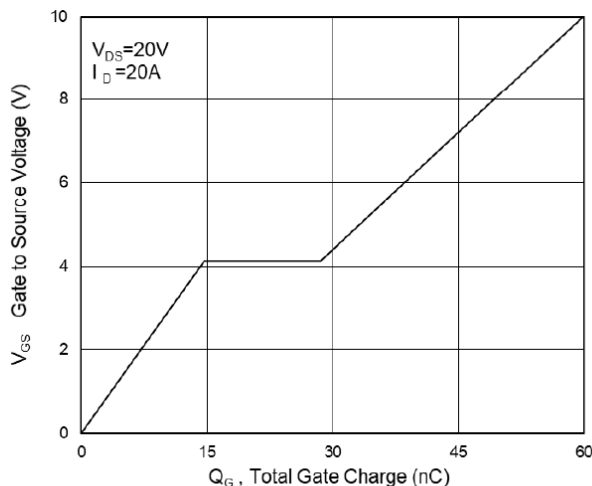


Fig.4 Gate-Charge Characteristics

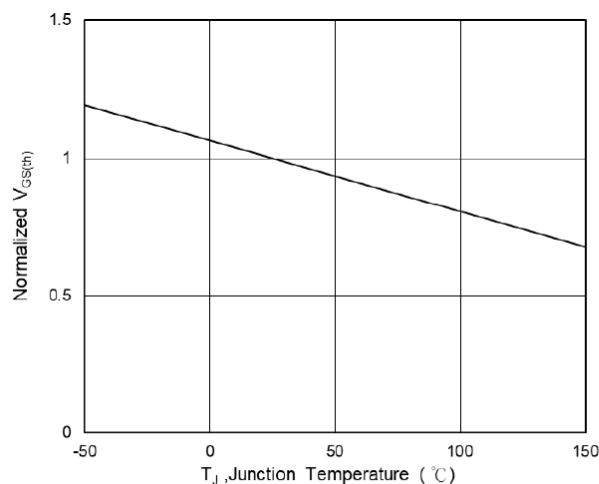


Fig.5 Normalized $V_{GS(th)}$ vs T_J

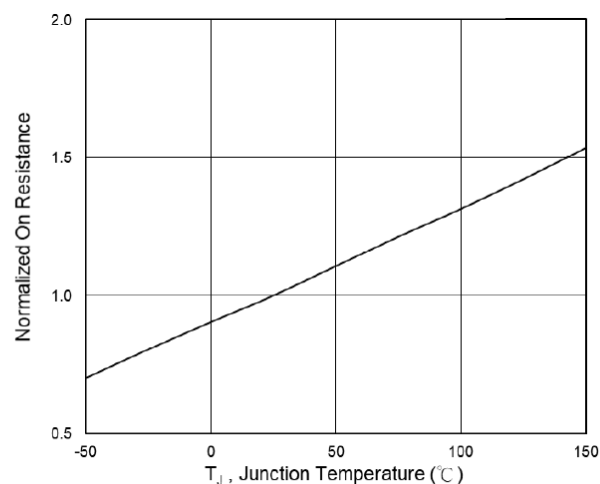


Fig.6 Normalized $R_{DS(ON)}$ vs T_J

CHARACTERISTIC CURVES

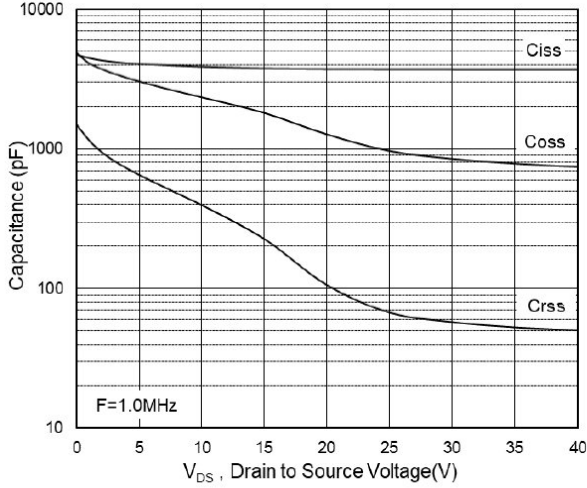


Fig.7 Capacitance

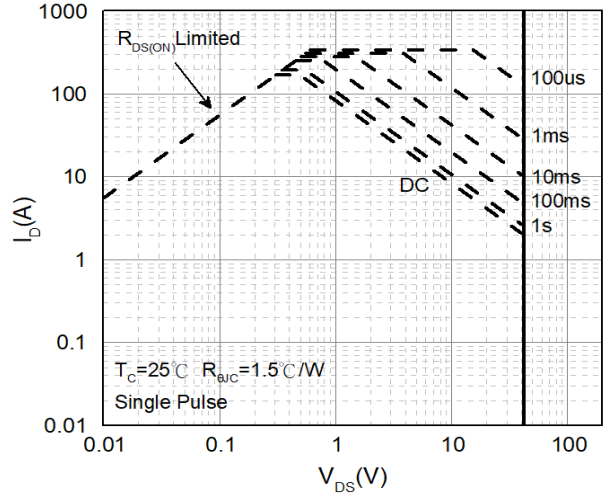


Fig.8 Safe Operating Area

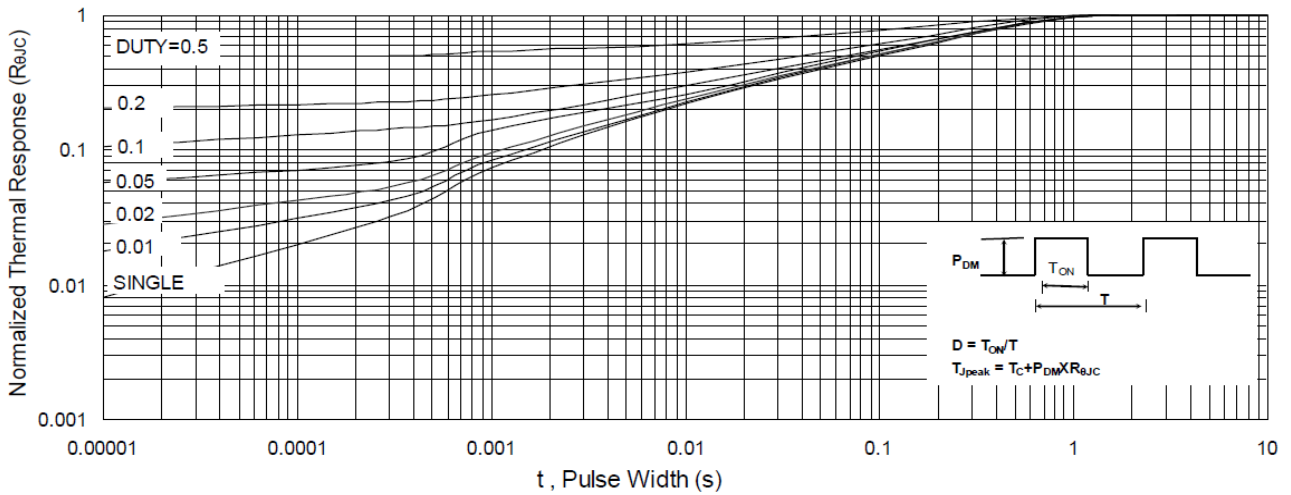


Fig.9 Normalized Maximum Transient Thermal Impedance

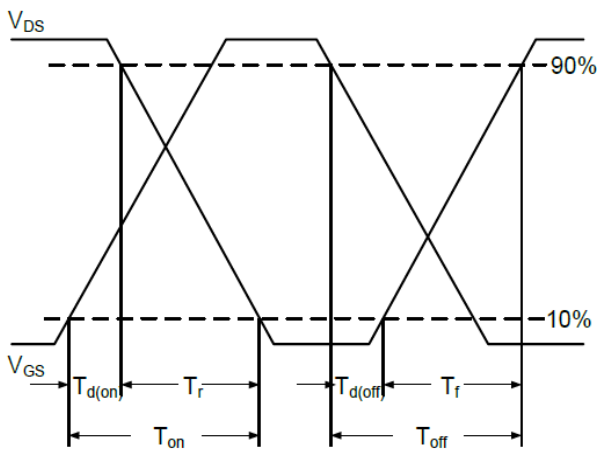


Fig.10 Switching Time Waveform

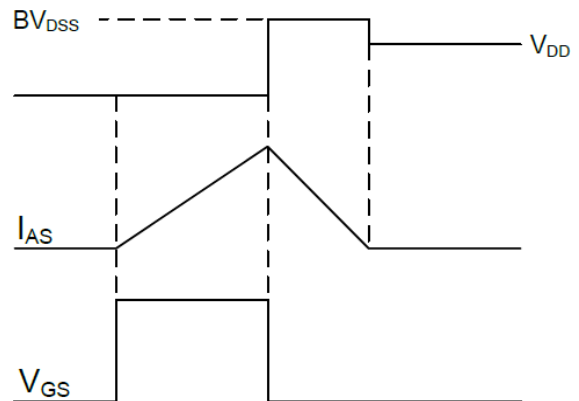


Fig.11 Unclamped Inductive Waveform