Elektronische Bauelemente

SPR45N04S-C

45A, 40V, $R_{DS(ON)}$ 6.5mΩ

N-Channel Shielded Gate Trench Power MOSFET

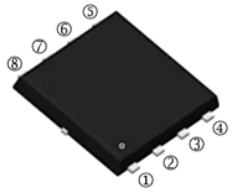
RoHS Compliant Product
A suffix of "-C" specifies halogen free

DESCRIPTION

The SPR45N04S-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 SPR45N04S-C meet the RoHS and Green Product requirement with full function reliability approved.

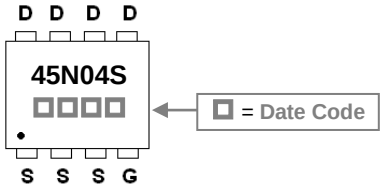
PR-8PP



FEATURES

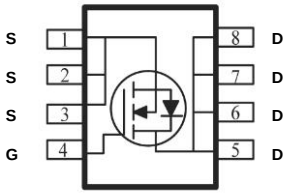
- Shielded Gate Trench Technology
- Super Low Gate Charge
- Green Device Available

MARKING



PACKAGE INFORMATION

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



ORDER INFORMATION

Part Number	Type
SPR45N04S-C	Lead (Pb)-free and Halogen-free

ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [1] @V_{GS}=10V	T_C=25°C	I_D	45	A
	T_C=100°C		29	
Pulsed Drain Current [2]		I_{DM}	90	A
Total Power Dissipation [3]	T_C=25°C	P_D	21	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	°C
Thermal Resistance Ratings				
Maximum Thermal Resistance Junction-Ambient [1]		$R_{\theta JA}$	65	°C/W
Maximum Thermal Resistance Junction-Case [1]		$R_{\theta JC}$	6	

ELECTRICAL CHARACTERISTICS (T_J=25°C unless otherwise specified)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage		BV_{DSS}	40	-	-	V	V_{GS}=0, I_D=250μA
Gate Threshold Voltage		$V_{GS(th)}$	1	1.9	2.5	V	V_{DS}=V_{GS}, I_D=250μA
Gate-Source Leakage Current		I_{GSS}	-	-	±100	nA	V_{GS}= ±20V, V_{DS}=0
Drain-Source Leakage Current	T_J=25°C	I_{DSS}	-	-	1	μA	V_{DS}=32V, V_{GS}=0
	T_J=55°C		-	-	5		
Static Drain-Source On-Resistance [2]		$R_{DS(ON)}$	-	4.7	6.5	mΩ	V_{GS}=10V, I_D=15A
			-	7.5	10.5		V_{GS}=4.5V, I_D=15A
Gate Resistance		R_g	-	1.329	-	Ω	V_{GS}=V_{DS}=0V, f=1MHz
Total Gate Charge		Q_g	-	20.41	-	nC	I_D=15A V_{DS}=20V V_{GS}=10V
Gate-Source Charge		Q_{gs}	-	3.67	-		
Gate-Drain Change		Q_{gd}	-	4.4	-		
Turn-on Delay Time		$T_{d(on)}$	-	6.7	-	nS	V_{DD}=20V I_D=15A V_{GS}=10V R_G=3Ω
Rise Time		T_r	-	9.9	-		
Turn-off Delay Time		$T_{d(off)}$	-	17.8	-		
Fall Time		T_f	-	5.8	-		
Input Capacitance		C_{iss}	-	1038.5	-	pF	V_{GS}=0 V_{DS}=20V f=1MHz
Output Capacitance		C_{oss}	-	359	-		
Reverse Transfer Capacitance		C_{rss}	-	10	-		
Source-Drain Diode							
Continuous Source Current [1]		I_S	-	-	45	A	V_G=V_D=0V, Force Current
Diode Forward Voltage [2]		V_{SD}	-	-	1.2	V	V_{GS}=0, I_S=1A, T_J=25°C

Notes:
1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2oz copper.
2. The data tested by pulsed, Pulse Width≦300μs, Duty Cycle≦2%.
3. The power dissipation is limited by 150°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.

TYPICAL CHARACTERISTICS CURVE

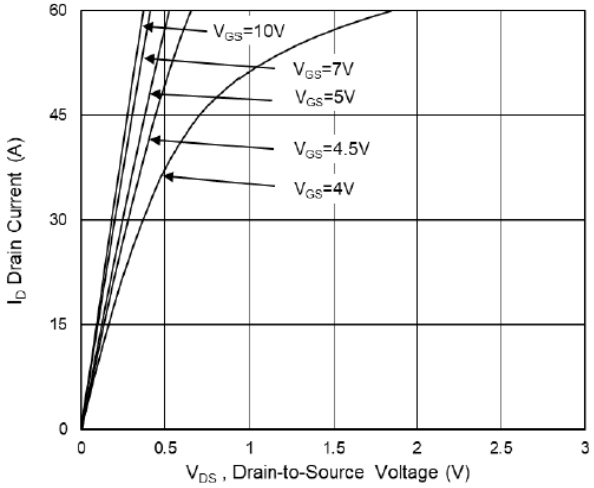


Fig.1 Typical Output Characteristics

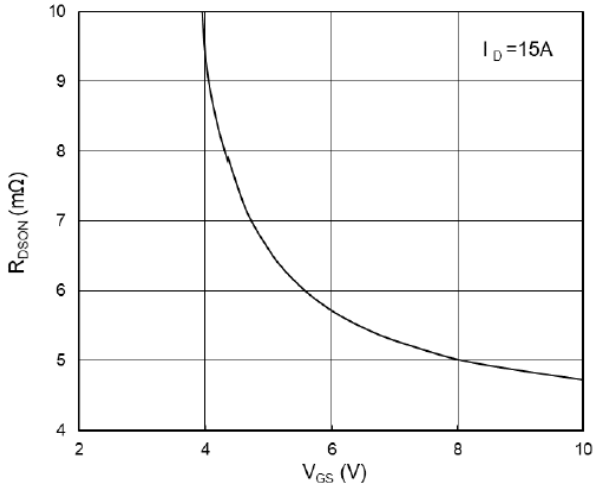


Fig.2 On-Resistance vs G-S Voltage

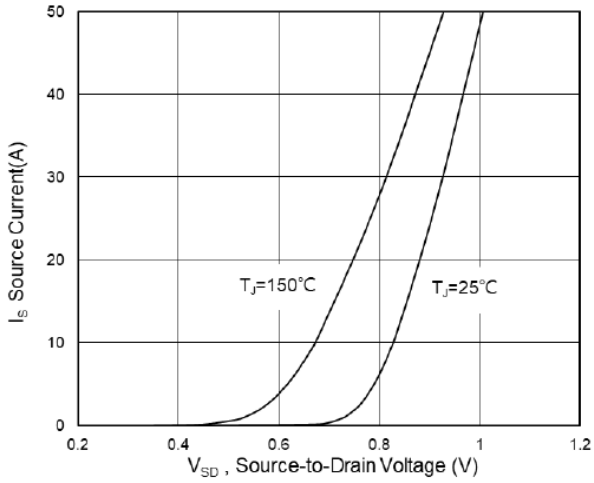


Fig.3 Source Drain Forward Characteristics

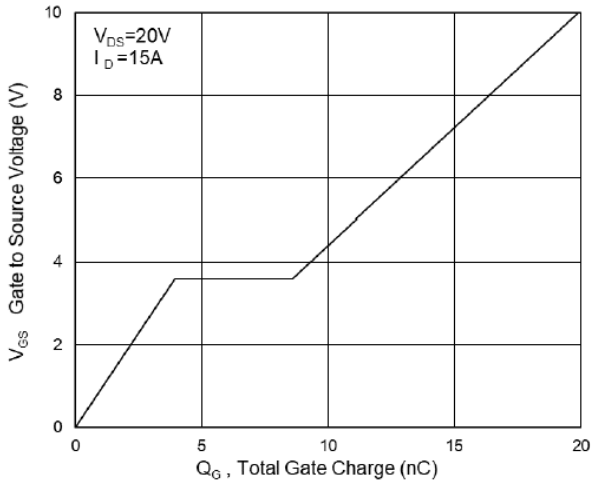


Fig.4 Gate-Charge Characteristics

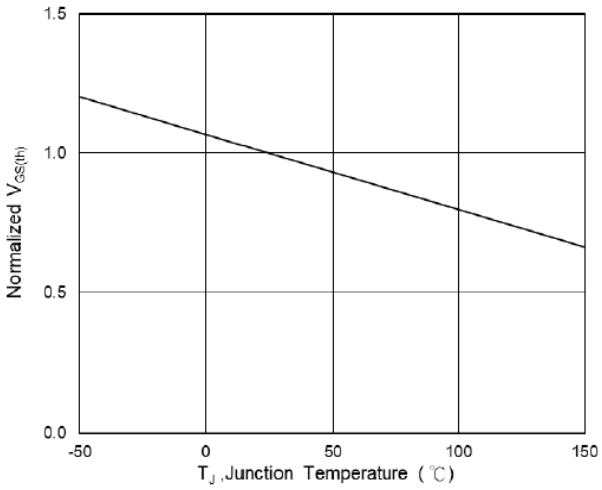


Fig.5 Normalized $V_{GS(th)}$ vs T_J

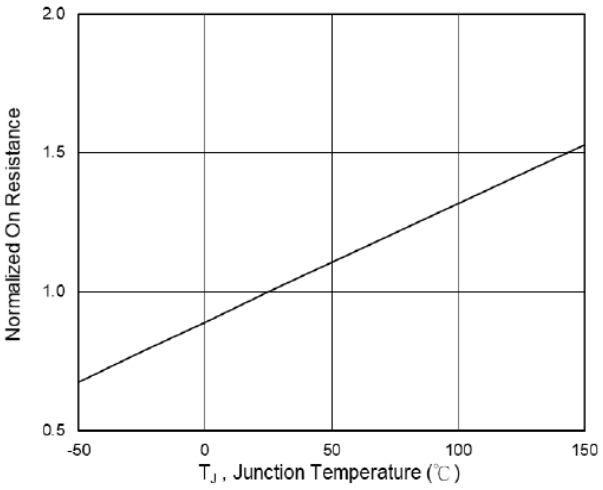


Fig.6 Normalized R_{DSON} vs T_J

TYPICAL CHARACTERISTICS CURVE

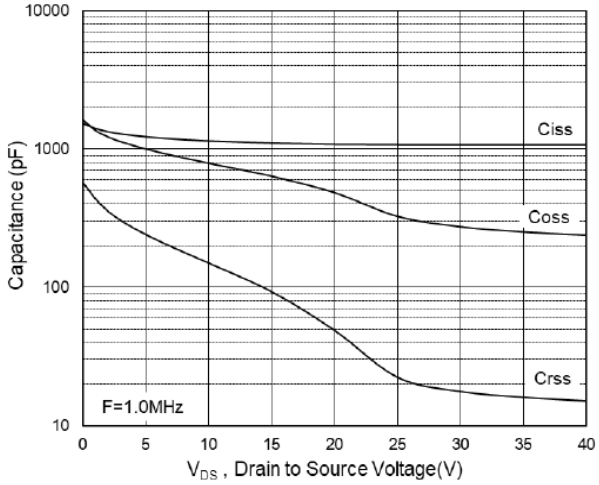


Fig.7 Capacitance

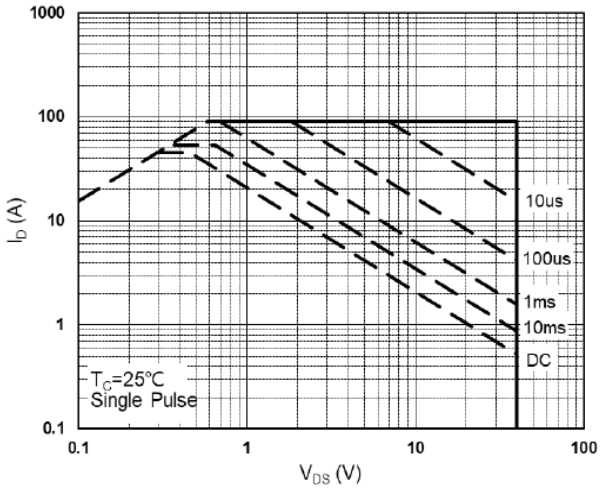


Fig.8 Safe Operating Area

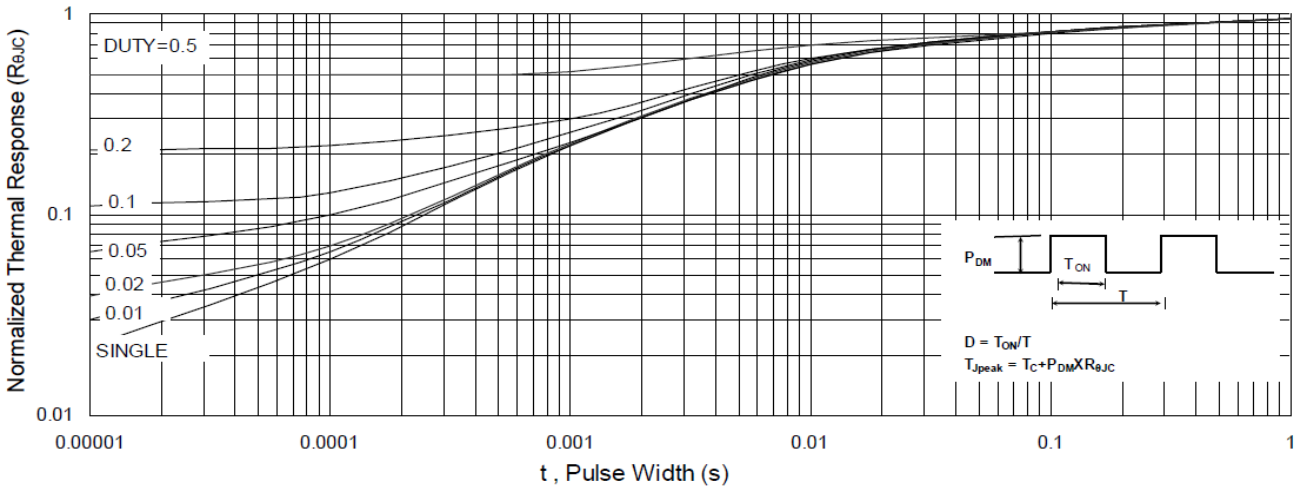


Fig.9 Normalized Maximum Transient Thermal Impedance

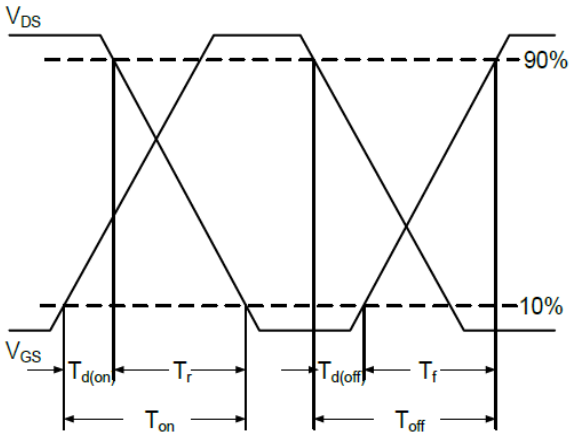


Fig.10 Switching Time Waveform

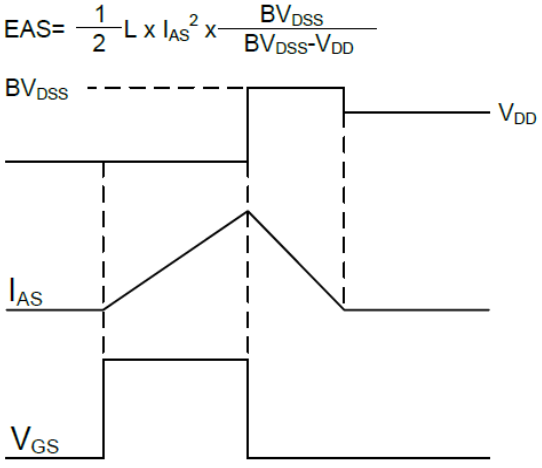


Fig.11 Unclamped Inductive Switching Waveform

PACKAGE OUTLINE DIMENSIONS

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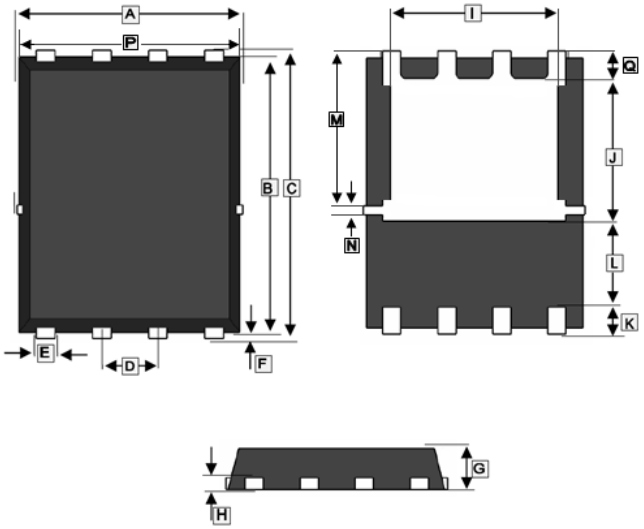
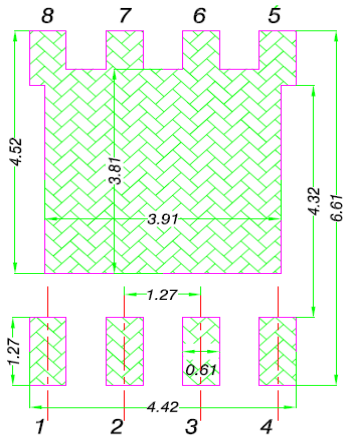


REF.	Millimeter	
	Min.	Max.
A	4.90	5.10
B	5.70	5.90
C	5.90	6.10
D	1.27 BSC.	
E	0.33	0.51
F	0.06	0.20
G	0.80	1.10
H	0.254 REF.	
I	3.80 REF.	
J	3.60 REF.	
K	0.60 REF.	
L	1.10 REF.	
M	3.75 REF.	
N	0.25 REF.	
P	4.80	5.00
Q	0.50 REF.	

MOUNTING PAD LAYOUT

PR-8PP



*Dimensions in millimeters