

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

## DESCRIPTION

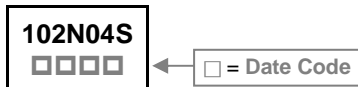
The SSD102N04S-C is the highest performance N-Ch MOSFETs with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the synchronous buck converter applications.

The SSD102N04S-C meet the RoHS and Green Product requirement with full function reliability approved.

## FEATURES

- High Speed Power Switching
- Super Low Gate Charge
- Green Device Available

## MARKING



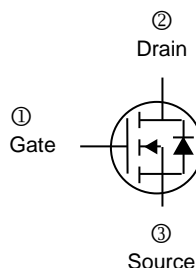
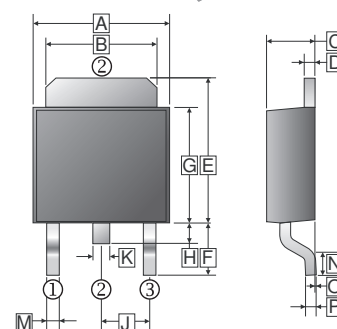
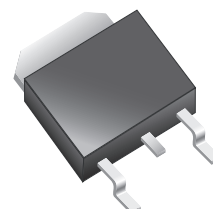
## PACKAGE INFORMATION

Package	MPQ	Leader Size
TO-252	2.5K	13 inch

## ORDER INFORMATION

Part Number	Type
SSD102N04S-C	Lead (Pb)-free and Halogen-free

## TO-252(D-Pack)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.3	6.9	J	2.3 REF.	
B	4.95	5.53	K	0.89 REF.	
C	2.1	2.5	M	0.45	1.14
D	0.4	0.9	N	1.55 Typ.	
E	6	7.7	O	0	0.15
F	2.90 REF.		P	0.58 REF.	
G	5.4	6.4			
H	0.6	1.2			

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup> , @ $V_{GS}=10V$	$I_D$	$T_C=25^\circ C$	102
		$T_C=100^\circ C$	65
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	320	A
Total Power Dissipation <sup>3</sup>	$P_D$	34.7	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~150	$^\circ C$
Thermal Resistance Ratings			
Maximum Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	62	$^\circ C/W$
Maximum Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	3.6	

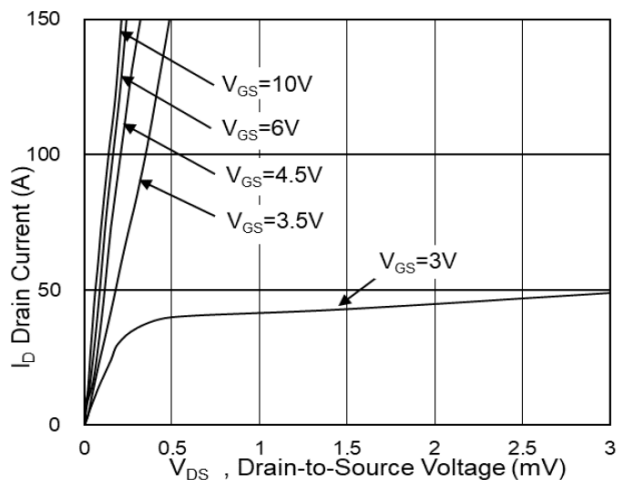
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$BV_{DSS}$	40	-	-	V	$V_{GS}=0, I_D=250\mu\text{A}$	
Gate Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Forward Transconductance	$g_{fs}$	-	53	-	S	$V_{DS}=5\text{V}, I_D=20\text{A}$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20\text{V}$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$	$V_{DS}=32\text{V}, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	5		$V_{DS}=32\text{V}, V_{GS}=0$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	-	2.6	m $\Omega$	$V_{GS}=10\text{V}, I_D=20\text{A}$	
		-	-	3.2		$V_{GS}=4.5\text{V}, I_D=20\text{A}$	
Total Gate Charge(4.5V)	$Q_g$	-	45	-	nC	$I_D=20\text{A}$ $V_{DS}=15\text{V}$ $V_{GS}=10\text{V}$	
Total Gate Charge	$Q_g$	-	88	-			
Gate-Source Charge	$Q_{gs}$	-	12	-			
Gate-Drain Change	$Q_{gd}$	-	18.5	-			
Turn-on Delay Time	$T_{d(on)}$	-	18.5	-	nS	$V_{DD}=15\text{V}$ $I_D=20\text{A}$ $V_{GS}=10\text{V}$ $R_G=3.3\Omega$	
Rise Time	$T_r$	-	9	-			
Turn-off Delay Time	$T_{d(off)}$	-	58.5	-			
Fall Time	$T_f$	-	32	-			
Input Capacitance	$C_{iss}$	-	3972	-	pF	$V_{GS}=0$ $V_{DS}=25\text{V}$ $f=1\text{MHz}$	
Output Capacitance	$C_{oss}$	-	896	-			
Reverse Transfer Capacitance	$C_{rss}$	-	62	-			
<b>Source-Drain Diode</b>							
Continuous Source Current <sup>1</sup>	$I_S$	-	-	102	A		
Pulsed Source Current <sup>2</sup>	$I_{SM}$	-	-	320	A		
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-	1.2	V	$V_{GS}=0, I_S=1\text{A}, T_J=25^\circ\text{C}$	

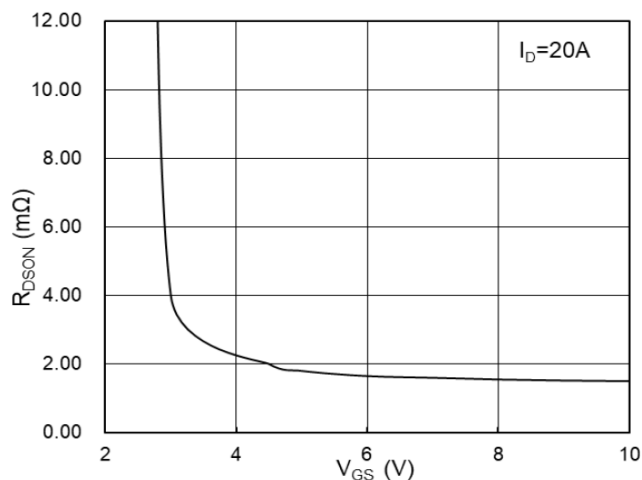
Notes:

- Surface Mounted on 1inch<sup>2</sup> FR4 Board with 2OZ copper.
- The data tested by pulsed, Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
- The power dissipation is limited by 150 $^\circ\text{C}$ , junction temperature.

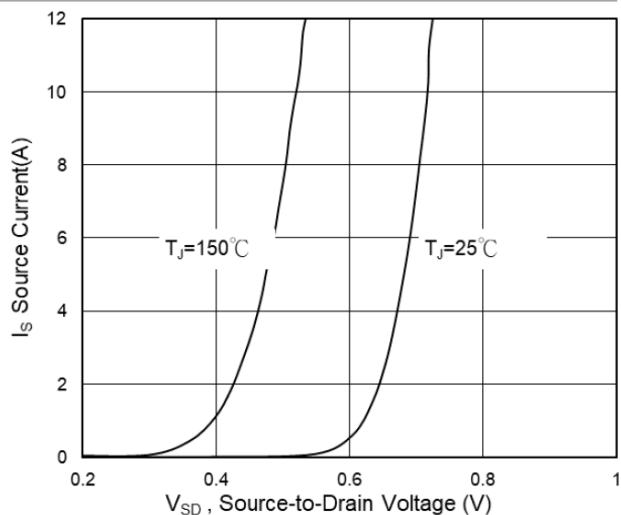
**TYPICAL CHARACTERISTICS CURVE**



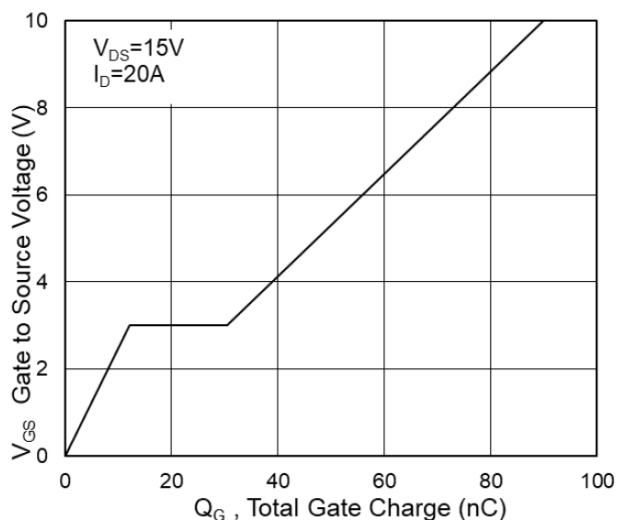
**Fig.1 Typical Output Characteristics**



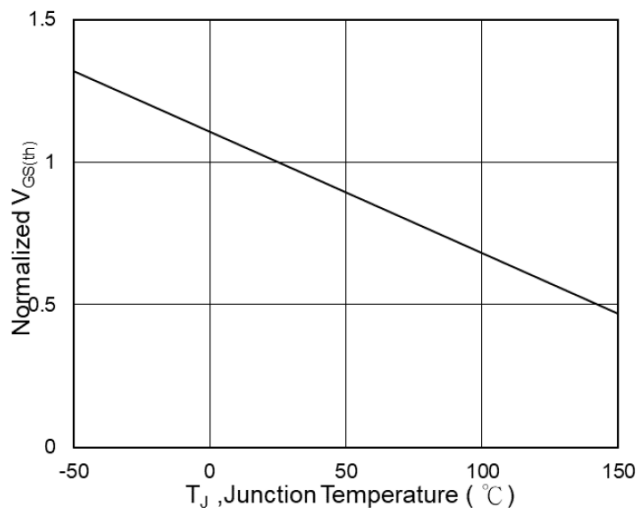
**Fig.2 On-Resistance vs G-S Voltage**



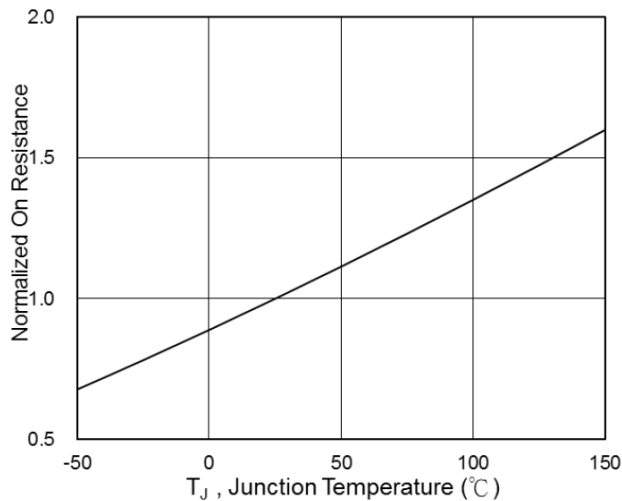
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**

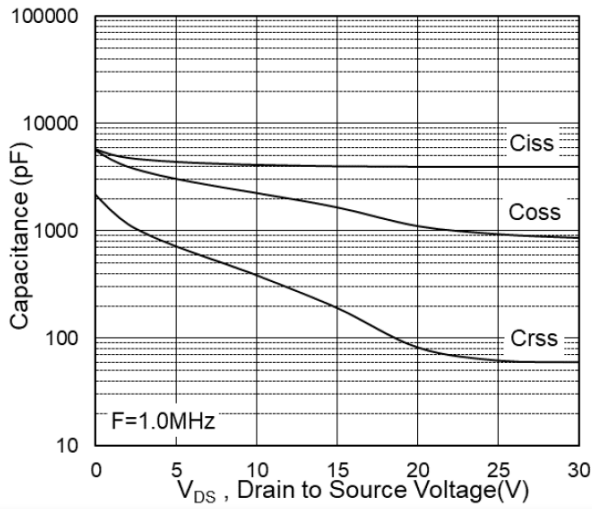


**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**

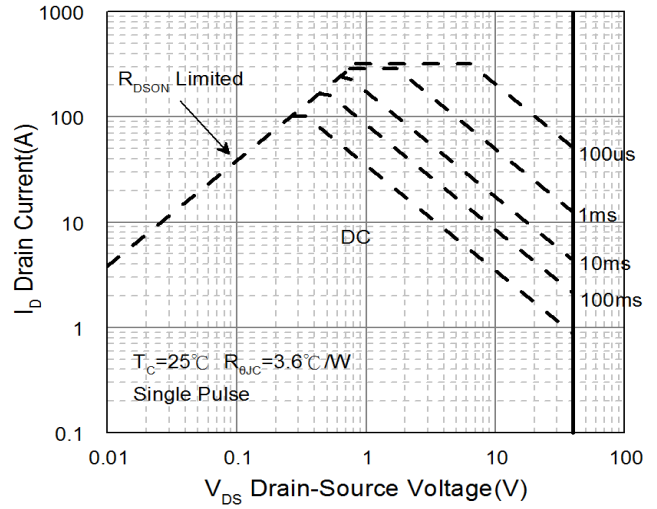


**Fig.6 Normalized  $R_{DS(ON)}$  vs  $T_J$**

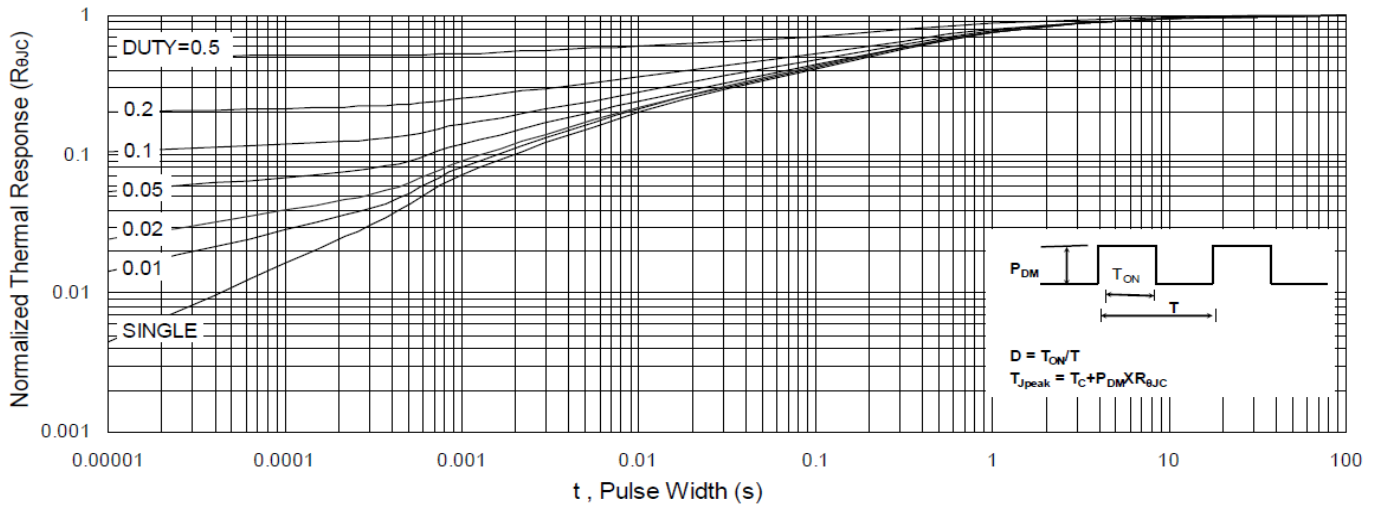
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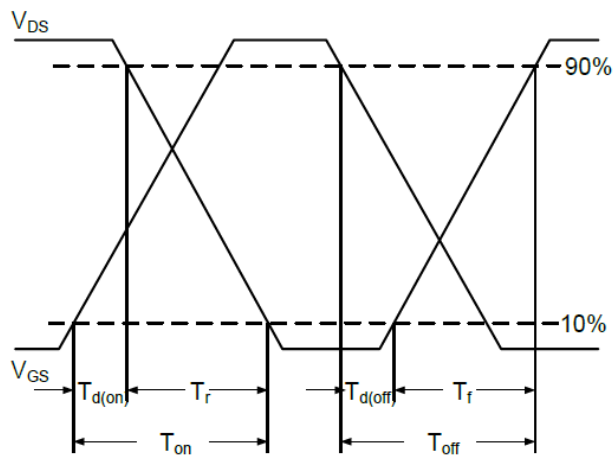
**Fig.7 Capacitance**



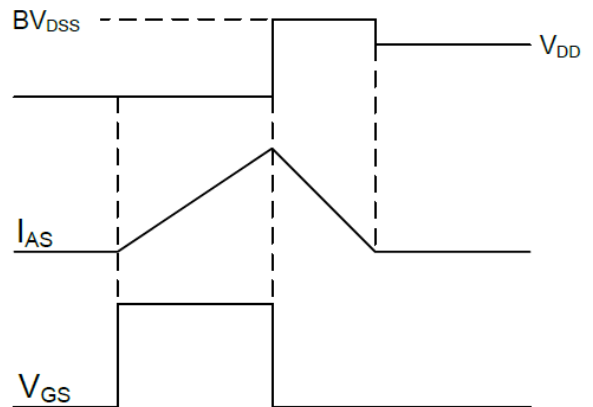
**Fig.8 Safe Operating Area**



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

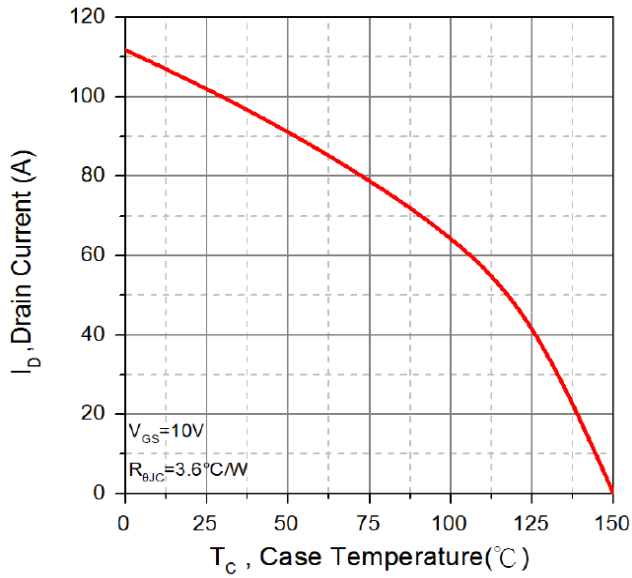


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Waveform**

**TYPICAL CHARACTERISTICS CURVE**



**Fig.12 Drain Current vs Case Temperature**