

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

## DESCRIPTION

SSD42N04-C is the highest performance trench N-ch MOSFETs with extreme high cell density, which provides excellent  $R_{DS(ON)}$  and gate charge for most of the synchronous buck converter applications.

SSD42N04-C meets the RoHS and Green Product requirement with full function reliability approved.

## FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Green Device Available

## MARKING



## PACKAGE INFORMATION

Package	MPQ	Leader Size
TO-252	2.5K	13 inch

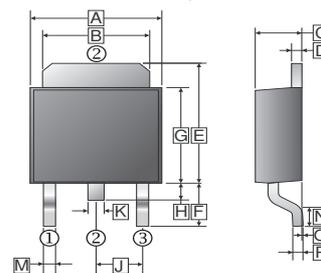
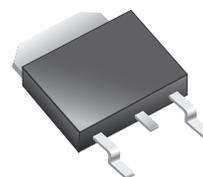
## ORDER INFORMATION

Part Number	Type
SSD42N04-C	Lead (Pb)-free and Halogen-free

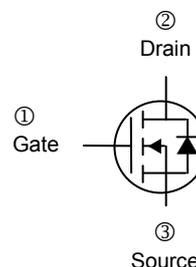
## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup> @ $V_{GS}=10V$	$I_D$	$T_C=25^\circ C$	42
		$T_C=100^\circ C$	26
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	100	A
Total Power Dissipation <sup>3</sup>	$P_D$	$T_C=25^\circ C$	34.7
		$T_A=25^\circ C$	2
Operating Junction & Storage Temperature	$T_J, T_{STG}$	-55~150	$^\circ C$
<b>Thermal Resistance Ratings</b>			
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	Steady State, 62	$^\circ C/W$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	3.6	

## TO-252(D-Pack)



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.30	6.90	J	2.30 REF.	
B	4.95	5.53	K	0.89 REF.	
C	2.10	2.50	M	0.45	1.14
D	0.40	0.90	N	1.55 Typ.	
E	6.00	7.70	O	0	0.15
F	2.90 REF.		P	0.58 REF.	
G	5.40	6.40			
H	0.60	1.20			



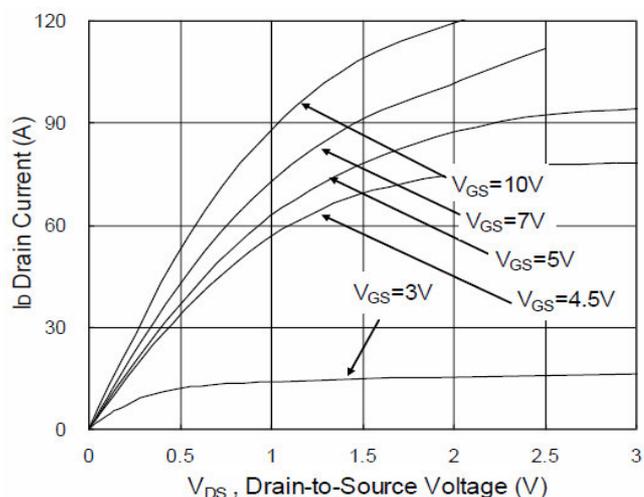
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	40	-	-	V	$V_{GS}=0V, I_D=250\mu A$	
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$	
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20V, V_{DS}=0V$	
Drain-Source Leakage Current	$I_{DSS}$	$T_J=25^\circ\text{C}$	-	-	1	uA	$V_{DS}=32V, V_{GS}=0$
		$T_J=55^\circ\text{C}$	-	-	5		$V_{DS}=32V, V_{GS}=0$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	9.5	12	m $\Omega$	$V_{GS}=10V, I_D=20A$	
		-	13.5	17		$V_{GS}=4.5V, I_D=10A$	
Forward Transconductance	$g_{fs}$	-	36	-	S	$V_{DS}=5V, I_D=20A$	
Gate Resistance	$R_g$	-	2.1	-	$\Omega$	$V_{DS}=V_{GS}=0V, f=1\text{MHz}$	
Total Gate Charge	$Q_g$	-	10.7	-	nC	$I_D=12A$ $V_{DS}=20V$ $V_{GS}=4.5V$	
Gate-Source Charge	$Q_{gs}$	-	3.3	-			
Gate-Drain Change	$Q_{gd}$	-	4.2	-			
Turn-on Delay Time	$T_{d(on)}$	-	8.6	-	nS	$V_{DD}=12V$ $I_D=6A$ $V_{GS}=10V$ $R_G=3.3\Omega$	
Rise Time	$T_r$	-	3.4	-			
Turn-off Delay Time	$T_{d(off)}$	-	25	-			
Fall Time	$T_f$	-	2.2	-			
Input Capacitance	$C_{iss}$	-	1314	-	pF	$V_{GS}=0V$ $V_{DS}=15V$ $f=1\text{MHz}$	
Output Capacitance	$C_{oss}$	-	120	-			
Reverse Transfer Capacitance	$C_{rss}$	-	88	-			
<b>Source-Drain Diode</b>							
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-	1.2	V	$I_S=1A, V_{GS}=0V, T_J=25^\circ\text{C}$	
Continuous Source Current <sup>1</sup>	$I_S$	-	-	42	A	$V_G=V_D=0V, \text{Force Current}$	
Pulsed Source Current <sup>2</sup>	$I_{SM}$	-	-	100	A		

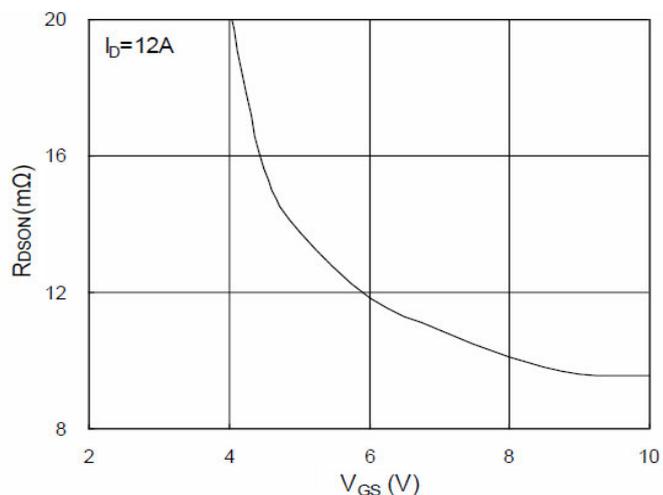
Notes:

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. Pulse width limited by maximum junction temperature.

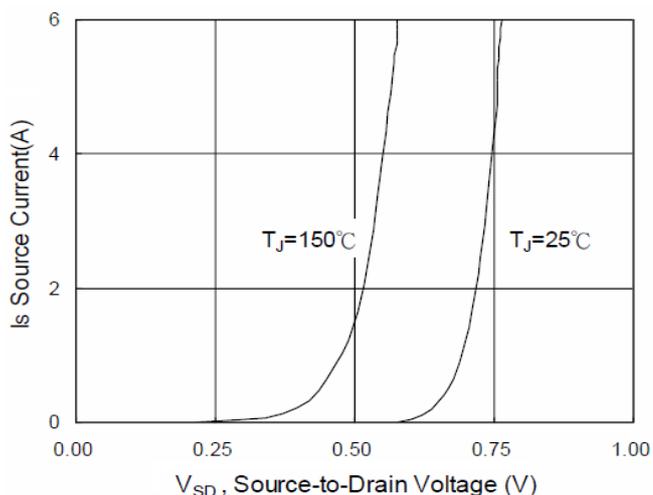
**CHARACTERISTIC CURVES**



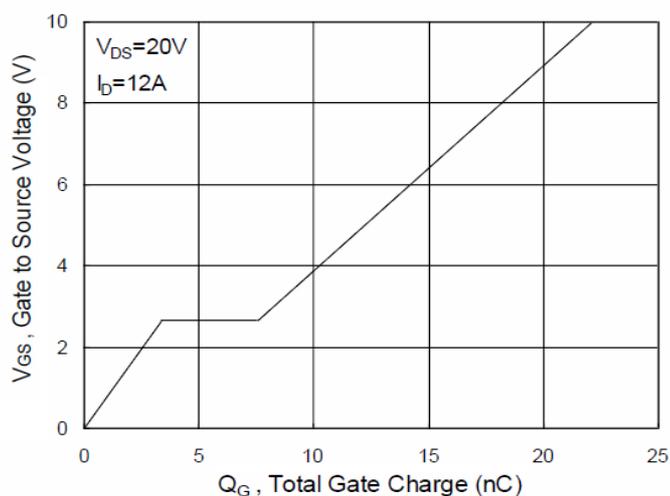
**Fig.1 Typical Output Characteristics**



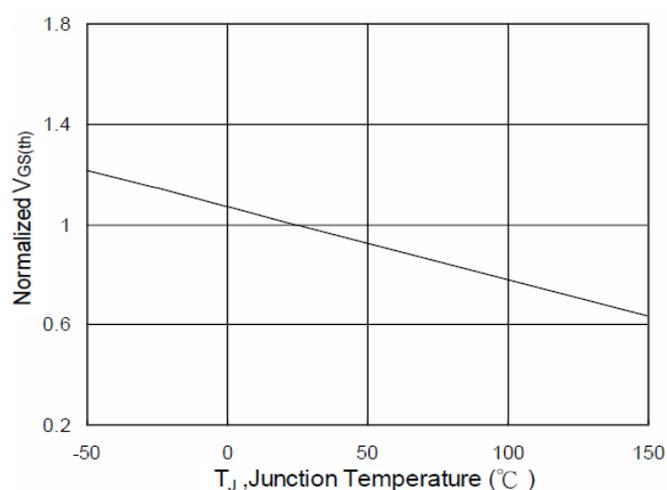
**Fig.2 On-Resistance vs. G-S Voltage**



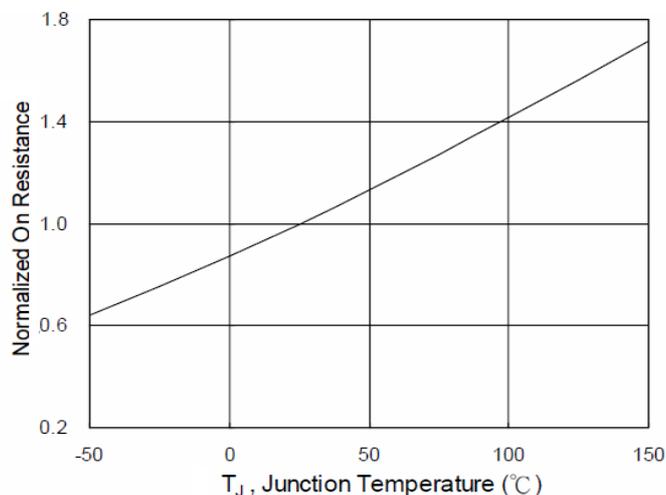
**Fig.3 Forward Characteristics of Reverse**



**Fig.4 Gate-Charge Characteristics**

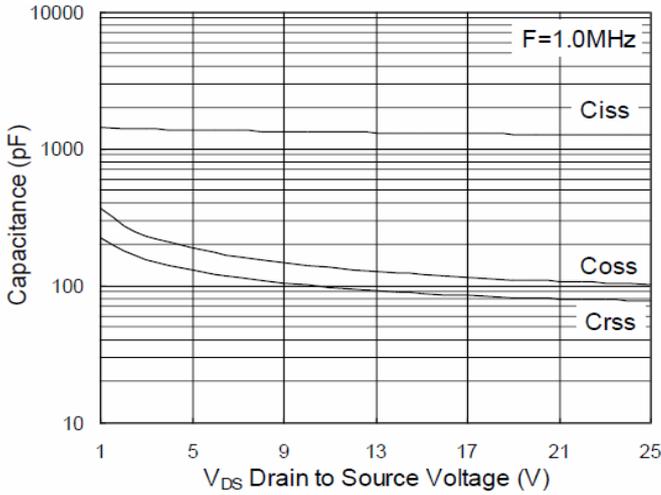


**Fig.5  $V_{GS(th)}$  vs.  $T_J$**

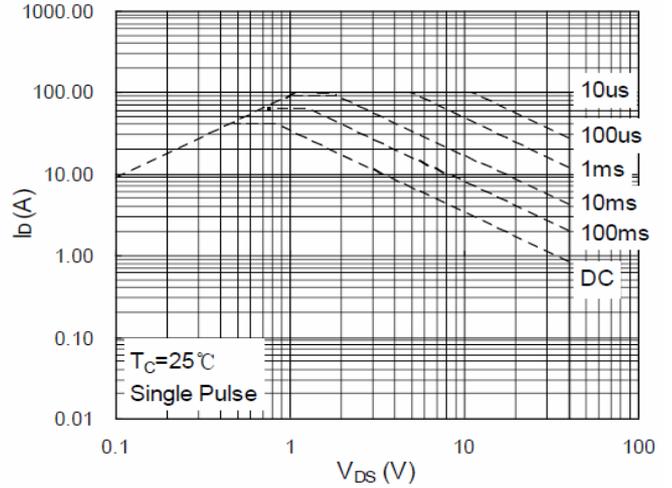


**Fig.6 Normalized  $R_{DS(ON)}$  vs.  $T_J$**

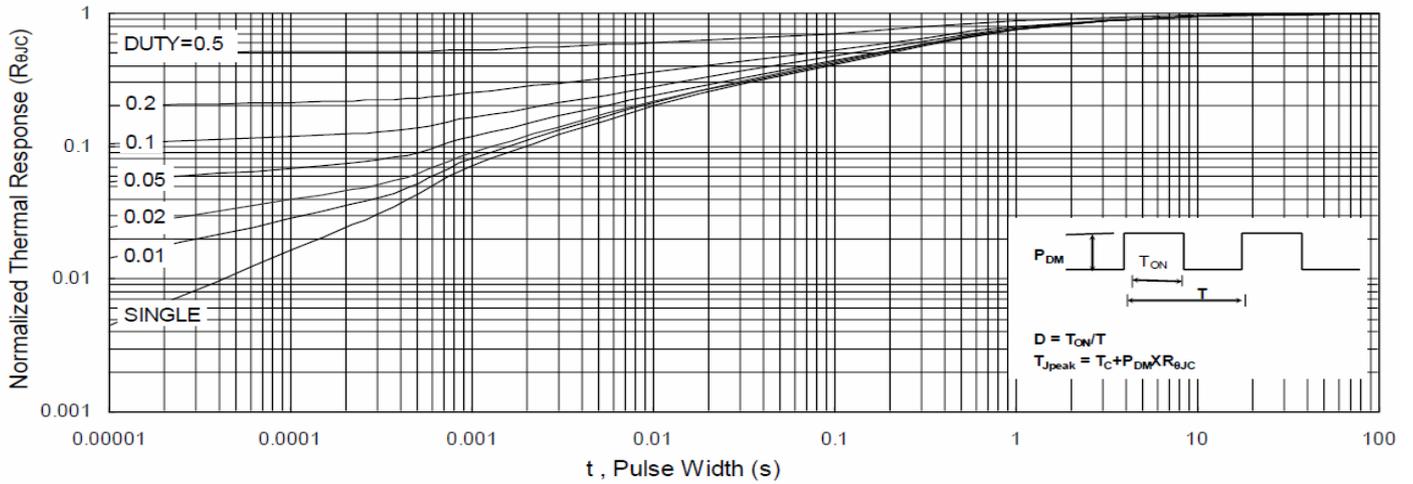
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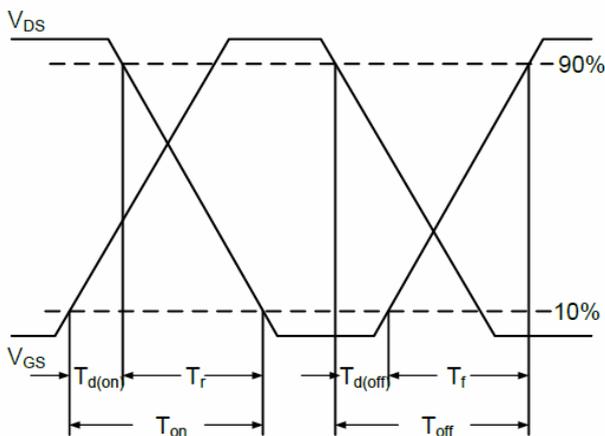
**Fig.7 Capacitance**



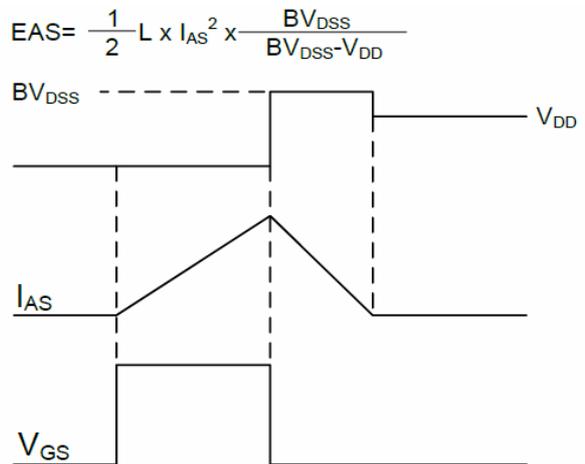
**Fig.8 Safe Operating Area**



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



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**