

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

DESCRIPTION

The SSE38N03-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 SSE38N03-C meet the RoHS and Green Product requirement with full function reliability approved.

FEATURES

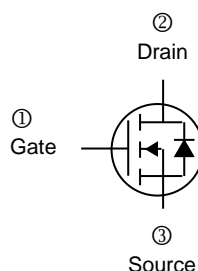
- High Speed Power Switching
- Super Low Gate Charge
- Green Device Available

MARKING

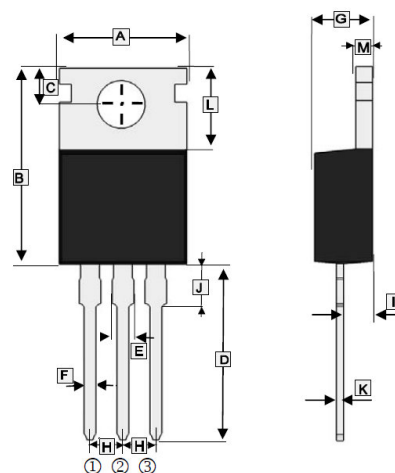


ORDER INFORMATION

Part Number	Type
SSE38N03-C	Lead (Pb)-free and Halogen-free



TO-220



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	9.70	10.60	H	2.54 TYP.	
B	14.22	16.5	I	2.03	2.92
C	2.54	3.40	J	2.70	3.30
D	12.7	14.7	K	0.33	0.65
E	1.17	1.78	L	5.5	7
F	0.4	1.00	M	1.20	1.40
G	3.60	4.82			

ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current ¹ @ V _{GS} =10V	I _D	T _C =25°C	38
		T _C =100°C	24
		T _A =25°C	8.2
		T _A =70°C	6.5
Pulsed Drain Current ²	I _{DM}	75	A
Single Pulse Avalanche Energy ⁴	E _{AS}	22	mJ
Avalanche Current	I _{AS}	21	A
Power Dissipation ³	P _D	T _C =25°C	41
		T _A =25°C	2
Operating Junction & Storage Temperature Range	T _J , T _{STG}	-55~150	°C
Thermal Resistance Ratings			
Thermal Resistance Junction-Ambient ¹	R _{θJA}	62	°C/W
Thermal Resistance Junction-Case ¹	R _{θJC}	3	

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	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$	
Forward Transconductance	g_{fs}	-	19	-	S	$V_{DS}=15V, I_D=30A$	
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	μA	$V_{DS}=24V, V_{GS}=0V$
		$T_J=55^\circ\text{C}$	-	-	5		$V_{DS}=24V, V_{GS}=0V$
Static Drain-Source On-Resistance ²	$R_{DS(ON)}$	-	-	18	m Ω	$V_{GS}=10V, I_D=30A$	
		-	-	30		$V_{GS}=4.5V, I_D=15A$	
Gate Resistance	R_g	-	2.5	-	Ω	$V_{DS}=V_{GS}=0, f=1\text{MHz}$	
Total Gate Charge	Q_g	-	6.2	-	nC	$I_D=15A$ $V_{DS}=15V$ $V_{GS}=4.5V$	
Gate-Source Charge	Q_{gs}	-	2.4	-			
Gate-Drain Charge	Q_{gd}	-	2.5	-			
Turn-on Delay Time	$T_{d(on)}$	-	3	-	nS	$V_{DD}=15V$ $I_D=15A$ $V_{GS}=10V$ $R_G=3.3\Omega$	
Rise Time	T_r	-	7.6	-			
Turn-off Delay Time	$T_{d(off)}$	-	21	-			
Fall Time	T_f	-	4	-			
Input Capacitance	C_{iss}	-	572	-	pF	$V_{GS}=0V$ $V_{DS}=15V$ $f=1\text{MHz}$	
Output Capacitance	C_{oss}	-	81	-			
Reverse Transfer Capacitance	C_{rss}	-	65	-			
Source-Drain Diode							
Diode Forward Voltage ²	V_{SD}	-	-	1.2	V	$I_S=1A, V_{GS}=0V$	
Continuous Source Current ¹	I_S	-	-	38	A	$V_{DS}=V_{GS}=0V, \text{Force Current}$	
Pulsed Source Current ²	I_{SM}	-	-	75	A		
Reverse Recovery Time	t_{rr}	-	17	-	nS	$I_F=15A, dI/dt=100A/\mu s,$	
Reverse Recovery Charge	Q_{rr}	-	3	-	nC	$T_J=25^\circ\text{C}$	

Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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 E_{AS} data shows Max. rating. The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=21A$.

TYPICAL CHARACTERISTIC

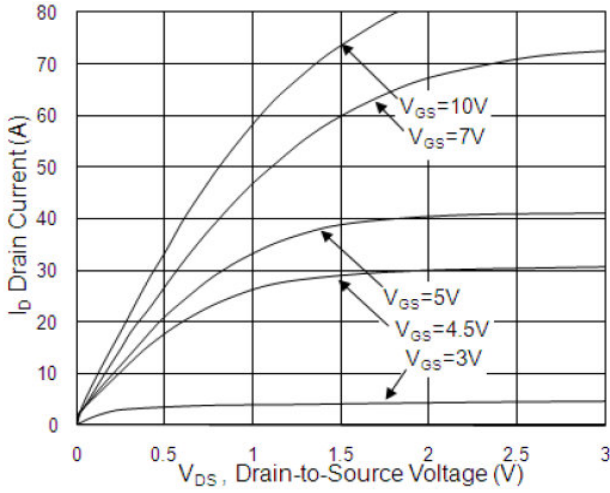


Fig.1 Typical Output Characteristics

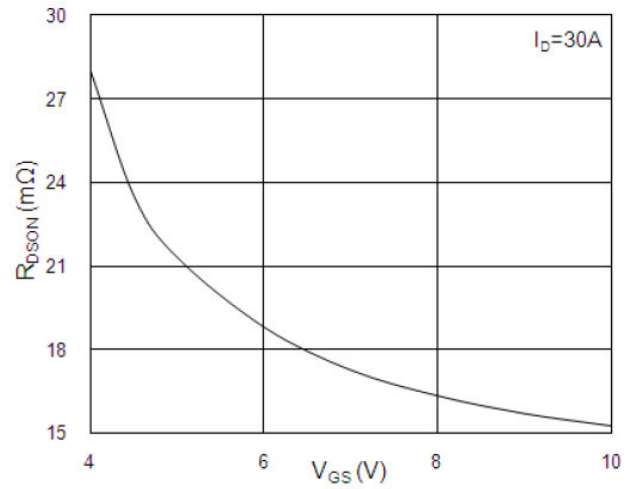


Fig.2 On-Resistance vs. G-S Voltage

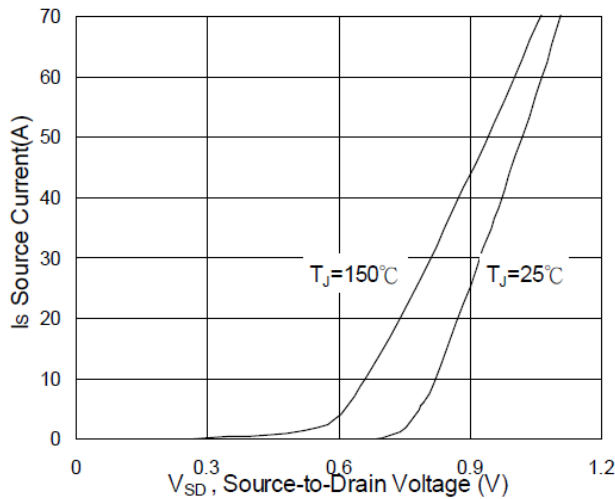


Fig.3 Forward Characteristics Of Reverse

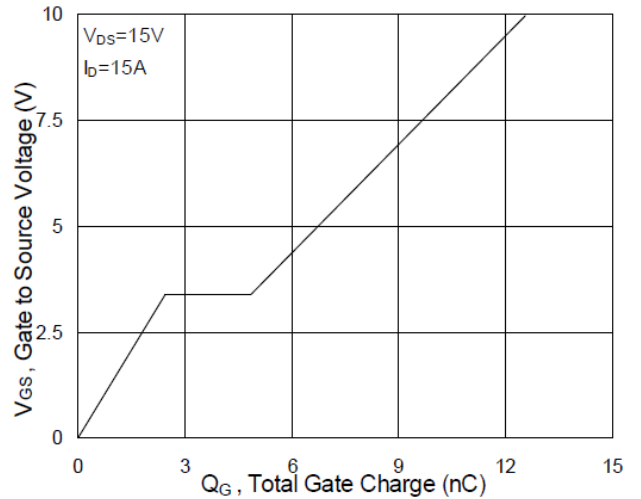


Fig.4 Gate-Charge Characteristics

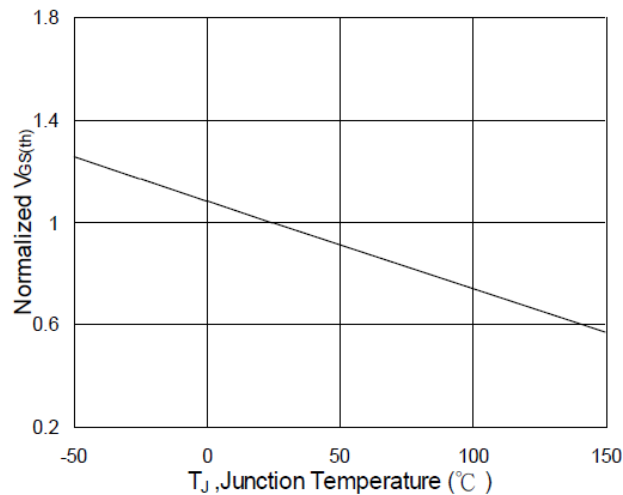


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

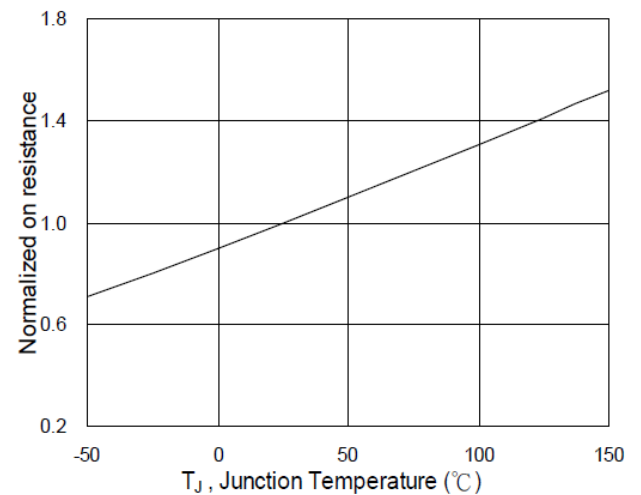


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

TYPICAL CHARACTERISTIC

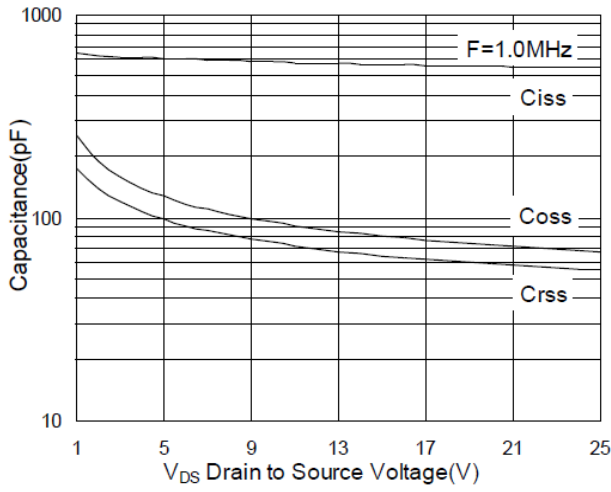


Fig.7 Capacitance

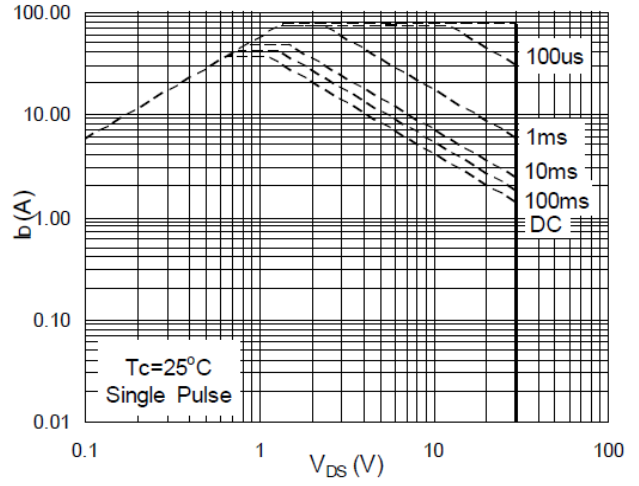


Fig.8 Safe Operating Area

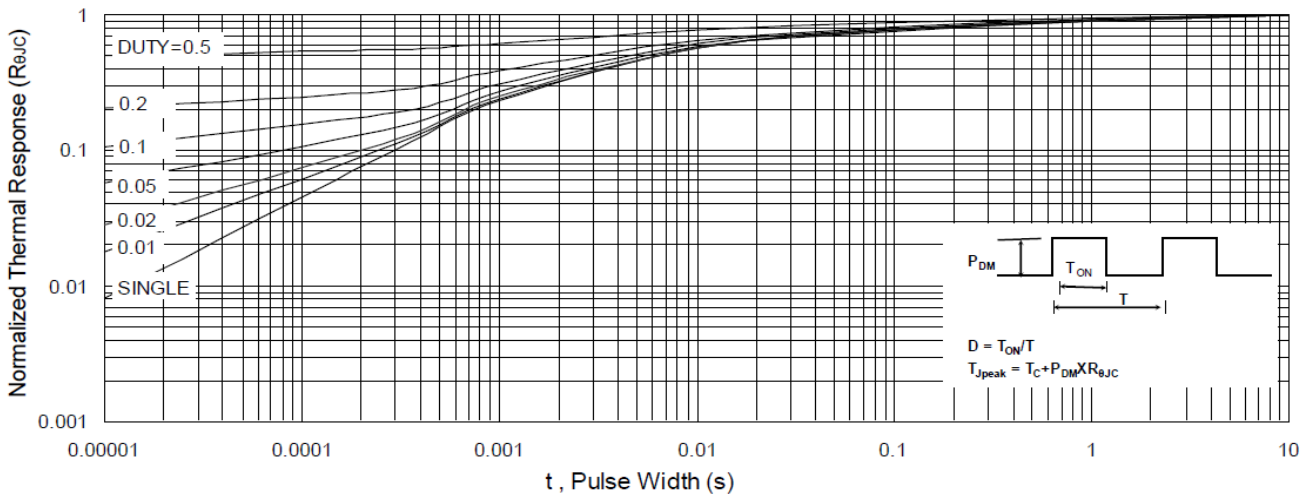


Fig.9 Normalized Maximum Transient Thermal Impedance

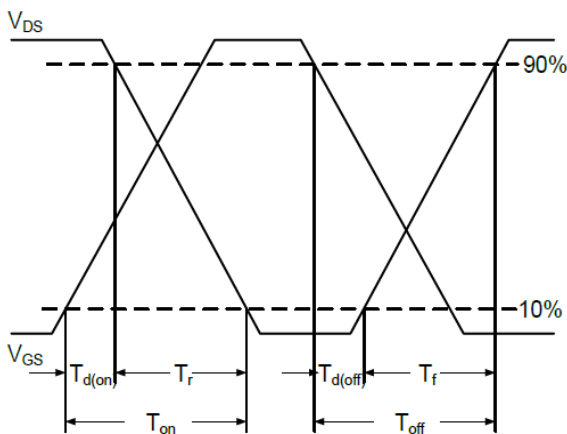


Fig.10 Switching Time Waveform

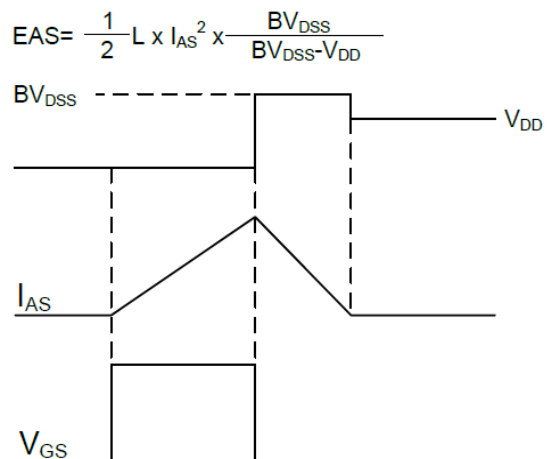


Fig.11 Unclamped Inductive Switching Waveform