

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

## DESCRIPTION

The SSU56N03S-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 SSU56N03S-C meet the RoHS and Green Product requirement with full function reliability approved.

## FEATURES

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

## MARKING



## PACKAGE INFORMATION

Package	MPQ	Leader Size
TO-263	0.8K	13 inch

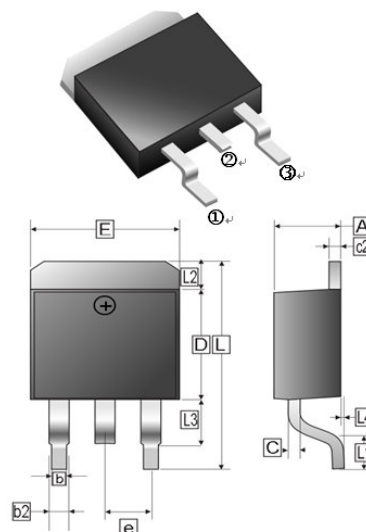
## ORDER INFORMATION

Part Number	Type
SSU56N03S-C	Lead (Pb)-free and Halogen-free

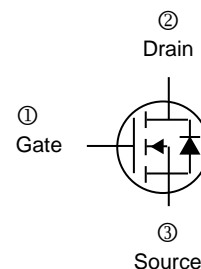
## ABSOLUTE MAXIMUM RATINGS ( $T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>1</sup> @ $V_{GS}=10\text{V}$	$I_D$	$T_C=25^\circ\text{C}$	56
		$T_C=100^\circ\text{C}$	34
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	130	A
Power Dissipation <sup>3</sup>	$P_D$	86	W
Operating Junction and Storage Temperature	$T_J, T_{STG}$	-55~150	$^\circ\text{C}$
Thermal Resistance Rating			
Thermal Resistance Junction-Ambient <sup>1</sup>	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance Junction-Case <sup>1</sup>	$R_{\theta JC}$	1.45	

## TO-263



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.00	4.87	c2	1.07	1.65
b	0.51	1.01	b2	1.34	REF
L4	0.00	0.30	D	8.0	9.65
C	0.30	0.74	e	2.54	REF
L3	1.50	REF	L	14.6	16.1
L1	2.5	REF	L2	1.27	REF
E	9.60	10.67			



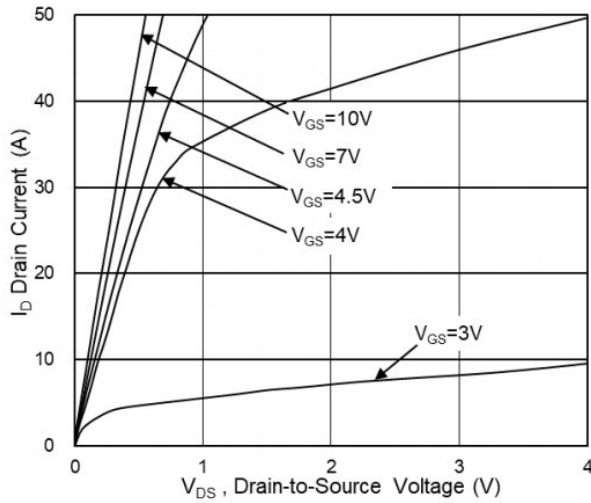
**ELECTRICAL CHARACTERISTICS** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

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	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Forward Transconductance	$g_{fs}$	-	45	-	S	$V_{DS}=5V, I_D=12A$
Gate-Source Leakage Current	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS}=\pm 20V$
Drain-Source Leakage Current	$I_{DSS}$	-	-	1	$\mu A$	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ\text{C}$
		-	-	5		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ\text{C}$
Static Drain-Source On-Resistance <sup>2</sup>	$R_{DS(ON)}$	-	8	10	m $\Omega$	$V_{GS}=10V, I_D=12A$
		-	12	15.8		$V_{GS}=4.5V, I_D=8A$
Total Gate Charge (4.5V)	$Q_g$	-	4.5	-	nC	$I_D=12A$ $V_{DS}=15V$ $V_{GS}=10V$
Total Gate Charge	$Q_g$	-	8.9	-		
Gate-Source Charge	$Q_{gs}$	-	2.4	-		
Gate-Drain Change	$Q_{gd}$	-	1.6	-		
Turn-on Delay Time	$T_{d(on)}$	-	5	-	nS	$V_{DD}=15V$ $I_D=12A$ $V_{GS}=10V$ $R_G=3\Omega$
Rise Time	$T_r$	-	3.7	-		
Turn-off Delay Time	$T_{d(off)}$	-	18.5	-		
Fall Time	$T_f$	-	3.2	-		
Input Capacitance	$C_{iss}$	-	562	-	pF	$V_{GS}=0V$ $V_{DS}=15V$ $f=1\text{MHz}$
Output Capacitance	$C_{oss}$	-	274	-		
Reverse Transfer Capacitance	$C_{rss}$	-	28	-		
<b>Source-Drain Diode</b>						
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	-	-	1.2	V	$I_S=1A, V_{GS}=0V$
Continuous Source Current <sup>1</sup>	$I_S$	-	-	56	A	$V_G=V_D=0, \text{Force Current}$

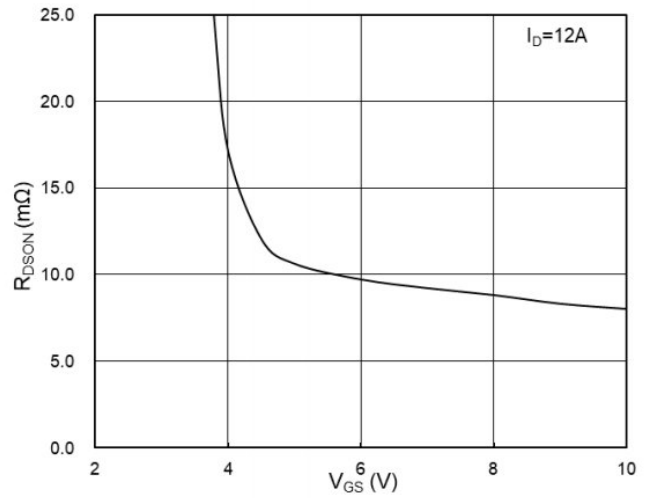
Notes:

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. The power dissipation is limited by 150 $^\circ\text{C}$  junction temperature.

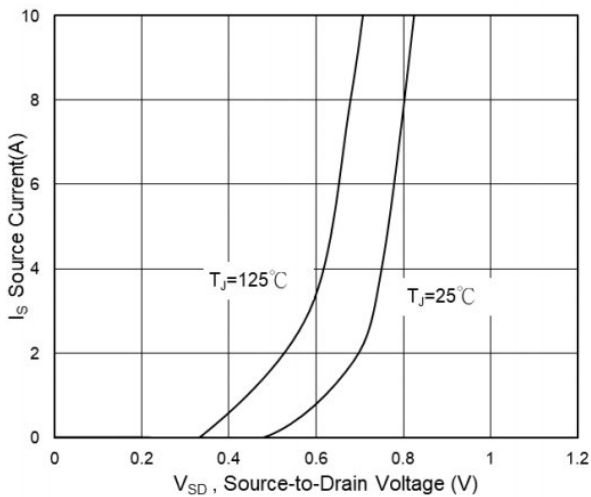
**CHARACTERISTIC CURVES**



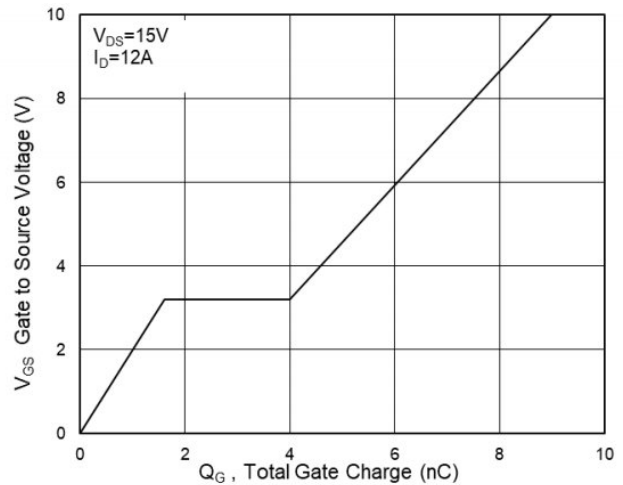
**Fig.1 Typical Output Characteristics**



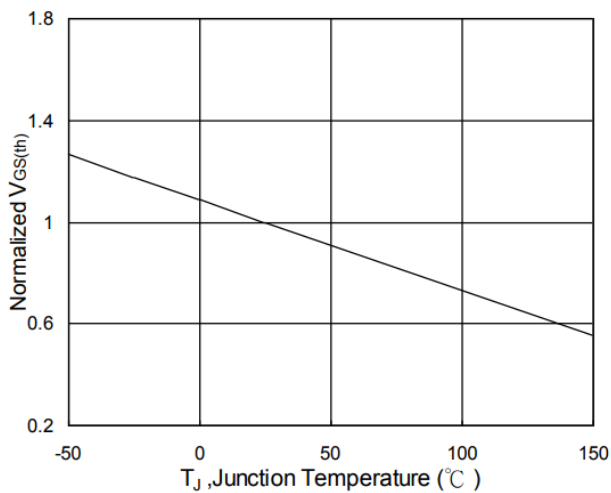
**Fig.2 On-Resistance vs G-S Voltage**



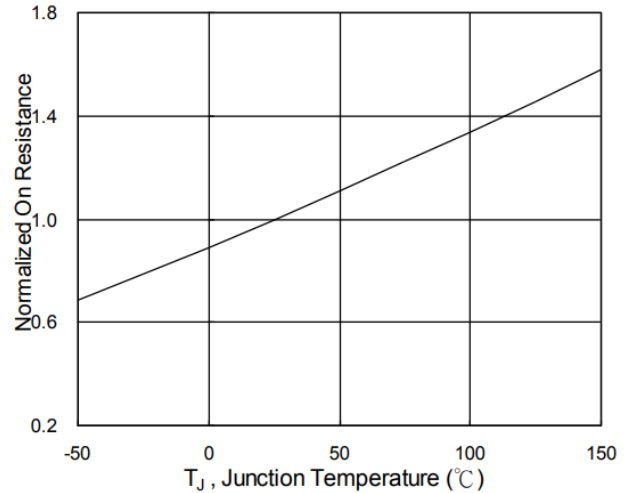
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**

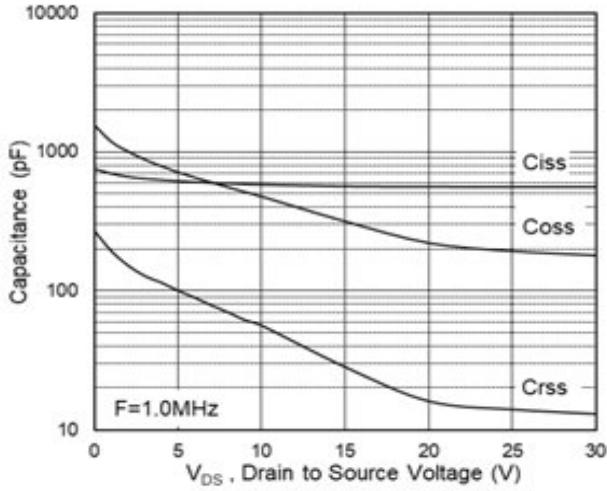


**Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$**

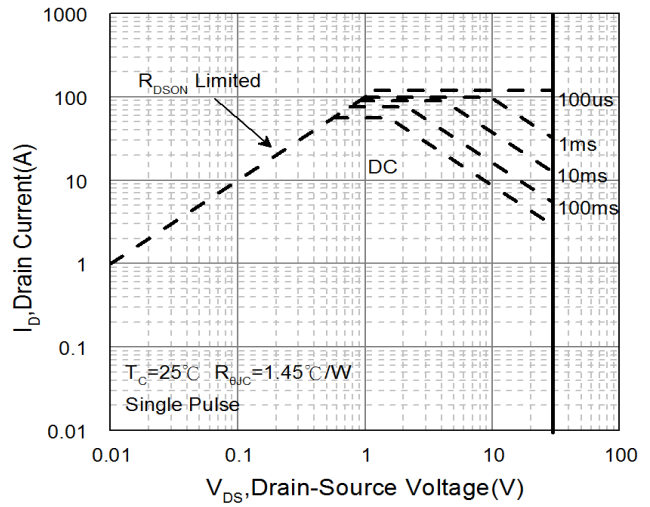


**Fig.6 Normalized  $R_{DS(ON)}$  vs  $T_J$**

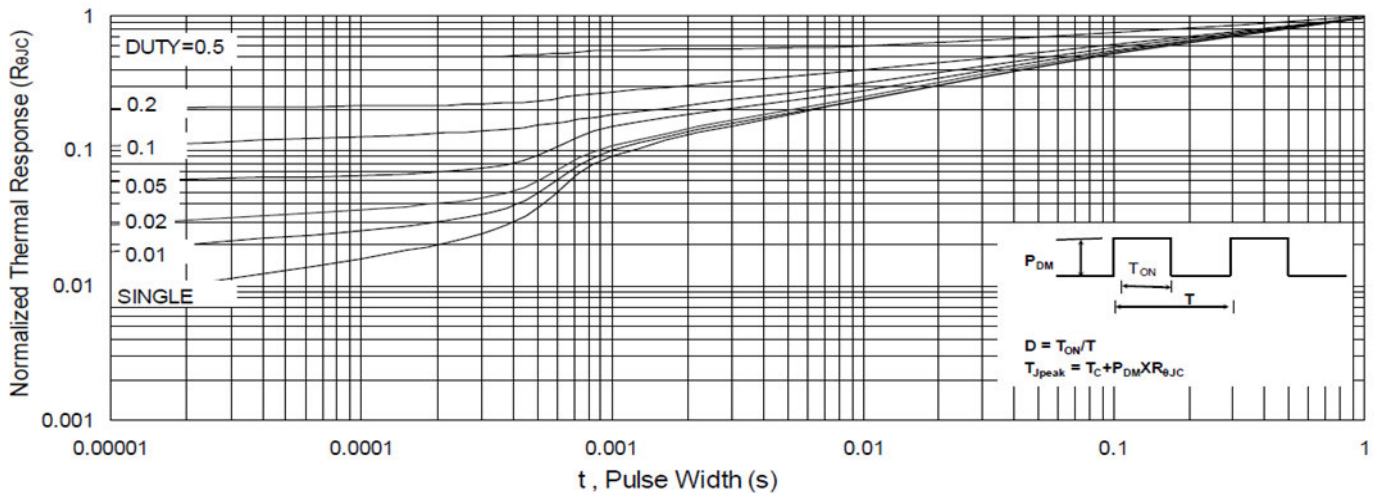
**CHARACTERISTIC CURVES**



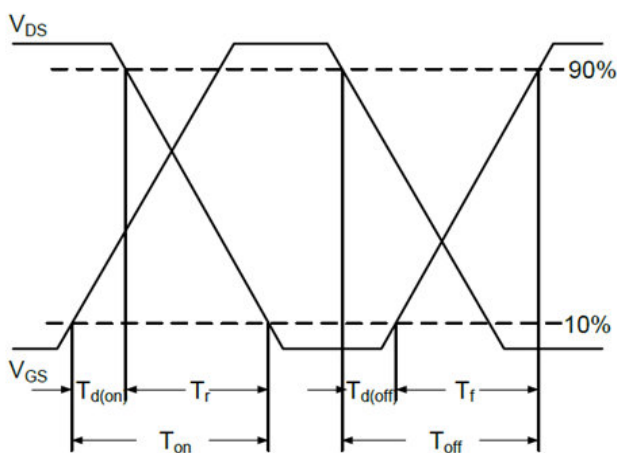
**Fig.7 Capacitance**



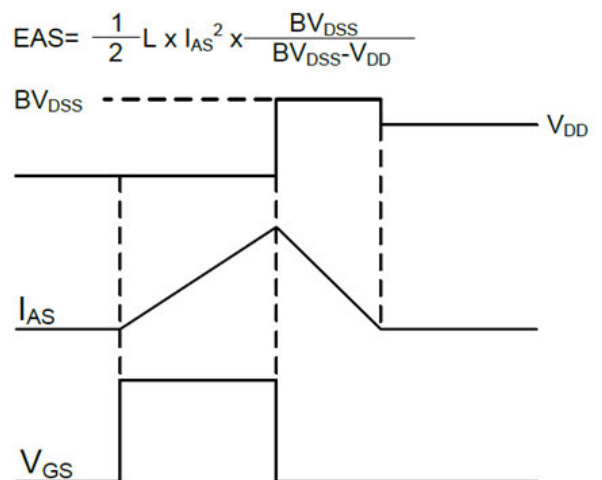
**Fig.8 Safe Operating Area**



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



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**