

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

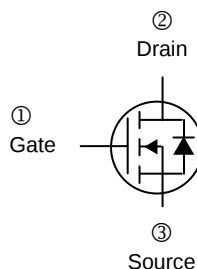
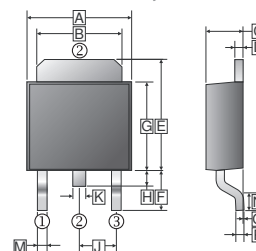
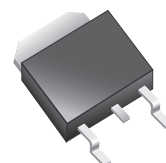
DESCRIPTION

The SSD05N50SL is the highest performance trench 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 .

FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

TO-252



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.35	6.90	J	2.30	REF.
B	4.95	5.50	K	0.64	1.14
C	2.10	2.50	M	0.50	0.95
D	0.43	0.9	N	1.3	1.8
E	6.0	7.5	O	0	0.13
F	2.80	REF.	P	0.58	REF.
G	5.40	6.40			
H	0.60	1.20			

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

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	± 30	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	5	A
	$T_C=100^\circ\text{C}$		3.1	A
Pulsed Drain Current		I_{DM}	20	A
Total Power Dissipation	$T_C=25^\circ\text{C}$	P_D	76	W
	Derate above 25°C		0.61	
Single Pulse Avalanche Energy ¹		E_{AS}	234	mJ
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	$^\circ\text{C}$
Thermal Resistance Rating				
Maximum Thermal Resistance Junction-Ambient		$R_{\theta JA}$	110	$^\circ\text{C} / \text{W}$
Maximum Thermal Resistance Junction-Case		$R_{\theta JC}$	1.64	$^\circ\text{C} / \text{W}$

Notes:

1. $L=30\text{mH}$, $I_{AS}=3.1\text{A}$, $V_{DD}=270\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Teat Conditions
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	500	-	-	V	V _{GS} =0, I _D = 250μA
Gate-Threshold Voltage	V _{GS(th)}	2	-	4	V	V _{DS} =V _{GS} , I _D =250μA
Gate-Source Leakage Current	I _{GSS}	-	-	±100	nA	V _{GS} = ±30V, V _{DS} =0
Drain-Source Leakage Current	I _{DSS}	-	-	1	μA	V _{DS} =500V, V _{GS} =0
Static Drain-Source On-Resistance	R _{DS(ON)}	-	1.2	1.5	Ω	V _{GS} =10V, I _D =2.5A
Total Gate Charge ^{1,2}	Q _g	-	9.1	-	nC	I _D =5A V _{DS} =400V V _{GS} =10V
Gate-Source Charge ^{1,2}	Q _{gs}	-	2.7	-		
Gate-Drain Change ^{1,2}	Q _{gd}	-	3.1	-		
Turn-on Delay Time ^{1,2}	T _{d(on)}	-	15.3	-	nS	V _{DD} =250V I _D =5A R _G =25 Ω
Rise Time ^{1,2}	T _r	-	37.4	-		
Turn-off Delay Time ^{1,2}	T _{d(off)}	-	27	-		
Fall Time ^{1,2}	T _f	-	22.2	-		
Input Capacitance	C _{iss}	-	479	-	pF	V _{GS} =0 V _{DS} =25V f =1.0MHz
Output Capacitance	C _{oss}	-	72	-		
Reverse Transfer Capacitance	C _{rss}	-	2.2	-		
Source-Drain Diode						
Diode Forward Voltage	V _{SD}	-	-	1.4	V	I _S =5A, V _{GS} =0
Continuous Source Current	I _S	-	-	5	A	Integral Reverse P-N Junction Diode in the MOSFET
Pulsed Source Current	I _{SM}	-	-	20	A	
Reverse Recovery Time ¹	T _{rr}	-	425.56	-	ns	I _S =5A, V _{GS} =0, dI _F /dt=100A/μS
Reverse Recovery Charge ¹	Q _{rr}	-	2.19	-	μC	

Notes:

1. Pulse Test: Pulse width $\leq 300\mu\text{S}$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature.

CHARACTERISTIC CURVES

Figure 1. On-Region Characteristics

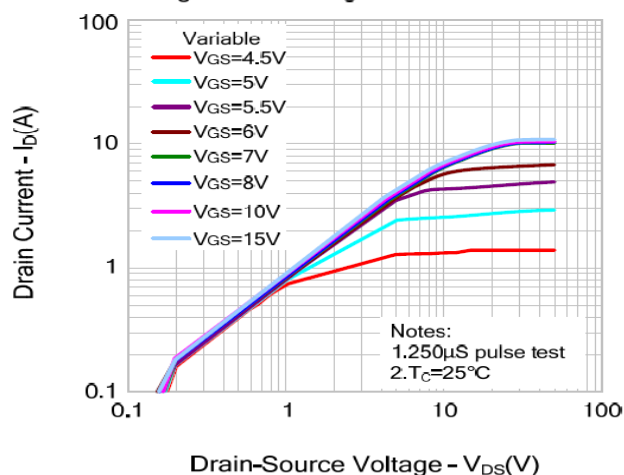


Figure 2. Transfer Characteristics

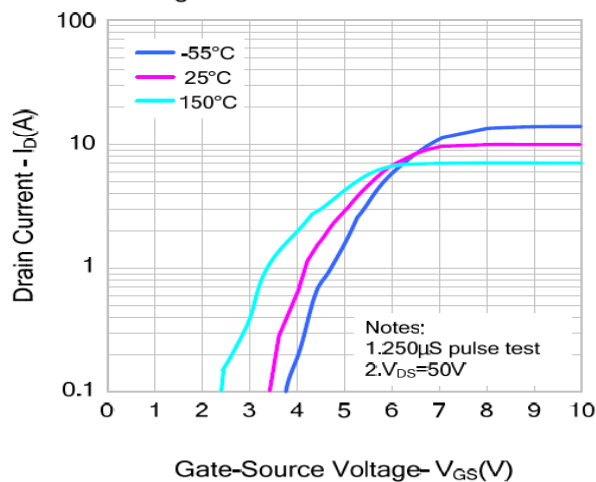


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

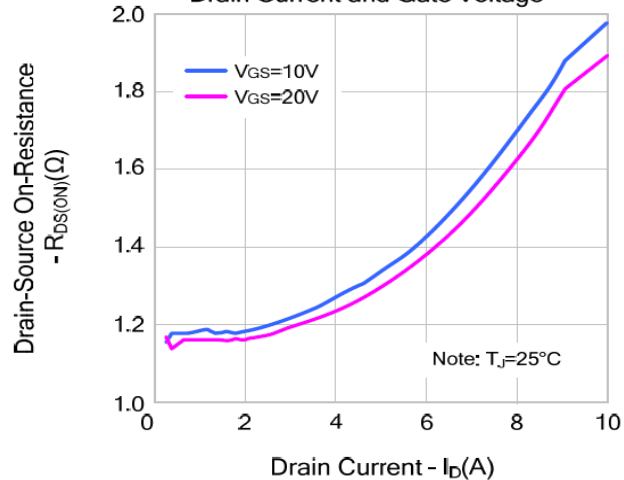


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

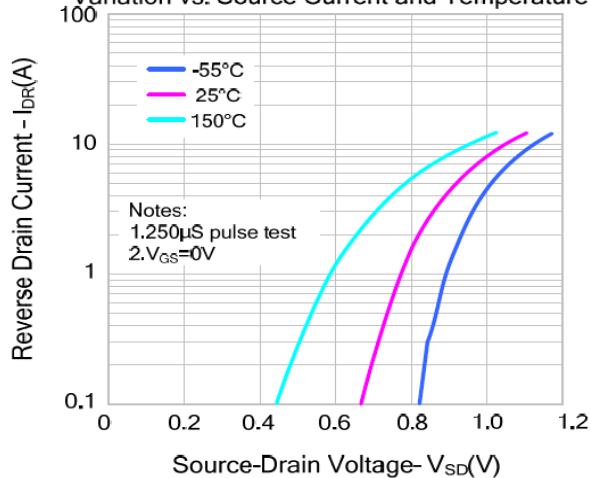


Figure 5. Capacitance Characteristics

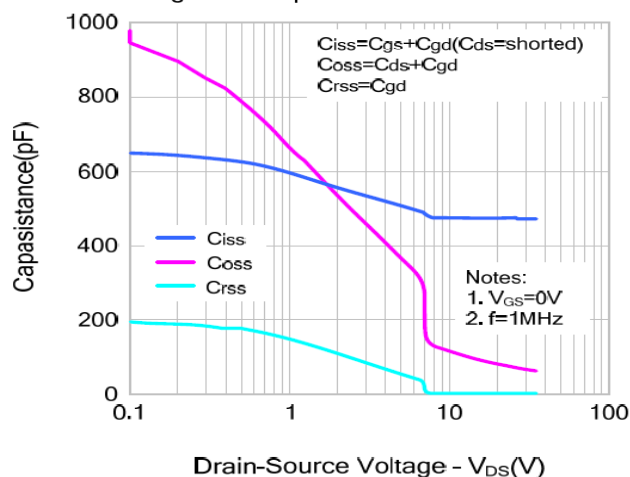
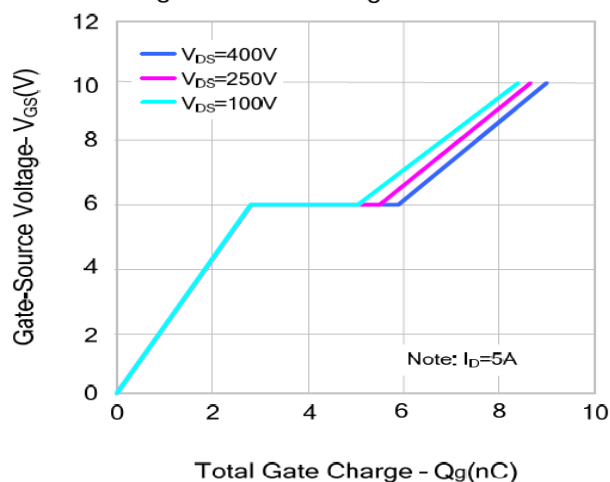


Figure 6. Gate Charge Characteristics



CHARACTERISTIC CURVES

Figure 7. Breakdown Voltage Variation vs. Temperature

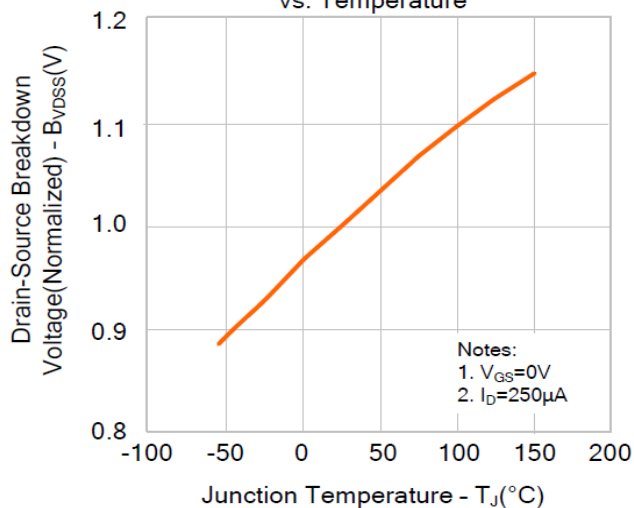


Figure 8. On-resistance Variation vs. Temperature

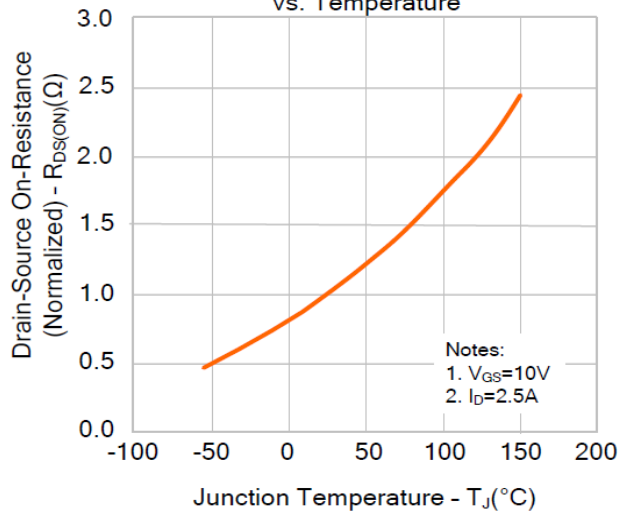


Figure 9 Max. Safe Operating Area

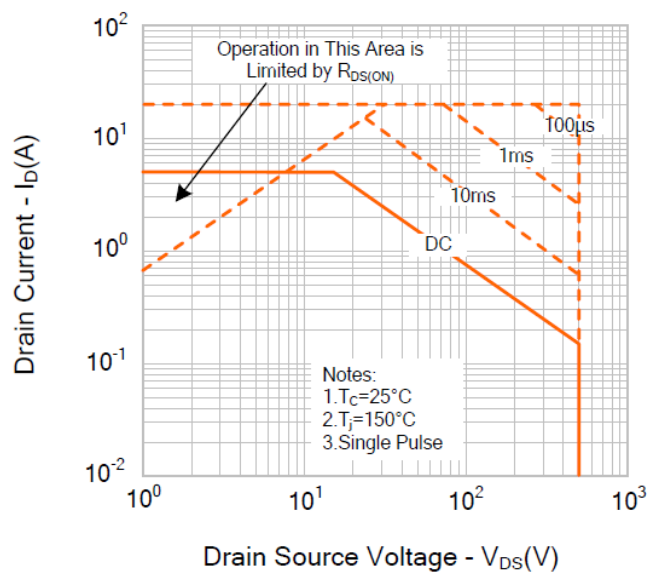
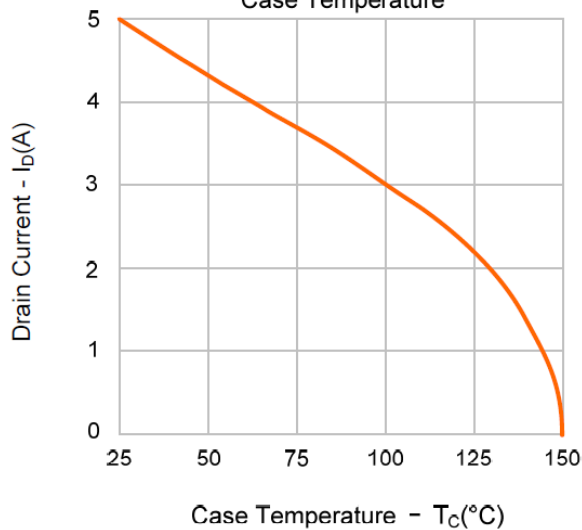
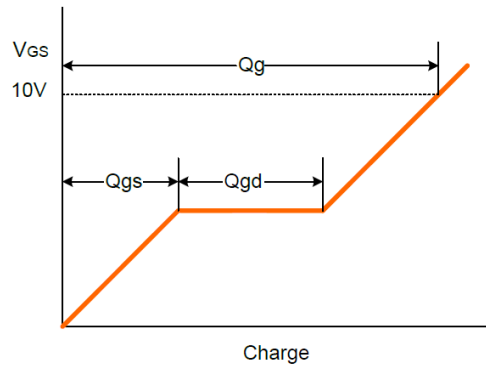
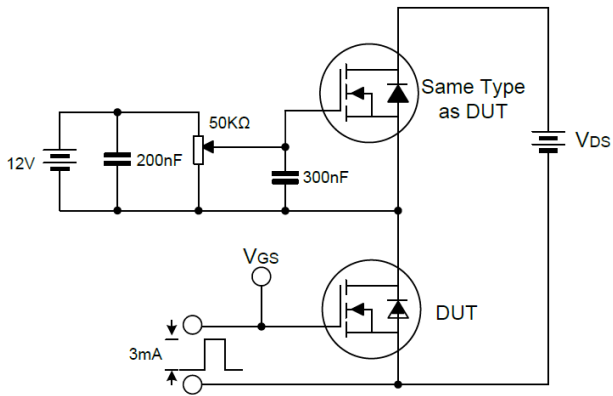


Figure 10. Maximum Drain Current vs. Case Temperature

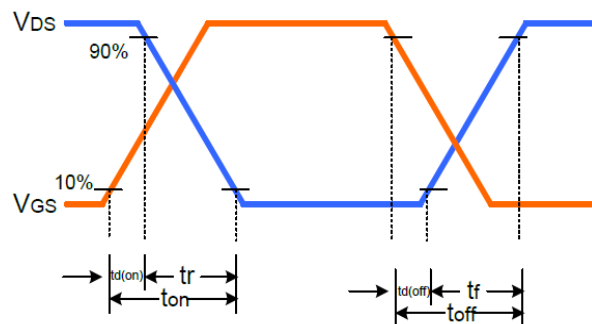
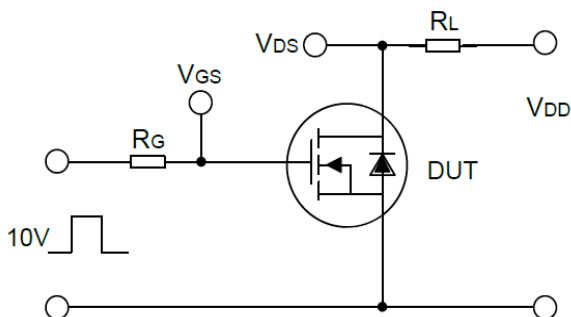


CHARACTERISTIC CURVES

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform

