V_{GS}=4.5V	9.5	m
	44	A

Part Number	Marking
HGA093N12SL	GA093N12SL

Absolute Maximum Ratings at T_j=25℃ (unless otherwise specified)

	Symbol	Conditions	Value	
Continuous Drain Current (Silicon Limited)	I_D	T_C=25℃	44	A
		T_C=100℃	31	
Drain to Source Voltage	V_{DS}	-	120	V
Gate to Source Voltage				
Pulsed Drain Current		-	250	
Avalanche Energy, Single Pulse				
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to175	

Parameter	Symbol		Unit
Thermal Resistance Junction-Ambient	R_{JA}	65	℃/W
Thermal Resistance Junction-Case	R_{JC}		℃/W

		V_{DS}=5V, I	-	70	-	S
Gate Resistance	R_G	V_{GS}=0V, V_{DS} Open, f=1MHz	-	1	-	

Input Capacitance	C_{iss}		-	2626	-	
Output Capacitance	C_{oss}	V_{GS}=0V, V_{DS}=60V, f=1MHz	-	329	-	pF
	C_{rss}		-	11	-	
Total Gate Charge	Q_g(10V)		-	38	-	
Total Gate Charge	Q_g(4.5V)	V_{DD}=60V, I_D=20A, V_{GS}=10V	-	18	-	nC
Gate to Source Charge	Q_{gs}		-	7	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	5	-	
Turn on Delay Time	$t_{d(on)}$		-	13	-	
Rise time	t_r	V_{DD}=60V, I_D=20A, V_{GS}=10V,	-	7	-	ns
Turn off Delay Time	$t_{d(off)}$	R_G=10 ,	-	22	-	
Fall Time	t_f		-	9	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=20A	-	0.9	1.2	V
Reverse Recovery Time	t_{rr}	V_R=60V, I_F=20A, dI_F/dt=100A/ s	-	53	-	ns
Reverse Recovery Charge	Q_{rr}		-	58	-	nC

Fig 1. Typical Output Characteristics	Figure 2. On-Resistance vs. Gate-Source Voltage

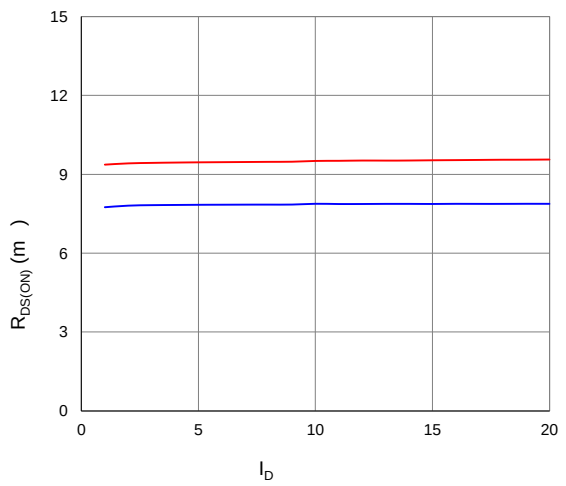
Figure 3. On-Resistance vs. Drain Current and Gate Voltage	Figure 4. Normalized On-Resistance vs. Junction Temperature
	

Figure 5. Typical Transfer Characteristics	Figure 6. Typical Source-Drain Diode Forward Voltage

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

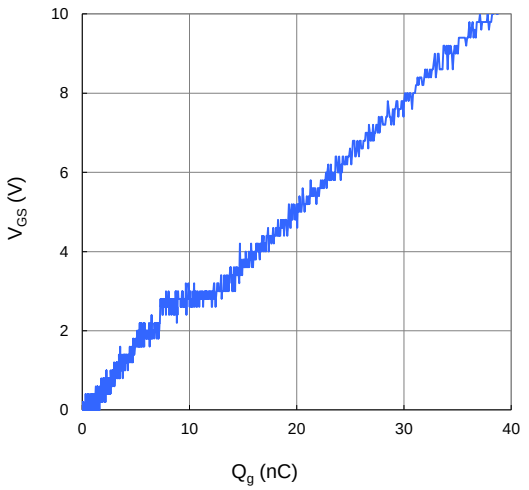


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

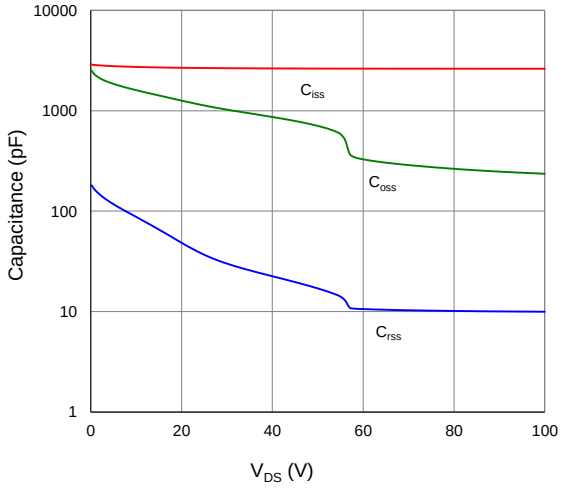


Figure 9. Maximum Safe Operating Area

Figure 10. Maximun Drain Current vs. Case Temperature

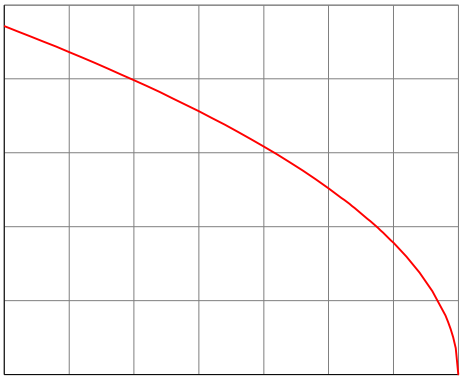
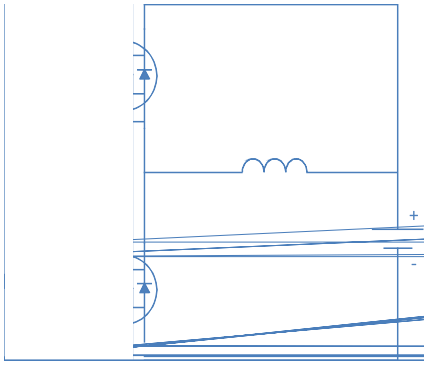
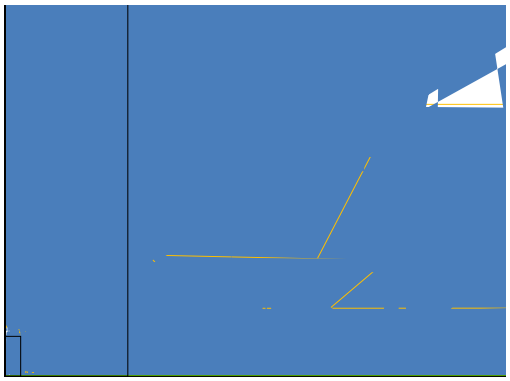
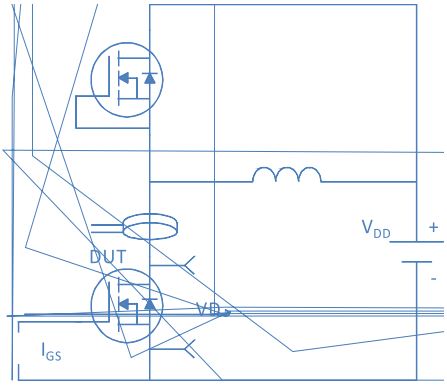
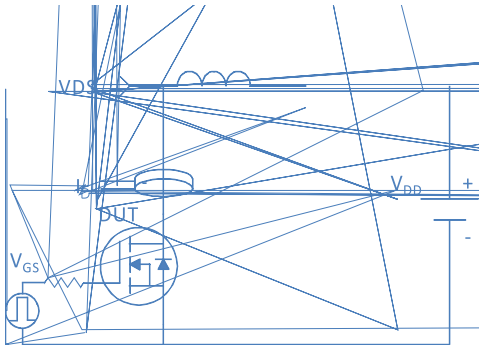
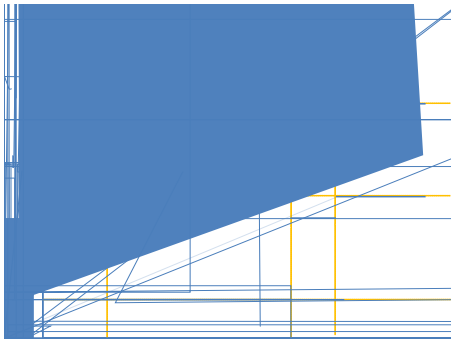
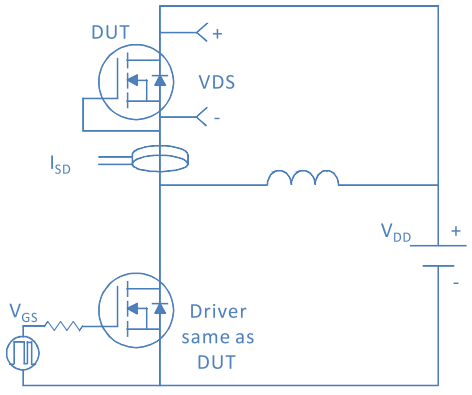
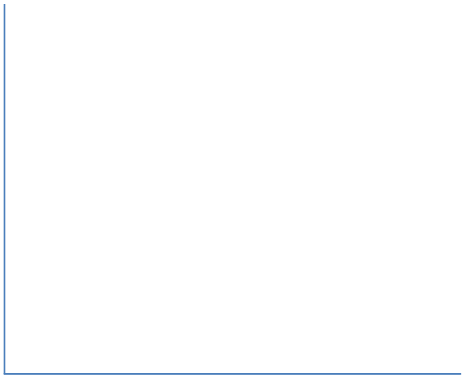


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

Inductive switching Test	
	

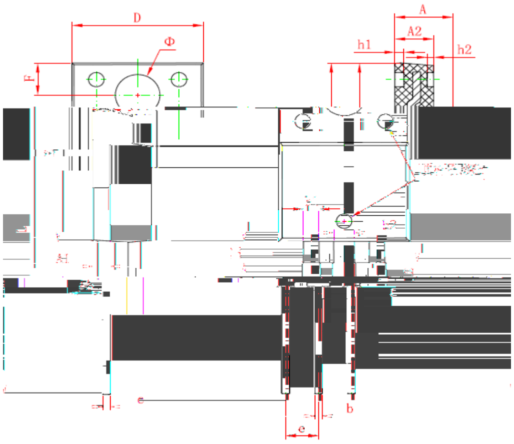
Gate Charge Test	
	

Uclamped Inductive Switching (UIS) Test	
	

Diode Recovery Test	
	

Package Outline

TO-220F, 3 leads



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.300	4.700	0.169	0.185
A1	1.300 REF.		0.051 REF.	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A2	[illegible]	[illegible]	[illegible]	[illegible]
b	[illegible]	[illegible]	[illegible]	[illegible]
b1	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0.530	c	[illegible]	[illegible]	[illegible]
0.408	D	9.960	10.360	0.392
0.598	E	14.800	15.200	0.583
.100 TYP.	e	2.540 TYP.		0
.106 REF.		2.700 REF.		0
.138 REF.	Φ	3.500 REF.		0
0.012	-	0.000	0.300	0.000
.031 REF.	h1	0.800 REF.		0
.020 REF.	h2	0.500 REF.		0
1.118	L	28.000	28.400	1.102
0.075	L1	1.700	1.900	0.067
0.083	L2	1.900	2.100	0.075