

120V N-Ch Power MOSFET

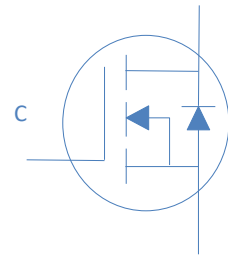
B

$V_{DS}$		120	V
$R_{DS(on),typ}$	TO-263	6	m
$R_{DS(on),typ}$	TO-220	6	m
$I_D$ (Silicon Limited)		133	A

B

B

I



Part Number	Package	Marking
HGB070N12S	TO-263	GB070N12S
HGP070N12S	TO-220	GP070N12S

**Absolute Maximum Ratings at  $T_J=25^{\circ}\text{C}$  (unless otherwise specified)**

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	$I_D$	$T_C=25^{\circ}\text{C}$	133	A
		$T_C=100^{\circ}\text{C}$	94	
Drain to Source Voltage	$V_{DS}$	-	120	V
Gate to Source Voltage	$V_{GS}$	-	$\pm 20$	V
Pulsed Drain Current	$I_{DM}$	-	320	A
Avalanche Energy, Single Pulse	$E_{AS}$	$L=0.4\text{mH}, T_C=25^{\circ}\text{C}$	500	mJ
Power Dissipation	$P_D$	$T_C=25^{\circ}\text{C}$	214	W
Operating and Storage Temperature	$T_J, T_{stg}$	-	-55 to 175	$^{\circ}\text{C}$

**Absolute Maximum Ratings**

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Ambient	$R_{JA}$	60	$^{\circ}\text{C/W}$
Thermal Resistance Junction-Case	$R_{JC}$	0.7	$^{\circ}\text{C/W}$

**Electrical Characteristics at  $T_J=25^{\circ}\text{C}$  (unless otherwise specified)**
**Static Characteristics**

Parameter	Symbol	Conditions	Value			Unit
			min	typ	max	
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\text{ A}$	120	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\text{ A}$	2.0	3	4.0	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=120V, T_J=25^{\circ}\text{C}$	-	-	1	A
		$V_{GS}=0V, V_{DS}=120V, T_J=100^{\circ}\text{C}$	-	-	100	
Gate to Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$ TO-263	-	5.7	6.7	m
Drain to Source on Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$ TO-220	-	6	7	m
Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=20A$	-	80	-	S
Gate Resistance	$R_G$	$V_{GS}=0V, V_{DS}\text{ Open}, f=1\text{MHz}$	-	2.5	-	

**Dynamic Characteristics**

Input Capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=60V, f=1\text{MHz}$	-	3382	-	pF
Output Capacitance	$C_{oss}$		-	438	-	
Reverse Transfer Capacitance	$C_{rss}$		-	8	-	
Total Gate Charge	$Q_g(10V)$	$V_{DD}=60V, I_D=20A, V_{GS}=10V$	-	38	-	nC
Gate to Source Charge	$Q_{gs}$		-	12	-	
Gate to Drain (Miller) Charge	$Q_{gd}$		-	5	-	
Turn on Delay Time	$t_{d(on)}$	$V_{DD}=60V, I_D=20A, V_{GS}=10V, R_G=10\ \Omega$	-	16	-	ns
Rise time	$t_r$		-	9	-	
Turn off Delay Time	$t_{d(off)}$		-	27	-	
Fall Time	$t_f$		-	12	-	

**Reverse Diode Characteristics**

Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_F=20A$	-	0.9	1.2	V
Reverse Recovery Time	$t_{rr}$	$V_R=60V, I_F=20A, di_F/dt=500A/\text{s}$	-	50	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	300	-	nC



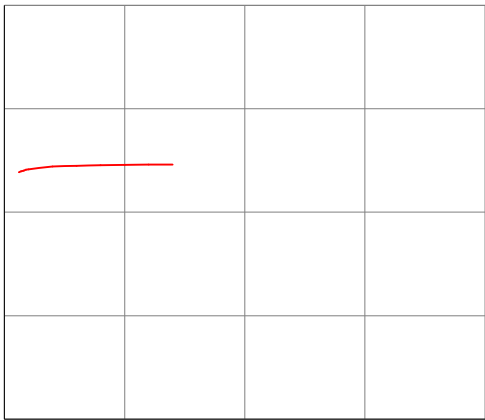
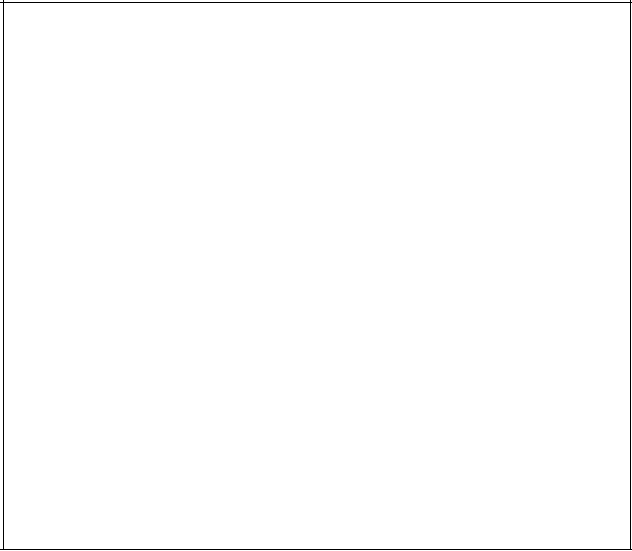


<p>Fig 1. Typical Output Characteristics</p> 	<p>Figure 2. On-Resistance vs. Gate-Source Voltage</p> 
<p>Figure 3. On-Resistance vs. Drain Current and Gate Voltage</p> 	<p>Figure 4. Normalized On-Resistance vs. Junction Temperature</p> 
<p>Figure 5. Typical Transfer Characteristics</p> 	<p>Figure 6. Typical Source-Drain Diode Forward Voltage</p> 

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

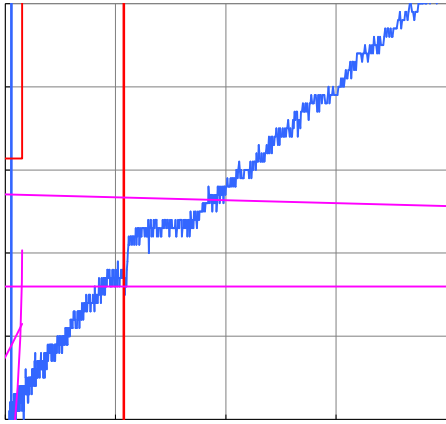


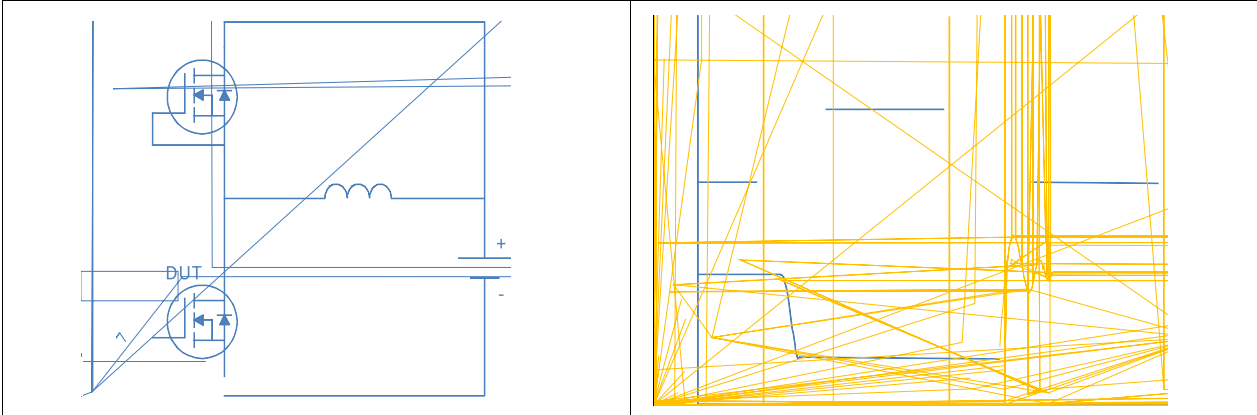
Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

Figure 9. Maximum Safe Operating Area

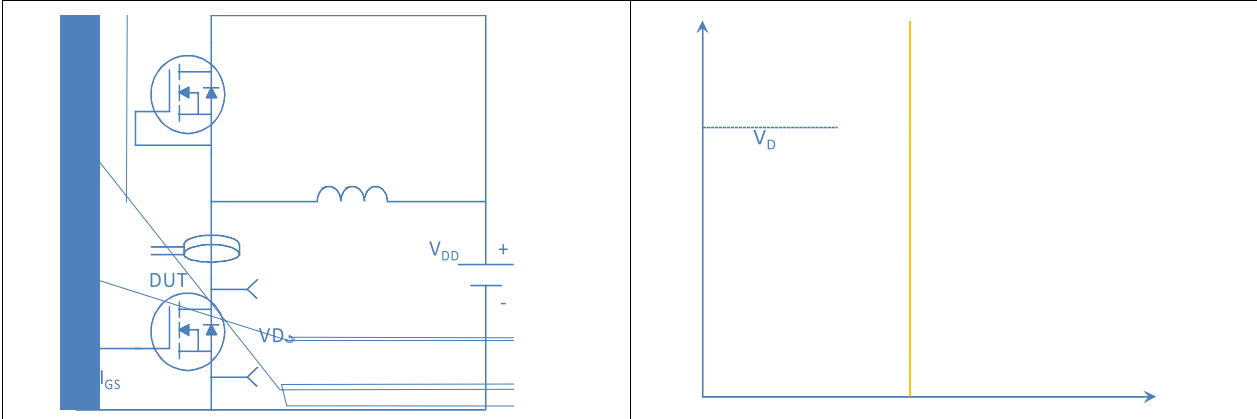
Figure 10. Maximun Drain Current vs. Case Temperature

Normalized  $I_D$

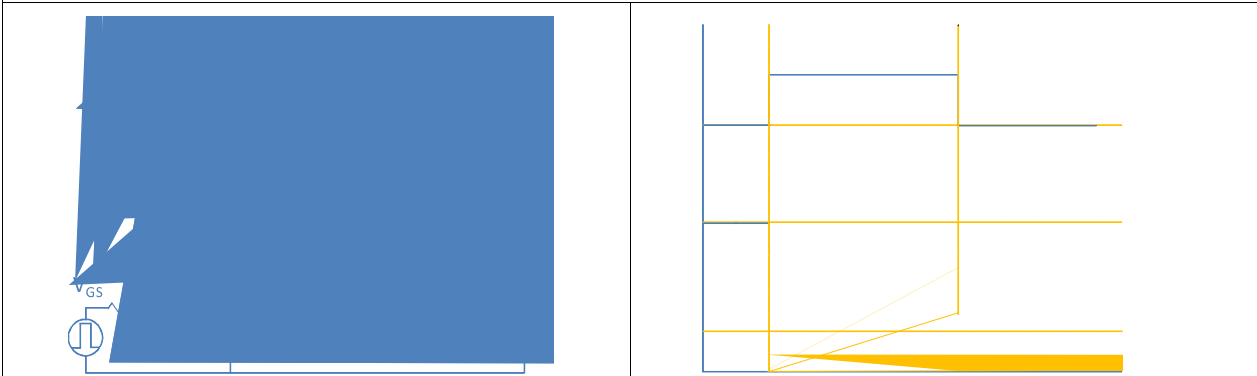
Inductive switching Test



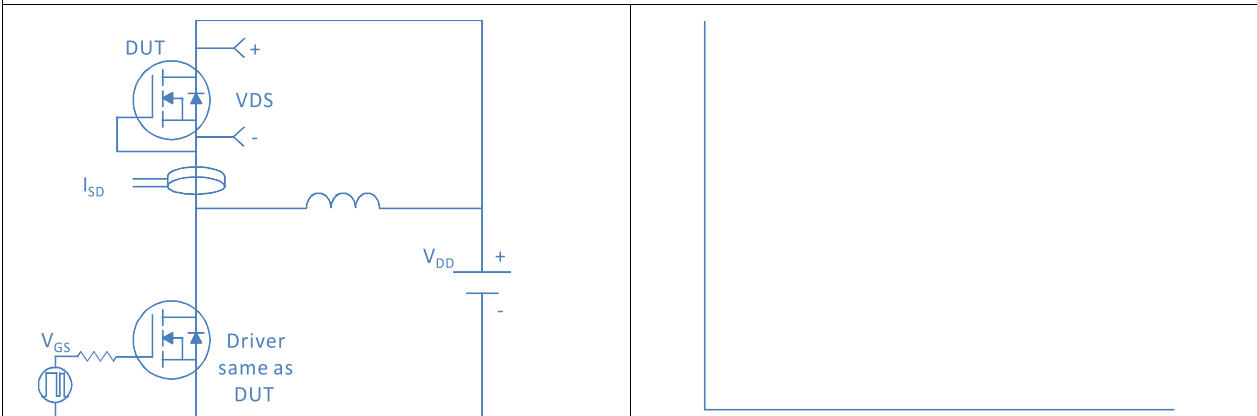
Gate Charge Test



Unclamped Inductive Switching (UIS) Test

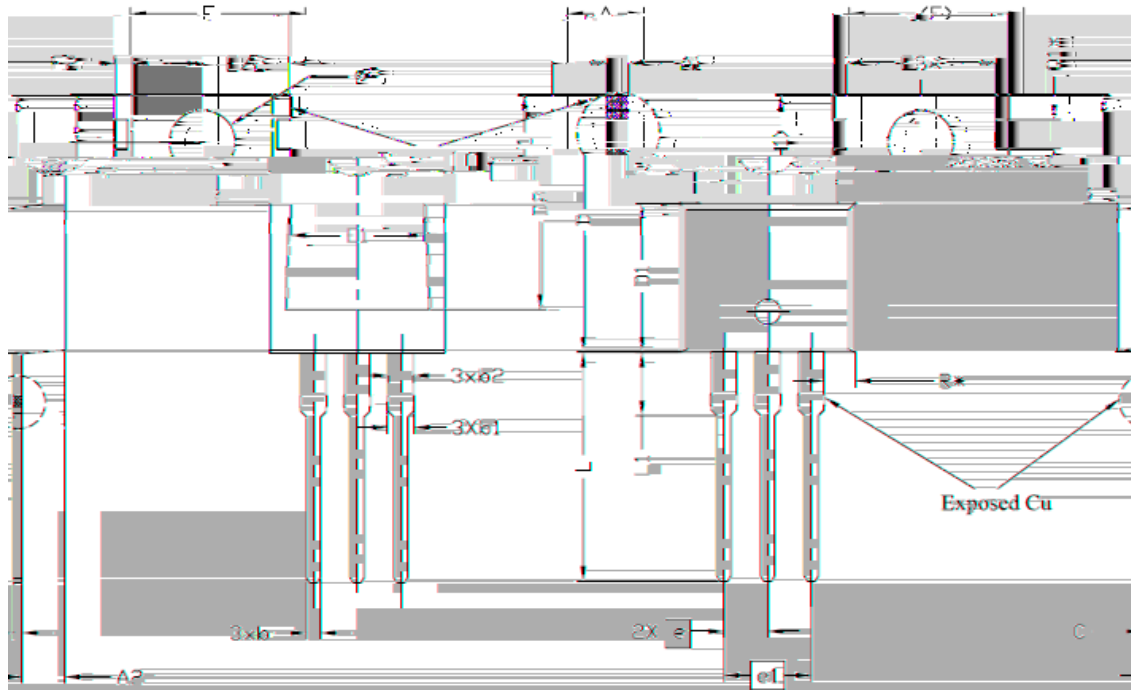


Diode Recovery Test



Package Outline

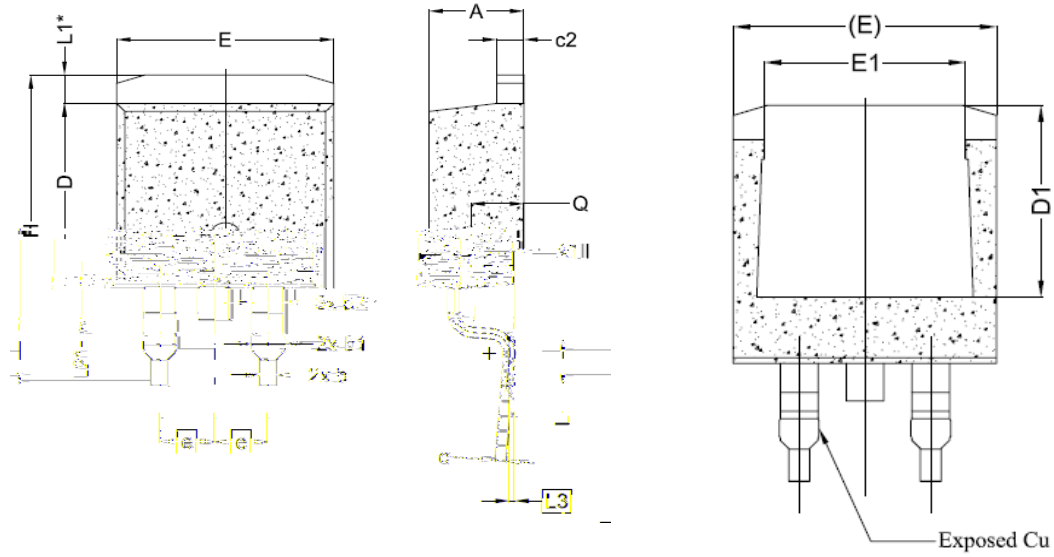
TO-220, 3 leads



SYMBOL	DIMENSIONS			NOTES
	MIN.	NOM.	MAX.	
A	4,24	4,44	4,64	
A1	1,15	1,27	1,40	
A2	2,30	2,48	2,70	
b	0,70	0,80	0,90	
b1	1,20	1,55	1,75	
b2	1,20	1,45	1,70	
c	0,40	0,50	0,60	
D	14,70	15,37	16,00	4
D1	8,82	8,92	9,02	
D2	12,63	12,73	12,83	5
E	9,96	10,16	10,36	4,5
E1	6,86	7,77	8,89	5
E2	-	-	0,76	6
E3*	8,70REF.			
e	2,54BSC			
e1	5,08BSC			
H1	6,30	6,45	6,60	5,6
L	13,47	13,72	13,97	
L1	3,60	3,80	4,00	
∅P	3,75	3,84	3,93	
Q	2,60	2,80	3,00	
Q1*	1,73REF.			
R*	1,82REF.			

Package Outline

TO-263, 3 leads



SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	4,24	4,44	4,64
A1	0,00	0,10	0,25
b	0,70	0,80	0,90
b1	1,20	1,55	1,75
b2	1,20	1,45	1,70
c	0,40	0,50	0,60
c2	1,15	1,27	1,40
D	8,82	8,92	9,02
D1	6,86	7,65	

E	9,84	10,16	10,29
E1	8,89	9,75	9,89
e	2,54 (0,10)		
H1	14,51	15,00	15,25
L	1,34	2,32	2,78
L1	1,35 REF.		
L2	1,50 REF.		
L3	0,25 BSC		
Q	2,30	2,46	2,70