,

			mΩ
$R_{DS(on),typ}$	TO-220	4.7	mΩ

Part Number	Package	Marking
HGB059N12S	TO-263	

Continuous Drain Current (Package Limited)		T_C=25	120	
Drain to Source Voltage	V_{DS}	-	120	V
Gate to Source Voltage	V_{GS}	-	±20	V
Pulsed Drain Current	I_{DM}	-	500	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.4mH, T_C=25	720	mJ
Power Dissipation				W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to175	

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\Theta JC}$	0.45	/W
Thermal Resistance Junction-Ambient	$R_{\Theta JA}$	60	/W

	$V_{(BR)DSS}$					
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA	2			
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=120V, T_j=25	-	-	1	μA
		V_{GS}=0V, V_{DS}=120V, T_j=100	-	-	100	
Gate to Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Drain to Source on Resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=20A TO-263	-	4.4	5.6	mΩ
		TO-220	-	4.7	5.9	
Transconductance	g_{fs}	V_{DS}=5V, I_D=20A	-	80	-	S
Gate Resistance	R_G	V_{GS}=0V, V_{DS} Open, f=1MHz	-	0.7	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}		-	7740	-	
Output Capacitance	C_{oss}	V_{GS}=0V, V_{DS}=60V, f=1MHz	-	450	-	pF
Reverse Transfer Capacitance	C_{rss}		-	16.5	-	
Total Gate Charge	Q_g		-	92	-	
Gate to Source Charge	Q_{gs}	V_{DD}=60V, I_D=20A, V_{GS}=10V	-	29	-	nC
Gate to Drain (Miller) Charge	Q_{gd}		-	13	-	
Turn on Delay Time	$t_{d(on)}$		-	30	-	
Rise time	t_r	V_{DD}=60V, I_D=20A, V_{GS}=10V,	-	23	-	ns
Turn off Delay Time	$t_{d(off)}$	R_G=10Ω,	-	50	-	
Fall Time	t_f		-	16	-	

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/μs	-	70	-	ns
Reverse Recovery Charge	Q_{rr}		-	590	-	nC

Fig 1. Typical Output Characteristics

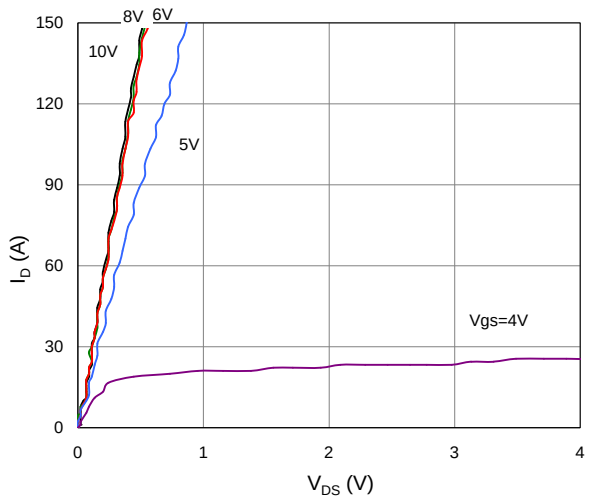


Figure 2. On-Resistance vs. Gate-Source Voltage

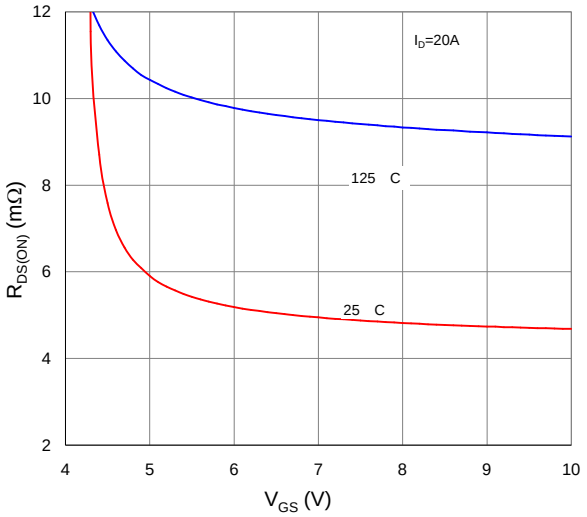


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

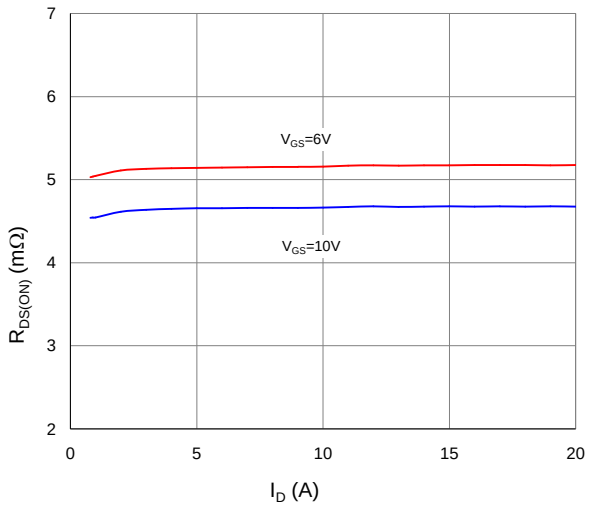


Figure 4. Normalized On-Resistance vs. Junction Temperature

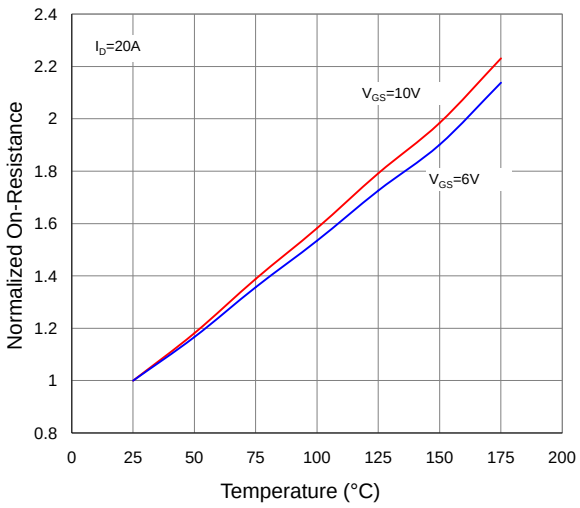


Figure 5. Typical Transfer Characteristics

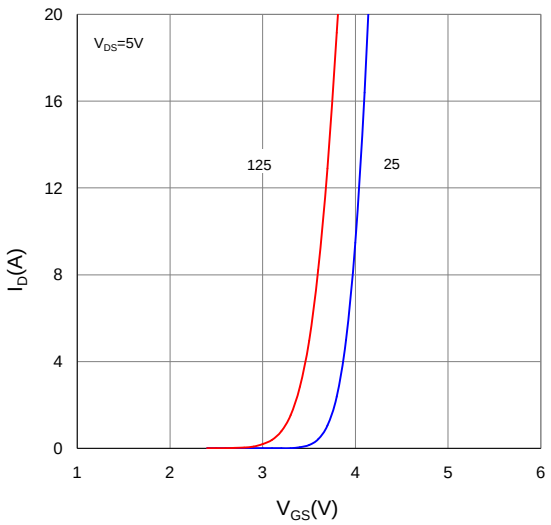


Figure 6. Typical Source-Drain Diode Forward Voltage

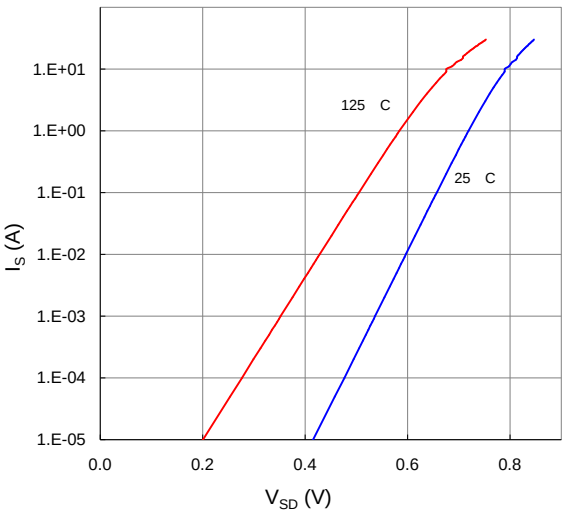


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

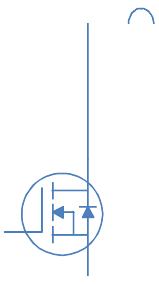
Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

Figure 9. Maximum Safe Operating Area

Figure 10. Maximun Drain Current vs. Case Temperature

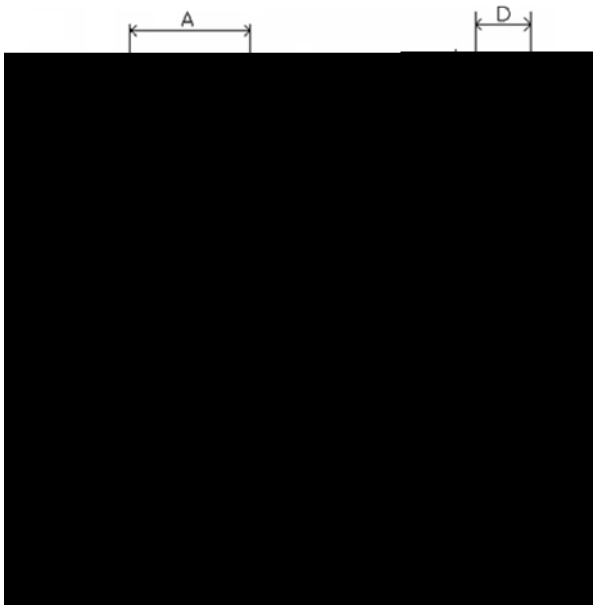
Inductive switching Test	

Gate Charge Test	

Uclamped Inductive Switching (UIS) Test	
	

Diode Recovery Test	

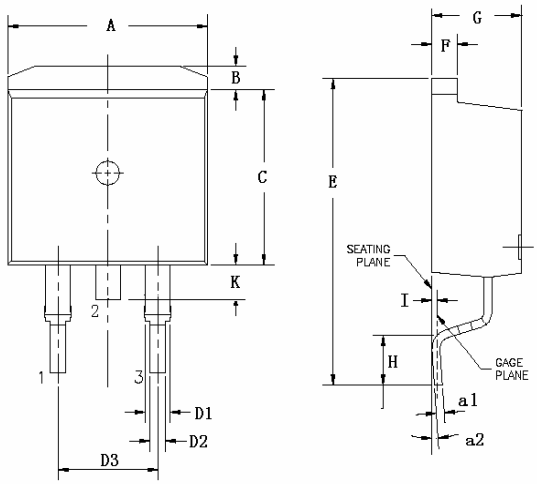
TO-220, 3 leads



Dimentions in mm unless otherwise specified

Symbol	Min	Nom	Max
A	9.66	9.97	10.28
A2	9.80	10.00	10.20
B	15.60	15.70	15.80
C	12.70	13.48	14.27
D	4.30	4.50	4.70
E	9.00	9.20	9.40
F		2.54	
G1	1.32	1.52	1.72
G2	0.70	0.82	0.95
G3	0.45	0.52	0.60
H	3.50	3.60	3.70
I	2.70	2.80	2.90
J	15.70	15.97	16.25
K	2.20	2.40	2.60
L	1.15	1.27	1.40
N	6.40	6.60	6.80

TO-263, 2 leads



Dimentions in mm unless otherwise specified

Symbol	Min	Nom	Max
A	9.66	9.97	10.28
B	1.02	1.17	1.32
C	8.59	9.00	9.40
D1	1.14	1.27	1.40
D2	0.70	0.83	0.95
D3		5.08	
E	15.09	15.24	15.39
F	1.15	1.28	1.40
G	4.30	4.50	4.70
H	2.29	2.54	2.79
I		0.25	
K	1.30	1.45	1.60
a1	0.45	0.55	0.65
a2(degree)	0°		8°