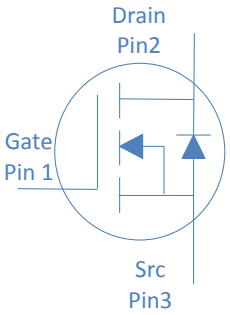
- High Speed Power Switching
- Enhanced Body diode dv/dt capability
- Enhanced Avalanche Ruggedness
- 100% UIS Tested, 100% Rg Tested
- Lead Free

V_{DS}		200	V
$R_{DS(on),typ}$	TO-263	28	mΩ
$R_{DS(on),typ}$	TO-247	28	mΩ
$R_{DS(on),typ}$	TO-220	28	mΩ
I_D		51	A

Application

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- Motor Control

TO-263



TO-247

Part Number	Package	Marking
HGB320N20S	TO-263	GB320N20S
HGK320N20S	TO-247	GK320N20S
HGP320N20S	TO-220	GP320N20S

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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current	I_D	T_C=25	51	A
		T_C=100	36	
Drain to Source Voltage	V_{DS}	-	200	V
Gate to Source Voltage	V_{GS}	-	±20	V
Pulsed Drain Current	I_{DM}	-	150	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.4mH, T_C=25	180	mJ
Power Dissipation	P_D	T_C=25	214	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to175	

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	R	0.7	/W
Thermal Resistance Junction-Ambient	R	60	/W

Electrical Characteristics at T_j=25 (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=250μA		200	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250μA		2	3	4	
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS}=0V, V_{DS}=200V, T_j=25		-	-	1	μA
		V_{GS}=0V, V_{DS}=200V, 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=10A	TO-263	-	28	32	mΩ
	$R_{DS(on)}$	V_{GS}=10V, I_D=10A	TO-247	-	28	32	mΩ
	$R_{DS(on)}$	V_{GS}=10V, I_D=10A	TO-220	-	28	32	mΩ
Transconductance	g_{fs}	V_{DS}=5V, I_D=10A		-	31	-	S
Gate Resistance	R_G	V_{GS}=0V, V_{DS} Open, f=1MHz		-	4.6	-	Ω

Dynamic Characteristics

Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=100V, f=1MHz	-	1598	-	pF
Output Capacitance	C_{oss}		-	124	-	
Reverse Transfer Capacitance	C_{rss}		-	7.5	-	
Total Gate Charge	Q_g	V_{DD}=100V, I_D=10A, V_{GS}=10V	-	19	-	nC
Gate to Source Charge	Q_{gs}		-	7	-	
Gate to Drain (Miller) Charge	Q_{gd}		-	2	-	
Turn on Delay Time	$t_{d(on)}$	V_{DD}=100V, I_D=10A, V_{GS}=10V, R_G=10Ω,	-	12	-	ns
Rise time	t_r		-	17	-	
Turn off Delay Time	$t_{d(off)}$		-	23	-	
Fall Time	t_f		-	10	-	

Reverse Diode Characteristics

Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_F=10A	-	0.9	1.2	V
Reverse Recovery Time	t_{rr}	V_R=100V, I_F=10A, dI_F/dt=100A/μs	-	90	-	ns
Reverse Recovery Charge	Q_{rr}		-	306	-	nC

Fig 1. Typical Output Characteristics

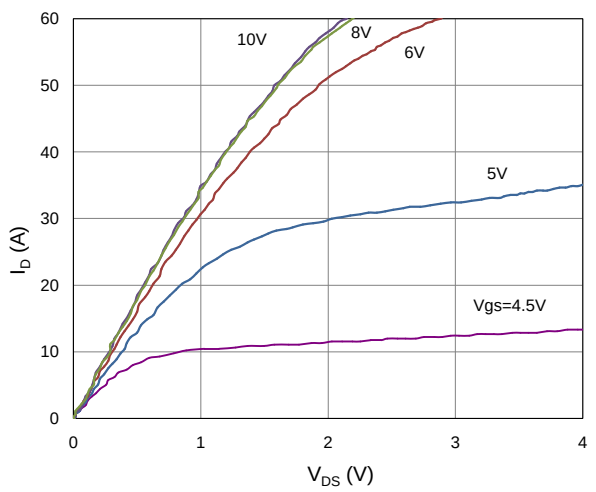


Figure 2. On-Resistance vs. Gate-Source Voltage

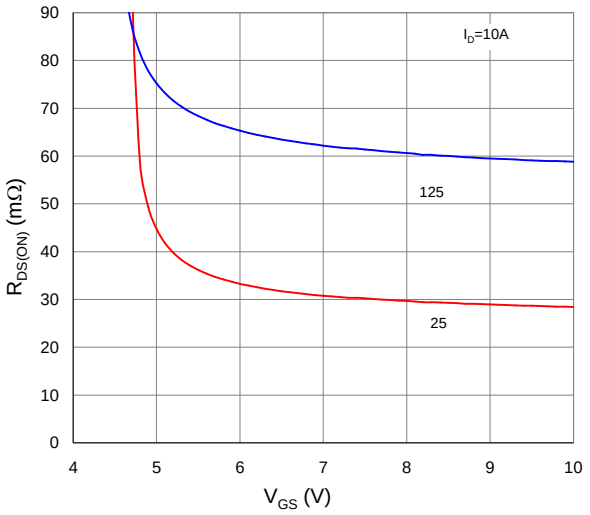


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

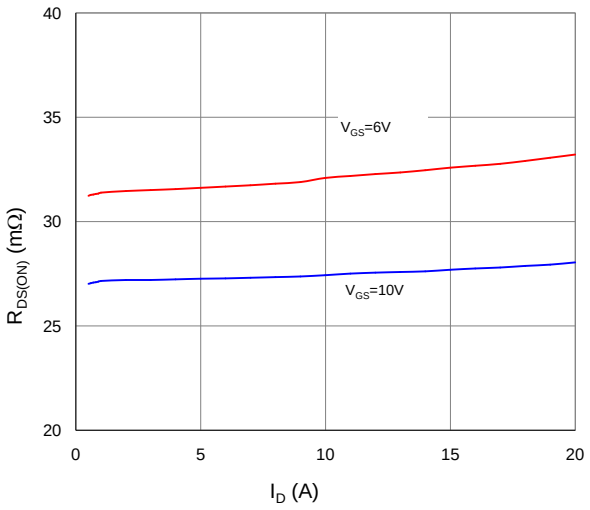


Figure 4. Normalized On-Resistance vs. Junction Temperature

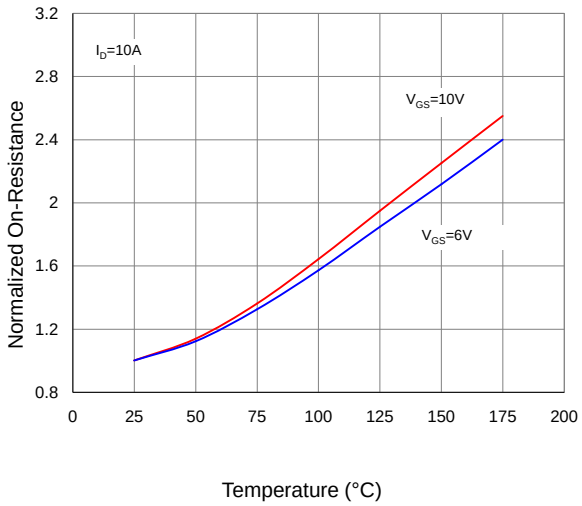


Figure 5. Typical Transfer Characteristics

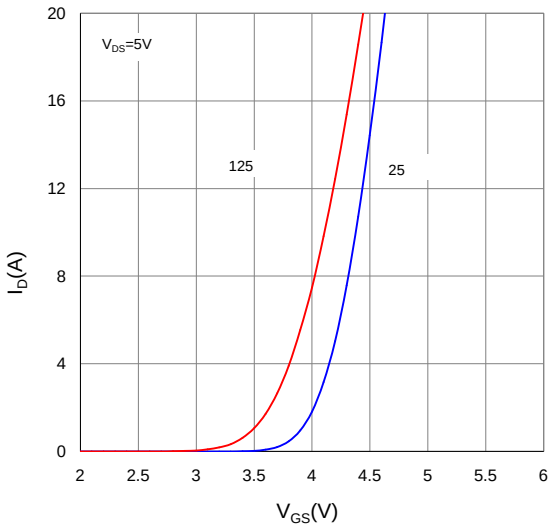


Figure 6. Typical Source-Drain Diode Forward Voltage

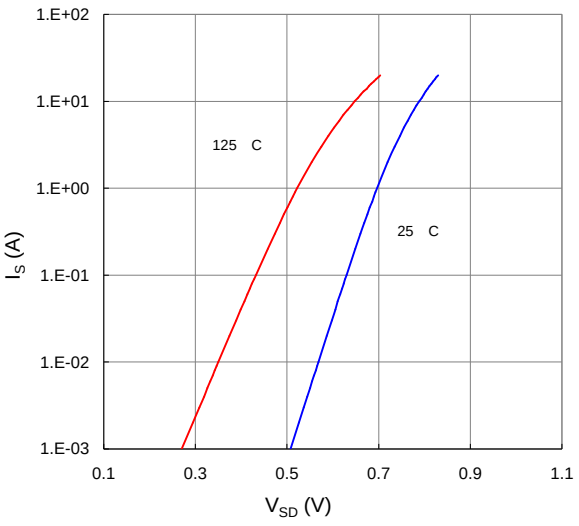


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

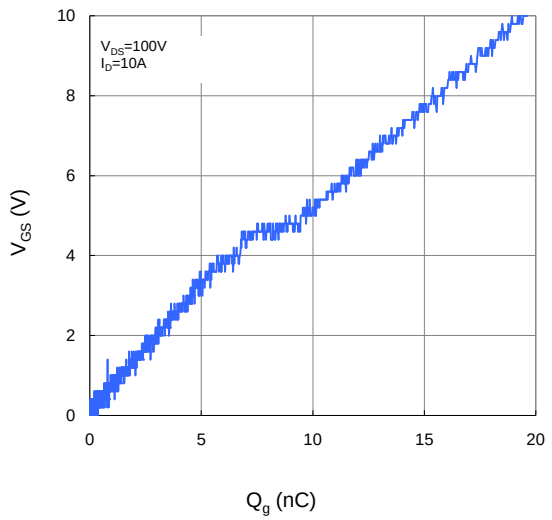


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

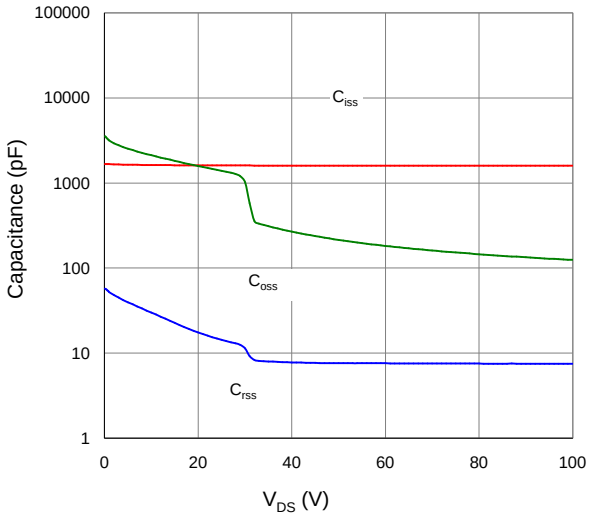


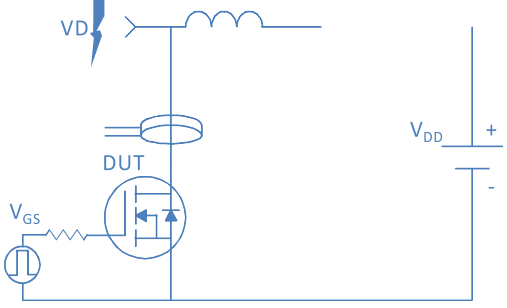
Figure 9. Maximum Safe Operating Area

Figure 10. Maximun Drain Current vs. Case Temperature

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

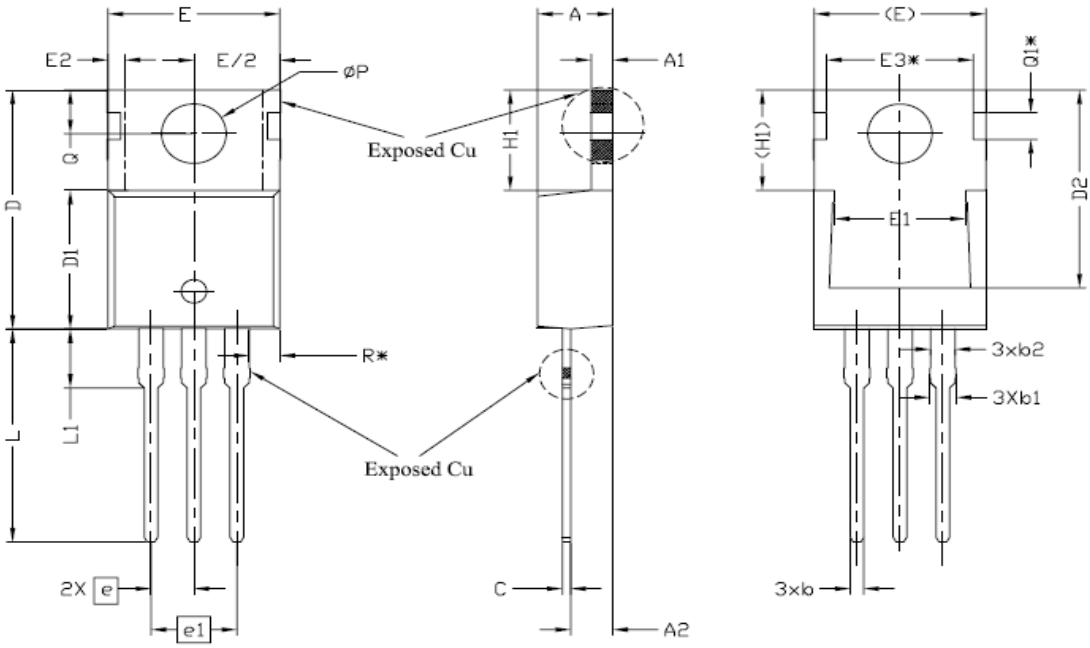
Inductive switching Test	

Gate Charge Test	

Uclamped Inductive Switching (UIS) Test	
	

Diode Recovery Test	

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	
ØP	3.75	3.84	3.93	
Q	2.60	2.80	3.00	
Q1*	1.73REF.			
R*	1.82REF.			

TO-263, 3 leads

TO-247, 3 leads