100V N-Ch Power MOSFET

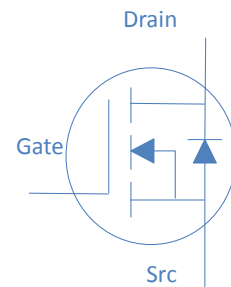| V_{DS}		100	V
$R_{DS(on),typ}$	V_{GS}=10V	3.6	mΩ
$R_{DS(on),typ}$	V_{GS}=4.5V	4.8	mΩ
$I_{D \text{ (Sillicon Limited)}}$		166	A

Feature

◇ Optimized for high speed smooth switching,Logic level

◇ Enhanced Body diode dv/dt capability

◇ Enhanced Avalanche Ruggedness

◇ 100% UIS Tested, 100% Rg Tested

◇ Lead Free, Halogen Free

Application

◇ DC-DC Conversion

◇ Hard Switching and High Speed Circuit

◇ Power Tools

◇ UPS

◇ SSR

TO220

Drain

Gate

Src

Part Number	Package	Marking
HGP042N10AL	TO-220	GP042N10AL

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

Parameter	Symbol	Conditions	Value	Unit
Continuous Drain Current (Silicon Limited)	I_D	T_C=25℃	166	A
		T_C=100℃	117	
Drain to Source Voltage	V_{DS}	-	100	V
Gate to Source Voltage	V_{GS}	-	±20	V
Pulsed Drain Current	I_{DM}	-	450	A
Avalanche Energy, Single Pulse	E_{AS}	L=0.1mH, T_C=25℃	180	mJ
Power Dissipation	P_D	T_C=25℃	231	W
Operating and Storage Temperature	T_J, T_{stg}	-	-55 to175	℃

Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Thermal Resistance Junction-Case	$R_{\theta JC}$	0.65	℃/W
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	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		100	-	-	V
Gate Threshold Voltage	V$_{GS(th)}$	V$_{GS}$=V$_{DS}$, I$_D$=250μA		1.4	1.8	2.4	
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{GS}$=0V, V$_{DS}$=100V, T$_j$=25℃		-	-	1	μA
		V$_{GS}$=0V, V$_{DS}$=100V, 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-220	-	3.6	4.2	mΩ
Drain to Source on Resistance	R$_{DS(on)}$	V$_{GS}$=4.5V, I$_D$=20A	TO-220	-	4.8	6	mΩ
Transconductance	g$_{fs}$	V$_{DS}$=5V, I$_D$=20A		-	80	-	S
Gate Resistance	R$_G$	V$_{GS}$=0V, V$_{DS}$ Open, f=1MHz		-	1.2	-	Ω

Dynamic Characteristics

Parameter	Symbol	Conditions					Unit
Input Capacitance	C$_{iss}$	V$_{GS}$=0V, V$_{DS}$=50V, f=1MHz		-	3720	-	pF
Output Capacitance	C$_{oss}$			-	893	-	
Reverse Transfer Capacitance	C$_{rss}$			-	32.6	-	
Total Gate Charge	Q$_g$ (10V)	V$_{DD}$=50V, I$_D$=20A, V$_{GS}$=10V		-	93	-	nC
Total Gate Charge	Q$_g$ (4.5V)			-	53	-	
Gate to Source Charge	Q$_{gs}$			-	8	-	
Gate to Drain (Miller) Charge	Q$_{gd}$			-	32	-	
Turn on Delay Time	t$_{d(on)}$	V$_{DD}$=50V, I$_D$=20A, V$_{GS}$=10V, R$_G$=10Ω,		-	15	-	ns
Rise time	t$_r$			-	18	-	
Turn off Delay Time	t$_{d(off)}$			-	52	-	
Fall Time	t$_f$			-	24	-	

Reverse Diode Characteristics

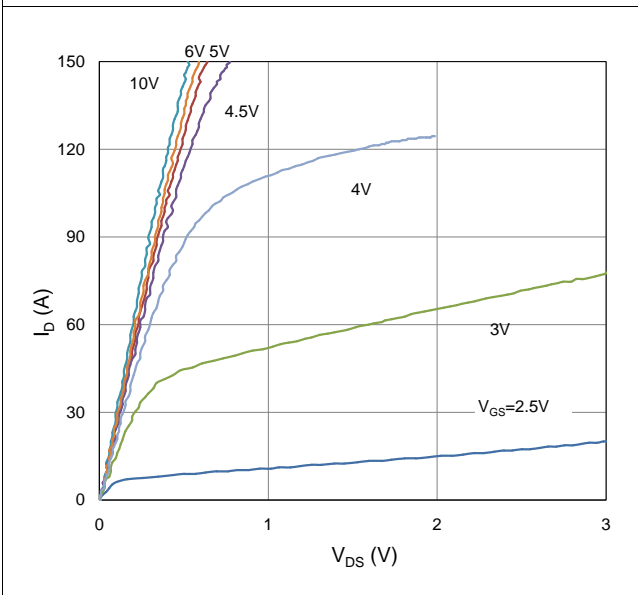| Parameter	Symbol	Conditions	min	typ	max	Unit
Diode Forward Voltage	V$_{SD}$	V$_{GS}$=0V, I$_F$=20A	-	0.9	1.2	V
Reverse Recovery Time	t$_{rr}$	V$_R$=50V, I$_F$=20A, dI$_F$/dt=500A/μs	-	45	-	ns
Reverse Recovery Charge	Q$_{rr}$		-	214	-	nC

Hunteck

Fig 1. Typical Output Characteristics

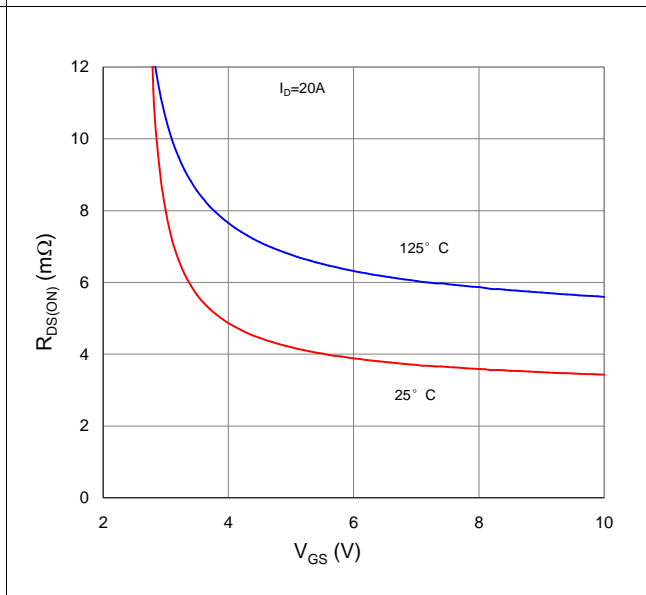Figure 2. On-Resistance vs. Gate-Source Voltage

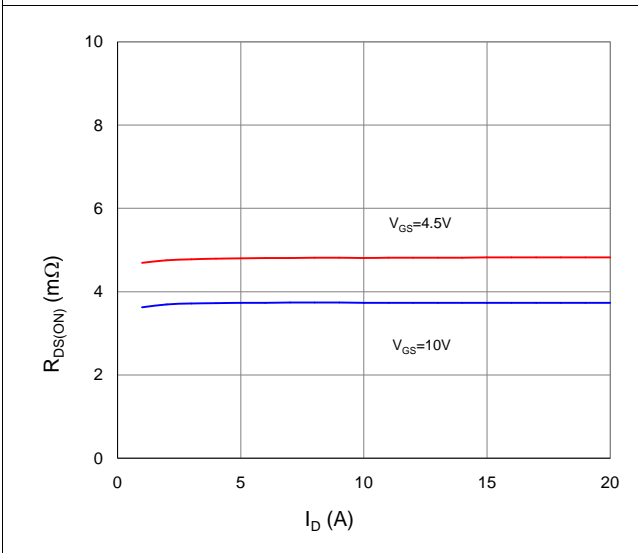Figure 3. On-Resistance vs. Drain Current and Gate Voltage

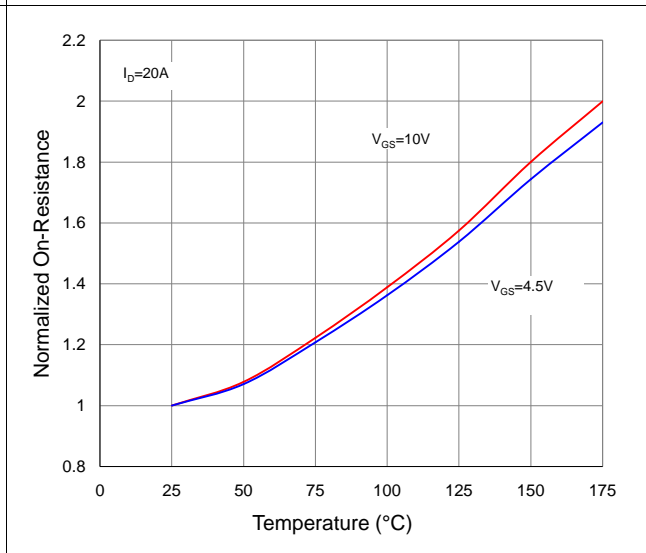Figure 4. Normalized On-Resistance vs. Junction Temperature
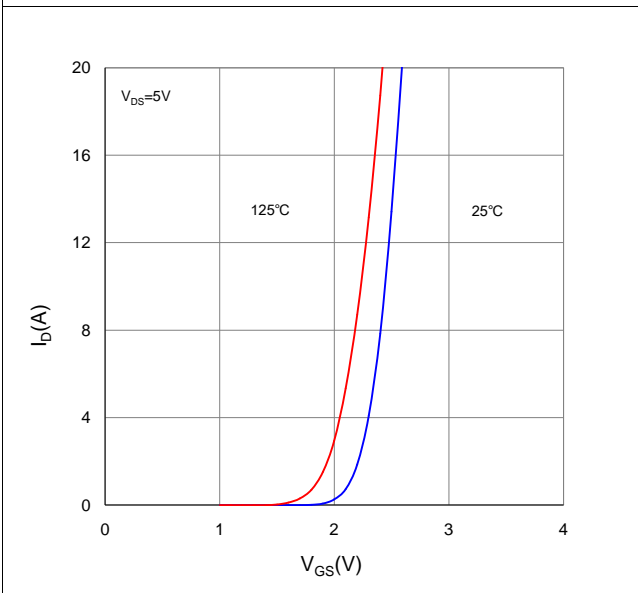
Figure 5. Typical Transfer Characteristics

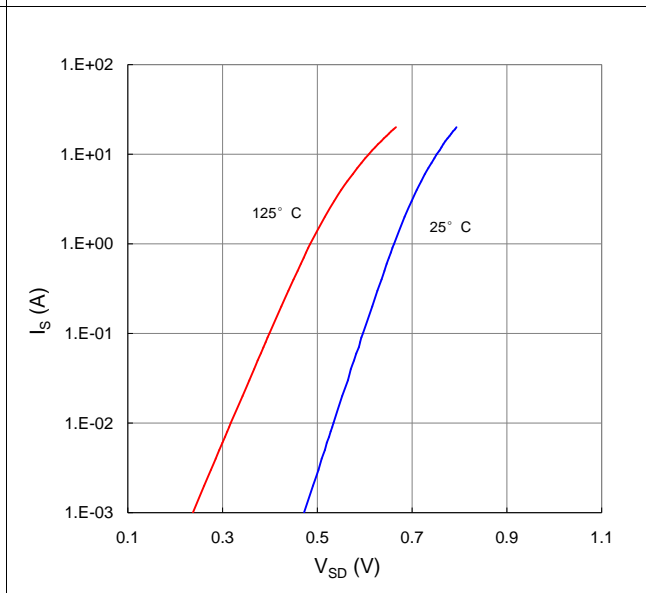Figure 6. Typical Source-Drain Diode Forward Voltage

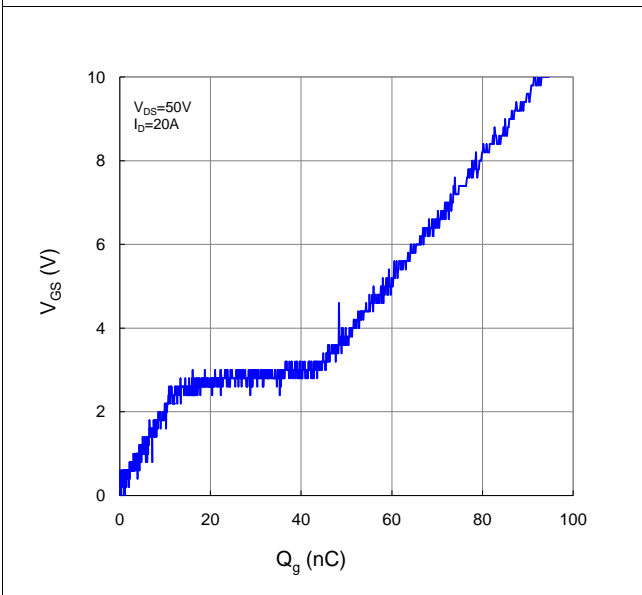Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

V_{DS}=50V
I_D=20A

V_{GS} (V) vs Q_g (nC)

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

Capacitance (pF) vs V_{DS} (V)

C_{iss}
C_{oss}
C_{rss}

Figure 9. Maximum Safe Operating Area

$R_{DS(ON)}$ limited
10us
100us
1ms
10ms
DC

$T_{J(Max)}$=175°C
T_C=25°C

I_D (A) vs V_{DS} (V)
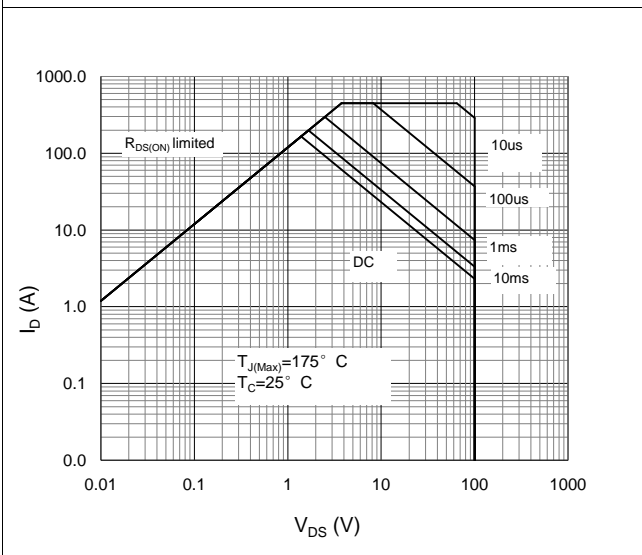
Figure 10. Maximun Drain Current vs. Case Temperature

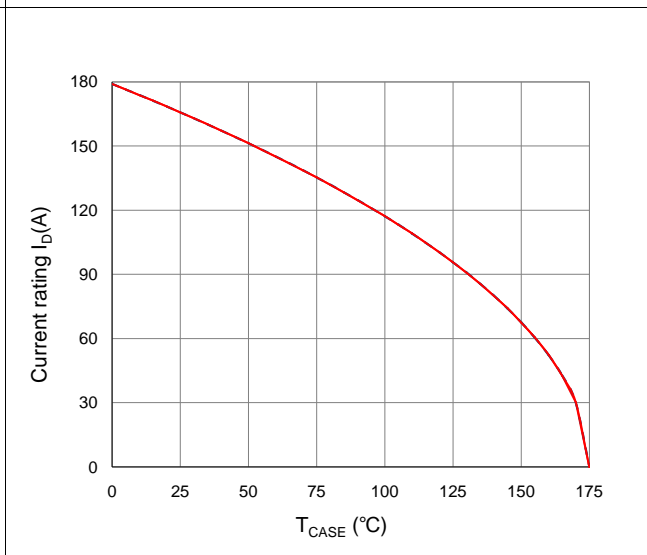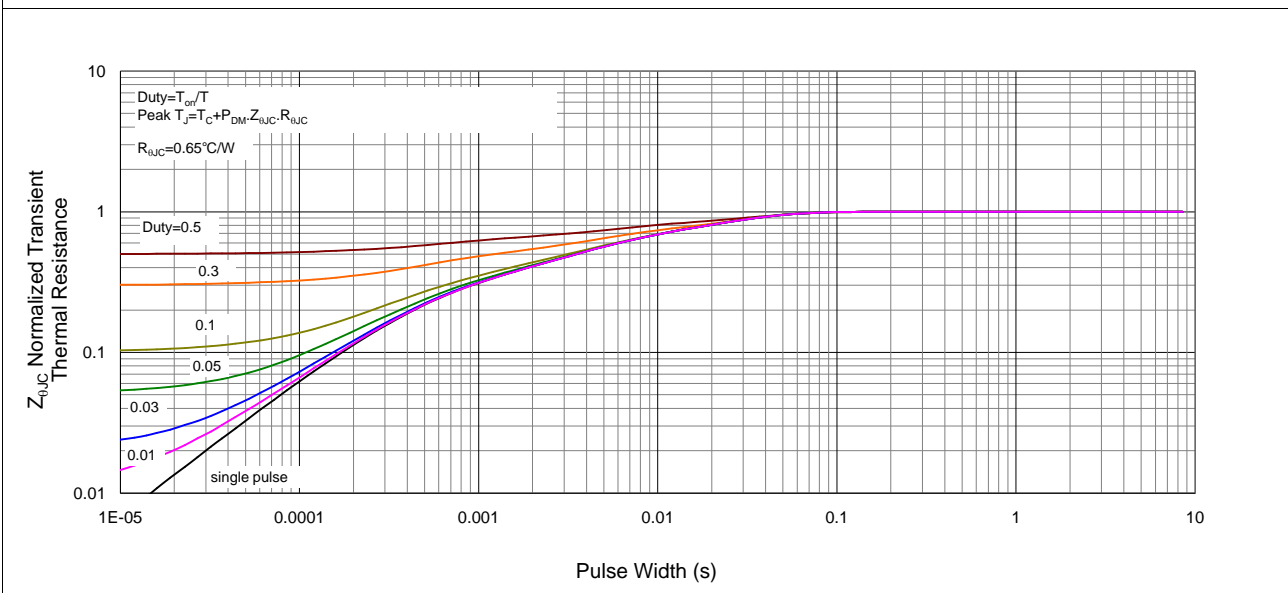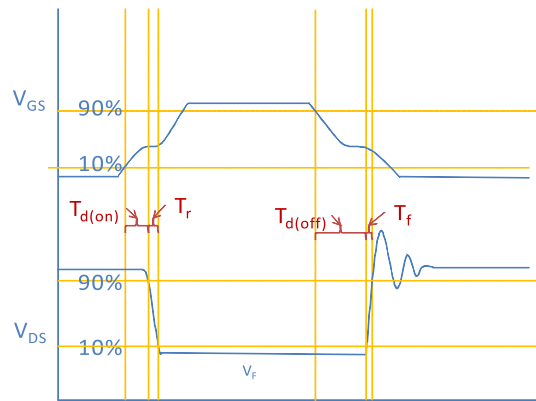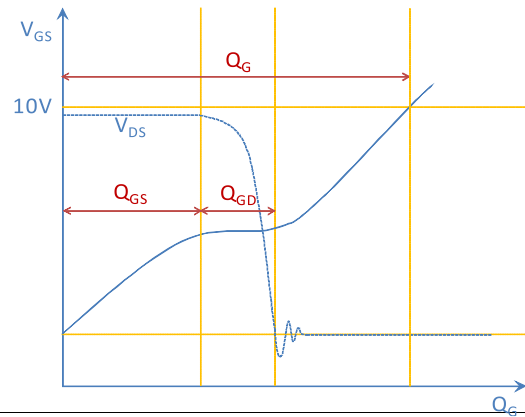Current rating I_D(A) vs T_{CASE} (°C)

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

Duty=T_{on}/T
Peak T_J=T_C+P_{DM}·$Z_{\theta JC}$·$R_{\theta JC}$
$R_{\theta JC}$=0.65°C/W

Duty=0.5
0.3
0.1
0.05
0.03
0.01
single pulse

$Z_{\theta JC}$ Normalized Transient Thermal Resistance vs Pulse Width (s)
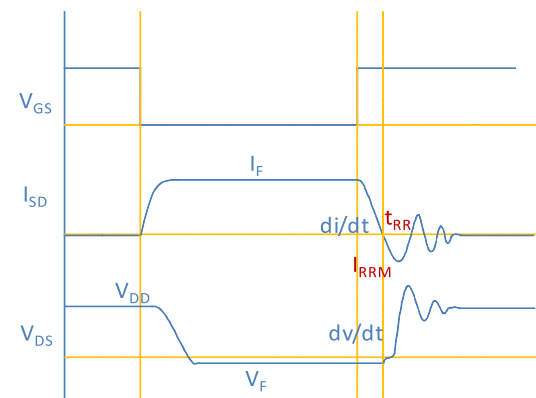
Inductive switching Test

Gate Charge Test

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