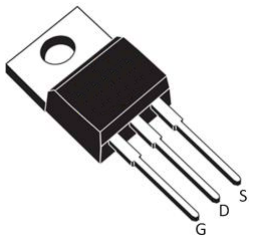
HMB100N20

Silicon N-Channel Power MOSFET

V_{DSS}	200	V
I_D	100	A
P_D	300	W
$R_{DS(ON)type}$	10	mΩ

TO-220



General Description：

The HMB100N20 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications. The package form is TO-263, which accords with the RoHS standard.

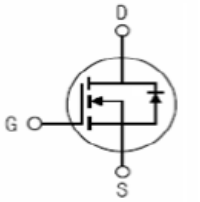
Features：

- **Fast Switching**
- **Low Gate Charge and Rdson**
- **Low Reverse transfer capacitances**
- **100% Single Pulse avalanche energy Test**

Applications：

Power switching application
Hard switched and high frequency circuits
Uninterruptible power supply

Inner Equivalent Principium Chart



Absolute（Tc= 25℃ unless otherwise specified）：

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	200	V
I_D	Continuous Drain Current	100	A
	Continuous Drain Current T_C = 100 °C	71	A
I_{DM}	Pulsed Drain Current	400	A
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS} a2	Single Pulse Avalanche Energy	1200	mJ
E_{AR} a1	Avalanche Energy ,Repetitive	80	mJ
I_{AR} a1	Avalanche Current	100	A
dv/dt a3	Peak Diode Recovery dv/dt	5.0	V/ns
P_D	Power Dissipation	300	W
T_J， T_{stg}	Operating Junction and Storage Temperature Range	175，–55 to 175	℃
T_L	MaximumTemperature for Soldering	300	℃

Electrical Characteristics（Tc= 25℃ unless otherwise specified）：

OFF Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	200	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	ID=250uA,Reference25℃	--	0.1	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS} = 200V, V_{GS}= 0V, T_a = 25℃	--	--	1	μA
		V_{DS} =160V, V_{GS}= 0V, T_a = 125℃	--	--	250	
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+20V	--	--	1	μA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-20V	--	--	-1	μA

ON Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On-Resistance	V_{GS}=10V,I_D=50A	--	10	14	mΩ
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.5	--	4.5	V
Pulse width tp≤380μs, δ ≤2%						

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D =50A	70	--	--	S
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 100V f = 1.0MHz	--	4300	--	pF
C_{oss}	Output Capacitance		--	350	--	
C_{rss}	Reverse Transfer Capacitance		--	10	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =50A V_{DD} = 100V V_{GS} = 10V R_G = 4.7Ω	--	18	--	ns
tr	Rise Time		--	27	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	42	--	
t_f	Fall Time		--	12	--	
Q_g	Total Gate Charge	I_D =50A V_{DD} =100V V_{GS} = 10V	--	65	--	nC
Q_{gs}	Gate to Source Charge		--	25	--	
Q_{gd}	Gate to Drain (“Miller”)Charge		--	17	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)		--	--	100	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	400	A
V_{SD}	Diode Forward Voltage	I_S=100A,V_{GS}=0V	--	--	1.5	V
trr	Reverse Recovery Time	I_S=100A,T_J = 25° C	--	140	--	ns
Qrr	Reverse Recovery Charge	dI_F/dt=100A/us, V_{GS}=0V	--	600	--	nC
Pulse width tp≤380μs, δ ≤2%						

Symbol	Parameter	Typ.	Units
$R_{\theta c}$	Junction-to-Case	0.5	℃/W

[a1]: Repetitive rating; pulse width limited by maximum junction temperature

[a2]: EAS condition : Tj=25℃ ,VDD= 50V,VG=10V,L=0.5mH,Rg=25Ω

[a3]: I_{SD} =100A,di/dt ≤100A/us,V_{DD}≤BV_{DS}, Start T_J=25℃

Test Circuit and Waveform

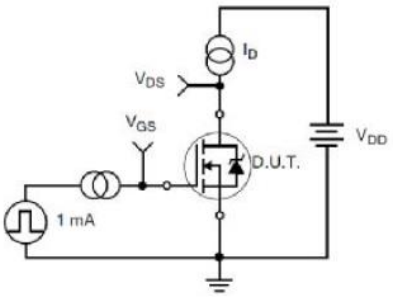


Figure 17. Gate Charge Test Circuit

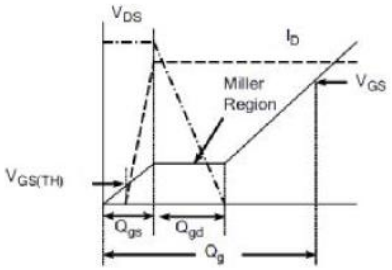


Figure 18. Gate Charge Waveform

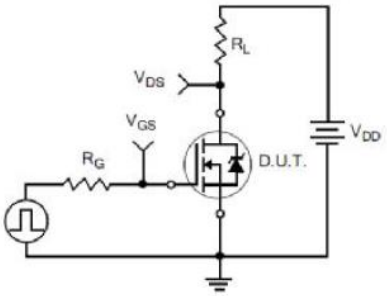


Figure 19. Resistive Switching Test Circuit

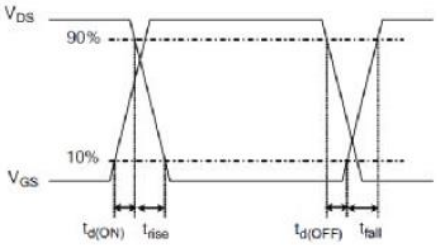


Figure 20. Resistive Switching Waveforms

Characteristics Curve :

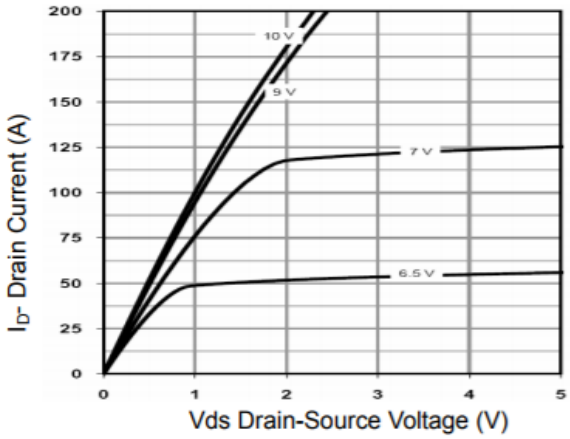


Figure 1 Output Characteristics

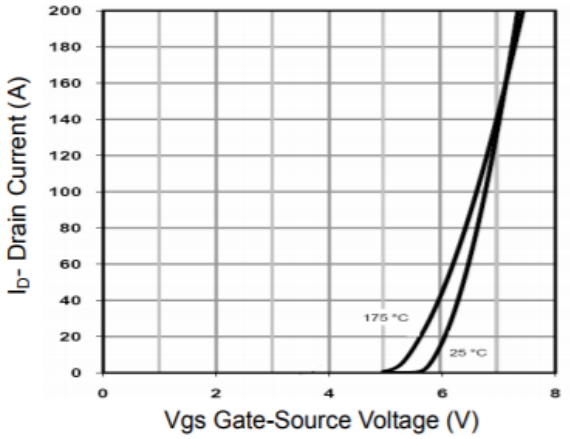


Figure 2 Transfer Characteristics

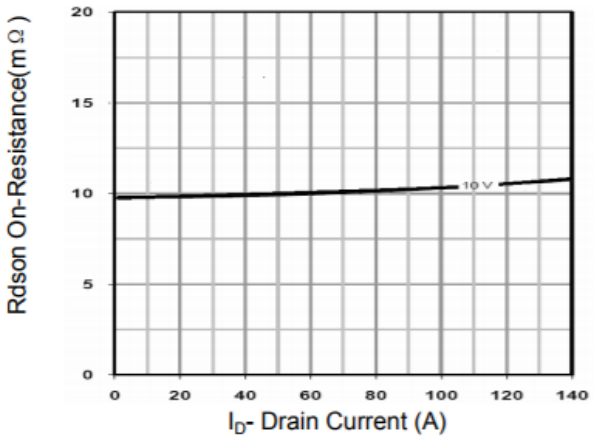


Figure 3 Rdson- Drain Current

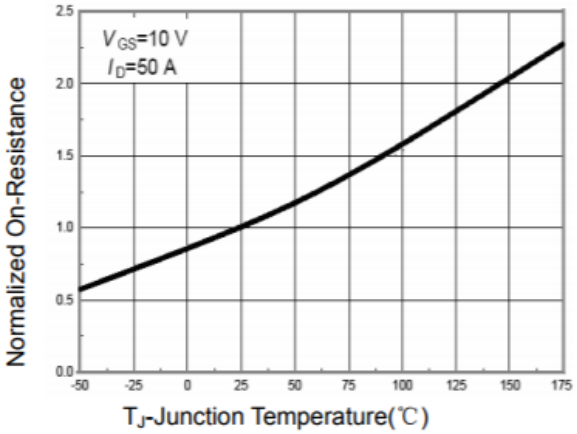


Figure 4 Rdson-JunctionTemperature

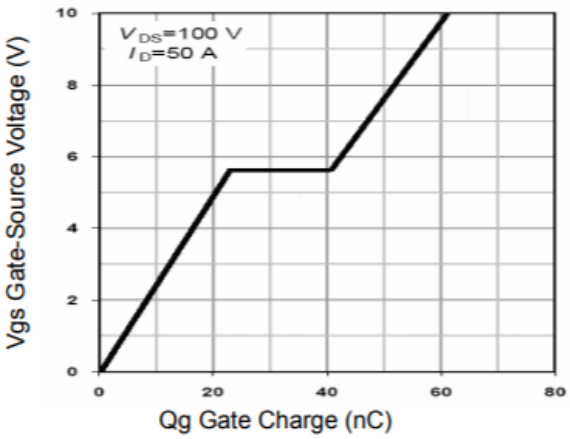


Figure 5 Gate Charge

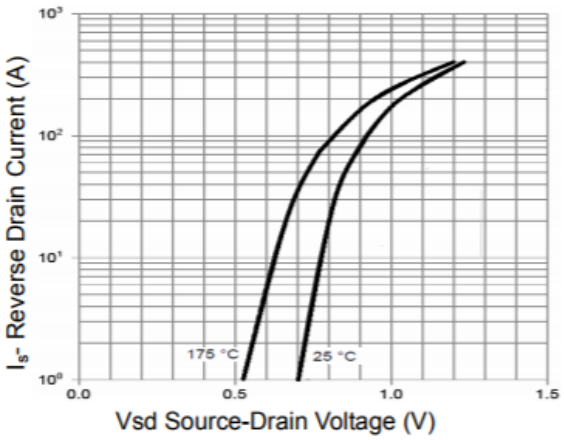


Figure 6 Source- Drain Diode Forward

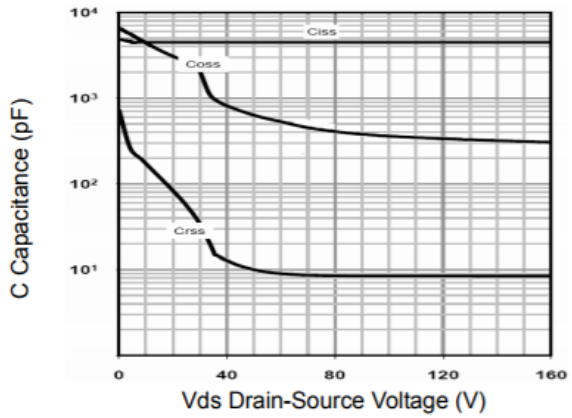


Figure 7 Capacitance vs Vds

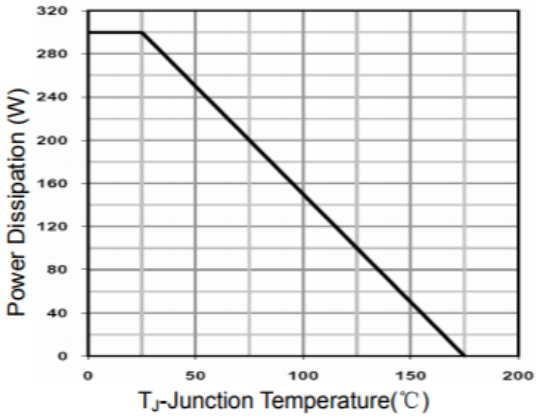


Figure 9 Power De-rating

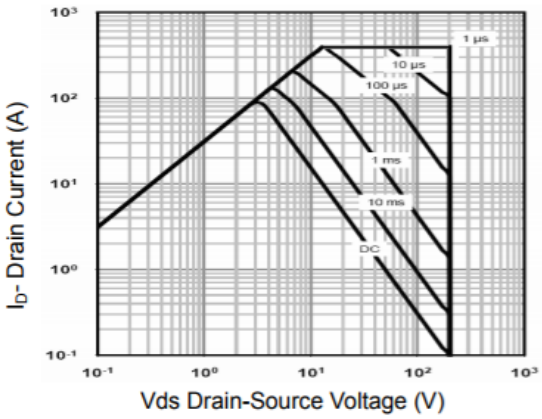


Figure 8 Safe Operation Area

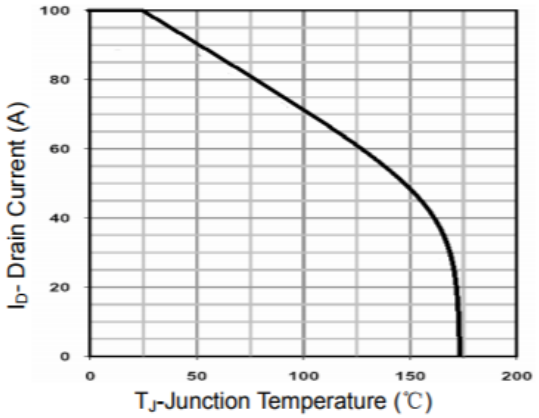


Figure 10 Current De-rating

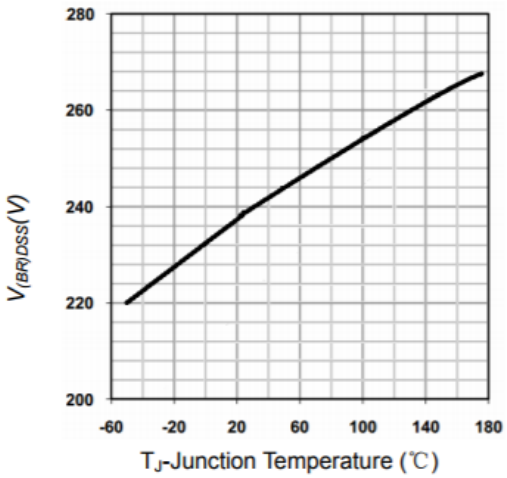


Figure 11 Drain-source breakdown voltage