

Silicon N-Channel Power MOSFET

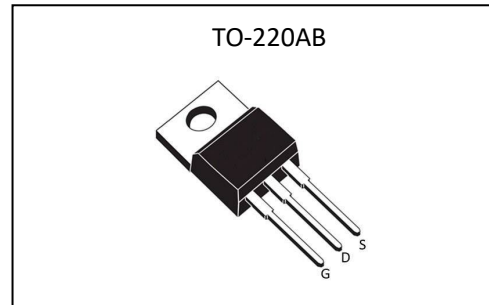
General Description:

The HMB120N10 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. The package form is TO-220AB, which accords with the RoHS standard.

V_{DSS}	100	V
I_D	120	A
P_D	200	W
$R_{DS(ON)type}$	3.5	m Ω

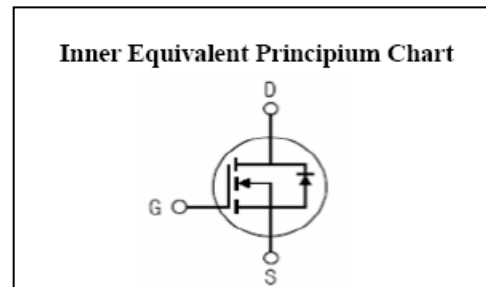
Features:

- $R_{DS(ON)} < 4.4m\Omega$ @ $V_{GS}=10V$ (Typ3.5m Ω)
- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation



Applications:

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



Absolute (Tc= 25°C unless otherwise specified):

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage ^{a1}	100	V
I_D	Continuous Drain Current ^{a2}	120	A
I_{DM}	Pulsed Drain Current ^{a2a4}	480	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	200	W
E_{AS}	Single pulse avalanche energy ^{a5}	1200	mJ
T_J, T_{stg}	Operating Junction and Storage Temperature Range	175, -55 to 175	°C

Electrical Characteristics (Tc= 25°C 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	100	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} =100V, V _{GS} = 0V, T _a = 25°C	--	--	5.0	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} = +20V	--	--	0.1	μA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} = -20V	--	--	-0.1	μA

ON Characteristics ^{a3}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =75A	--	3.5	4.4	mΩ
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2.0	--	4.0	V

Pulse width tp ≤ 380μs, δ ≤ 2%

Dynamic Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =20A	70	--	--	S
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V f=1.0MHz	--	13	--	pF
C _{oss}	Output Capacitance		--	0.60	--	
C _{rss}	Reverse Transfer Capacitance		--	0.75	--	

Resistive Switching Characteristics ^{a4}						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =50V, I _D =40A V _{GS} =10V, R _G =10Ω	--	60	--	ns
t _r	Rise Time		--	120	--	
t _{d(OFF)}	Turn-Off Delay Time		--	150	--	
t _f	Fall Time		--	83	--	
Q _g	Total Gate Charge	V _{DD} =50V, I _D =80A V _{GS} =10V	--	128	--	nC
Q _{gs}	Gate to Source Charge		--	33	--	
Q _{gd}	Gate to Drain ("Miller")Charge		--	38	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Rating			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current ^{a2} (Body Diode)		--	--	120	A
V_{SD}	Diode Forward Voltage	$I_S=90A, V_{GS}=0V$	--	--	1.2	V

Symbol	Parameter	Typ.	Units
$R_{\theta JC}$	Junction-to-Case ^{a2}	0.75	°C/W

^{a1}: $T_J=+25^{\circ}C$ to $+175$

^{a2}: Silicon limited current only..

^{a3}: Package limited current.

^{a4}: Repetitive rating; pulse width limited by maximum junction temperature.

^{a5}: Pulse width $\leq 380\mu s$; duty cycle $\leq 2\%$.

Characteristics Curve :

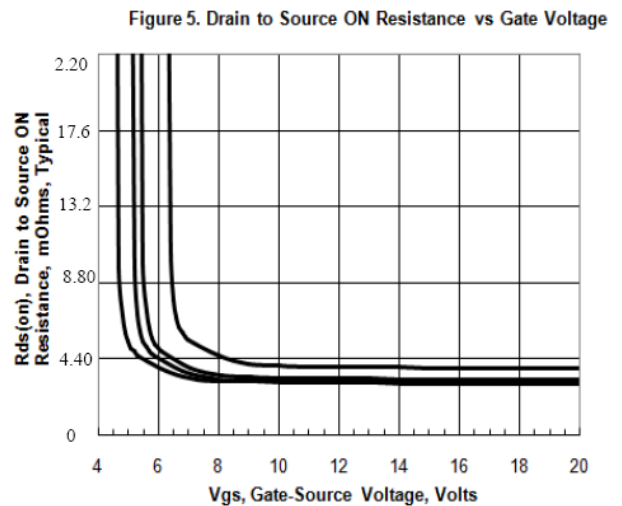
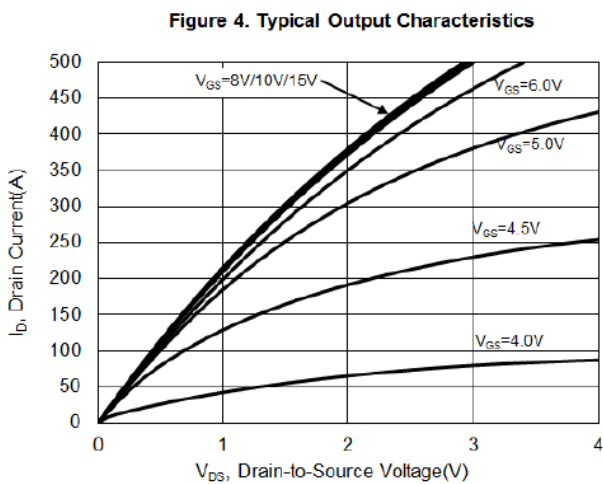
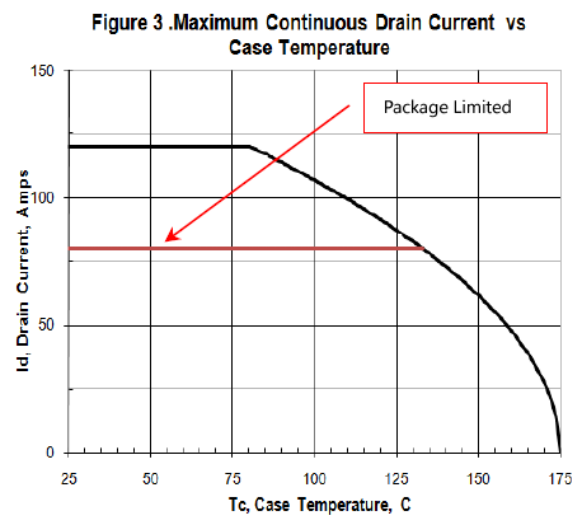
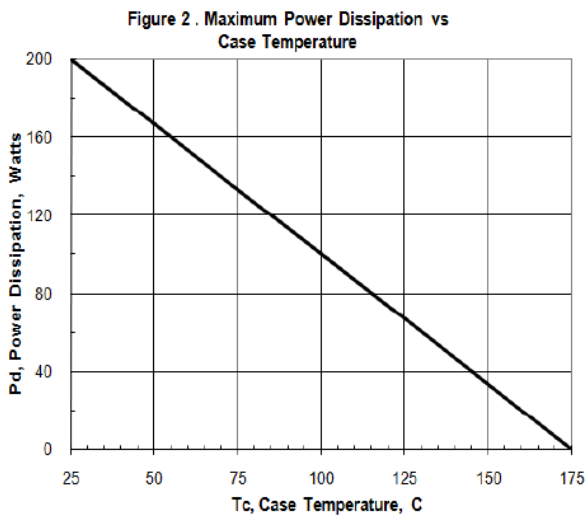
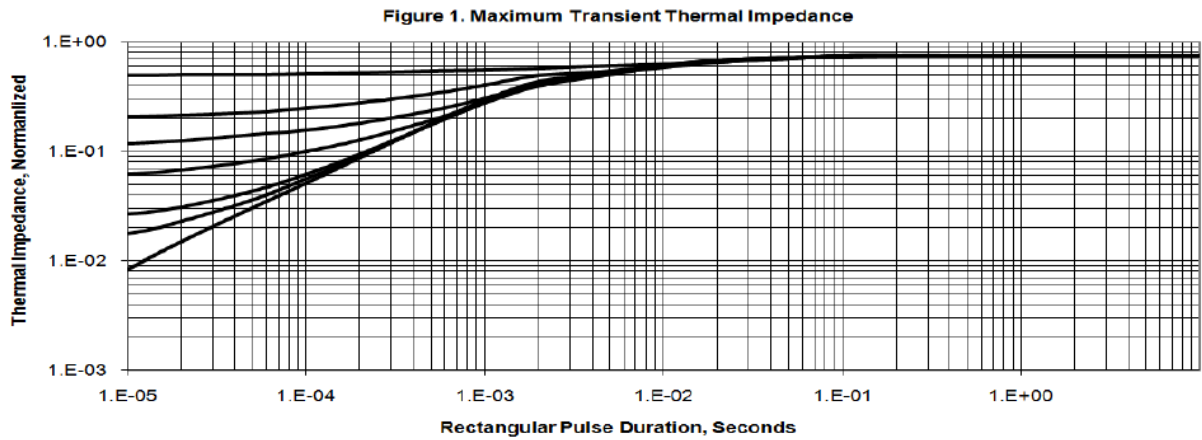


Figure 6. Peak Current Capability

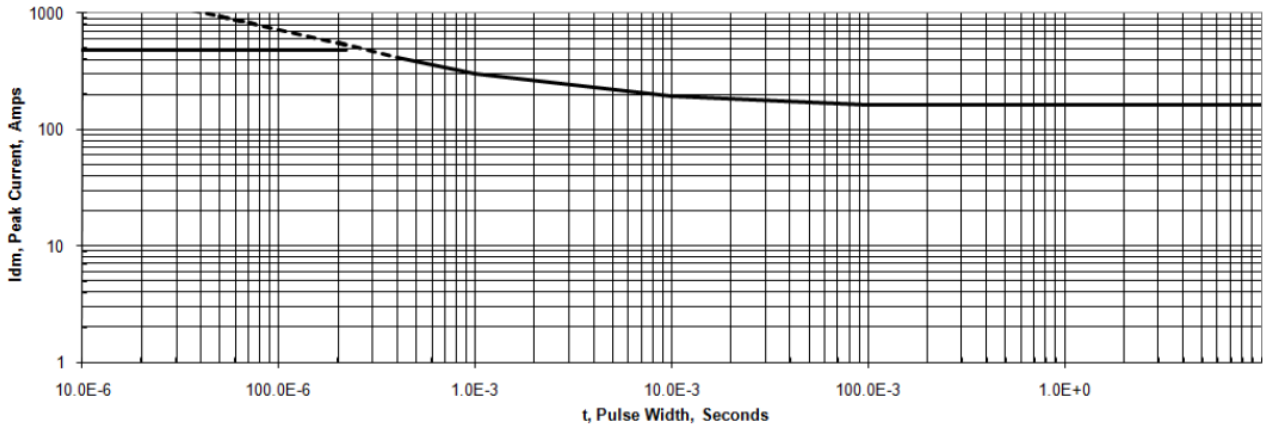


Figure 7. Typical Transfer Characteristics

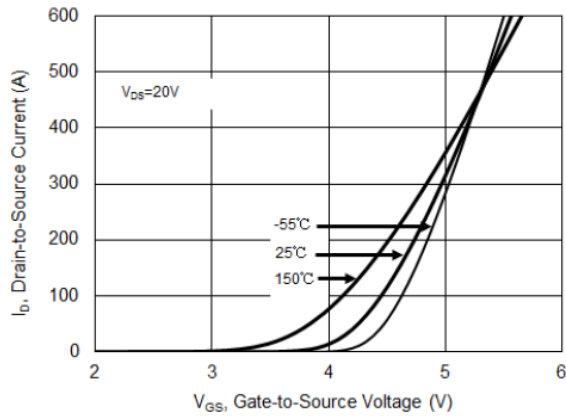


Figure 8. Unclamped Inductive Switching Capability

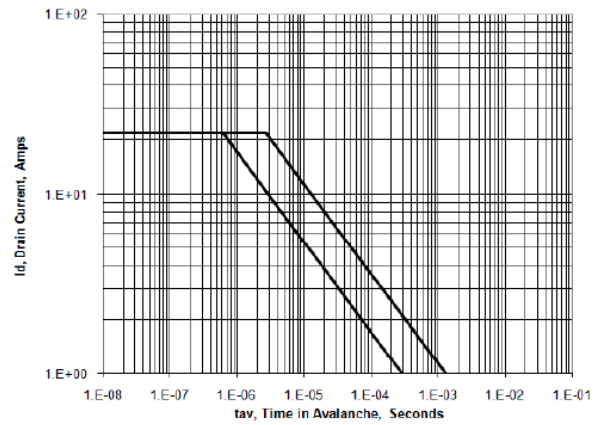


Figure 9. Drain to Source ON Resistance vs Drain Current

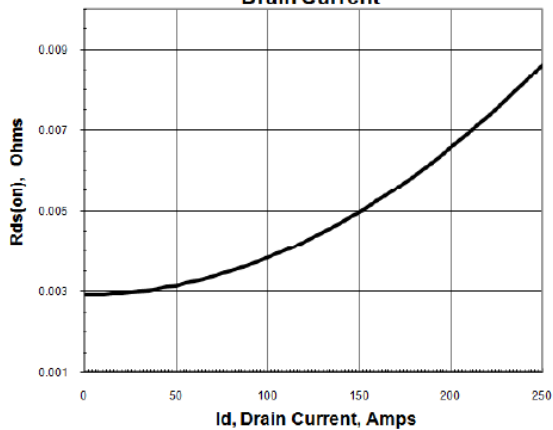


Figure 10. Typical Drain-to-Source On Resistance vs. Junction Temperature

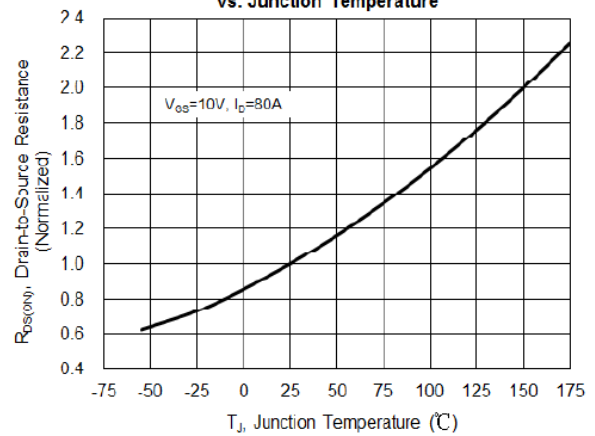


Figure 11. Typical Breakdown Voltage vs. Junction Temperature

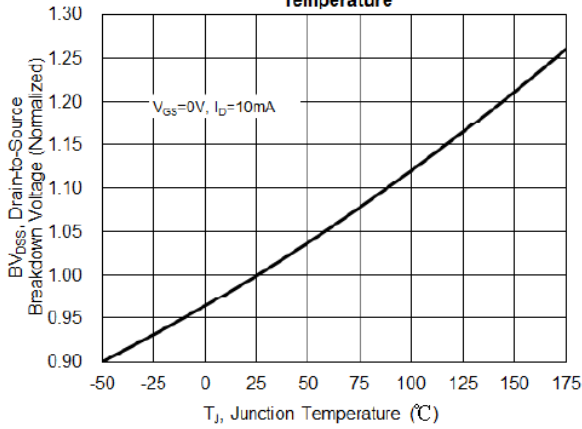


Figure 12. Typical Threshold Voltage vs. Junction Temperature

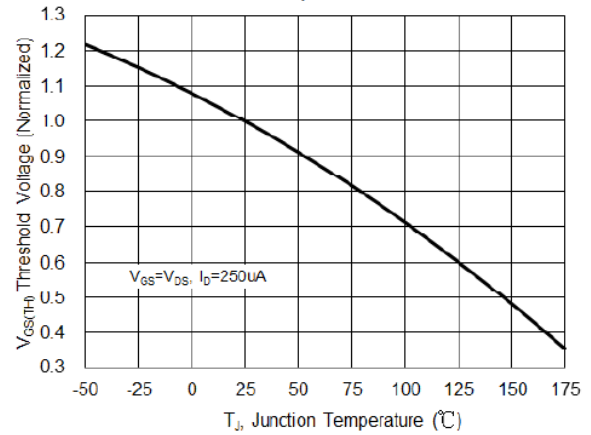


Figure 13. Maximum Safe Operating Area

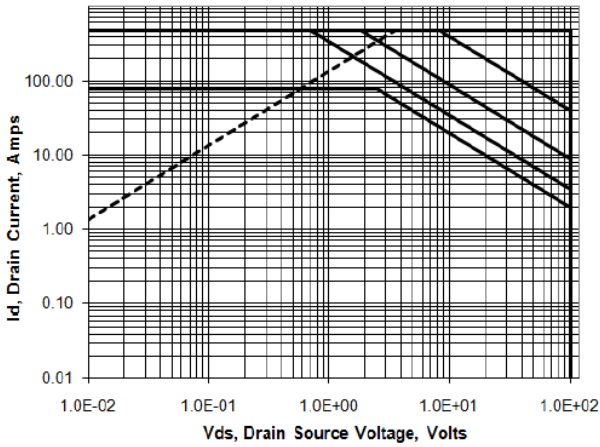


Figure 14. Capacitance vs V_{ds}

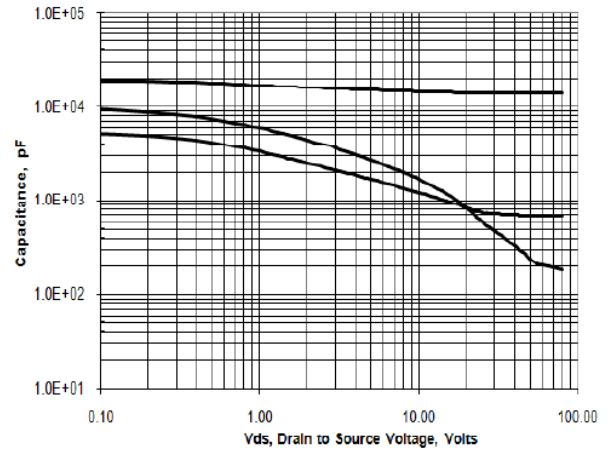


Figure 15. Typical Gate Charge

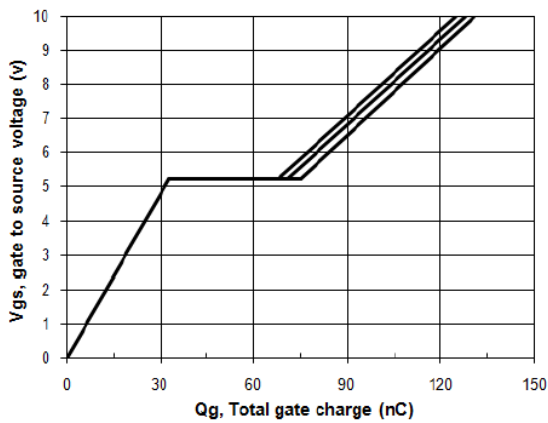


Figure 16. Typical Body Diode Transfer Characteristics

