MMN600DB012B

120V 600A N-ch Power MOSFET Module

February 2017 Preliminary RoHS Compliant

PRODUCT FEATURES

- ☐ $R_{DS(ON).typ}$=0.45mΩ@V_{GS}=10V
- ☐ 175℃operating temperature
- ☐ Low Gate Charge Minimize Switching Loss
- ☐ Fast Recovery body Diode
- ☐ 10K Ω Gate Protected Resistance Inside
- ☐ Inside the module,each MOSFET chip has a gate resistance:10Ω

APPLICATIONS

- ☐ High efficiency DC/DC Converters
- ☐ Synchronous Rectifier

Type	V_{DS}	I_D	$R_{DS(ON).max}$ T_J=25℃	T_{Jmax}	Marking	Package
MMN600DB012B	120V	600A	0.6mΩ	175℃	MMN600DB012B	NDB

ABSOLUTE MAXIMUM RATINGS(T_C=25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{DSS}	Drain - Source Voltage	T_J=25℃	120	V
V_{GSS}	Gate - Source Voltage		±20	
I_D	Continuous Drain Current	T_C=25℃	905	A
		T_C=110℃	600	
I_{DM}	Pulsed Drain Current at V_{GS}=10V	Limited by T_{Jmax}	1200	
P_D	Maximum Power Dissipation		1500	W
E_{AS}	Single Pulse Avalanche Energy	V_{DD}=50V,L=1mH	7200	mJ

THERMAL AND MODULE CHARACTERISTICS (T_C=25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
R_{thJC}	Thermal resistance,junction to case Per MOSFET		0.1	K/W
T_{Jmax}	Max. Junction Temperature		175	℃
T_{STG}	Storage Temperature Range		-40～125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
Torque	to heatsink	Recommended（M5）	2.5～5	Nm
	to terminal	Recommended（M5）	2.5～5	
Weight			240	g

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MOSFET

ELECTRICAL CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain Source Breakdown Voltage	V_{GS}=0V, I_D=2mA		120			V
$R_{DS(ON)}$	Drain Source ON Resistance	V_{GS}=10V, I_D=600A(chip)			0.45	0.6	mΩ
I_{DSS}	Drain Source Leakage Current	V_{DS}=120V,V_{GS}=0V				2	mA
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}= V_{DS} , I_D=2mA		3.0		5.0	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V,V_{GS}=±20V		-2		2	mA
R_{gint}	Integrated Gate Resistor				1.5		Ω
Q_g	Total Gate Charge	V_{DD}=60V, I_D=600A , V_{GS}=10V			1264	1690	nC
Q_{gs}	Gate Source Charge				416		nC
Q_{gd}	Gate Drain Charge				296		nC
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f =1MHz			86		nF
C_{oss}	Output Capacitance				23.5		nF
C_{rss}	Reverse Transfer Capacitance				2.35		nF
$t_{d(on)}$	Turn on Delay Time	V_{DD}=60V,I_D=300A, R_G =5Ω, V_{GS}=10V, (Inductive Load)	T_J=25℃		264		ns
t_r	Rise Time				200		ns
$t_{d(off)}$	Turn off Delay Time				395		ns
t_f	Fall Time				156		ns

Source-Drain BODY-DIODE CHARACTERISTICS *(T_C=25°C unless otherwise specified)*

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
I_{SD}	Continuous Source Drain Current				600	A
I_{SDM}	Pulse Source Drain Current	Limited by T_{Jmax}			1200	A
V_{SD}	Forward Voltage	I_S=600A , V_{GS}=0V		0.9	1.2	V
t_{rr}	Reverse Recovery time	I_F=300A , V_{GS}=0V dI$_F$/dt=-1000A/μs		162		ns
Q_{RR}	Reverse Recovery Charge			6900		nC

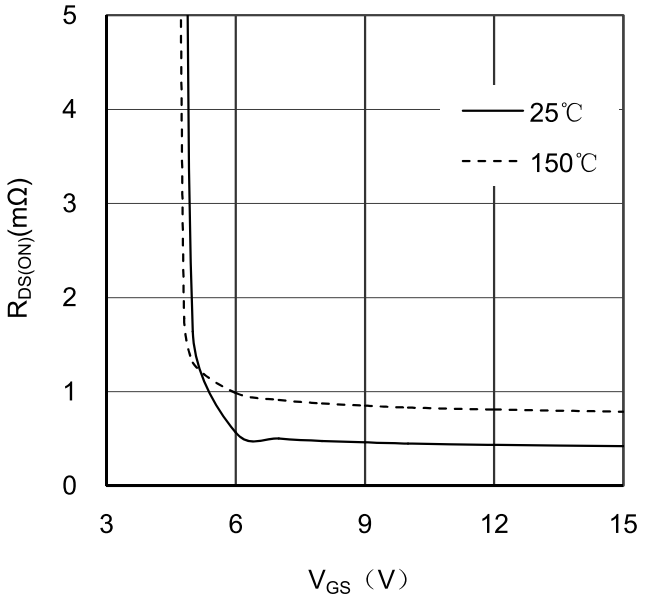


Figure 1. Typical $R_{DS(ON)}$ vs Gate Voltage

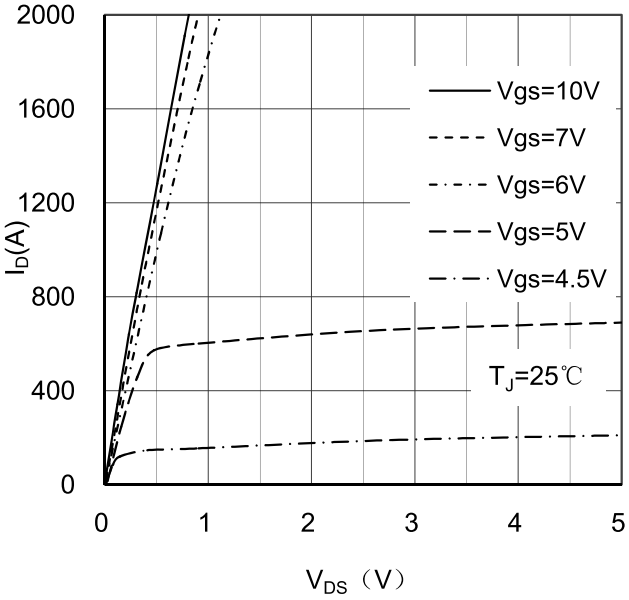


Figure 2. Typical Output Characteristics

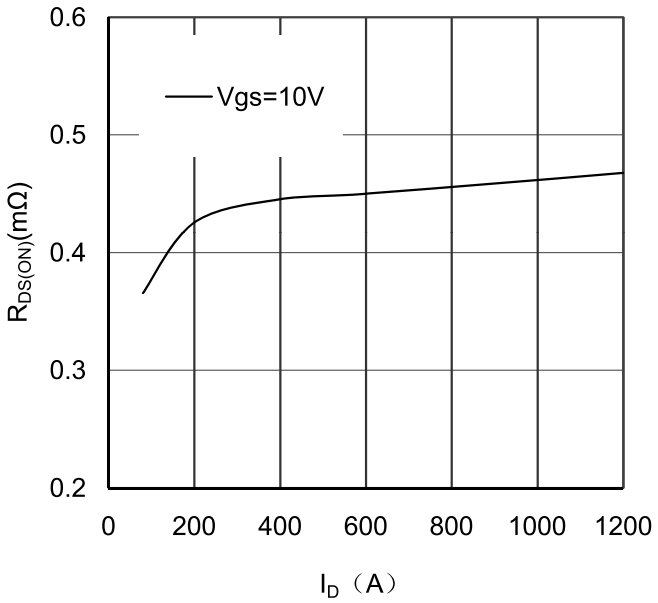


Figure 3. Drain-Source ON Resistance vs I_D

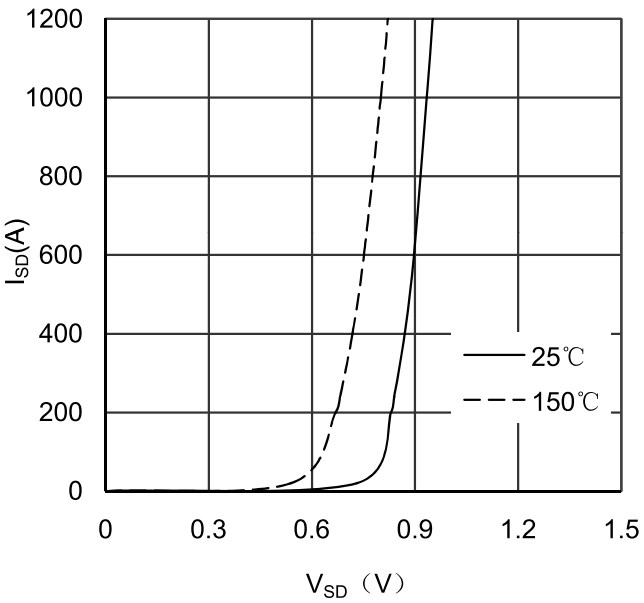


Figure 4. Source-Drain Voltage

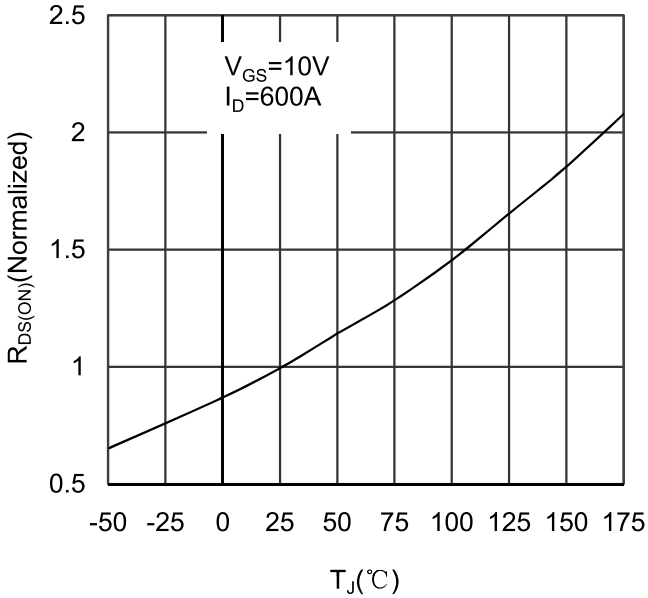


Figure 5. Drain-Source ON Resistance vs Junction Temperature

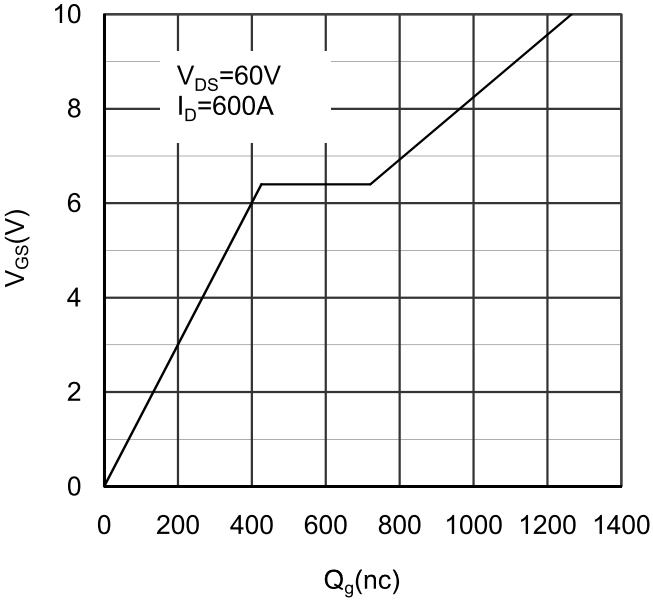


Figure 6. Gate Charge characteristics

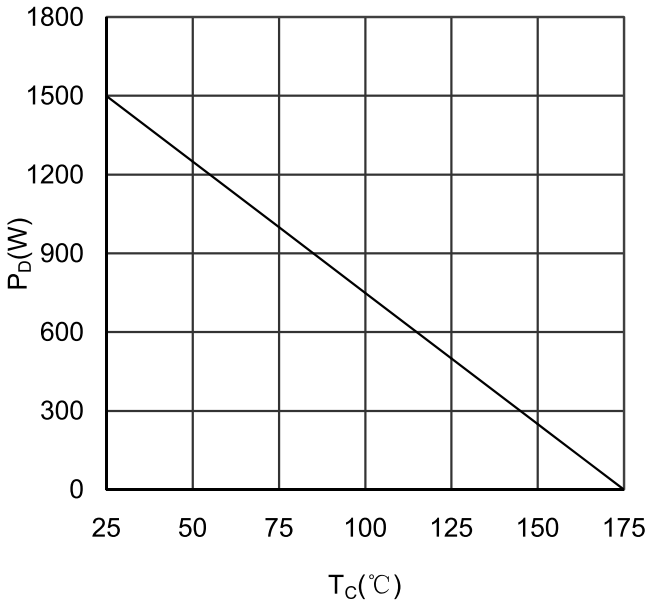


Figure 7. Maximum Power Dissipation vs Case Temperature

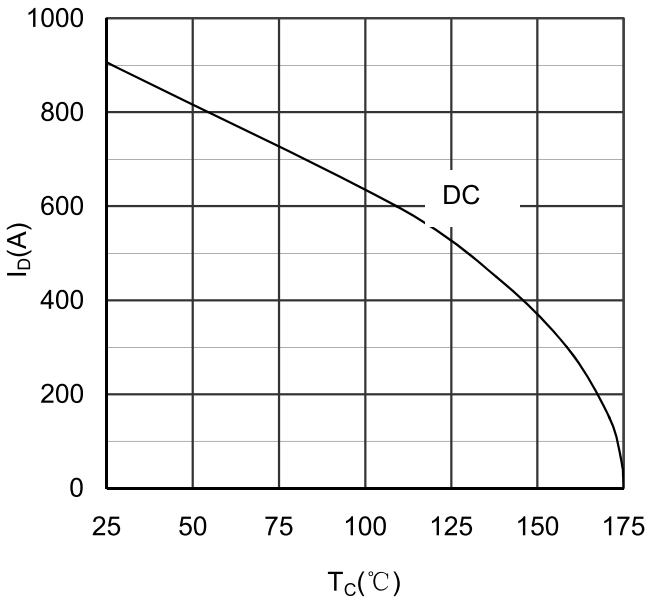


Figure 8. Maximum Continuous Drain Current vs Case Temperature

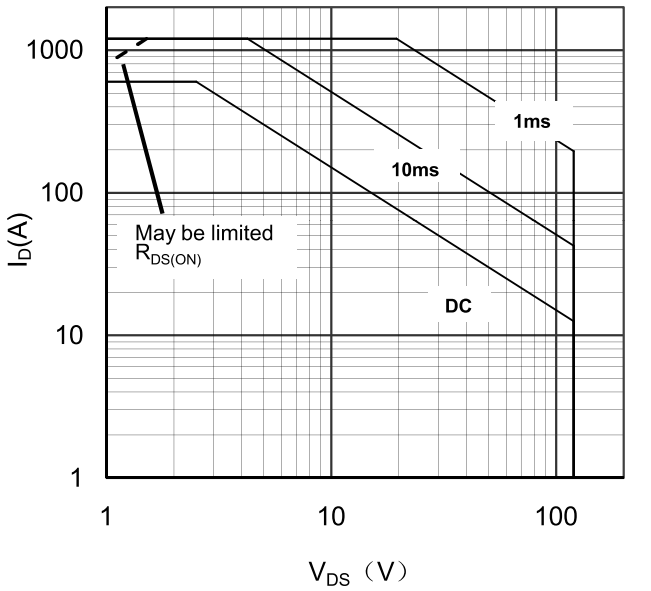


Figure 9. Maximum Forward Safe Operation Area

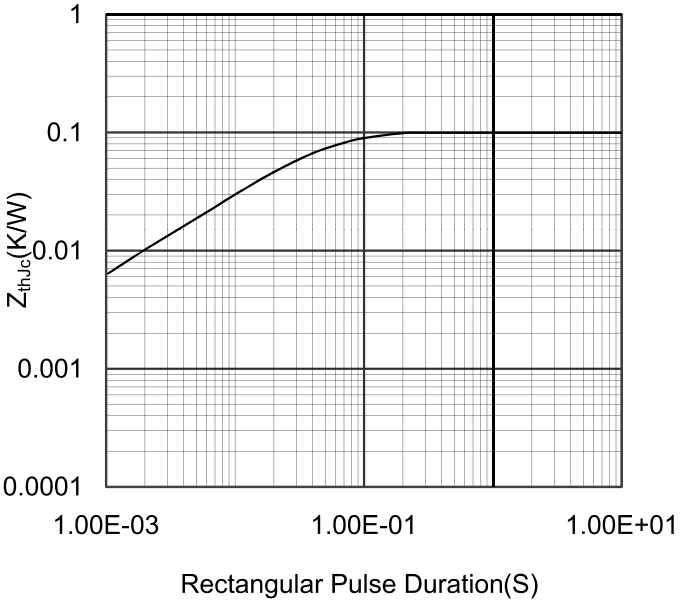


Figure 10. Transient Thermal Impedance

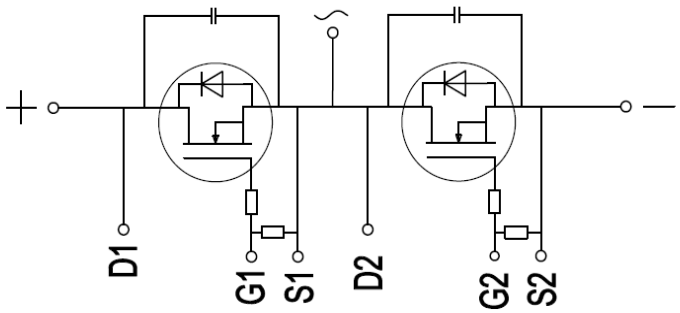
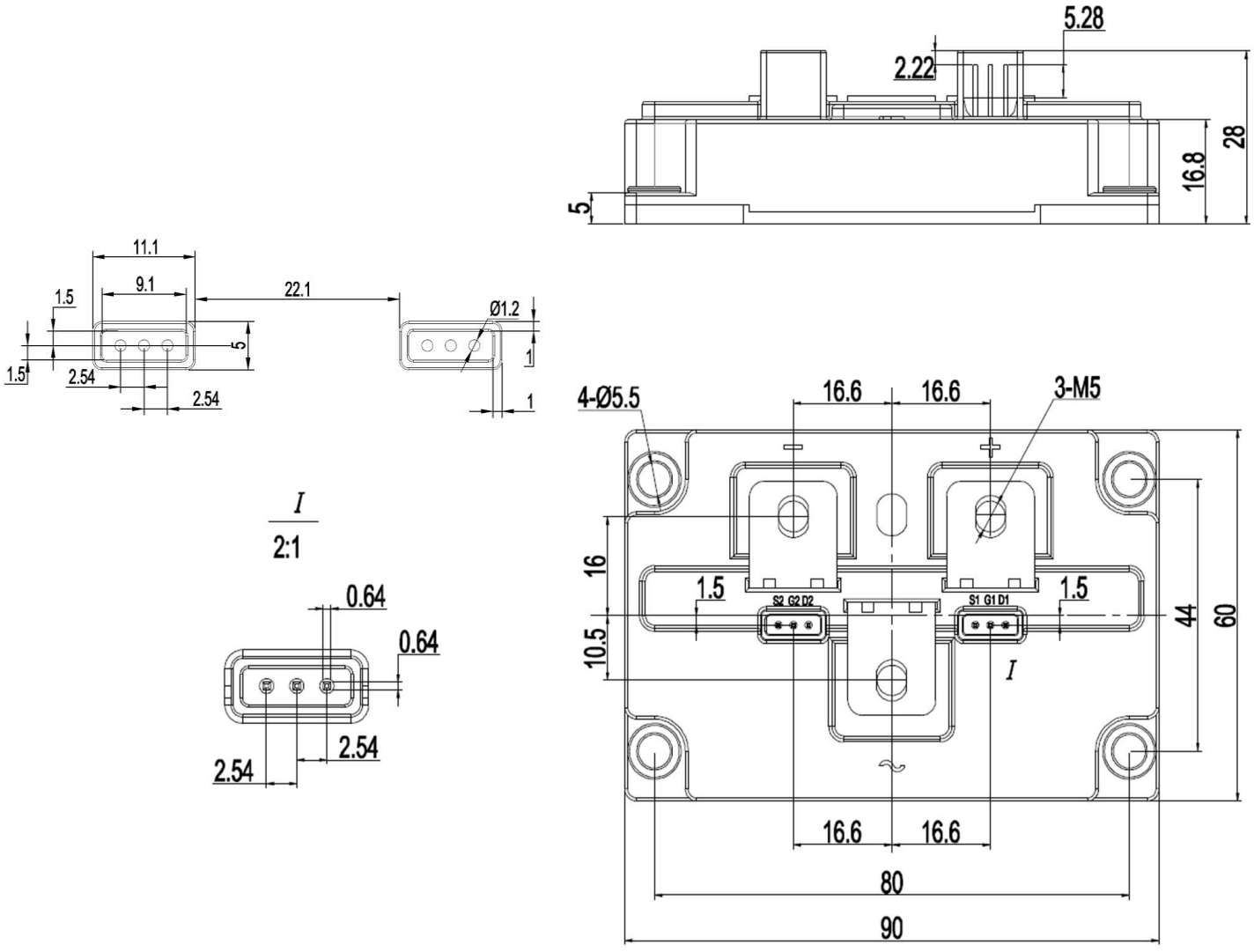


Figure 11. Circuit Diagram



Dimensions in (mm)

Figure 12. Package Outline