

## PRODUCT FEATURES

- $R_{DS(ON),typ}=1.1m\Omega@V_{GS}=10V$
- 175°C operating temperature
- Low Gate Charge Minimize Switching Loss
- Fast Recovery body Diode
- 20K  $\Omega$  Gate Protected Resistance Inside
- Inside the module, each MOSFET chip has a gate resistance: 2.2 $\Omega$



## APPLICATIONS

- High efficiency DC/DC Converters
- ISG EV Products
- UPS inverter

Type	$V_{DS}$	$I_D$	$R_{DS(ON),max} T_J=25^\circ C$	$T_{Jmax}$	Marking	Package
MMN668A010U1	100V	668A	1.4m $\Omega$	175 $^\circ C$	MMN668A010U1	NA

## ABSOLUTE MAXIMUM RATINGS ( $T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
$V_{DSS}$	Drain - Source Voltage	$T_J=25^\circ C$	100	V
$V_{GSS}$	Gate - Source Voltage		$\pm 20$	
$I_D$	Continuous Drain Current	$T_C=25^\circ C$	668	A
		$T_C=100^\circ C$	470	
$I_{DM}$	Pulsed Drain Current at $V_{GS}=10V$	Limited by $T_{Jmax}$	940	
$P_D$	Maximum Power Dissipation		1071	W
$E_{AS}$	Single Pulse Avalanche Energy	$V_{DD}=50V, L=1mH$	3000	mJ

## THERMAL AND MODULE CHARACTERISTICS ( $T_C=25^\circ C$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
$R_{thJC}$	Thermal resistance, junction to case Per MOSFET		0.14	K/W
$T_{Jmax}$	Max. Junction Temperature		175	$^\circ C$
$T_{STG}$	Storage Temperature Range		-40~125	
Torque	to heatsink	Recommended (M5)	2.5~5	Nm
	to terminal	Recommended (M5)	2.5~5	
Weight			110	g

MacMic Science & Technology Co., Ltd.

Add: #18, Hua Shan Zhong Lu, New District, Changzhou City, Jiangsu Province, P. R. of China

# MMN668A010U1

## MOSFET

### ELECTRICAL CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit	
$V_{(BR)DSS}$	Drain Source Breakdown Voltage	$V_{GS}=0V, I_D=1mA$	100			V	
$R_{DS(ON)}$	Drain Source ON Resistance	$V_{GS}=10V, I_D=300A(\text{chip})$		1.1	1.4	m $\Omega$	
$I_{DSS}$	Drain Source Leakage Current	$V_{DS}=100V, V_{GS}=0V$			2	mA	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=1mA$	2.0		4.0	V	
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-2		2	mA	
$R_{gint}$	Integrated Gate Resistor			1.2		$\Omega$	
$Q_g$	Total Gate Charge	$V_{DD}=65V, I_D=300A, V_{GS}=10V$		660		nC	
$Q_{gs}$	Gate Source Charge			170		nC	
$Q_{gd}$	Gate Drain Charge			225		nC	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		44		nF	
$C_{oss}$	Output Capacitance			3.05		nF	
$C_{rss}$	Reverse Transfer Capacitance			0.73		nF	
$t_{d(on)}$	Turn on Delay Time	$V_{DD}=50V, I_D=200A,$ $R_G=5\Omega, V_{GS}=10V,$ Resistive Load	$T_J=25^\circ\text{C}$		122		ns
$t_r$	Rise Time				88		ns
$t_{d(off)}$	Turn off Delay Time				540		ns
$t_f$	Fall Time				112		ns

### Source-Drain BODY-DIODE CHARACTERISTICS ( $T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
$I_{SD}$	Continuous Source Drain Current				400	A
$I_{SDM}$	Pulse Source Drain Current	Limited by $T_{Jmax}$			800	A
$V_{SD}$	Forward Voltage	$I_S=300A, V_{GS}=0V$		1.0	1.2	V
$t_{rr}$	Reverse Recovery time	$I_F=200A, V_{GS}=0V$		130		ns
$Q_{RR}$	Reverse Recovery Charge	$di_F/dt=-140A/\mu s$		800		nC

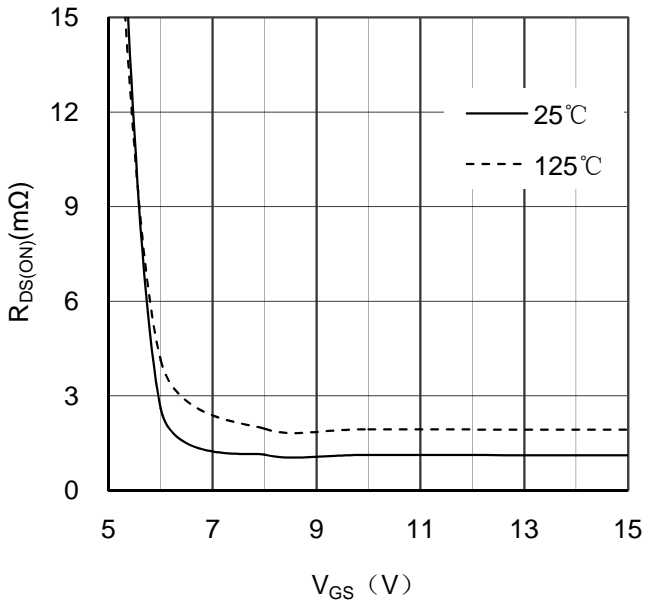


Figure 1. Typical  $R_{DS(ON)}$  vs Gate Voltage

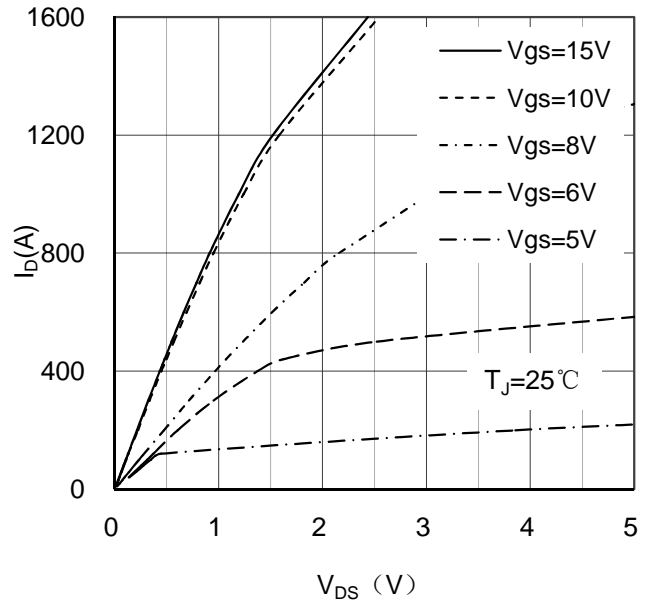


Figure 2. Typical Output Characteristics

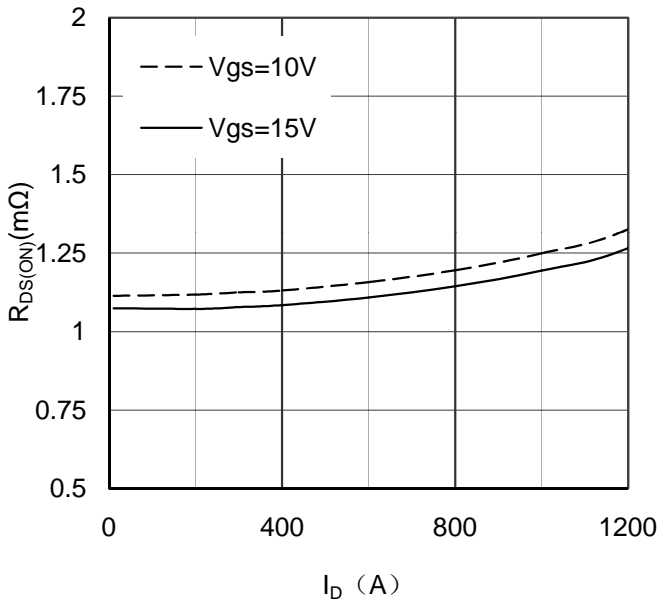


Figure 3. Drain-Source ON Resistance vs  $I_D$

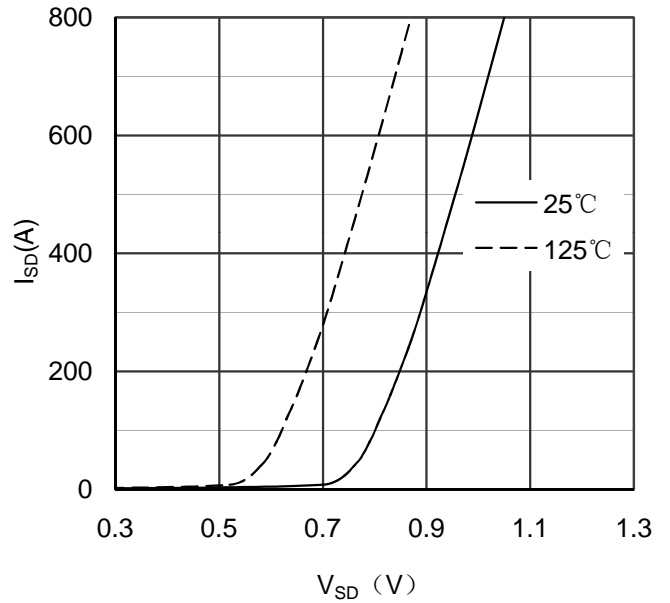


Figure 4. Source-Drain Voltage

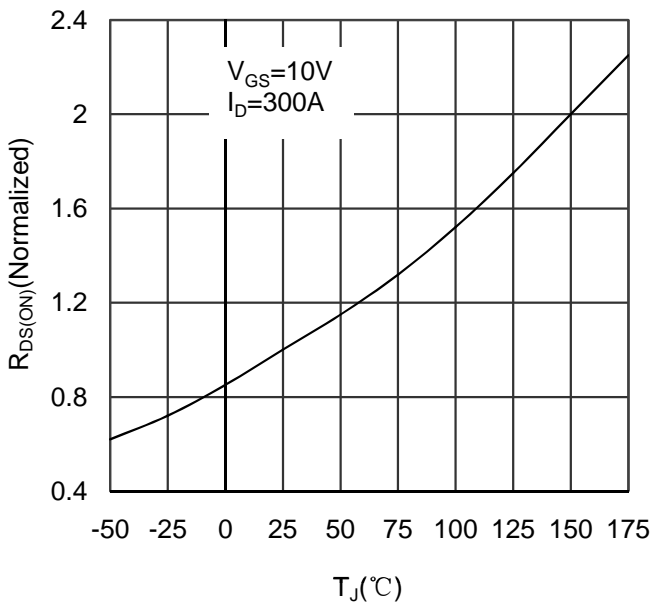


Figure 5. Drain-Source ON Resistance vs Junction Temperature

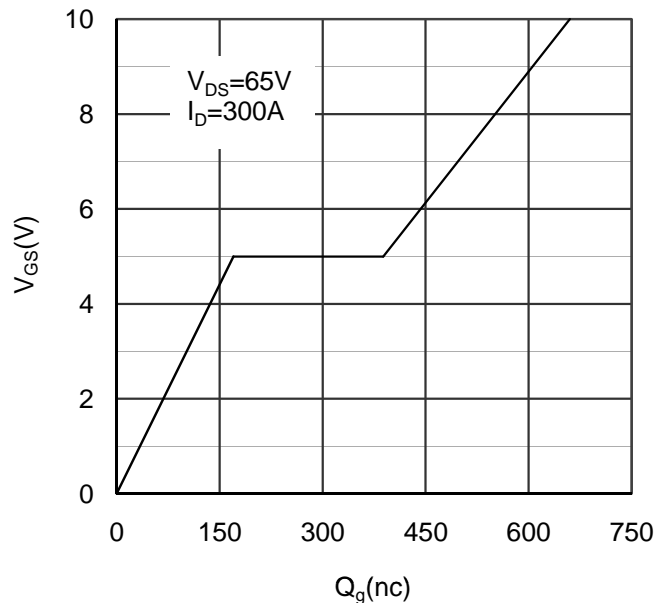


Figure 6. Gate Charge characteristics

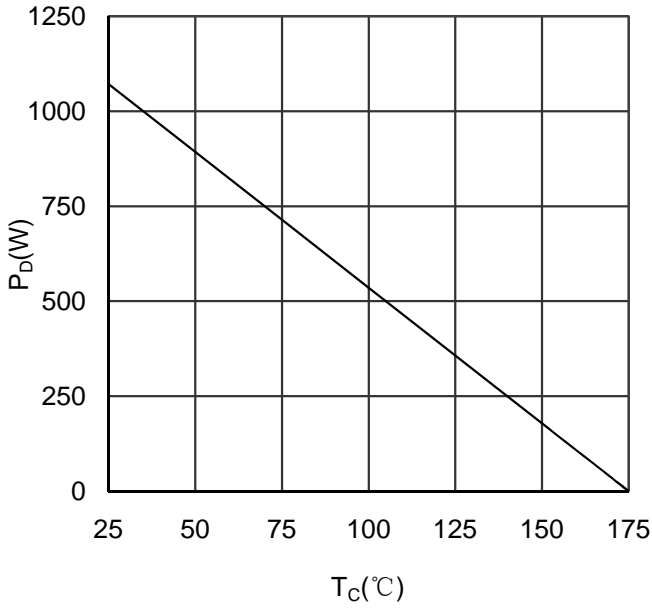


Figure 7. Maximum Power Dissipation vs Case Temperature

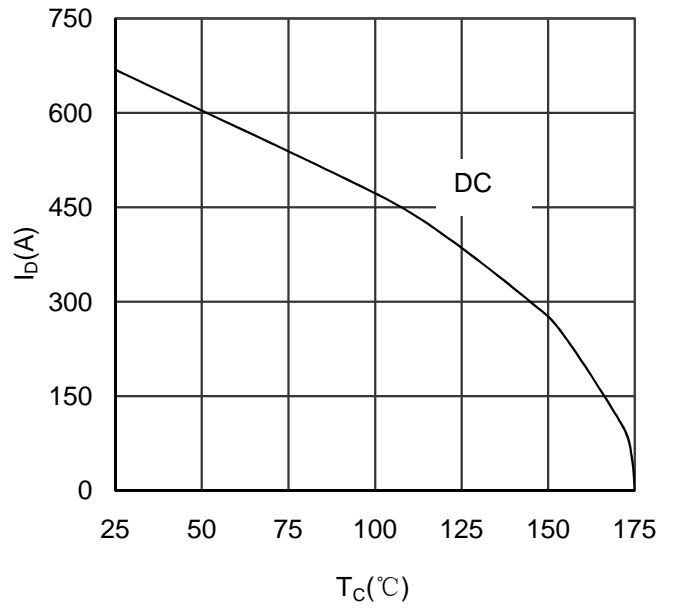


Figure 8. Maximum Continuous Drain Current vs Case Temperature

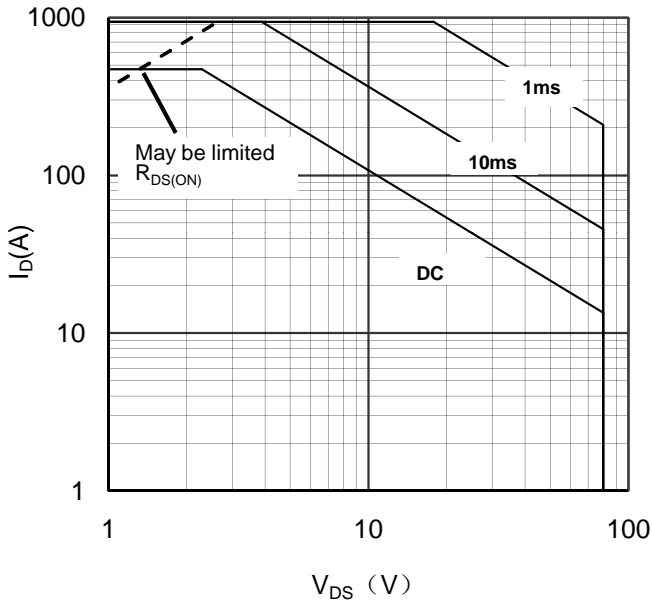


Figure 9. Maximum Forward Safe Operation Area

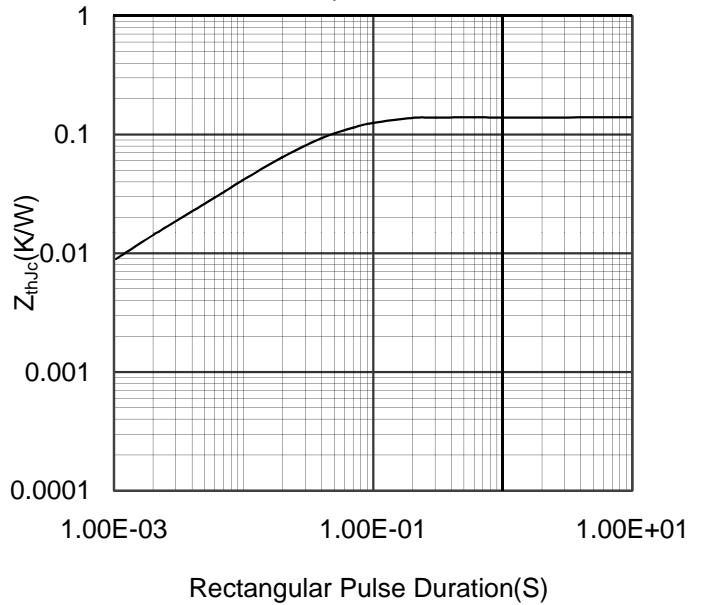


Figure 10. Transient Thermal Impedance

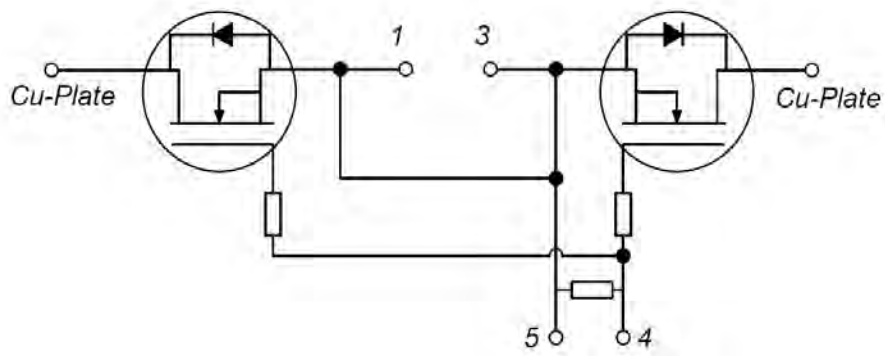
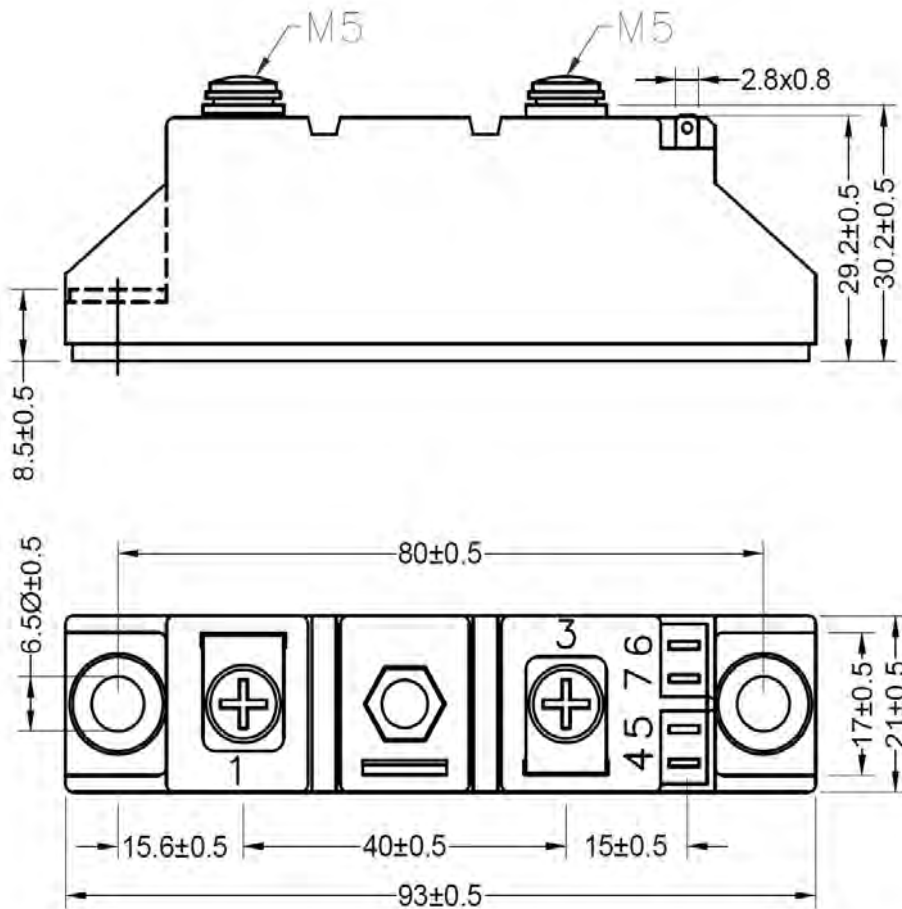


Figure 11. Circuit Diagram



Dimensions in (mm)

Figure 12. Package Outline