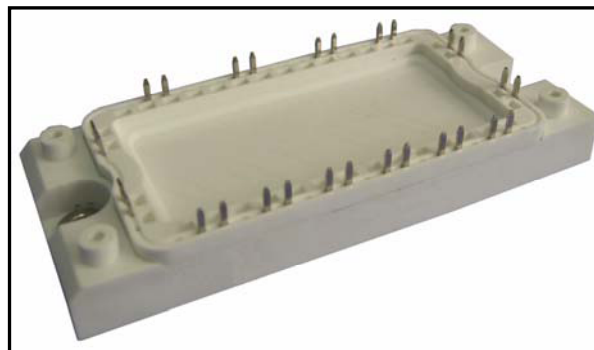


FEATURES

- ☐ High level of integration
- ☐ IGBT³ CHIP(Trench+Field Stop technology)
- ☐ Low saturation voltage and positive temperature coefficient
- ☐ Fast switching and short tail current
- ☐ Free wheeling diodes with fast and soft reverse recovery
- ☐ Solderable pins for PCB mounting
- ☐ Temperature sense included



APPLICATIONS

- ☐ AC motor control
- ☐ Motion/servo control
- ☐ Inverter and power supplies

INVERTER SECTOR

ABSOLUTE MAXIMUM RATINGS

T_C=25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Values	Unit
IGBT				
V _{CES}	Collector - Emitter Voltage	T _{VJ} =25°C	1200	V
V _{GES}	Gate - Emitter Voltage		±20	V
I _C	DC Collector Current	T _C =25°C	75	A
		T _C =80°C	50	A
I _{CM}	Repetitive Peak Collector Current	t _p =1ms	100	A
P _{tot}	Power Dissipation Per IGBT		260	W
Diode				
V _{RRM}	Repetitive Reverse Voltage	T _{VJ} =25°C	1200	V
I _{F(AV)}	Average Forward Current	T _C =25°C	75	A
		T _C =80°C	50	A
I _{FRM}	Repetitive Peak Forward Current	t _p =1ms	100	A
I ² t		T _{VJ} =125°C, t=10ms, V _R =0V	680	A ² s

INVERTER SECTOR

ELECTRICAL AND THERMAL CHARACTERISTICS

 $T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
IGBT						
$V_{GE(th)}$	Gate - Emitter Threshold Voltage	$V_{CE}=V_{GE}$, $I_C=2.0\text{mA}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=50\text{A}$, $V_{GE}=15\text{V}$, $T_{VJ}=25^{\circ}\text{C}$		1.7		V
		$I_C=50\text{A}$, $V_{GE}=15\text{V}$, $T_{VJ}=125^{\circ}\text{C}$		1.9		V
I_{CES}	Collector Leakage Current	$V_{CE}=1200\text{V}$, $V_{GE}=0\text{V}$, $T_{VJ}=25^{\circ}\text{C}$			1	mA
		$V_{CE}=1200\text{V}$, $V_{GE}=0\text{V}$, $T_{VJ}=125^{\circ}\text{C}$			10	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0\text{V}$, $V_{GE} \pm 15\text{V}$, $T_{VJ}=125^{\circ}\text{C}$	-400		400	nA
R_{Gint}	Integrated Gate Resistor			4.0		Ω
Q_{ge}	Gate Charge	$V_{CE}=600\text{V}$, $I_C=50\text{A}$, $V_{GE} = \pm 15\text{V}$		0.47		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$		3.6		nF
C_{res}	Reverse Transfer Capacitance			0.16		nF
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=600\text{V}$, $I_C=50\text{A}$, $T_{VJ}=25^{\circ}\text{C}$		90		ns
		$R_G = 18\ \Omega$, $T_{VJ}=125^{\circ}\text{C}$		90		ns
t_r	Rise Time	$V_{GE} = \pm 15\text{V}$, $T_{VJ}=25^{\circ}\text{C}$		30		ns
		Inductive Load $T_{VJ}=125^{\circ}\text{C}$		50		ns
$t_{d(off)}$	Turn - off Delay Time	$V_{CC}=600\text{V}$, $I_C=50\text{A}$, $T_{VJ}=25^{\circ}\text{C}$		420		ns
		$R_G = 18\ \Omega$, $T_{VJ}=125^{\circ}\text{C}$		520		ns
t_f	Fall Time	$V_{GE} = \pm 15\text{V}$, $T_{VJ}=25^{\circ}\text{C}$		70		ns
		Inductive Load $T_{VJ}=125^{\circ}\text{C}$		90		ns
E_{on}	Turn - on Energy	$V_{CC}=600\text{V}$, $I_C=80\text{A}$, $T_{VJ}=25^{\circ}\text{C}$		4.9		mJ
		$R_G = 18\ \Omega$, $T_{VJ}=125^{\circ}\text{C}$		6.6		mJ
E_{off}	Turn - off Energy	$V_{GE} = \pm 15\text{V}$, $T_{VJ}=25^{\circ}\text{C}$		4.0		mJ
		Inductive Load $T_{VJ}=125^{\circ}\text{C}$		4.9		mJ
I_{sc}	Short Circuit Current	$t_{psc} \leq 10\ \mu\text{s}$, $V_{GE}=15\text{V}$ $T_{VJ}=125^{\circ}\text{C}$, $V_{CC}=900\text{V}$		200		A
R_{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)				0.48	K /W
Diode						
V_F	Forward Voltage	$I_F=50\text{A}$, $V_{GE}=0\text{V}$, $T_{VJ}=25^{\circ}\text{C}$		1.65		V
		$I_F=50\text{A}$, $V_{GE}=0\text{V}$, $T_{VJ}=125^{\circ}\text{C}$		1.65		V
t_{rr}	Reverse Recovery Time	$I_F=50\text{A}$, $V_R=600\text{V}$		275		ns
I_{RRM}	Max. Reverse Recovery Current	$di_F/dt=-1200\text{A}/\mu\text{s}$		50		A
E_{rec}	Reverse Recovery Energy	$T_{VJ}=125^{\circ}\text{C}$		4.4		mJ
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				0.78	K /W

NTC SECTOR**CHARACTERISTIC VALUES***T_C=25°C unless otherwise specified*

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R ₂₅	Resistance	T _C =25°C		5		KΩ
B _{25/50}				3375		K

MODULE CHARACTERISTICS*T_C=25°C unless otherwise specified*

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
T _{VJ max}	Max. Junction Temperature				150	°C
T _{VJ op}	Operating Temperature		-40		125	°C
T _{stg}	Storage Temperature		-40		125	°C
V _{isol}	Insulation Test Voltage	AC, t=1min		3000		V
CTI	Comparative Tracking Index		250			
M _d	Mounting Torque	Recommended (M5)	2.5		5	N· m
Weight				180		g

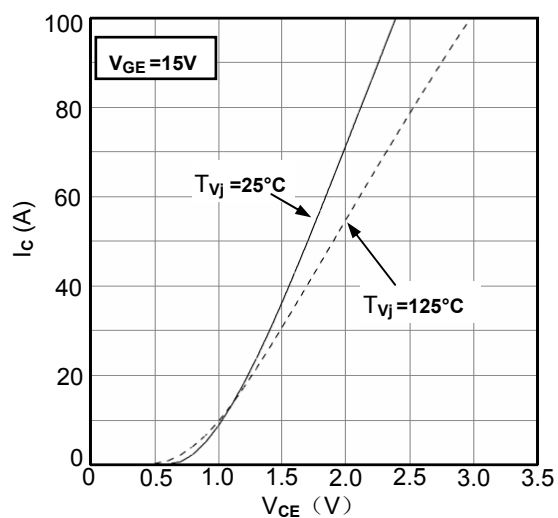


Figure1. Typical Output Characteristics
IGBT-inverter

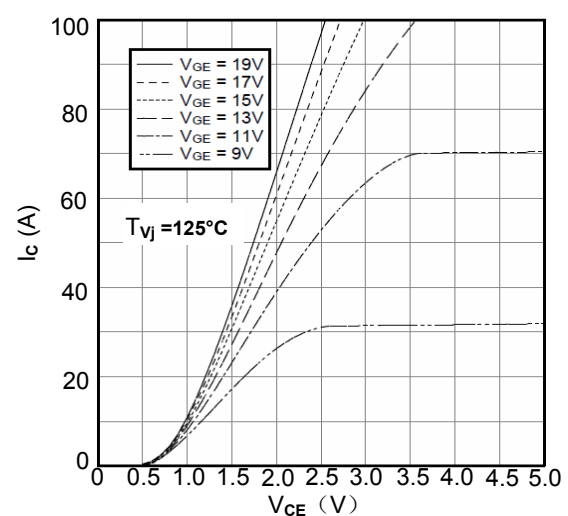


Figure2. Typical Output Characteristics
IGBT-inverter

MIMMG50H120X6TN

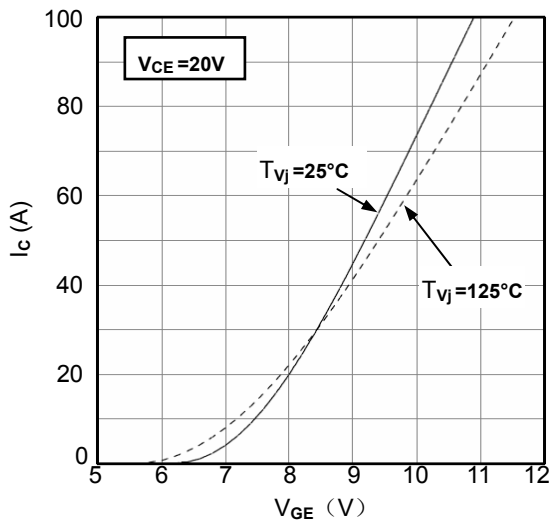


Figure3. Typical Transfer characteristics IGBT-inverter

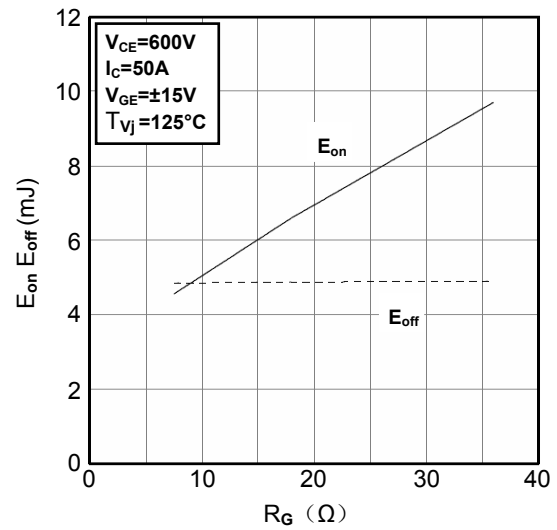


Figure4. Switching Energy vs. Gate Resistor IGBT-inverter

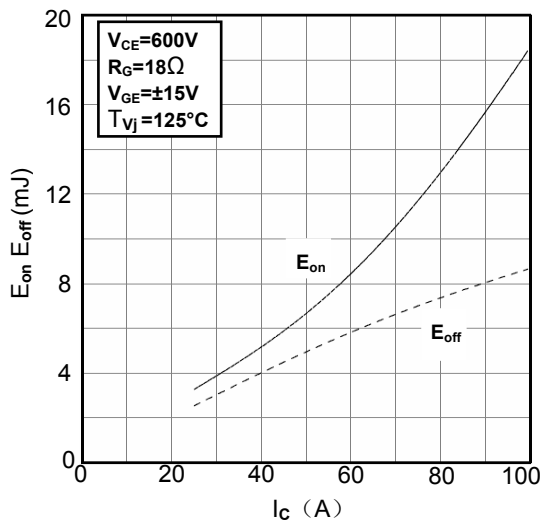


Figure5. Switching Energy vs. Collector Current IGBT-inverter

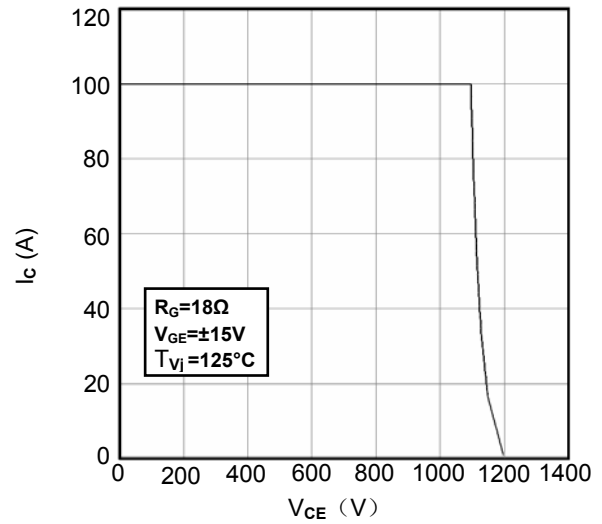


Figure6. Reverse Biased Safe Operating Area IGBT-inverter

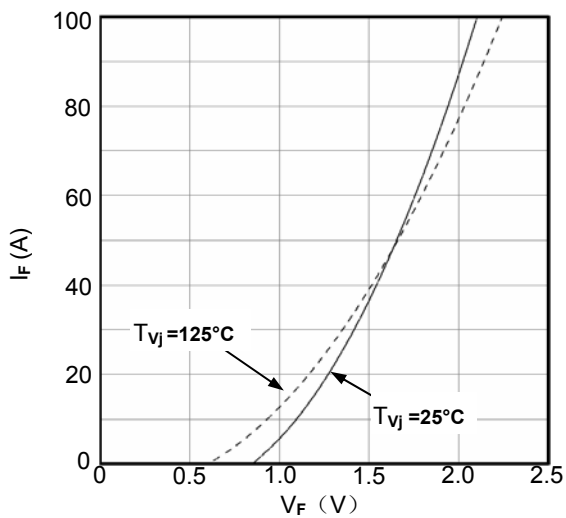


Figure7. Diode Forward Characteristics Diode-inverter

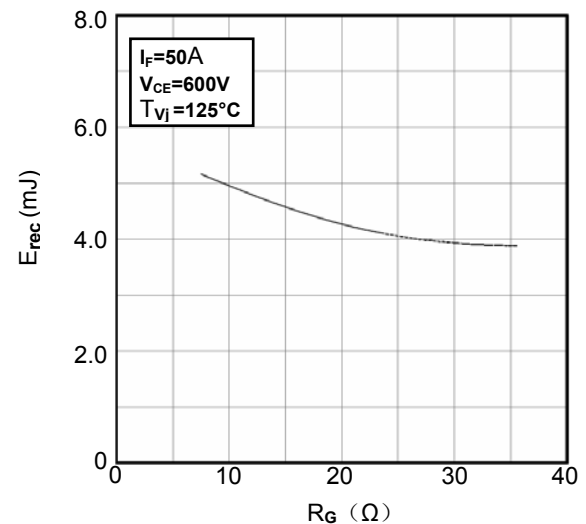


Figure8. Switching Energy vs. Gate Resistor Diode-inverter

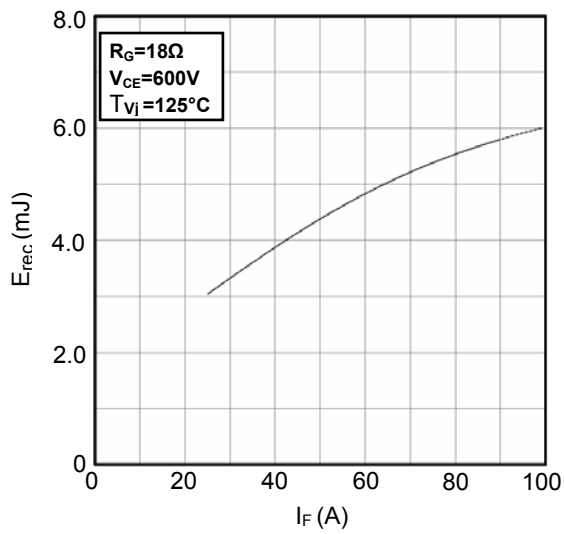


Figure9. Switching Energy vs. Forward Current
Diode-inverter

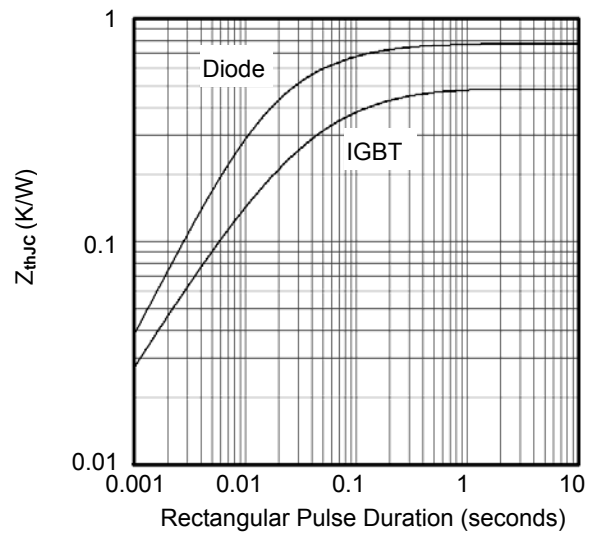


Figure10. Transient Thermal Impedance of
Diode and IGBT-inverter

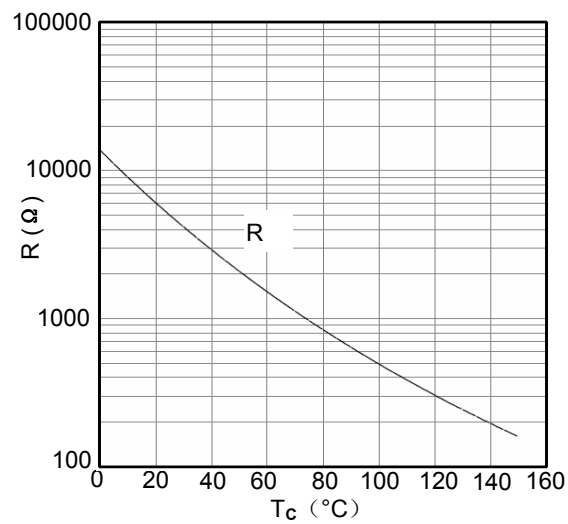


Figure11. NTC Characteristics

MIMMG50H120X6TN

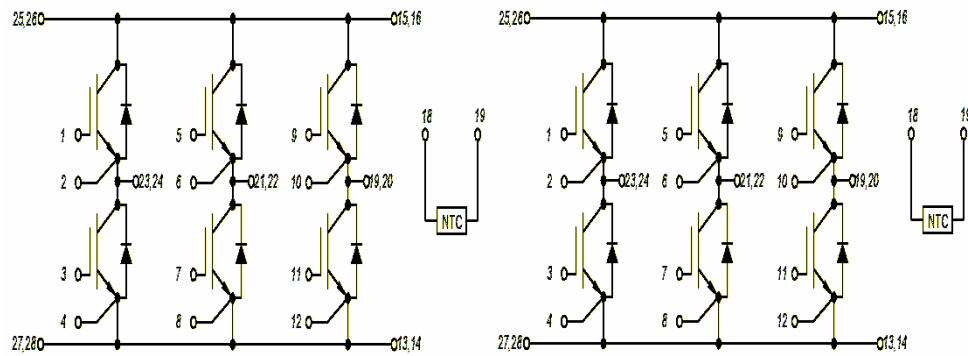
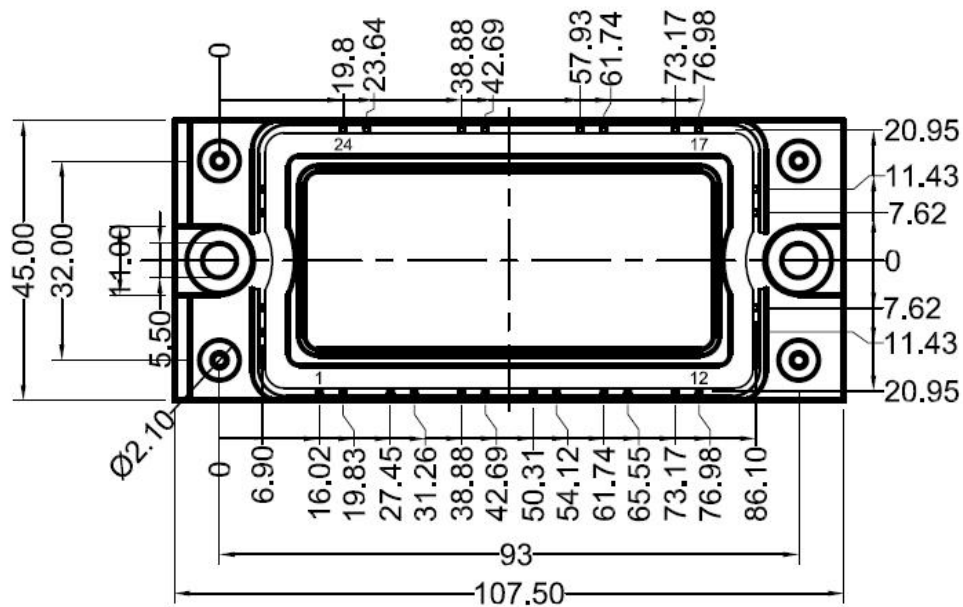
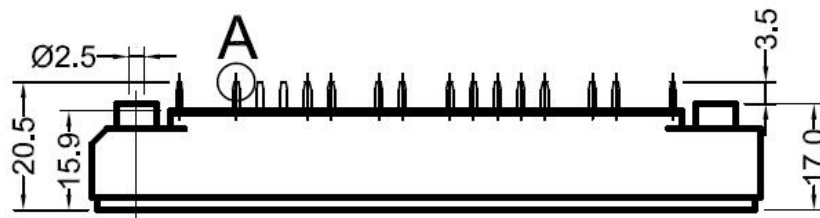


Figure12. Circuit Diagram



Dimensions (mm)

Figure13. Package Outline