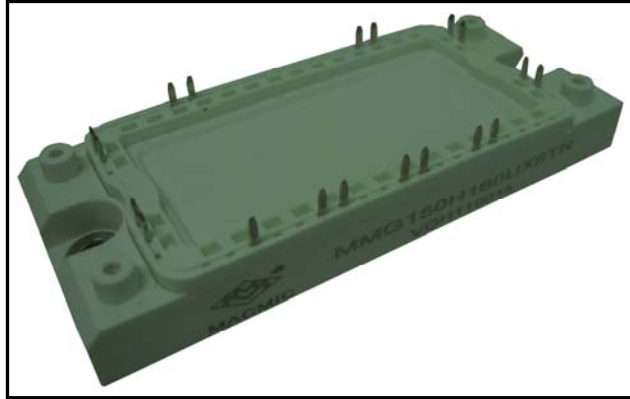


FEATURES

- Soldering connections for PCB mounting
- Convenient package outline
- Suitable for wave soldering
- High temperature and power cycling capability



APPLICATIONS

- Drive inverters with brake system

BRAKE 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	105	A
		T _C =80°C	75	A
I _{CM}	Repetitive Peak Collector Current	t _p =1ms	150	A
P _{tot}	Power Dissipation Per IGBT		348	W
Diode				
V _{RRM}	Repetitive Reverse Voltage	T _{vj} =25°C	1200	V
I _{F(AV)}	Average Forward Current	T _C =25°C	105	A
		T _C =80°C	75	A
I _{FRM}	Repetitive Peak Forward Current	t _p =1ms	150	A
I ² t		T _{vj} =125°C, t=10ms, V _R =0V	1150	A ² s

MMG150H160UX6TN

BRAKE 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	$V_{CE}=V_{GE}, I_C=3.0\text{mA}$	5.0	5.8	6.5	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	$I_C=75\text{A}, V_{GE}=15\text{V}, T_{VJ}=25^{\circ}\text{C}$		1.7		V
		$I_C=75\text{A}, V_{GE}=15\text{V}, T_{VJ}=125^{\circ}\text{C}$		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			10		Ω
Q_{ge}	Gate Charge	$V_{CE}=600\text{V}, I_C=75\text{A}, V_{GE} = \pm 15\text{V}$		0.7		μC
C_{ies}	Input Capacitance	$V_{CE}=25\text{V}, V_{GE}=0\text{V}, f=1\text{MHz}$		5.3		nF
C_{res}	Reverse Transfer Capacitance				0.2	
$t_{d(on)}$	Turn - on Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A},$ $R_G = 4.7 \Omega,$	$T_{VJ} = 25^{\circ}\text{C}$	260		ns
			$T_{VJ} = 125^{\circ}\text{C}$	290		ns
t_r	Rise Time	$V_{GE} = \pm 15\text{V},$ Inductive Load	$T_{VJ} = 25^{\circ}\text{C}$	30		ns
			$T_{VJ} = 125^{\circ}\text{C}$	50		ns
$t_{d(off)}$	Turn - off Delay Time	$V_{CC}=600\text{V}, I_C=75\text{A},$ $R_G = 4.7 \Omega,$	$T_{VJ} = 25^{\circ}\text{C}$	420		ns
			$T_{VJ} = 125^{\circ}\text{C}$	520		ns
t_f	Fall Time	$V_{GE} = \pm 15\text{V},$ Inductive Load	$T_{VJ} = 25^{\circ}\text{C}$	70		ns
			$T_{VJ} = 125^{\circ}\text{C}$	90		ns
E_{on}	Turn - on Energy	$V_{CC}=600\text{V}, I_C=75\text{A},$ $R_G = 4.7 \Omega,$	$T_{VJ} = 25^{\circ}\text{C}$	6.6		mJ
			$T_{VJ} = 125^{\circ}\text{C}$	9.4		mJ
E_{off}	Turn - off Energy	$V_{GE} = \pm 15\text{V},$ Inductive Load	$T_{VJ} = 25^{\circ}\text{C}$	6.8		mJ
			$T_{VJ} = 125^{\circ}\text{C}$	8.0		mJ
I_{sc}	Short Circuit Current	$t_{psc} \leq 10\mu\text{S}, V_{GE}=15\text{V}$ $T_{VJ}=125^{\circ}\text{C}, V_{CC}=900\text{V}$		300		A
R_{thJC}	Junction-to-Case Thermal Resistance (Per IGBT)				0.36	K / W
Diode						
V_F	Forward Voltage	$I_F=75\text{A}, V_{GE}=0\text{V}, T_{VJ} = 25^{\circ}\text{C}$		1.65		V
		$I_F=75\text{A}, V_{GE}=0\text{V}, T_{VJ} = 125^{\circ}\text{C}$		1.65		V
t_{rr}	Reverse Recovery Time	$I_F=75\text{A}, V_R=600\text{V}$		300		ns
I_{RRM}	Max. Reverse Recovery Current	$di_F/dt=-2000\text{A}/\mu\text{s}$		85		A
E_{rec}	Reverse Recovery Energy	$T_{VJ} = 125^{\circ}\text{C}$		6.5		mJ
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				0.6	K / W

MMG150H160UX6TN

DIODE-RECTIFIER SECTOR

ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	Test Conditions	Values	Unit
V_{RRM}	Repetitive Reverse Voltage	$T_{Vj}=25^{\circ}\text{C}$	1600	V
$I_{d(AV)}$	Average Output Current	$T_C=85^{\circ}\text{C}$	150	A
I_{FSM}	Non-Repetitive Surge Forward Current	$T_{Vj}=45^{\circ}\text{C}$, $t=10\text{ms}$, 50Hz	450	A
		$T_{Vj}=45^{\circ}\text{C}$, $t=8.3\text{ms}$, 60Hz	400	A
I^2t		$T_{Vj}=45^{\circ}\text{C}$, $t=10\text{ms}$, 50Hz	1012	A^2s
		$T_{Vj}=45^{\circ}\text{C}$, $t=8.3\text{ms}$, 60Hz	800	A^2s

DIODE-RECTIFIER SECTOR

ELECTRICAL AND THERMAL CHARACTERISTICS

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F=75\text{A}$, $T_{Vj}=25^{\circ}\text{C}$		1.25	1.35	V
		$I_F=75\text{A}$, $T_{Vj}=125^{\circ}\text{C}$		1.15		V
I_R	Reverse Leakage Current	$V_R=1600\text{V}$, $T_{Vj}=25^{\circ}\text{C}$			50	μA
		$V_R=1600\text{V}$, $T_{Vj}=125^{\circ}\text{C}$			1	mA
V_{T0}	Threshold Voltage				0.8	V
r_T	Forward Slope Resistance				7.3	$\text{m}\Omega$
R_{thJCD}	Junction-to-Case Thermal Resistance (Per Diode)				0.66	K/W

NTC SECTOR

CHARACTERISTIC VALUES

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Resistance	$T_C=25^{\circ}\text{C}$		5		$\text{K}\Omega$
$B_{25/50}$				3375		K

MODULE CHARACTERISTICS

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$T_{Vj\text{max}}$	Max. Junction Temperature				150	$^{\circ}\text{C}$
$T_{Vj\text{op}}$	Operating Temperature		-40		125	$^{\circ}\text{C}$
T_{stg}	Storage Temperature		-40		125	$^{\circ}\text{C}$
V_{isol}	Insulation Test Voltage	AC, $t=1\text{min}$		3000		V
M_d	Mounting Torque	Recommended (M5)	2.5		5	$\text{N}\cdot\text{m}$
Weight				200		g

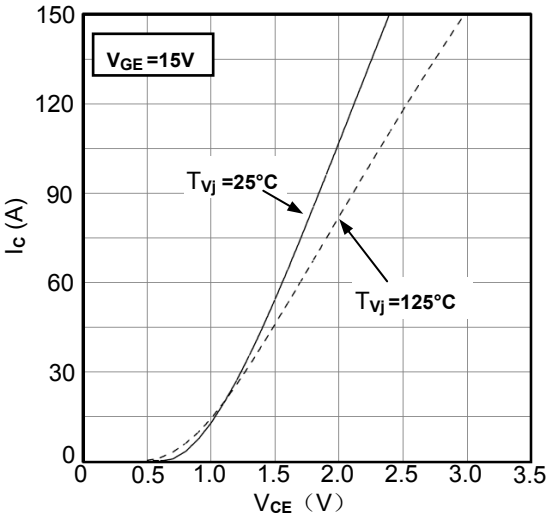


Figure1. Typical Output Characteristics IGBT-Brake

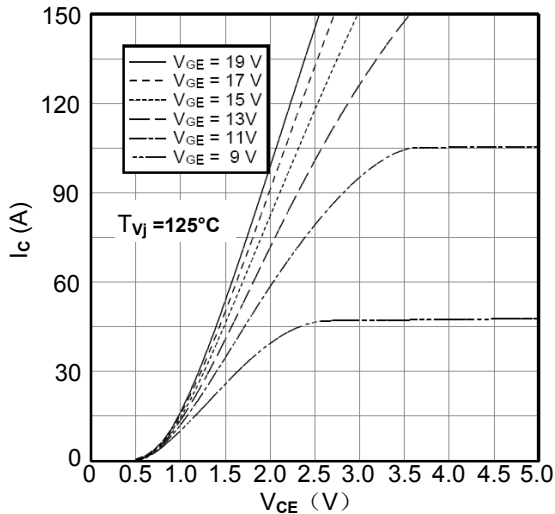


Figure2. Typical Output Characteristics IGBT- Brake

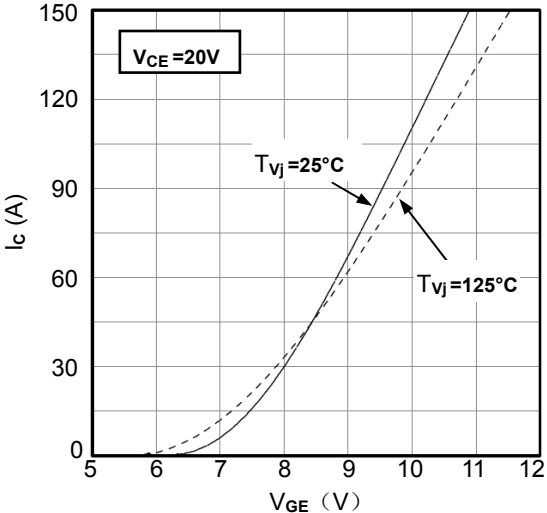


Figure3. Typical Transfer characteristics IGBT- Brake

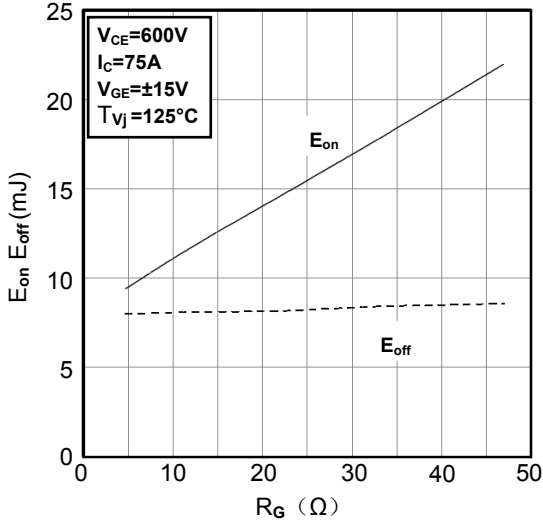


Figure4. Switching Energy vs. Gate Resistor IGBT- Brake

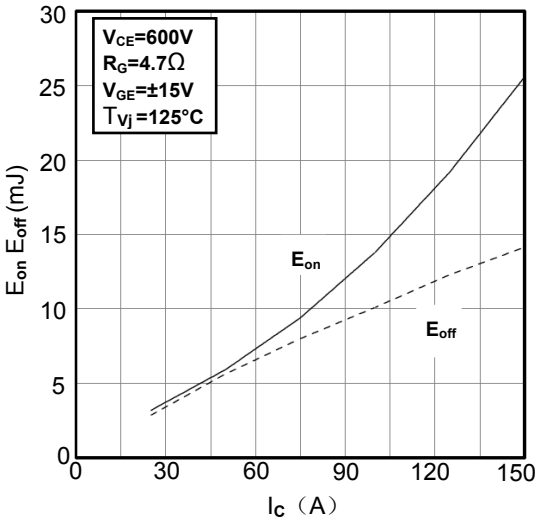


Figure5. Switching Energy vs. Collector Current IGBT- Brake

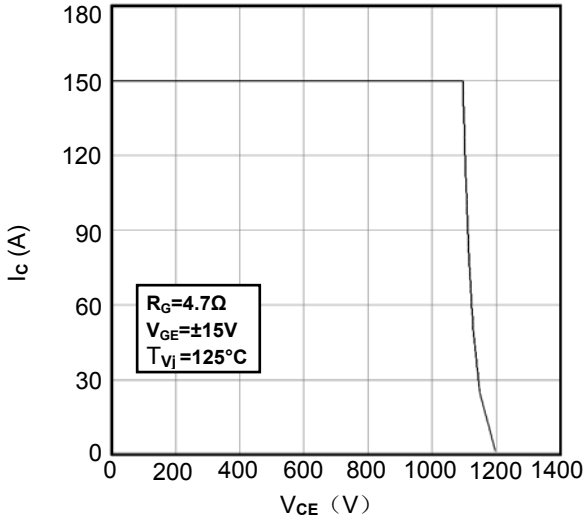


Figure6. Reverse Biased Safe Operating Area IGBT- Brake

MMG150H160UX6TN

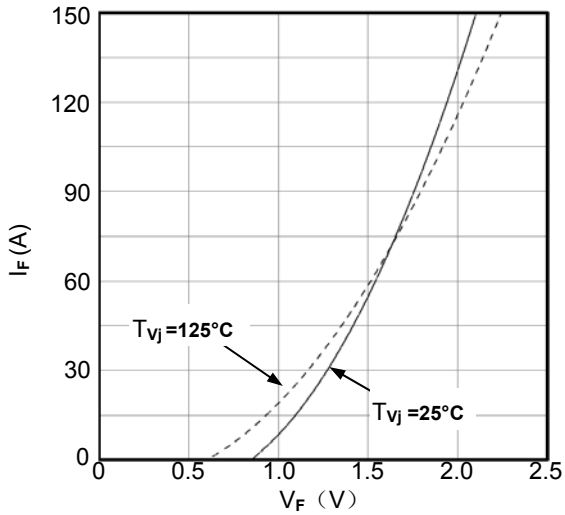


Figure7. Diode Forward Characteristics
Diode - Brake

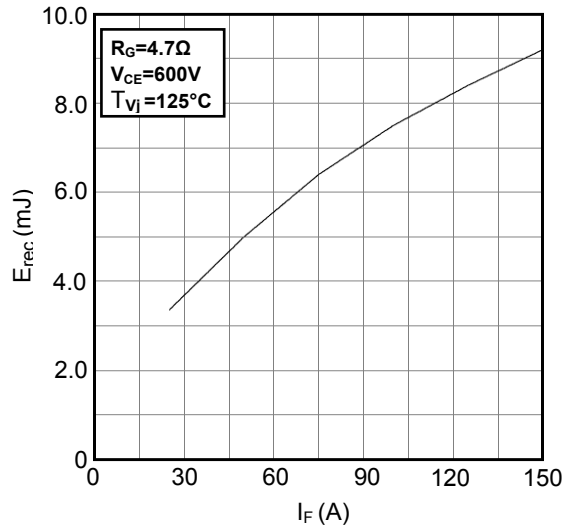


Figure8. Switching Energy vs. Forward Current
Diode- Brake

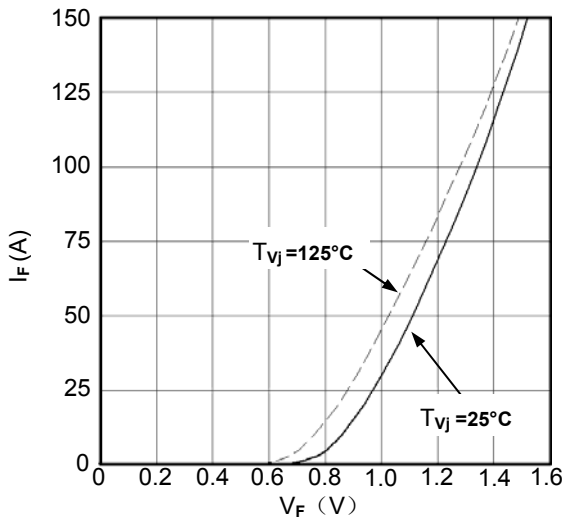


Figure9. Diode Forward Characteristics
Diode- rectifier

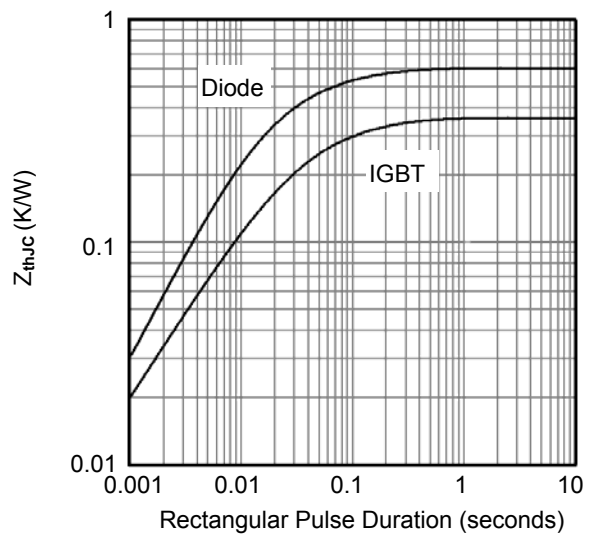


Figure10. Transient Thermal Impedance of
Diode and IGBT- Brake

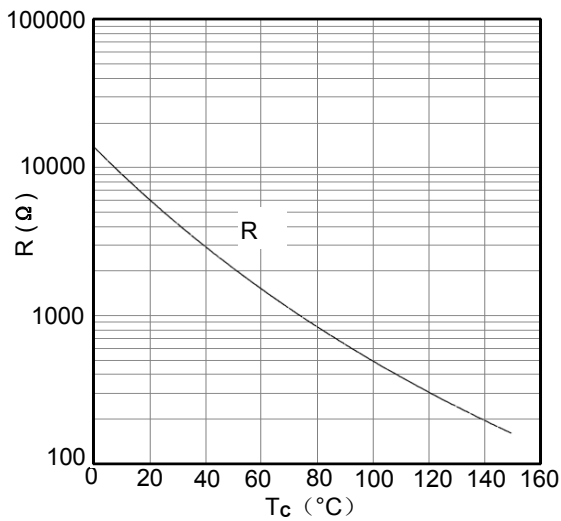


Figure11. NTC Characteristics

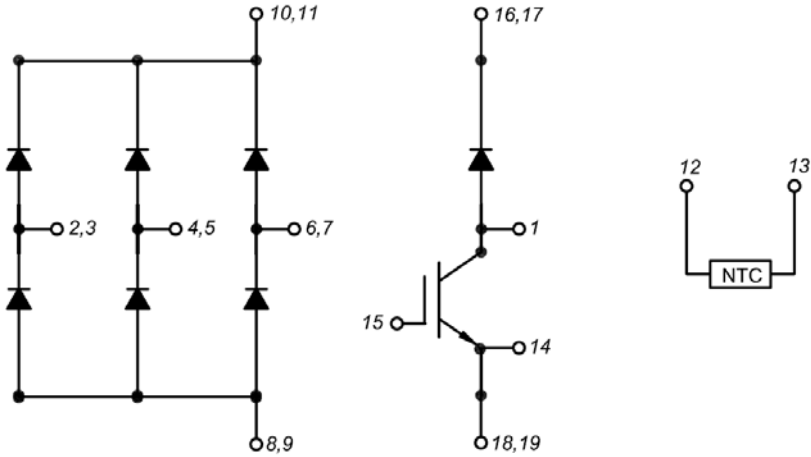
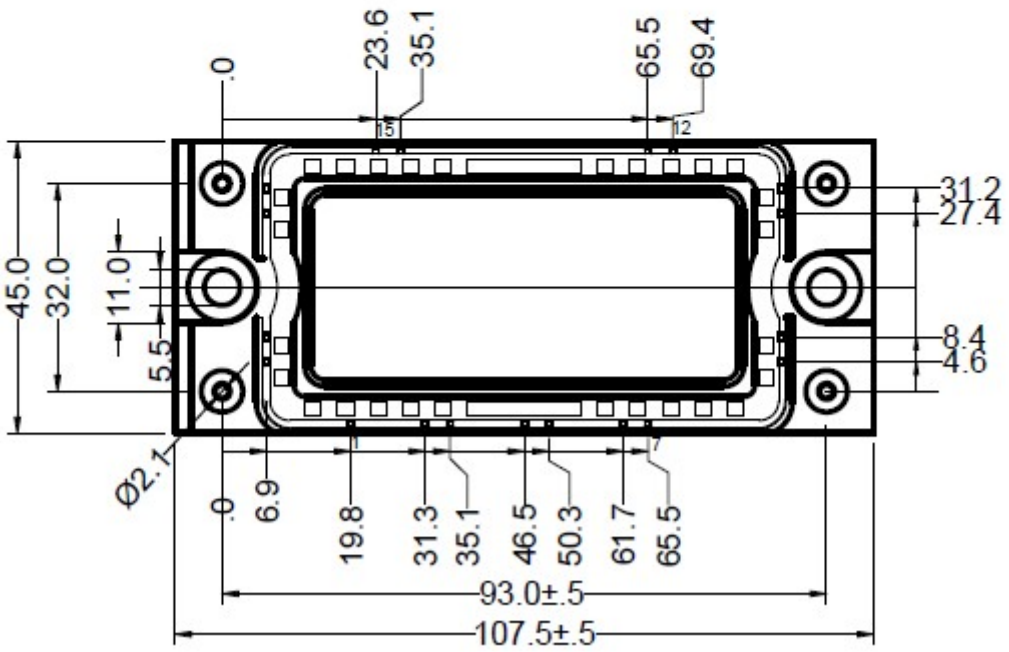
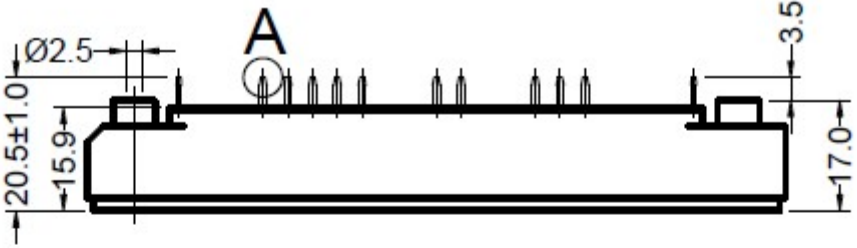


Figure12. Circuit Diagram



Dimensions (mm)
Figure13. Package Outline