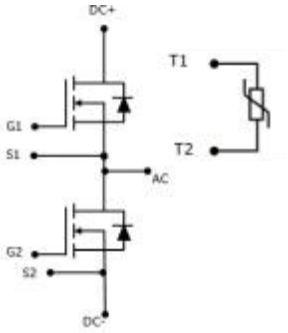
JX300N1200MK3-A

1200V, 300A, 5.3mΩ, Half-Bridge, Silicon Carbide MOSFET Module

Product Data Sheet JXC-3T03-14A A/0

General Description

TheJX-MEP module incorporates JX's 1200V Gen3 N-channel SiC MOSFET and solder pin type. NTC temperature sensor inside.



Features

- High Current Density
- Low Inductive Design
- Low Switching Losses
- High-frequency Operation
- Zero Turn-off Tail Current from MOSFET
- Normally-off, Fail-safe Device Operation
- Si_3N_4 Internal Isolation

Applications

- High Frequency Switching Application
- DC/DC Converter
- Motor Drives
- Servo Drives
- UPS Systems
- PV

Ordering Informations

Order Number / Marking	JX300N1200MK3-A
Package Type	MEP

Key Parameters

Symbol	Parameter	Values			Unit	Test Conditions
Absolute maximum rating						
V_{DS}	Drain-source Voltage		1200		V	T_C=25°C
I_D	Drain Current (continuous)		300		A	T_C=25°C
T_J	Junction Temperature		150		°C	
Symbol	**Parameter**	**Min.**	**Typ.**	**Max.**	**Unit**	**Test Conditions**
Static characteristics						
$R_{DS(on)}$	Static Drain-source on Resistance	-	5.3	7.3	mΩ	V_{GS}=18V; I_D=150A; T_{VJ}=25°C
Dynamic characteristics						
Q_G	Total Gate Charge	-	714	-	nC	V_{DD}=800V; V_{GS}=-5/+18V; I_D=150A; T_C=25°C
Q_{GD}	Gate-drain Charge	-	234.9	-		
Source-drain diode						
Q_{RR}	Reverse Recovery Charge	-	678	-	nC	V_{GS}=-5/+18V; I_F=300A; V_R=900V; T_J=25°C

Absolute Maximum Ratings (at T_C=25°C unless otherwise specified)

Symbol	Parameter	Values	Unit
V_{DS}	Drain-source Voltage	1200	V
V_{GS}	Gate-source Voltage	-10/+22	V
I_D	Drain Current (continuous)	300	A
I_{DM}	Drain Current (pulsed)	600	A
V_{isol}	Isolation Test Voltage (f=50Hz; t=1min)	3.0	kV
L_{Stray}	Stray Inductance	10	nH
T_J; T_{stg}	Junction and Storage Temperature Range	-40 to +150	oC
M_S	Mounting Force Per Clamp	40 - 80	N
$R_{th\ JC}$	Thermal Resistance, Junction to Heatsink	0.13	oC/W
M	Weight	39	g

MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics (at T_C=25°C unless otherwise specified)						
BV_{DS}	Drain-source Breakdown Voltage	1200	-	-	V	V_{GS}=0V
I_{DSS}	Zero Gate Voltage Drain Current	-	-	300	μA	V_{DS}=1200V; V_{GS}=0V
I_{GSS}	Gate-body Leakage Current	-	-	3	μA	V_{GS}=-10/20V; V_{DS}=0V
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	V_{DS}=V_{GS}; I_D=30mA
$R_{DS(on)}$	Static Drain-source on Resistance		5.3	7.3	mΩ	V_{GS}=18V; I_D=150A; T_{VJ}=25°C
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
R_G	Gate Resistance	-	0.7	-	Ω	V_{GS}=0V; f=1MHz
Dynamic characteristics (at T_C=25°C unless otherwise specified)						
C_{iss}	Input Capacitance	-	20.6	-	nF	V_{DS}=1000V; f=1MHz; V_{AC}=25mV
C_{oss}	Output Capacitance	-	0.86	-		
C_{rss}	Reverse Transfer Capacitance	-	39	-	pF	
E_{on}	Turn-on Energy	-	22.7	-	mJ	V_{DD}=900V; V_{GS}=-5/+18V; I_D=300A; Load=100μH; $R_{G(ext)}$=5Ω
E_{off}	Turn-off Energy	-	16.9	-		
Q_{GS}	Gate-source Charge	-	230.0	-	nC	V_{DD}=800V; V_{GS}=-5/+18V; I_D=150A
Q_{GD}	Gate-drain Charge	-	234.9	-		
Q_G	Total Gate Charge	-	714	-		
$t_{d(on)}$	Turn-on Delay Time	-	101.4	-	ns	V_{DD}=900V; V_{GS}=-5/+18V; I_D=300A; $R_{G(ext)}$=5Ω; Load=100μH
t_r	Rise Time	-	93.0	-		
$t_{d(off)}$	Turn-off Delay Time	-	256.1	-		
t_f	Fall Time	-	54.3	-		

Body Diode Characteristics (at T_J=25°C unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{FSD}	Forward Voltage	-		6	V	V_{GS}=0V; I_F=150A
I_S	Continuous Diode Forward Current	-	150	-	A	V_{GS}=0V; T_C=25OC
t_{RR}	Reverse Recovery Time	-	32.8	-	ns	V_{GS}=-5/+18V; I_F=300A; V_R=900V
Q_{RR}	Reverse Recovery Charge	-	678	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	51.5	-	A	

NTC Thermistor Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
R_{25}	Rated Resistance	-	5.00	-	kΩ	T_{NTC}=25OC
ΔR/R	Deviation of R_{100}	-5	-	5	%	T_{NTC}=100°C; R_{100}=493.3Ω
$B_{25/50}$	Beta Value for 25°C to 50°C	-	3375	-	K	$R_2=R_{25}\exp[B_{25/50}(1/T_2 - 1/(298.15K))]$
$B_{25/80}$	Beta Value for 25°C to 80°C	-	3414	-	K	$R_2=R_{25}\exp[B_{25/80}(1/T_2 - 1/(298.15K))]$
$B_{25/100}$	Beta Value for 25°C to 100°C	-	3436	-	K	$R_2=R_{25}\exp[B_{25/100}(1/T_2 - 1/(298.15K))]$

Typical Performance

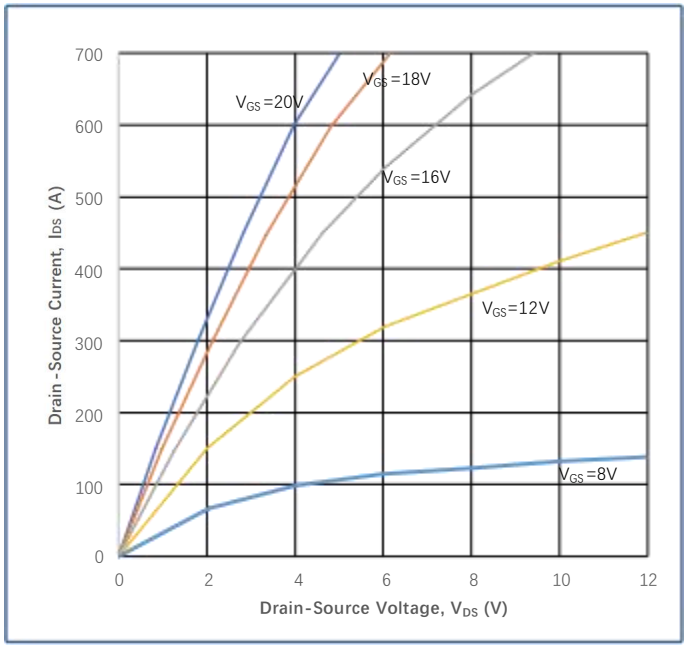


Figure 1

Output Characteristics (T_J=25°C)

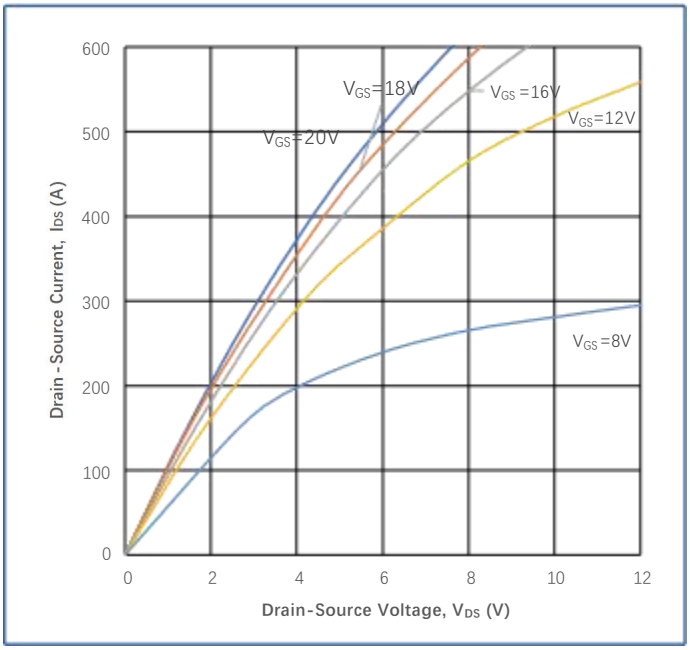


Figure 2

Typical Output Characteristics (T_J=150°C)

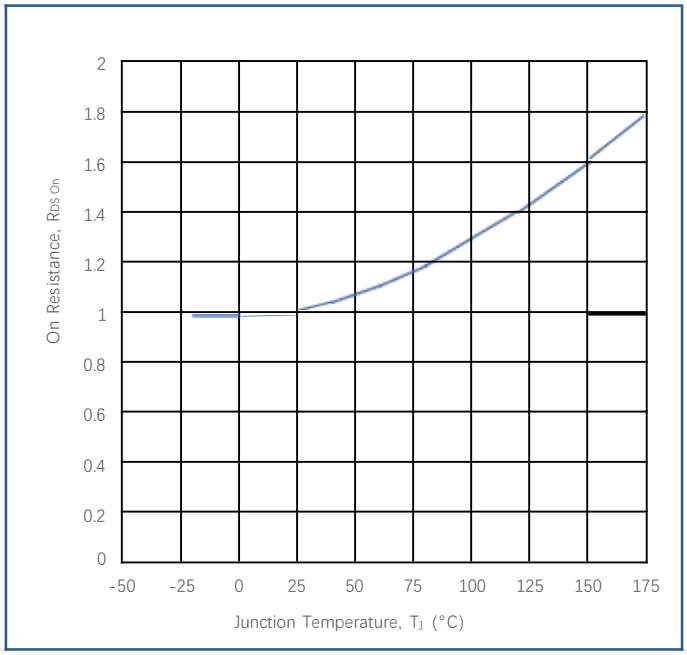


Figure 3

Normalized on-resistance vs. T_j

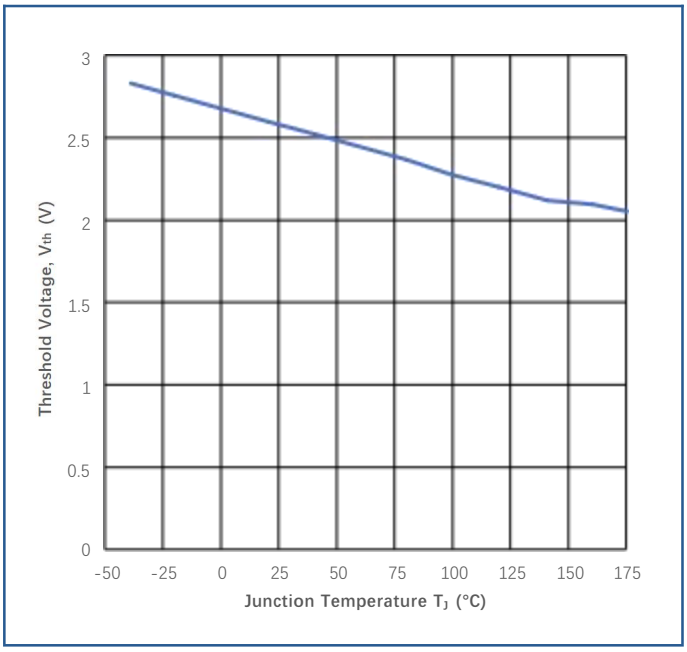


Figure 4

Threshold Voltage vs. Temperature

Typical Performance

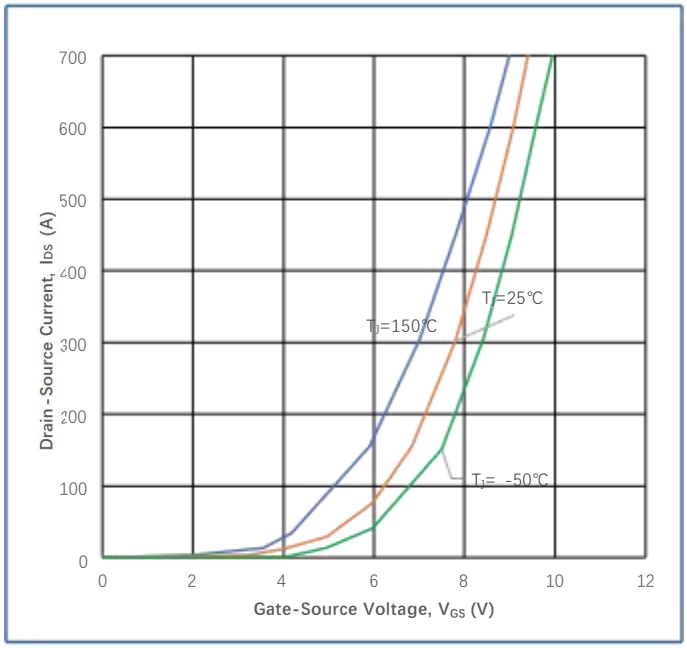


Figure 5

Transfer Characteristic for Various T_j

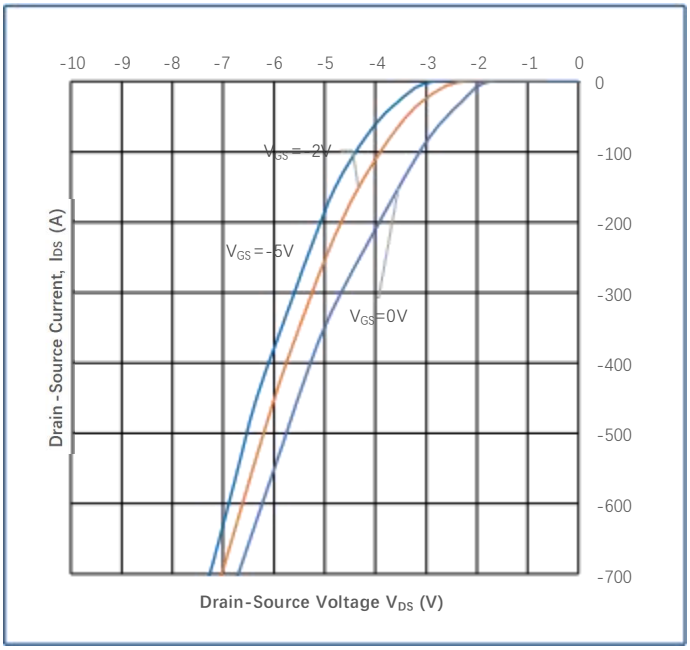


Figure 6

Body Diode Characteristic

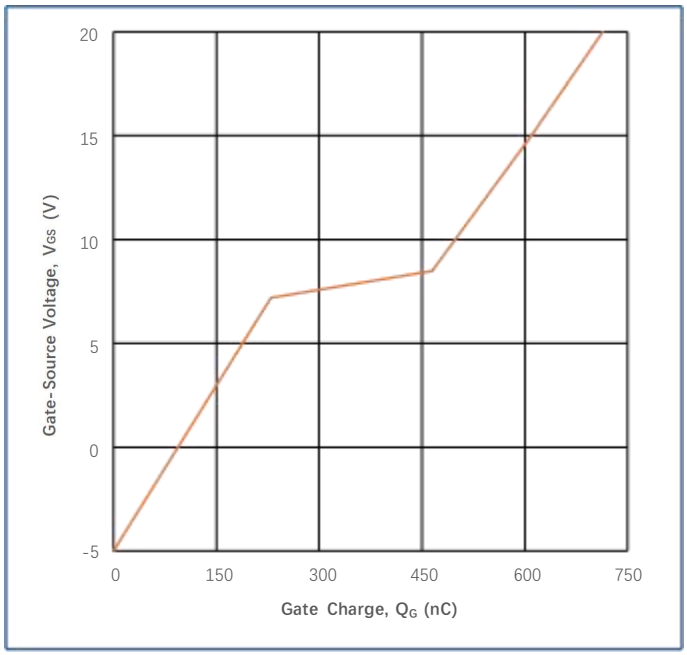


Figure 7

Gate Charge Characteristics

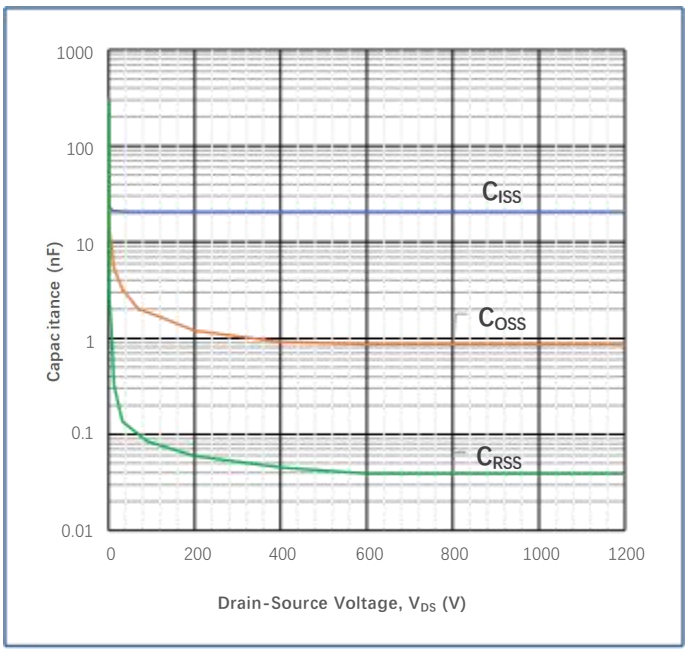


Figure 8

Capacitances vs. V_{DS}

Typical Performance

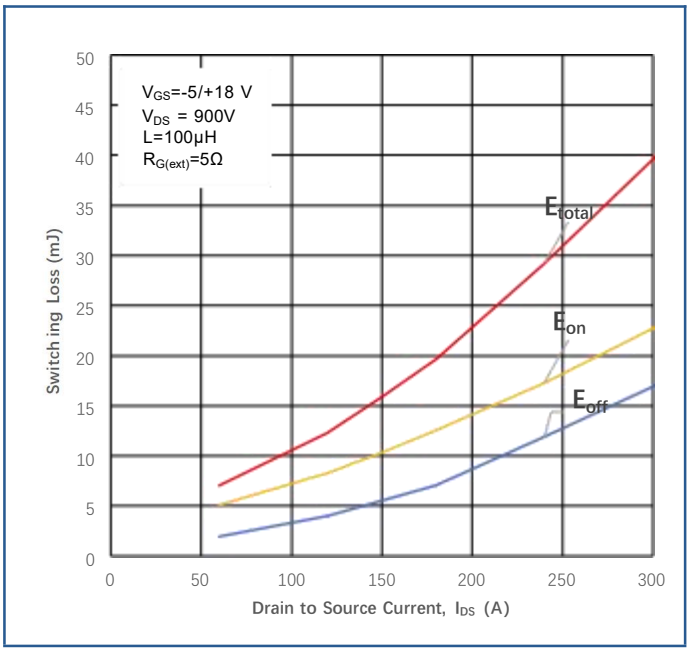


Figure 9

Inductive Switching Energy vs. Drain Current

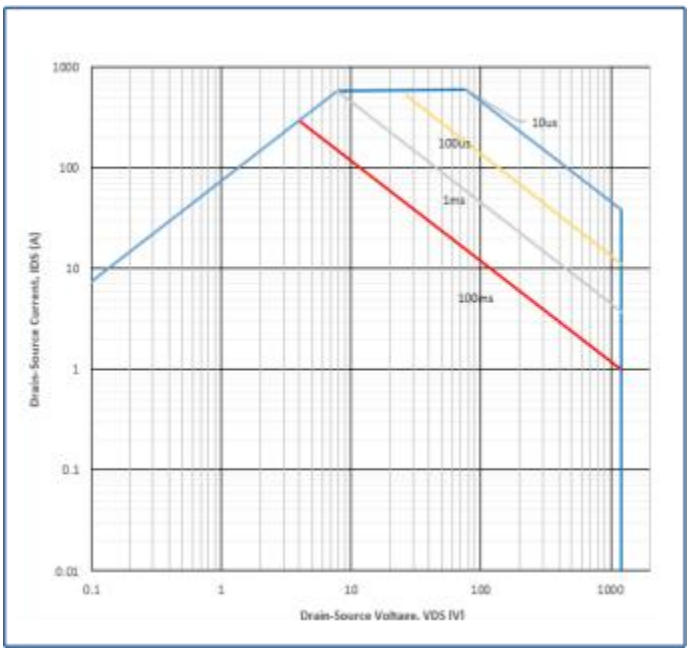
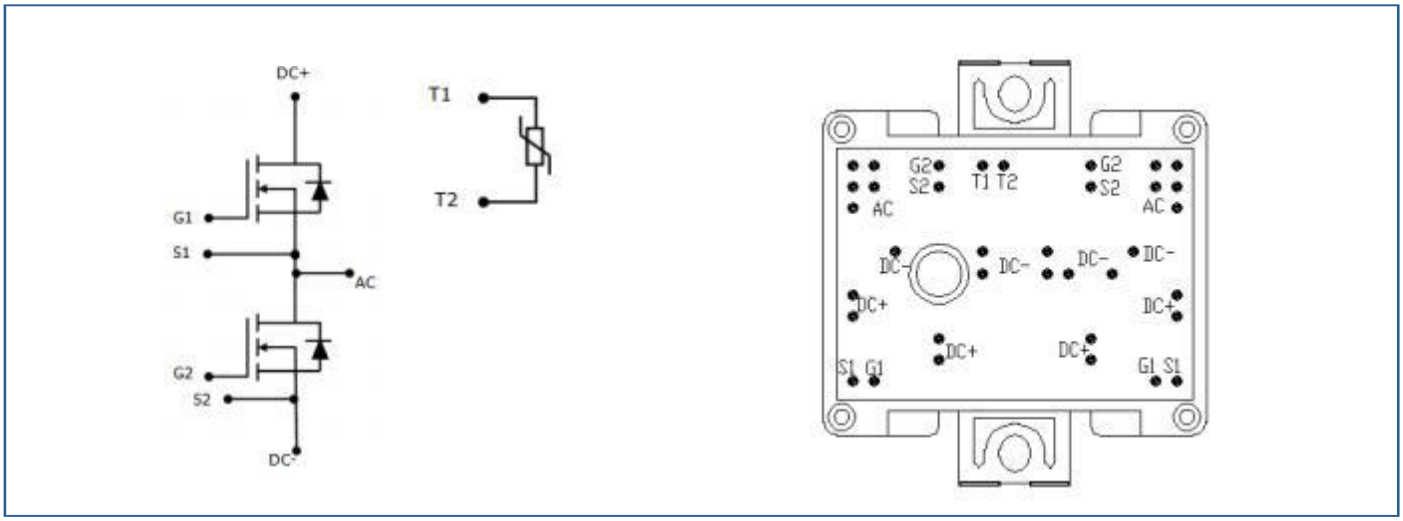


Figure 10

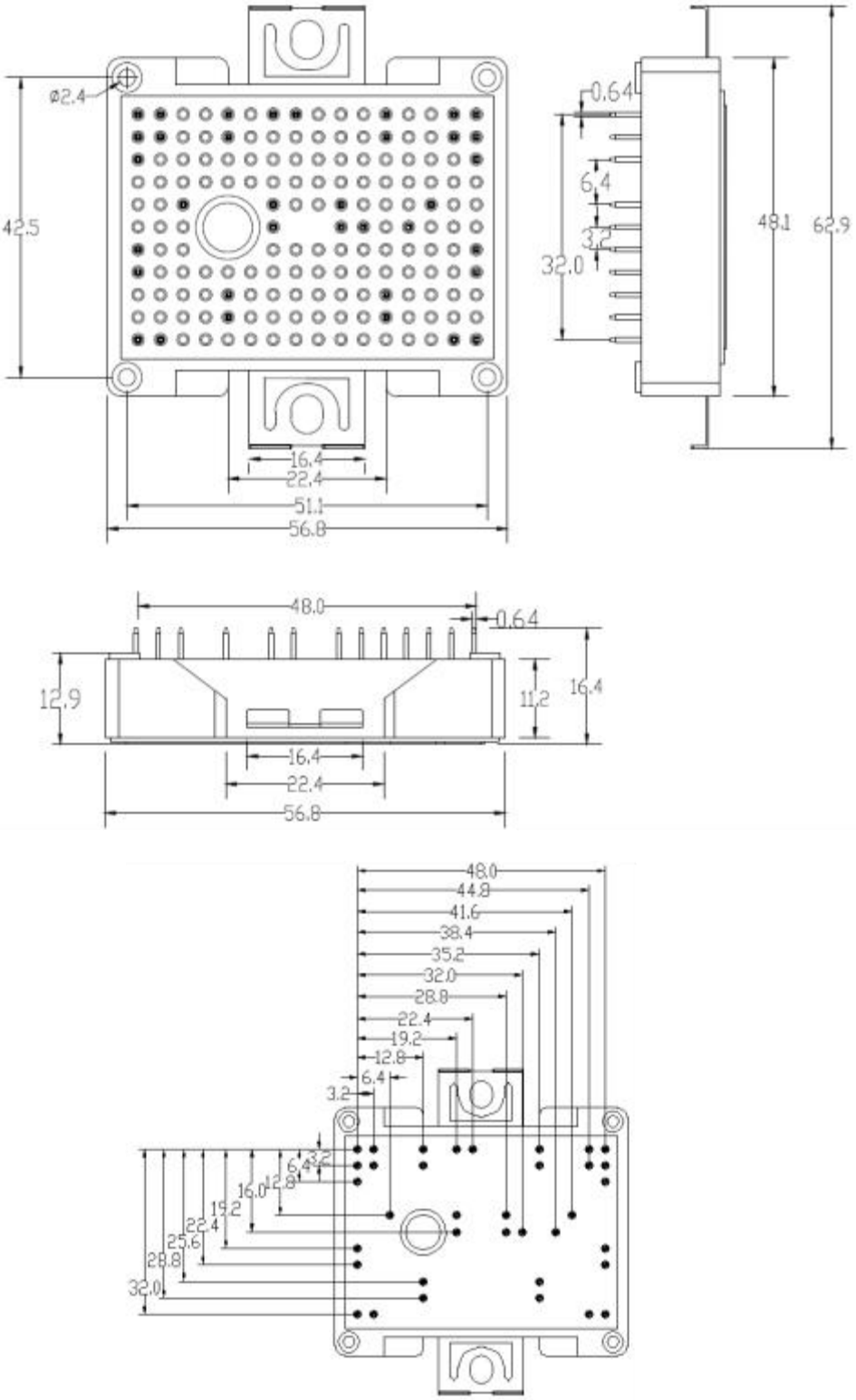
Safe Operating Area

Circuit Diagram Headline



Package Dimensions (mm)

Package Type： MEP



未标注线性公差按 GB/1804-2000c 级执行	公差分段	0.5-3	3-6	6-30	30-120	120-400
	c 级	±0.2	±0.3	±0.5	±0.8	±1.2

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