

ASR9N1200MEP2B

1200V, 160A, 9mΩ, Half-Bridge, Silicon Carbide MOSFET Module

Product Data Sheet

ASTC-3T03-154A A/0



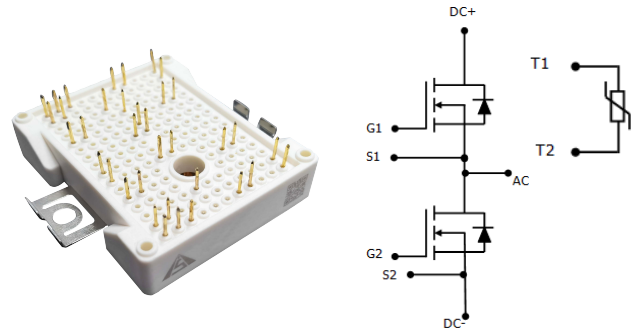
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General Description

The AST-MEP module incorporates AST'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
- ZTA Internal Isolation



Applications

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

Ordering Informations

Order Number / Marking	ASR9N1200MEP2B
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)	235			A	T _C =25°C
		160				T _C =100°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	-	9.0	11.0	mΩ	V _{GS} =18V; I _D =120A; T _{VJ} =25°C
		-	16.2	-		V _{GS} =18V; I _D =120A; T _{VJ} =175°C
Dynamic characteristics						
Q _G	Total Gate Charge	-	625	-	nC	V _{DD} =800V; V _{GS} =-5/+18V; I _D =100A; T _C =25°C
Q _{GD}	Gate-Drain Charge	-	165	-		
Source-drain diode						
Q _{RR}	Reverse Recovery Charge	-	3560	-	nC	V _{GS} =-5/+18V; I _F =235A; V _R =800V; R _{G(ext)} =3.3Ω; Load=35μH; T _J =25°C

Absolute Maximum Ratings (at $T_c=25^\circ\text{C}$ 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) ($T_c=25^\circ\text{C}$)	235	A
	Drain Current (continuous) ($T_c=100^\circ\text{C}$)	160	
I_{DM}	Drain Current (pulsed)	500	A
V_{isol}	Isolation Test Voltage ($f=50\text{Hz}$; $t=1\text{min}$)	3.0	kV
L_{Stray}	Stray Inductance	10	nH
T_J, T_{stg}	Junction and Storage Temperature Range	-40 to +150	$^\circ\text{C}$
M_S	Mounting Force Per Clamp	40 - 80	N
$R_{th JC}$	Thermal Resistance, Junction to Heatsink	0.13	$^\circ\text{C/W}$
M	Weight	39	g

MOSFET Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
Static characteristics (at $T_c=25^\circ\text{C}$ unless otherwise specified)						
BV_{DS}	Drain-Source Breakdown Voltage	1200	-	-	V	$V_{GS}=0\text{V}$
I_{DSS}	Zero Gate Voltage Drain Current	-	-	50	μA	$V_{DS}=1200\text{V}$; $V_{GS}=0\text{V}$
I_{GSS}	Gate-Body Leakage Current	-	-	2.5	μA	$V_{GS}=-10/20\text{V}$; $V_{DS}=0\text{V}$
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	$V_{DS}=V_{GS}$; $I_D=50\text{mA}$
$R_{DS(on)}$	Static Drain-Source on Resistance	-	9.0	11.0	m Ω	$V_{GS}=18\text{V}$; $I_D=120\text{A}$; $T_{VJ}=25^\circ\text{C}$
		-	16.2	-		$V_{GS}=18\text{V}$; $I_D=120\text{A}$; $T_{VJ}=175^\circ\text{C}$
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
R_G	Gate Resistance	-	1.1	-	Ω	$V_{GS}=0\text{V}$; $f=1\text{MHz}$
Dynamic characteristics (at $T_c=25^\circ\text{C}$ unless otherwise specified)						
C_{iss}	Input Capacitance	-	12.8	-	nF	$V_{DS}=1000\text{V}$; $f=1\text{MHz}$; $V_{AC}=25\text{mV}$
C_{oss}	Output Capacitance	-	0.55	-		
C_{rss}	Reverse Transfer Capacitance	-	20	-	pF	
E_{on}	Turn-on Energy	-	12.7	-	mJ	$V_{DD}=800\text{V}$; $V_{GS}=-5/+18\text{V}$; $I_D=235\text{A}$; $R_{G(ext)}=3.3\Omega$; Load=35 μH
E_{off}	Turn-off Energy	-	4.6	-		
Q_{GS}	Gate-Source Charge	-	160	-	nC	$V_{DD}=800\text{V}$; $V_{GS}=-5/+18\text{V}$; $I_D=100\text{A}$
Q_{GD}	Gate-Drain Charge	-	165	-		
Q_G	Total Gate Charge	-	625	-		
$t_{d(on)}$	Turn-on Delay Time	-	37.2	-	ns	$V_{DD}=800\text{V}$; $V_{GS}=-5/+18\text{V}$; $I_D=235\text{A}$; $R_{G(ext)}=3.3\Omega$; Load=35 μH
t_r	Rise Time	-	31.8	-		
$t_{d(off)}$	Turn-off Delay Time	-	70.1	-		
t_f	Fall Time	-	23.8	-		

Body Diode Characteristics (at $T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
V_{FSD}	Forward Voltage	-	-	6	V	$V_{GS}=0\text{V}$; $I_F=150\text{A}$
I_S	Continuous Diode Forward Current	-	150	-	A	$V_{GS}=0\text{V}$; $T_C=25^{\circ}\text{C}$
t_{RR}	Reverse Recovery Time	-	54.5	-	ns	$V_{GS}=-5/+18\text{V}$; $I_F=235\text{A}$; $V_R=800\text{V}$; $R_{G(ext)}=3.3\Omega$; Load= $35\mu\text{H}$
Q_{RR}	Reverse Recovery Charge	-	3560	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	259	-	A	

NTC Thermistor Characteristics

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

Typical Performance

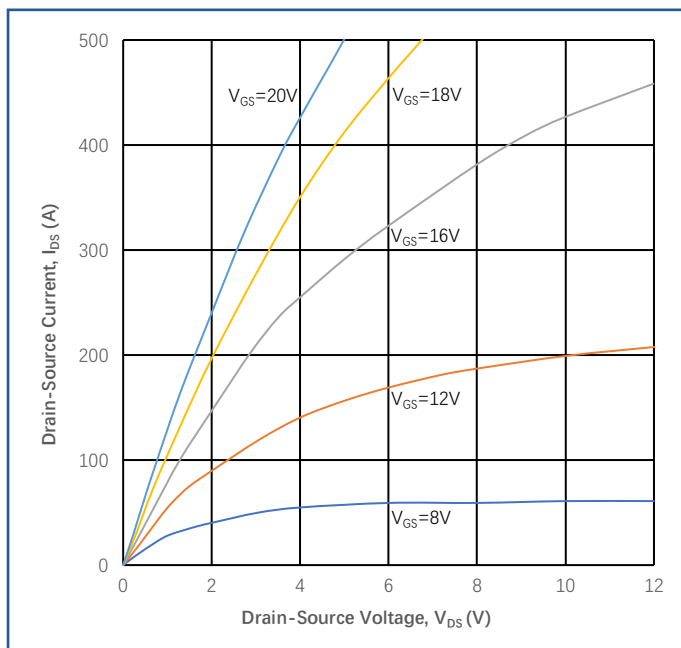


Figure 1
Output Characteristics ($T_J = 25^\circ\text{C}$)

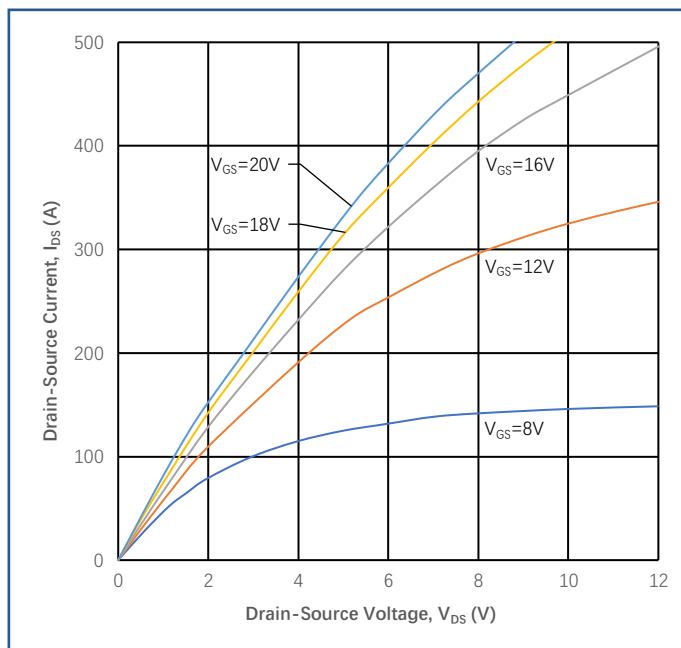


Figure 2
Typical Output Characteristics ($T_J = 150^\circ\text{C}$)

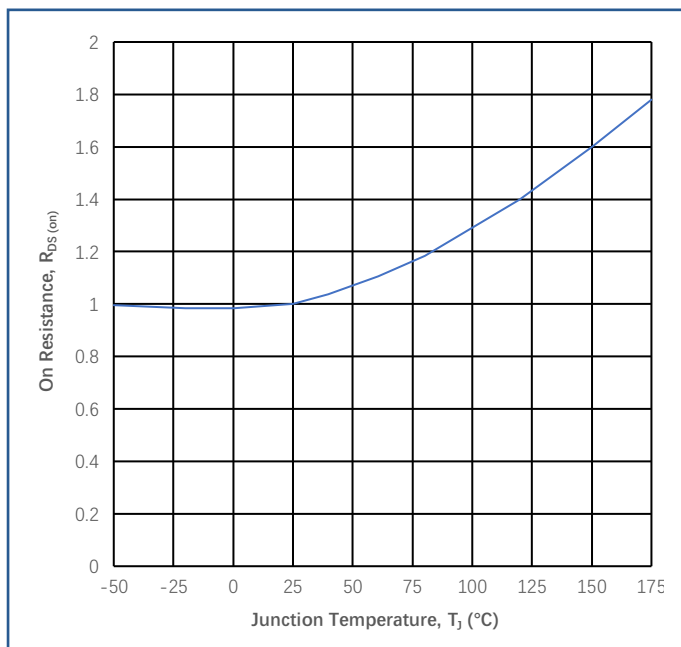


Figure 3
Normalized On-Resistance vs. T_J

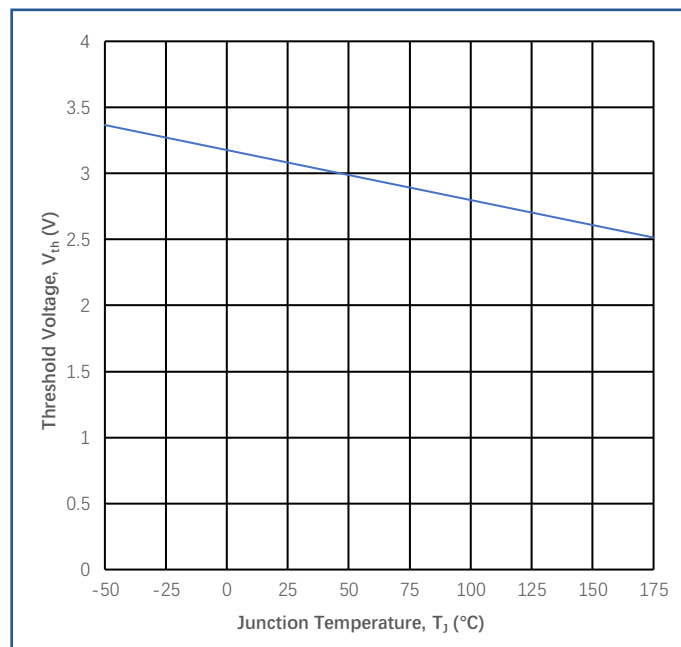


Figure 4
Threshold Voltage vs. Temperature

Typical Performance

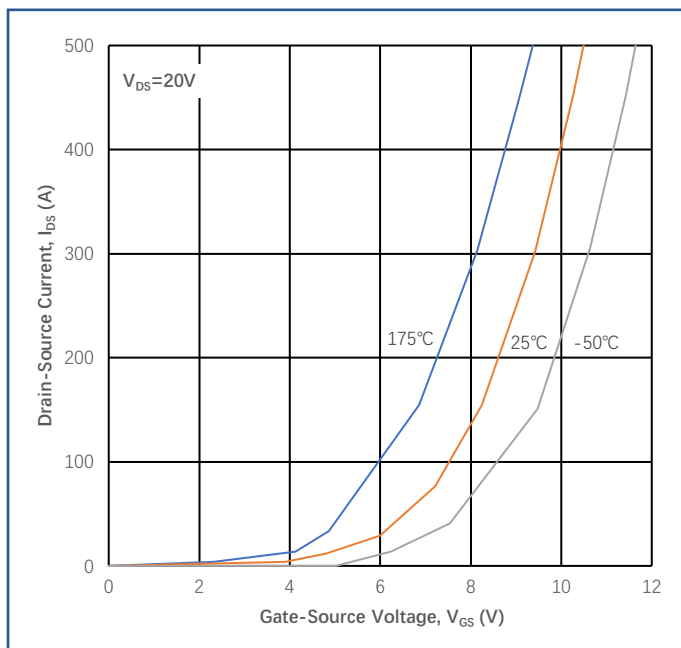


Figure 5
Transfer Characteristic for Various T_j

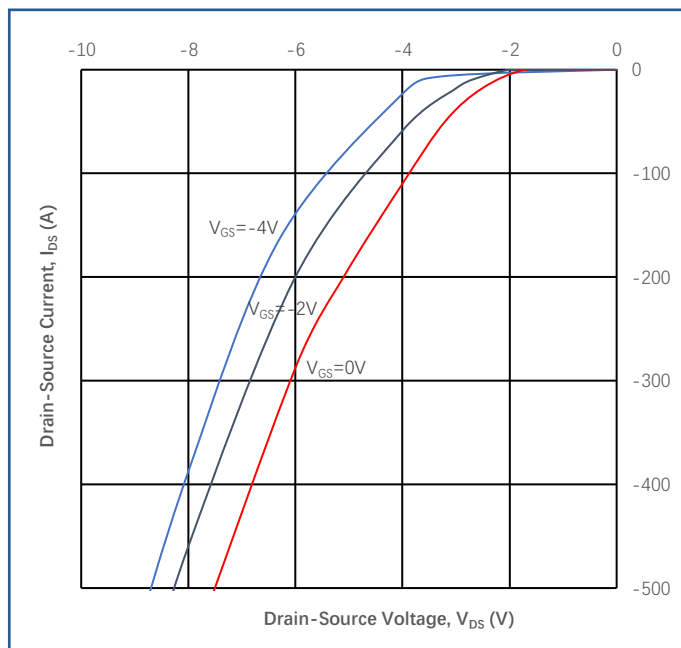


Figure 6
Body Diode Characteristic

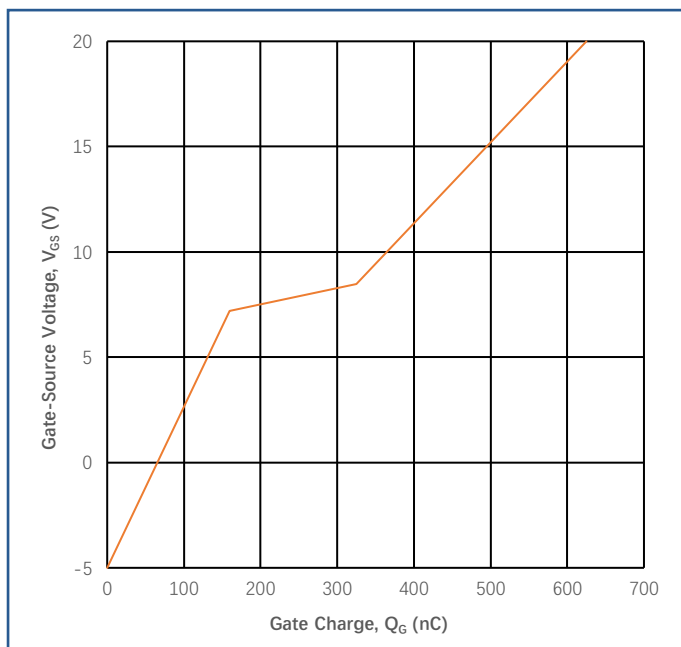


Figure 7
Gate Charge Characteristics

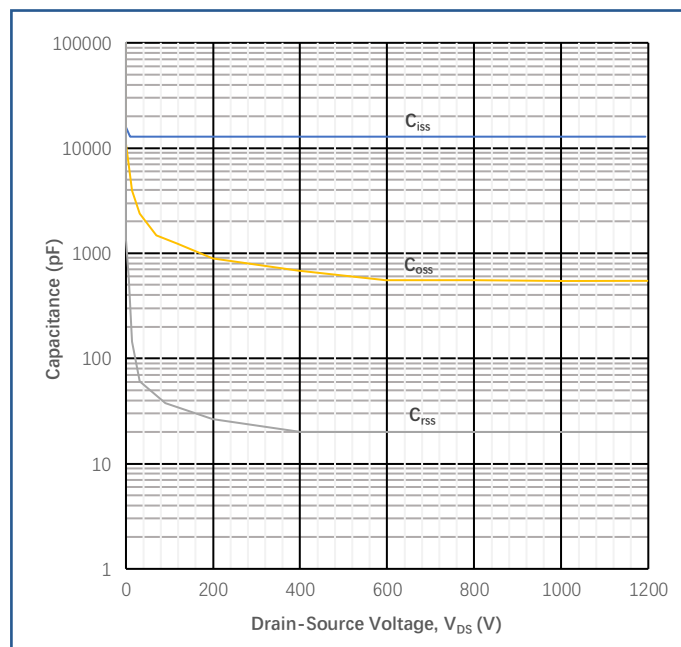


Figure 8
Capacitances vs. V_{DS}

Typical Performance

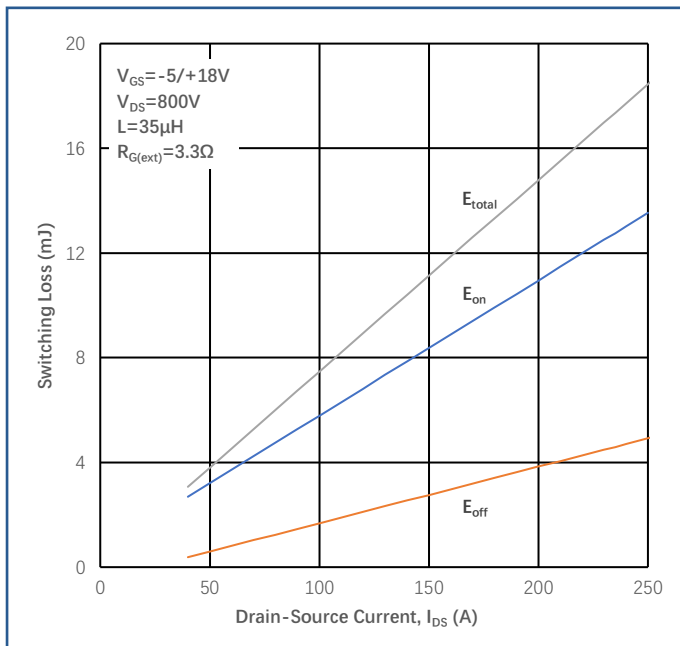


Figure 9
Inductive Switching Energy vs. Drain Current

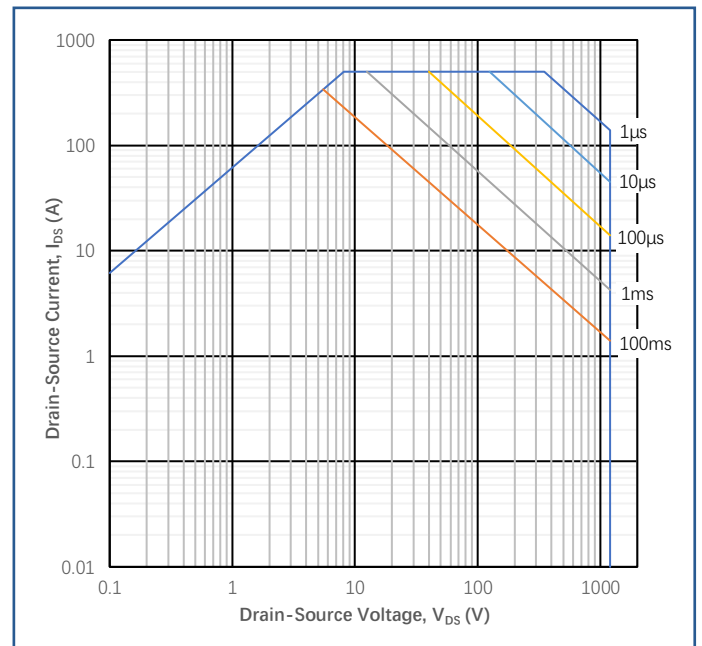
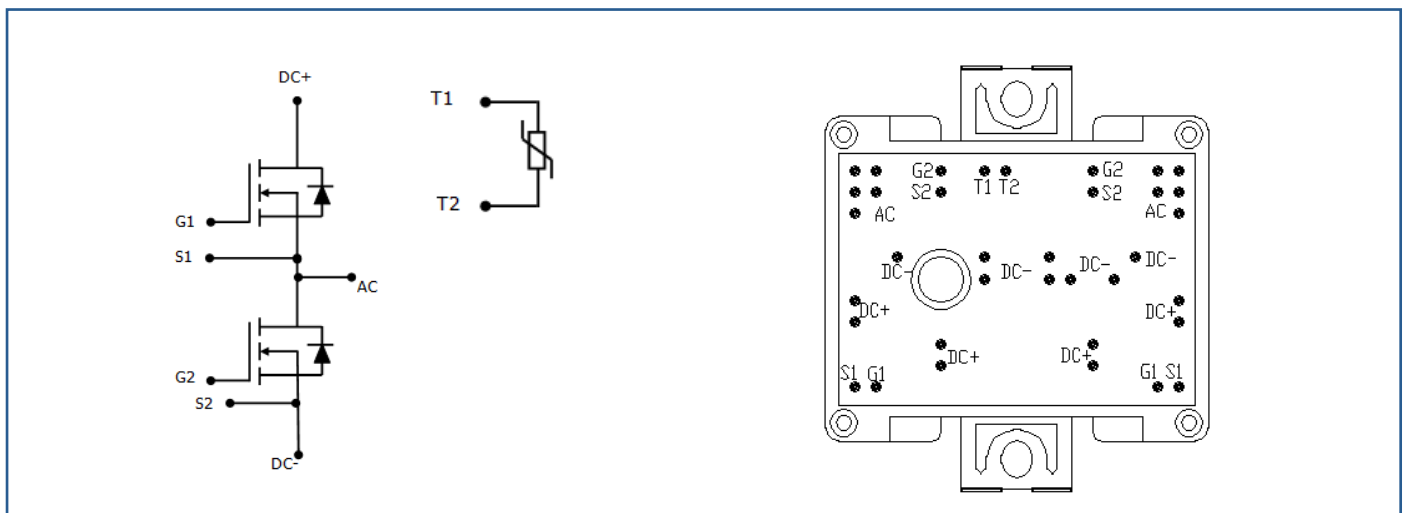


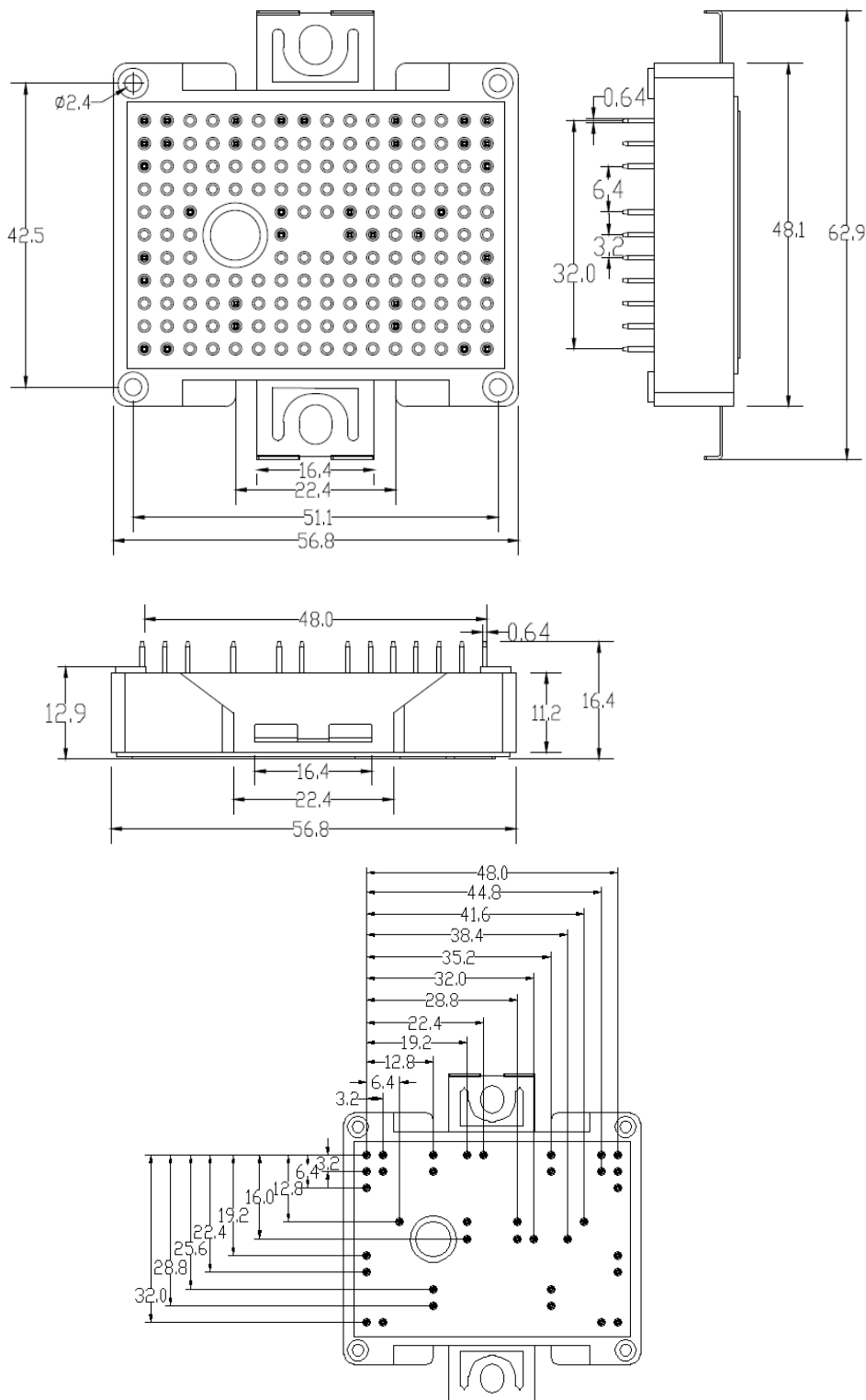
Figure 10
Safe Operating Area

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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