

ASR45N1200MEP6B

1200V, 45mΩ, Six-pack (Three-phase), Silicon Carbide MOSFET Module

Product Data Sheet

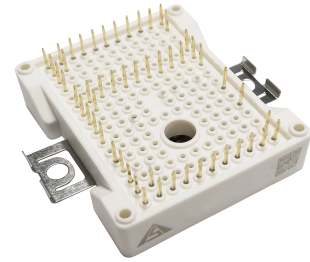
ASTC-3T03-135A A/0



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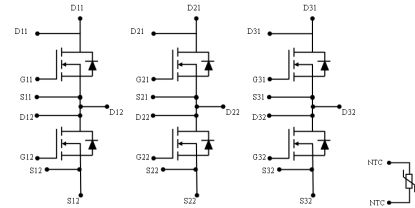
General Description

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



Applications

- High power converters
- Motor Drives
- Servo Drives
- UPS Systems
- Wind turbines

Ordering Informations

Order Number / Marking	ASR45N1200MEP6B
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)	60			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	-	45	52	mΩ	V _{GS} =18V; I _D =20A; T _C =25°C
Dynamic characteristics						
Q _G	Total Gate Charge	-	125	-	nC	V _{DD} =800V; V _{GS} =-5/+18V; I _D =20A; T _C =25°C
Q _{GD}	Gate-Drain Charge	-	33	-		
Source-Drain diode						
Q _{RR}	Reverse Recovery Charge	-	712	-	nC	V _{GS} =-5/+18V; I _F =20A; V _R =800V; Load=100uH

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) ($T_c=25^{\circ}\text{C}$)	60	A
	Drain Current (Continuous) ($T_c=90^{\circ}\text{C}$)	48	
I_{DM}	Drain Current (Pulsed)	100	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
$R_{th Jh}$	Thermal Resistance, Junction-to-Heatsink	0.27	$^{\circ}\text{C/W}$
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	$V_{GS}=0\text{V}$; $I_D=250\mu\text{A}$
I_{DSS}	Zero Gate Voltage Drain Current	-	-	10	μA	$V_{DS}=1200\text{V}$; $V_{GS}=0\text{V}$
I_{GSS}	Gate-Body Leakage Current	-	-	250	nA	$V_{GS}=-10/20\text{V}$; $V_{DS}=0\text{V}$
$V_{GS(th)}$	Gate Threshold Voltage	2	-	4	V	$V_{DS}=V_{GS}$; $I_D=10\text{mA}$
$R_{DS(on)}$	Static Drain-Source on Resistance	-	45	52	m Ω	$V_{GS}=18\text{V}$; $I_D=20\text{A}$; $T_c=25^{\circ}\text{C}$
$V_{GS(on)}$	Recommended Turn-on Voltage	-	18	-	V	Static
$V_{GS(off)}$	Recommended Turn-off Voltage	-	-5	-	V	
R_G	Gate Resistance	-	4.2	-	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	-	2.6	-	nF	$V_{DS}=1000\text{V}$; $f=100\text{kHz}$; $V_{AC}=25\text{mV}$
C_{oss}	Output Capacitance	-	0.11	-		
C_{rss}	Reverse Transfer Capacitance	-	4	-	pF	
E_{on}	Turn-on Energy	-	400	-	μJ	$V_{DD}=800\text{V}$; $V_{GS}=-5/+18\text{V}$; $I_D=20\text{A}$; $R_{G(ext)}=2.5\Omega$; Load=100 μH ; $T_J=25^{\circ}\text{C}$
E_{off}	Turn-off Energy	-	94	-		
Q_{GS}	Gate-Source Charge	-	32	-	nC	$V_{DD}=800\text{V}$; $V_{GS}=-5/+18\text{V}$; $I_D=20\text{A}$
Q_{GD}	Gate-Drain Charge	-	33	-		
Q_G	Total Gate Charge	-	125	-		
$t_{d(on)}$	Turn-on Delay Time	-	16	-	ns	$V_{DD}=800\text{V}$; $V_{GS}=-5/+18\text{V}$; $I_D=20\text{A}$; $R_{G(ext)}=2.5\Omega$; Load=100 μH ; $T_J=25^{\circ}\text{C}$
t_r	Rise Time	-	20	-		
$t_{d(off)}$	Turn-off Delay Time	-	29	-		
t_f	Fall Time	-	10	-		



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	$V_{\text{GS}}=0\text{V}$; $I_{\text{F}}=20\text{A}$
I_{S}	Continuous Diode Forward Current	-	30	-	A	$V_{\text{GS}}=0\text{V}$; $T_{\text{C}}=25^{\circ}\text{C}$
t_{RR}	Reverse Recovery Time	-	59	-	ns	$V_{\text{GS}}=-5/+18\text{V}$; $I_{\text{F}}=20\text{A}$; $V_{\text{R}}=800\text{V}$; Load=100 μH
Q_{RR}	Reverse Recovery Charge	-	712	-	nC	
I_{RRM}	Peak Reverse Recovery Current	-	19	-	A	

NTC Thermistor Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
R_{25}	Rated Resistance	-	5.00	-	k Ω	$T_{\text{NTC}}=25^{\circ}\text{C}$
$\Delta R/R$	Deviation of R_{100}	-5	-	5	%	$T_{\text{NTC}}=100^{\circ}\text{C}$; $R_{100}=493.3\Omega$
$B_{25/50}$	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

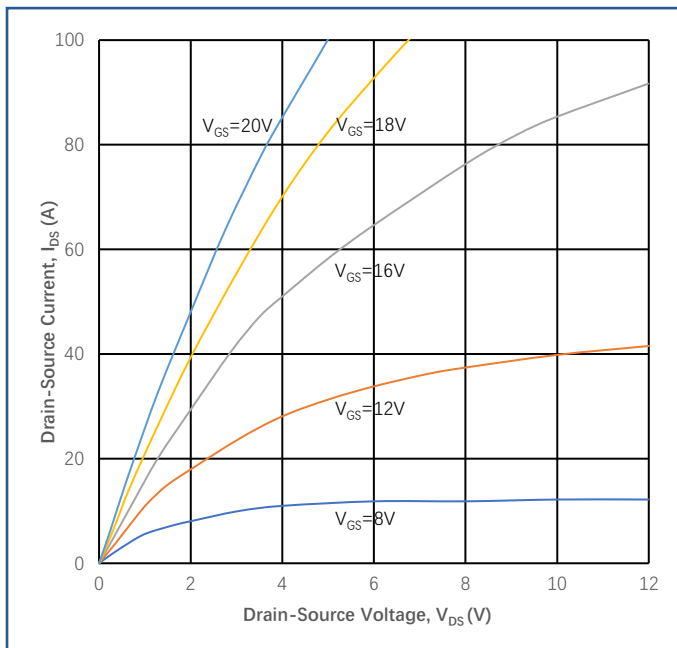


Figure 1
Output Characteristics (T_j=25°C)

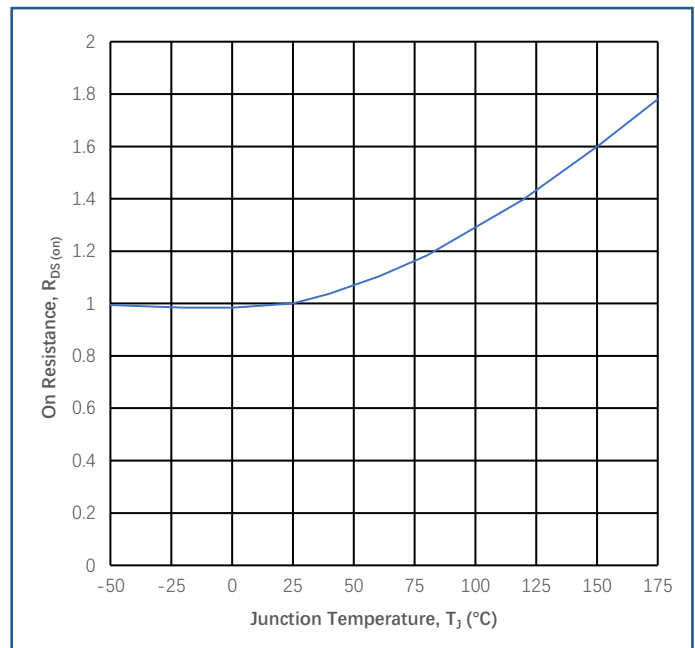


Figure 2
Normalized On-Resistance vs. Temperature

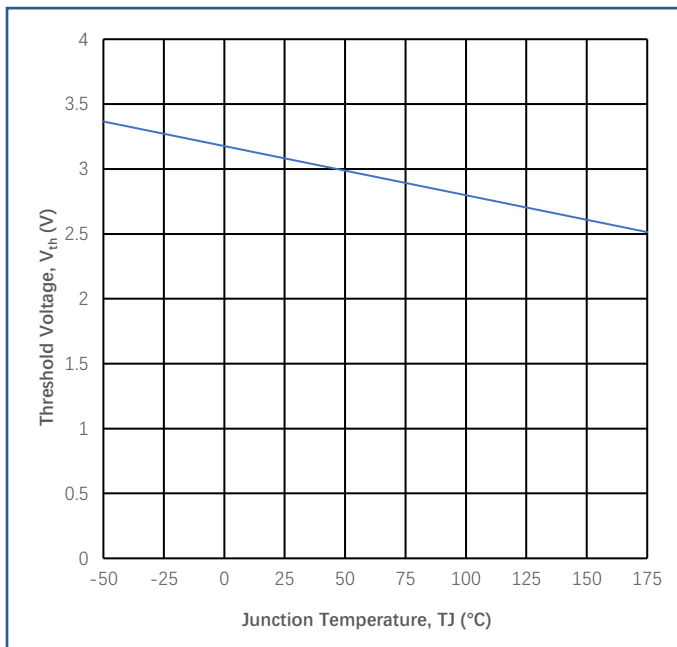


Figure 3
Threshold Voltage vs. Temperature

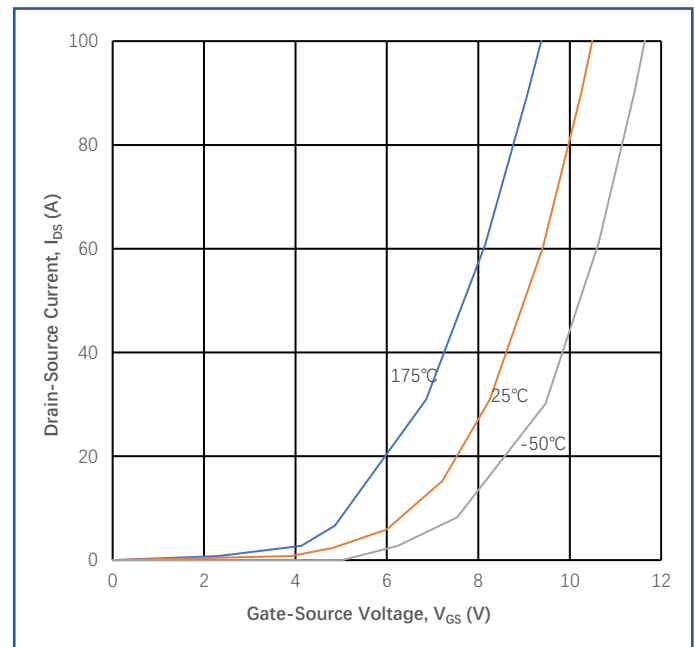


Figure 4
Transfer Characteristic for Various T_j

Typical Performance

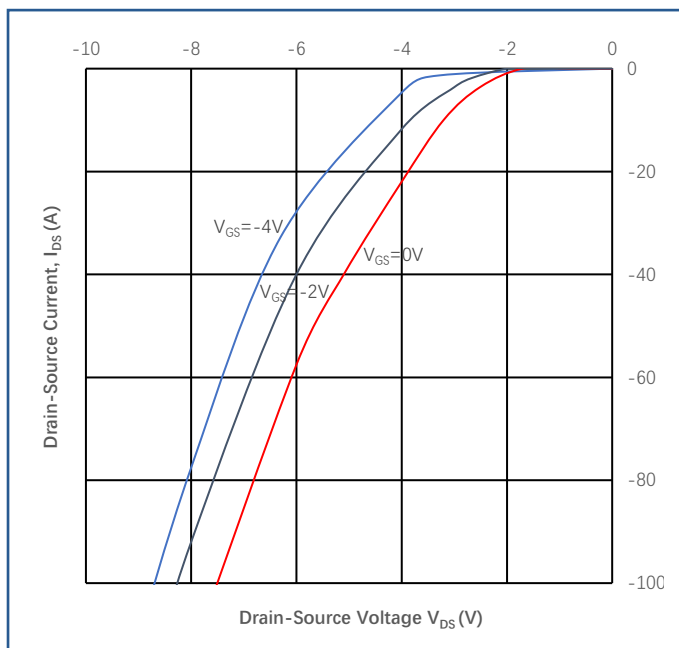


Figure 5
Diode Characteristic at 25°C

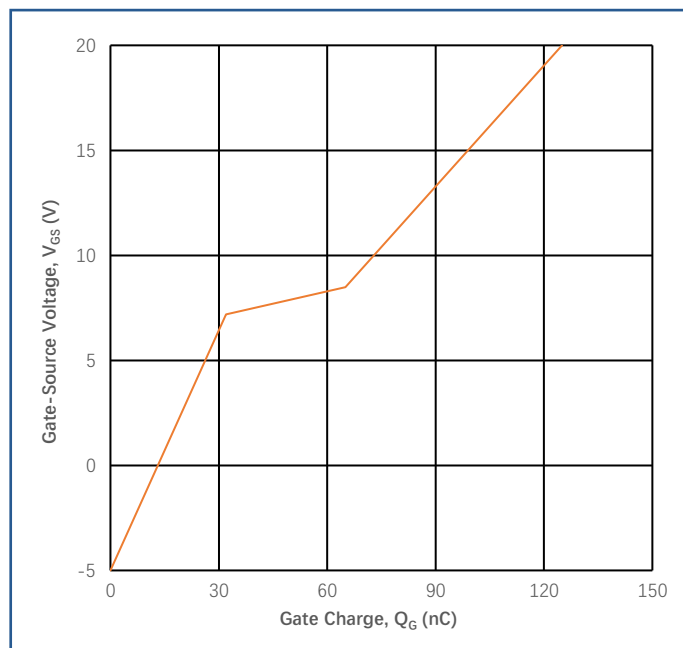


Figure 6
Typical Gate Charge Characteristics

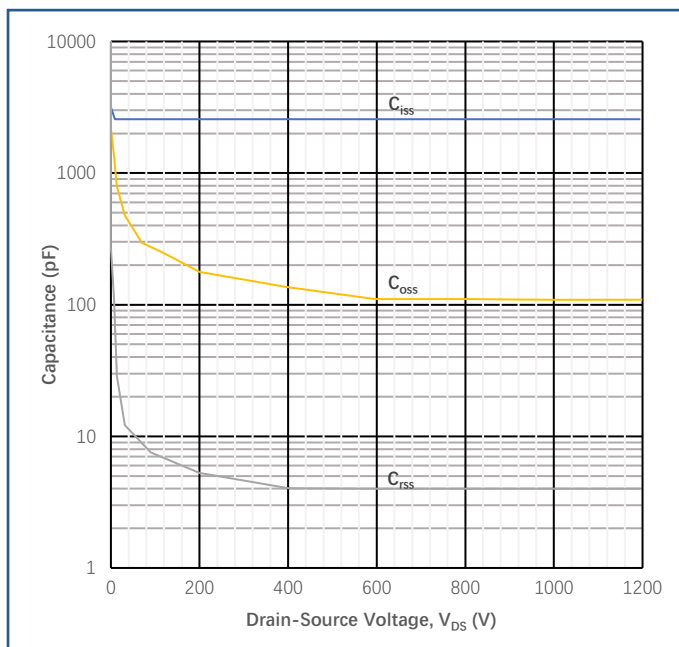


Figure 7
Capacitances vs. V_{DS}

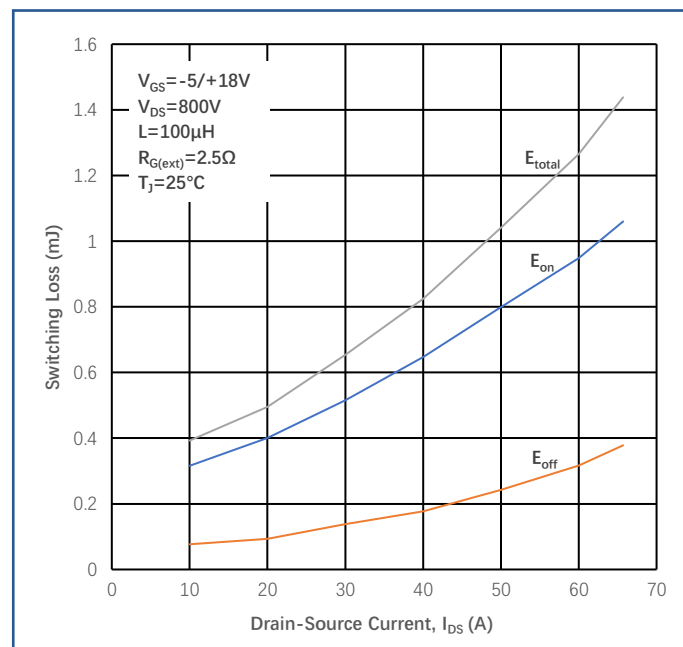


Figure 8
Inductive Switching Energy vs. Drain Current

Typical Performance

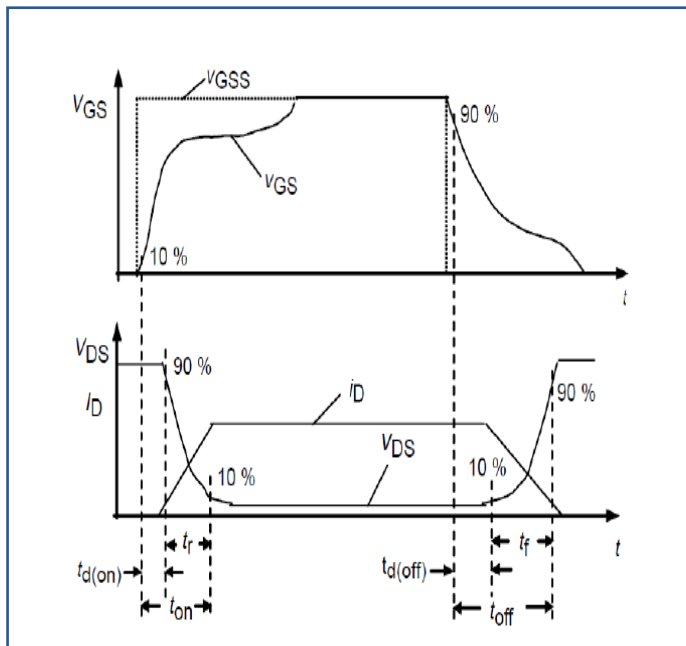


Figure 9

Switching Time Description

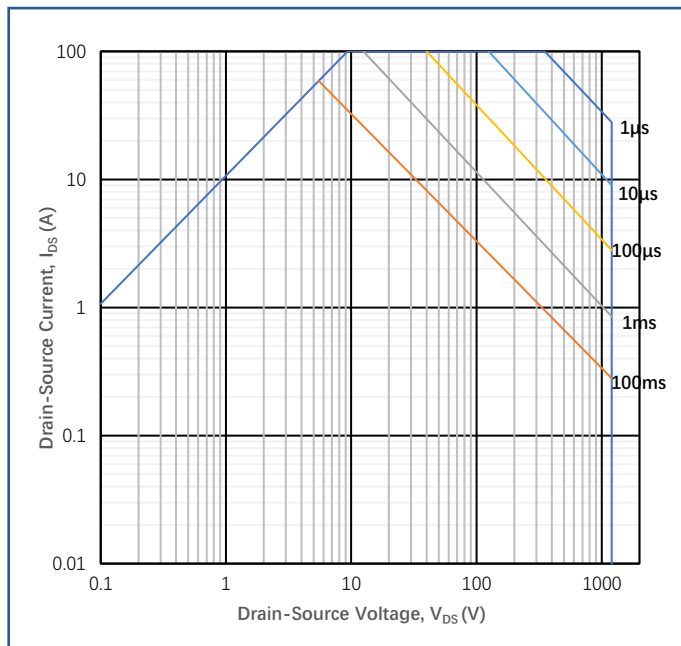
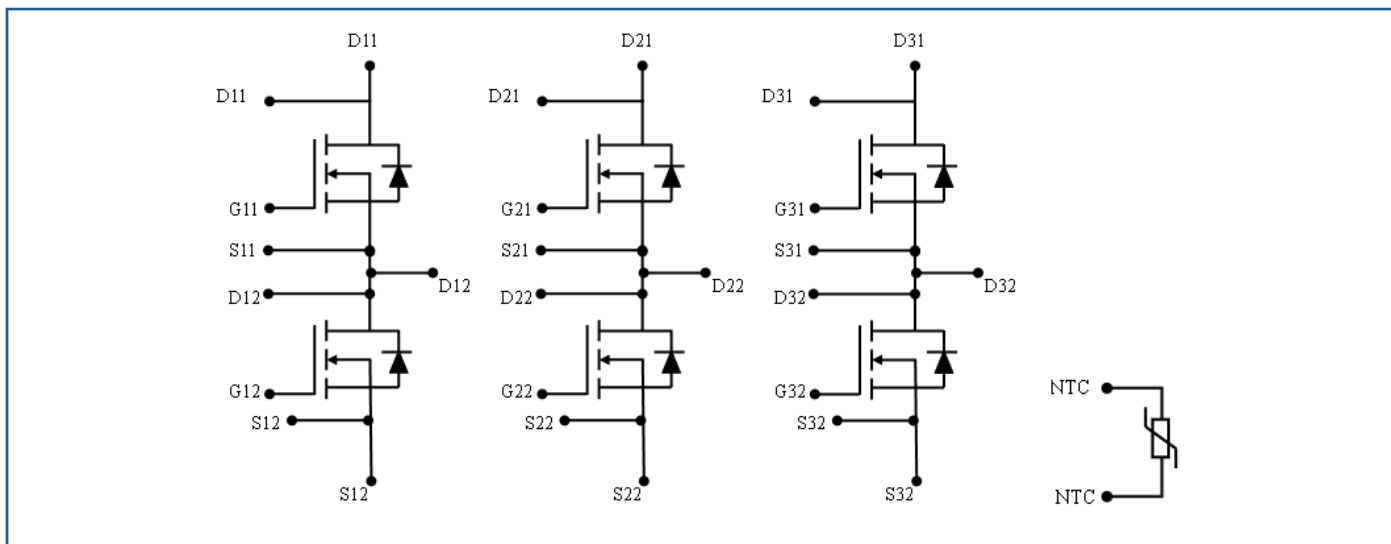


Figure 10

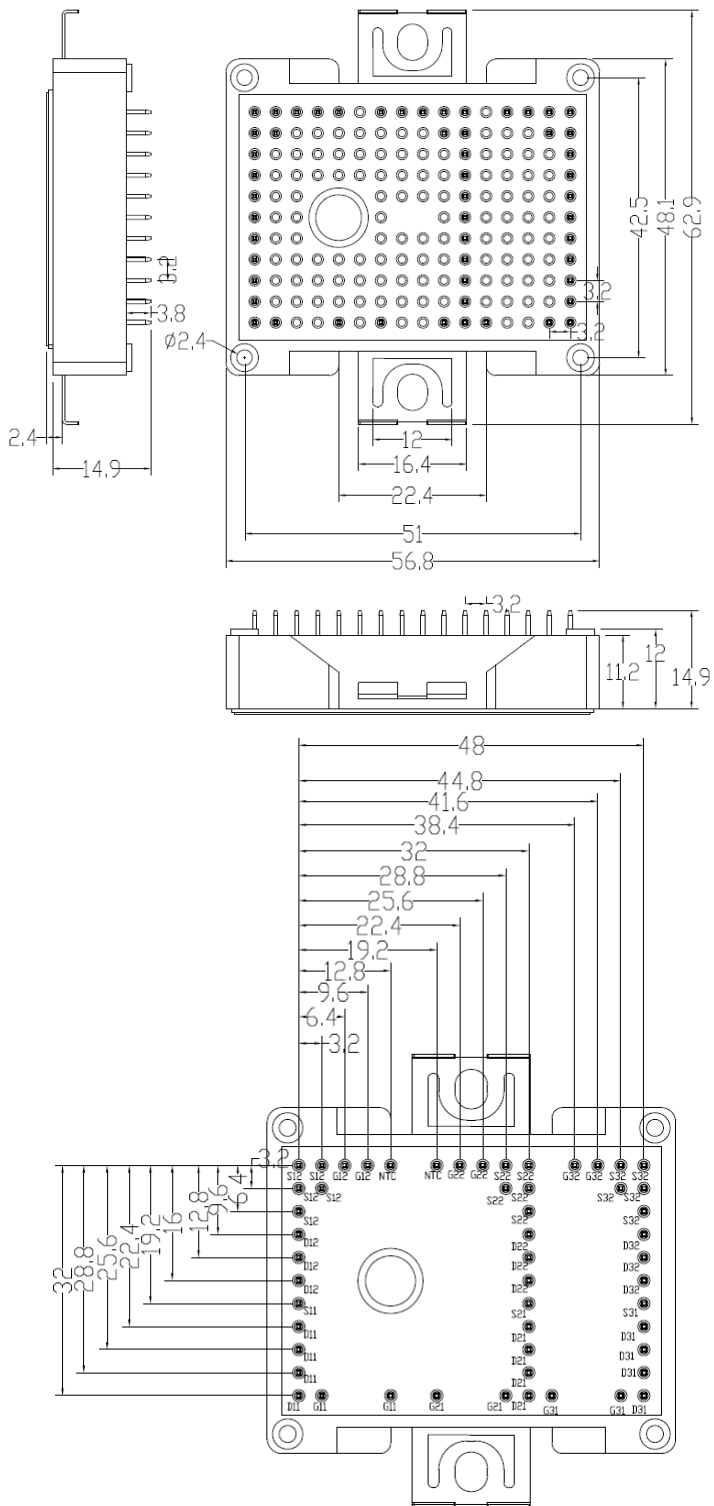
Safe Operating Area

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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