Features

- High Temperature, Humidity, and Bias Operation
- Ultra Low Loss
- High-Frequency Operation
- Zero Turn-off Tail Current from MOSFET
- Normally-off, Fail-safe Device Operation
- Ease of Paralleling
- Integrated NTC temperature sensor
- Cu Baseplate and Aluminum Nitride Insulator

Potential Applitions

- High power converters
- Motor drives
- Servo drives
- UPS systems
- Wind turbines

Package 152mm x 62.5mm x 20.5mm

Part Number	Package	Marking
ASC600N1200MED	Econodual	ASC600N1200MED

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1200	V
V_{GS}	Gate-Source Voltage(dynamic)	-10/+25	V
I_D	Drain Current	600	A
I_{DM}	Drain Current (pulsed)	1200	A
P_D	Power Dissipation T_C = 25°C	960	W
T_C,Tstg	Operating and Storage Temperature Range	-40 to +150	℃
T_J	Junction Temperature	175	℃
L_{Stray}	Stray Inductance	20	nH

Electrical Characteristics (T_C = 25℃ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source BreakdownVoltage	V_{GS}=0V	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =1200V, V_{GS} =0V			600	uA
I_{GSS}	Gate-body Leakage Current	V_{GS}=-10/20V,V_{DS}=0V			6	uA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=60mA	2.0		4.0	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=20V, I_D=300A		2.8	3.7	mΩ
R_G	Gate Resistance	V_{GS}=0V,f=1MHz		3.0		Ω
C_{iss}	Input Capacitance	V_{DS}=800V， f=100kHZ, V_{AC}=25mV		38.2		nF
C_{oss}	Output Capacitance			1.47		
C_{rss}	Reverse Transfer Capacitance			90		pF
E_{on}	Turn-on energy loss per pulse	V_{DD}=600V,V_{GS}=-5/+20V I_D=400A,R_G(ext=5Ω) Load=77uH,T_J=25℃		14.2		mJ
E_{off}	Turn-off energy loss per pulse			11.8		mJ
Q_{GS}	Gate-Source Charge	V_{DD}=1000V, V_{GS}=-5/+20V I_D=600A,		383.5		nC
Q_{GD}	Gate-Drain Charge			391.5		
Q_G	Total Gate Charge			1190		
td（on）	Turn-on delay time	V_{DD}=600V,V_{GS}=-5/+20V I_D=300A,R_G(ext=5Ω) Load=77uH,T_J=150℃		76		nS
tr	Rise Time			69		
td(off)	Turn-off delay time			165		
tf	Fall Time			42		
Vsd	Diode Forward voltage	If=400A, V_{GS}=0			6	V

Typical Performance-Reverse Diode(T J = 25 ℃ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VFSD	Forward Voltage	V_{GS} =0V， I_F =300A, T_J =25℃			6	V
*I*s	Continuous Diode Forward Current	V_{GS} =0V， T_J =25℃		300		A
I_{Spulse}	Pulsed body diode current			600		A
trr	Reverse Recovery Time	V_{GS} =-5V，I_F =300A, VR=800V， di/dt=5.4k A/μs T_J =25℃		98		ns
Qrr	Reverse Recovery Time			460		nC
Irrm	Peak Reverse Recovery Current			104		A

Thermal Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	Tc=90°C，P_D=150W			0.13	°C/W

NTC-Thermistor

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Ratedresistance	Tc=25°C		5.00		kΩ
ΔR/R	Deviation of R100	T_C = 100°C, R_{100} = 477Ω	-5		5	%
B25/50	B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298{,}15\ K))]$		3380		k
B25/80	B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298{,}15\ K))]$		3468		k
B25/100	B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298{,}15\ K))]$		3523		k

Typical Performance

Figure 1. Output Characteristics for Various T_J

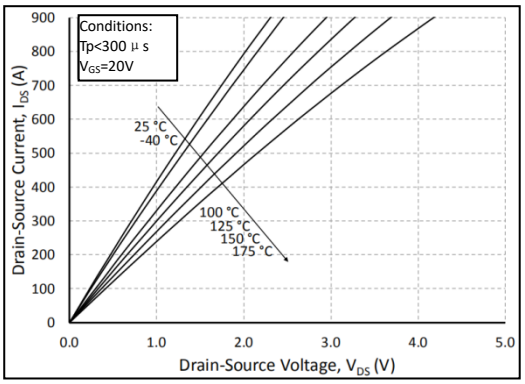


Figure 2. Normalized On-Resistance vs. Temperature

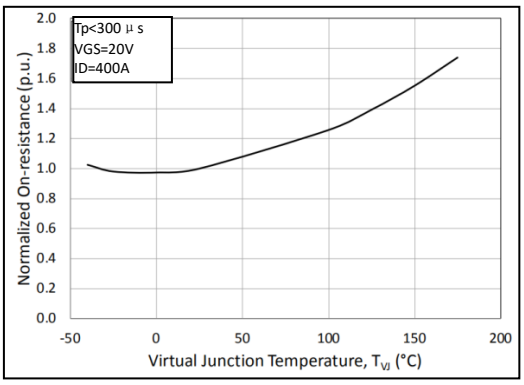


Figure 3. Threshold Voltage vs. Temperature

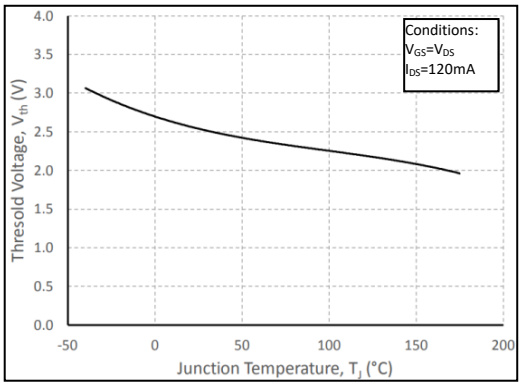


Figure 4. Transfer Characteristic for Various T_J

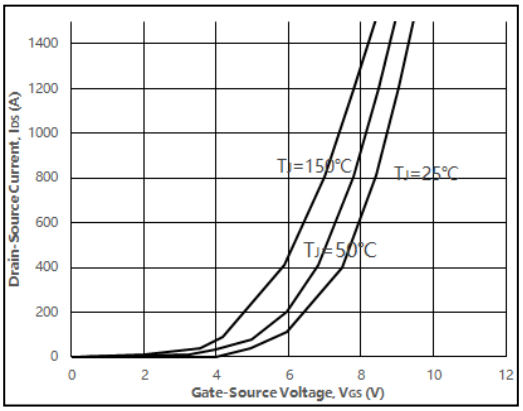


Figure 5. Diode Characteristic at 25 ˚C

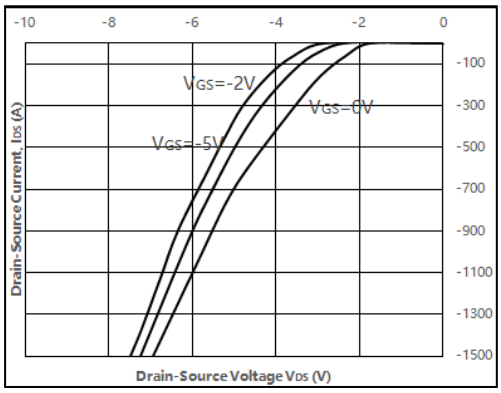


Figure 6. Typical Gate Charge Characteristics

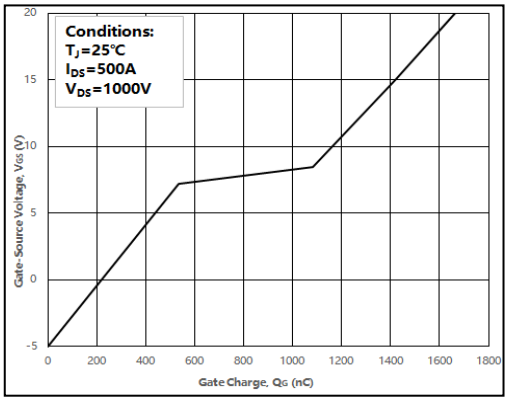


Figure 7. Typical Capacitances vs. Drain-Source Voltage

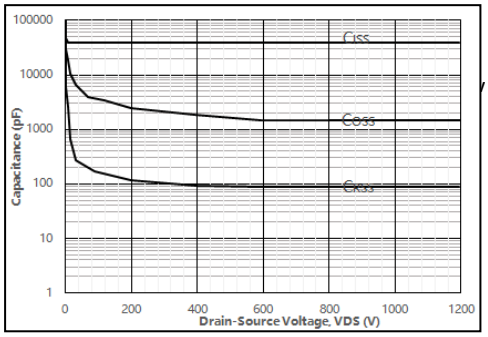


Figure 8. Inductive Switching Energy vs.Drain Current

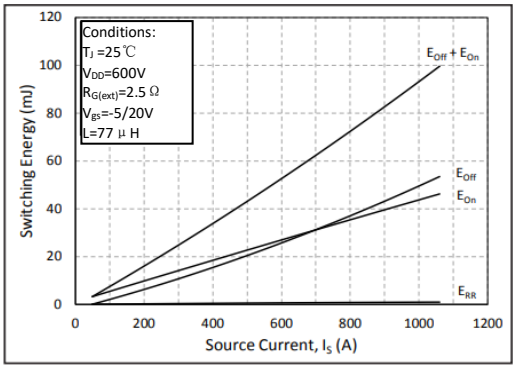


Figure 9. Resistive Switching Time Description

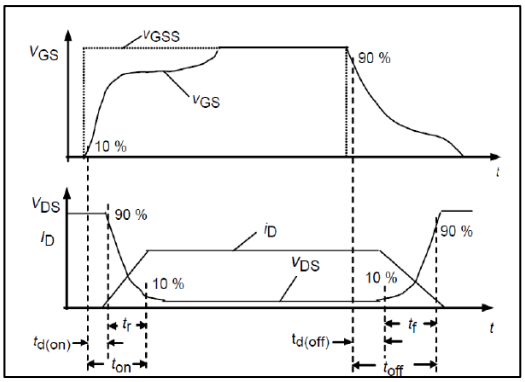
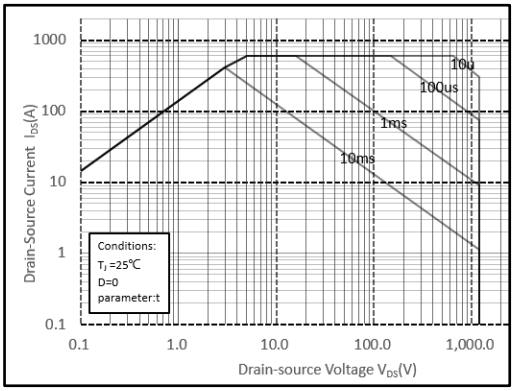
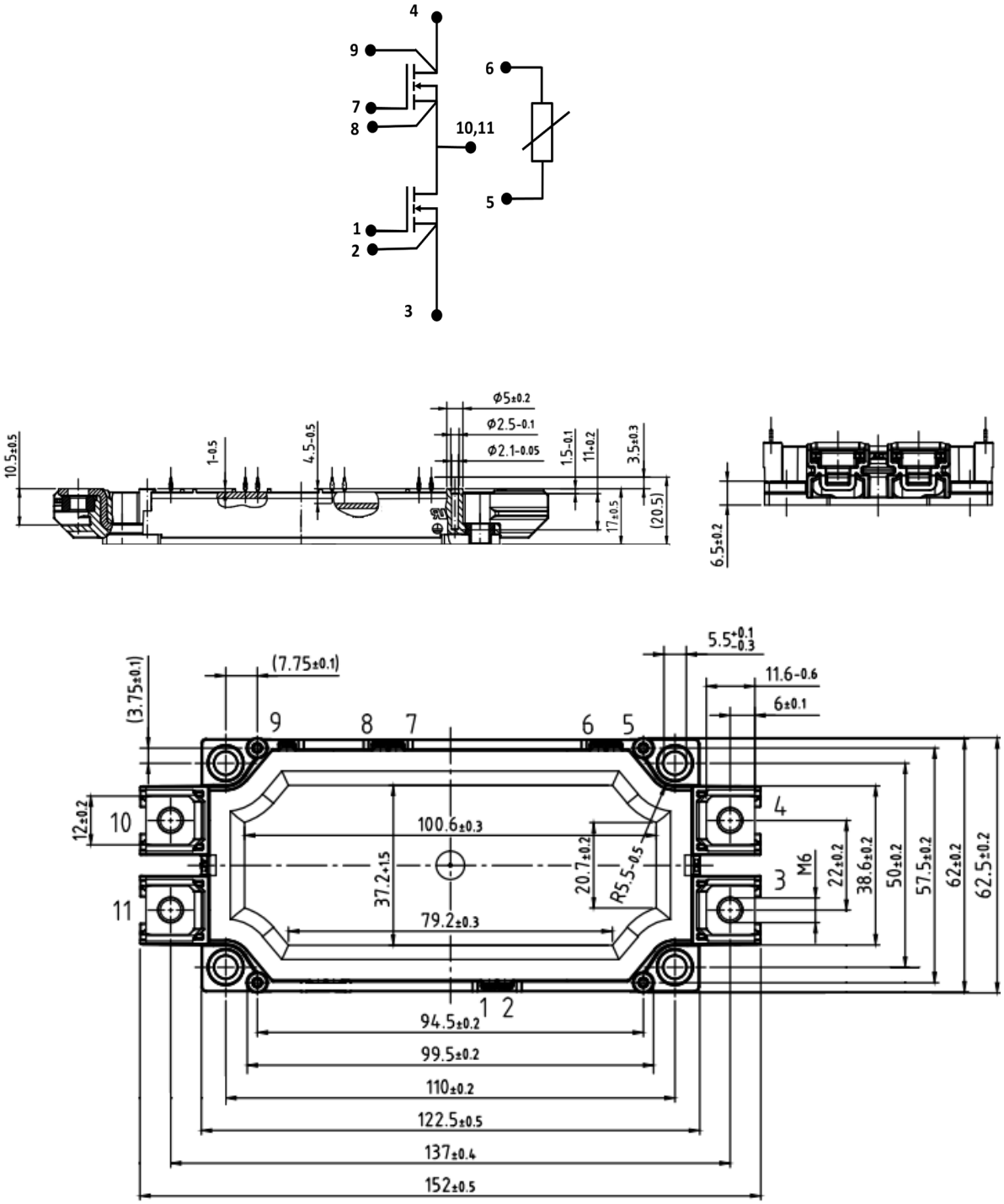
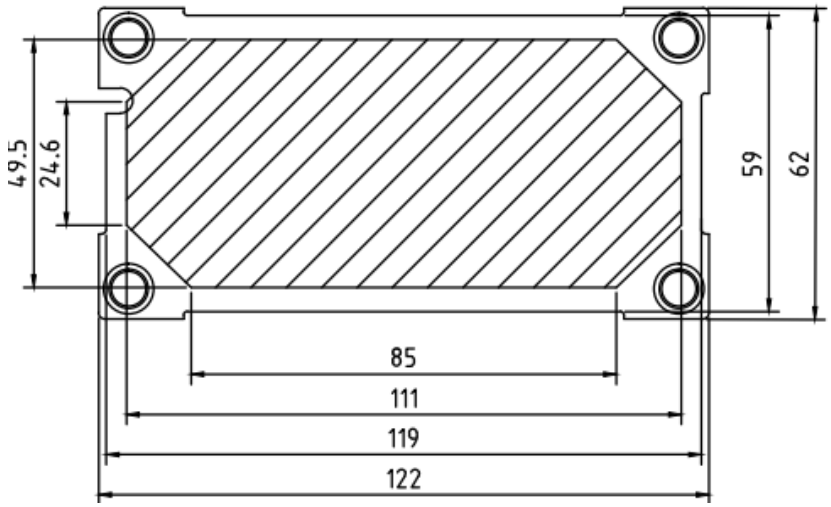


Figure 10. Safe Operating Area



Package Drawing:




49.5
24.6
59
62
85
111
119
122