ASC60N1200MB

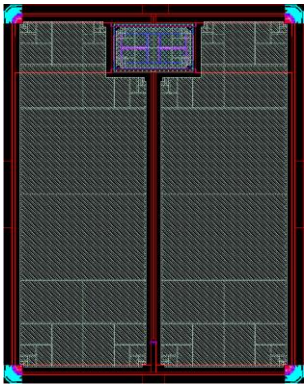
1200V N-Channel MOSFET

Description

Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, faster operating frequency, increased power density, reduced EMI, and reduced system size.

Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low RDS(on)
- Simple to drive with Standard Gate Drive
- 100% avalanche tested
- Maximum junction temperature of 175°C
- ROHS Compliant



Application

- EV Charging
- DC-AC Inverters
- High Voltage DC/DC Converters
- Switch Mode Power Supplies
- Power Factor Correction Modules
- Motor Drives

Part Number	Die Size
ASC60N1200MB	3.414×3.636

Absolute Maximum Ratings(Tc=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1200	V
I_D	Drain Current(continuous)at Tc=25℃	60	A
I_D	Drain Current(continuous)at Tc=100℃	48	A
I_{DM}	Drain Current (pulsed)	100	A
V_{GS}	Gate-Source Voltage	-10/+22	V
P_D	Power Dissipation T_C = 25°C	325	W
T_J, Tstg	Junction and Storage Temperature Range	-55 to +150	℃

Electrical Characteristics(T_J = 25℃ unless otherwise specified)

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	I_D=250uA,V_{GS}=0V	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =1200V, V_{GS} =0V, T_J=25°C			100	uA
I_{GSS}	Gate-body Leakage Current	V_{DS} =0V ; V_{GS} =-10 to 20V			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=10mA	2	3	4	V
V_{GSon}	Recommended turn-on Voltage	Static		20		V
V_{GSoff}	Recommended turn-off Voltage			-5		V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=20V, I_D=20A		45	52	mΩ
		V_{GS}=20V, I_D=20A T_J=150℃		72		mΩ

Typical Performance-Dynamic

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{iss}	Input Capacitance	V_{DS}=1000V,f=100kHz, V_{AC}=25mV		3239		pF
C_{oss}	Output Capacitance			112		pF
C_{rss}	Reverse Transfer Capacitance			6		pF
g_{fs}	Transconductance	V_{DS}=20V , I_D=20A		23		S
E_{OSS}	C_{OSS} Stored Energy	V_{DS}=1000V,f=100kHz		63		μJ
E_{ON}	Turn-On Energy（Body Diode）	V_{DS}=800V,V_{GS}=-5/20V，I_D=20A，L=100uH T_J=150℃		611		μJ
E_{OFF}	Turn-Off Energy（Body Diode）			103		μJ
Q_g	Total Gate Charge	V_{DS}=800V, V_{GS}=-5V/20V, I_D = 20A		125		nC
Q_{gs}	Gate-source Charge			32		nC
Q_{gd}	Gate-Drain Charge			33		nC
$R_{G(int)}$	Internal Gate Resistance	f=1MHz,V_{AC}=25mV		3.5		Ω
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=800V,V_{GS}=-5V/20V, I_D =20A, L=100 μH Rext=2.5Ω		15		ns
t_r	Rise Time			19		ns
$t_{d(off)}$	Turn-off Delay Time			25		ns
t_f	Fall Time			10		ns

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	V_{GS}=0V,I_F=20A,T_J=25°C		5	6	V
		V_{GS}=0V,I_F=20A,T_J=150°C		4.5	6	V
Is	Continuous Diode Forward Current	V_{GS}=0V，T_C=25°C		55		A
t_{rr}	Reverse Recovery Time	V_{GS}=-5 V, I_F=20 A, V_R=800 V, d*i*/d*t*=900 A/μs，T_J=150°C		50		nS
Q_{rr}	Reverse Recovery Charge			712		nC
I_{rrm}	Peak Reverse Recovery Current			19		A

Mechanical Parameters

Parameter	Typical Value	Unit
Die Dimensions(L×W) without scribe line	3.334×3.556	mm
Gate Pad Dimensions(L×W)	0.38×0.55	mm
Source Pad Metal Dimensions (LxW) Each	1.3×3.04×2	mm
Scribe Line	80	um
Die Thickness	175±25	um
Top Side Source metallization (Al)	4	um
Top Side Gate metallization (Al)	4	um
Bottom Drain metallization (Ti/Ni/Ag)	0.2/0.3/2	um

Chip Dimensions