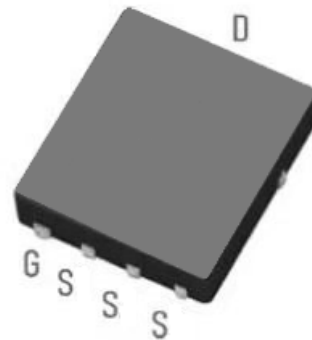



Description

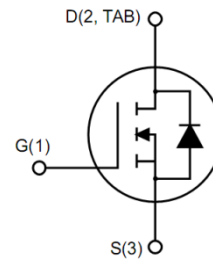
Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, 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 150°C
- ROHS Compliant


Application

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


Ordering Information

Part Number	Marking	Package	Packaging
ASR50N1200MD88	ASR50N1200MD88	DFN8*8	Tube



ASR50N1200MD88

Absolute Maximum Ratings($T_c=25^\circ\text{C}$)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	1200	V
I_D	Drain Current(continuous)at $T_c=25^\circ\text{C}$	40	A
I_D	Drain Current(continuous)at $T_c=100^\circ\text{C}$	20	A
I_{DM}	Drain Current (pulsed)	60	A
V_{GS}	Gate-Source Voltage	-10/+20	V
P_D	Power Dissipation $T_c = 25^\circ\text{C}$	152	W
T_J, T_{stg}	Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

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

Typical Performance-Static

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DS}	Drain-source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	1200			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=1200\text{V}, V_{GS}=0\text{V}, T_J=25^\circ\text{C}$			100	μA
I_{GSS}	Gate-body Leakage Current	$V_{DS}=0\text{V}; V_{GS}=-10$ to 18V			250	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=5\text{mA}$	1.5		3.5	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS}=18\text{V}, I_D=20\text{A}$		50	60	$\text{m}\Omega$
R_G	Gate Resistance	$V_{GS}=0\text{V}, f=1\text{MHz}$		3		Ω

Typical Performance-Dynamic

C_{iss}	Input Capacitance	$V_{DS}=470\text{V}, f=1\text{MHz}, V_{GS}=0\text{V}$		1648		pF
C_{oss}	Output Capacitance			86		pF
C_{rss}	Reverse Transfer Capacitance			12		pF
Q_g	Total Gate Charge	$V_{DS}=470\text{V}, I_D=30\text{A}, V_{GS}=-5\sim 20\text{V}$		82		nC
Q_{gs}	Gate-source Charge			19		nC
Q_{gd}	Gate-Drain Charge			22		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=470\text{V}, I_D=30\text{A}, V_{GS}=-5\text{V}\sim 20\text{V}, R_G=0\Omega,$		19		ns
t_r	Rise Time			23		ns
$t_{d(off)}$	Turn-off Delay Time			35		ns
t_f	Fall Time			21		ns

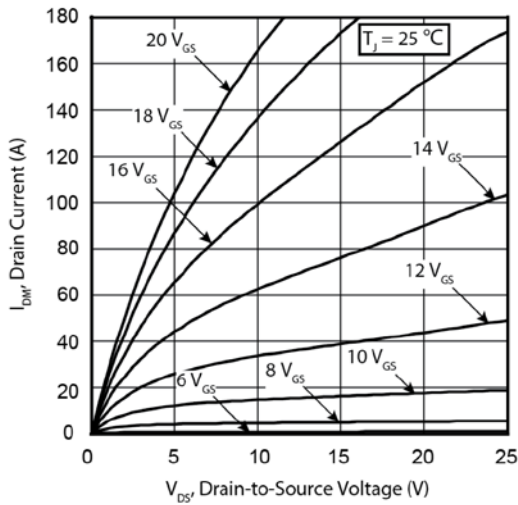
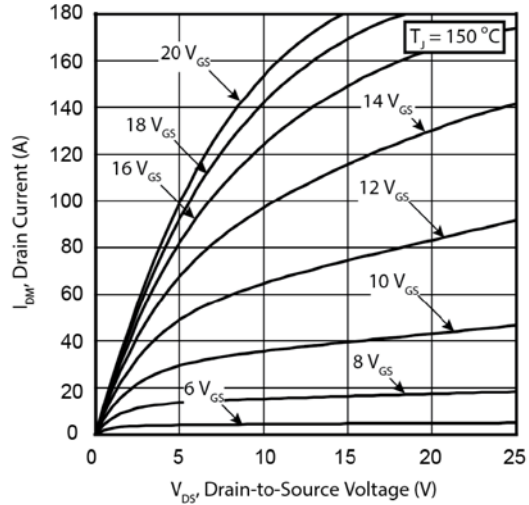
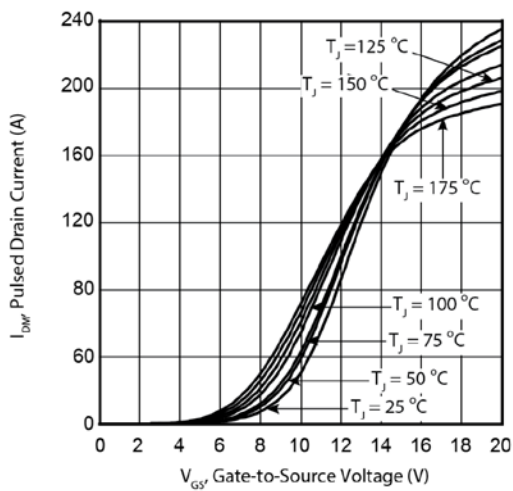
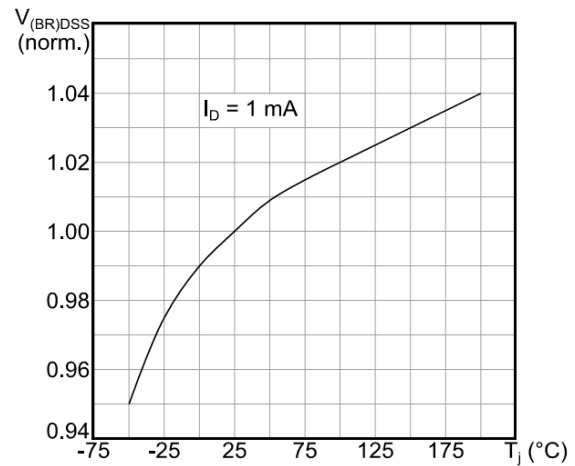
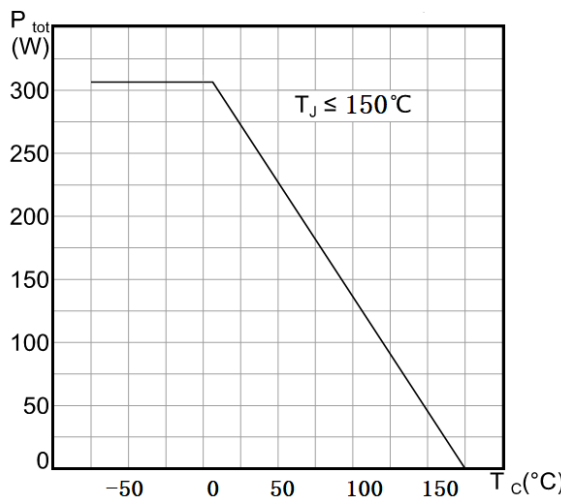
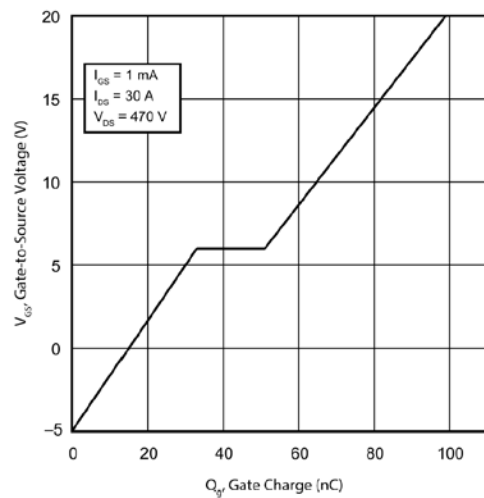
Typical Performance-Reverse Diode

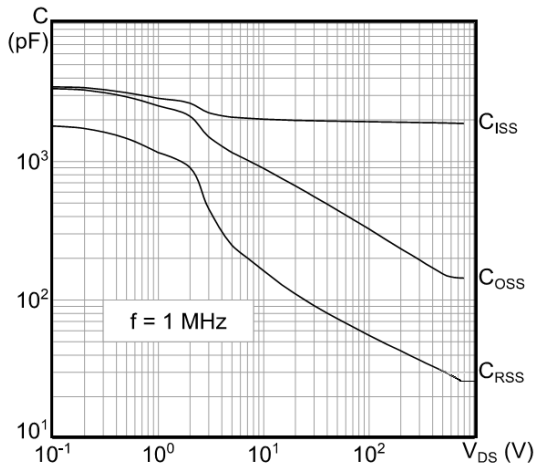
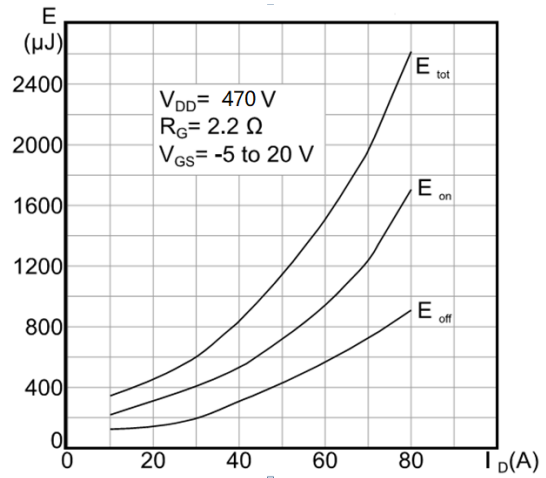
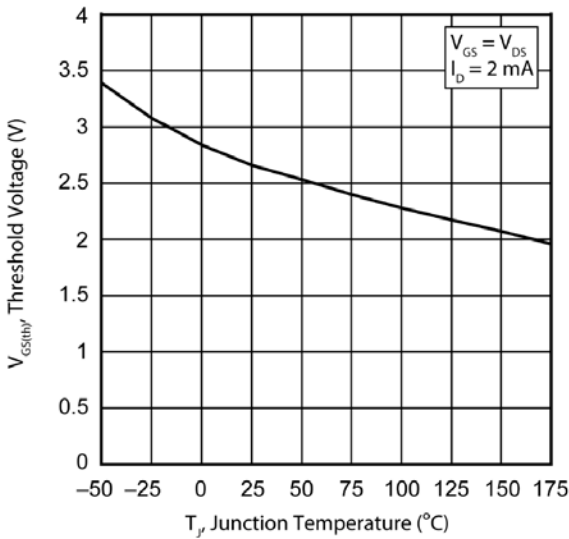
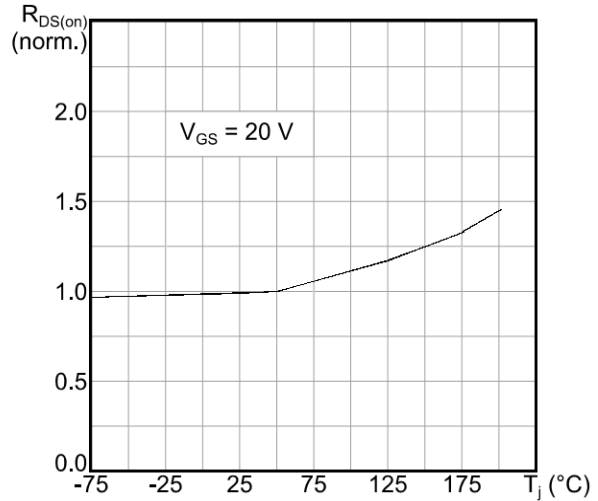
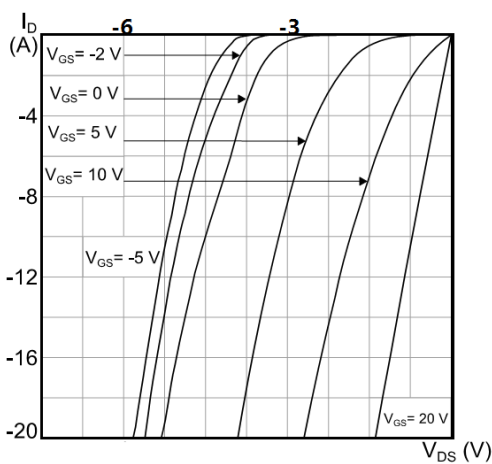
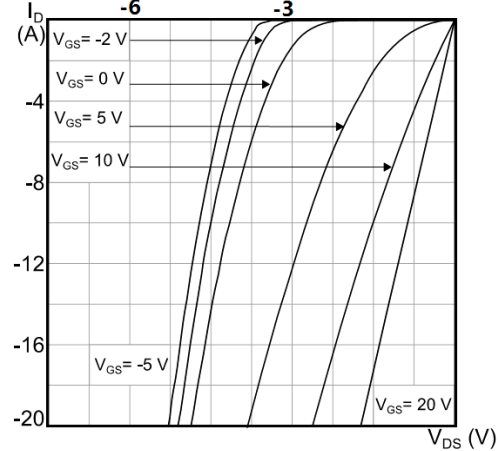
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V _{FSD}	Forward Voltage	V _{GS} =0V, I _F =20A, T _J =25°C	3		6	V
		V _{GS} =0V, I _F =20A, T _J =150°C	3		6	V
t _{rr}	Reverse Recovery Time	V _{GS} =-5 V, I _F =20 A, V _R =470 V, di/dt= -1000 A/μs		31		ns
Q _{rr}	Reverse Recovery Charge			242		nC
I _{rrm}	Peak Reverse Recovery Current			18		A

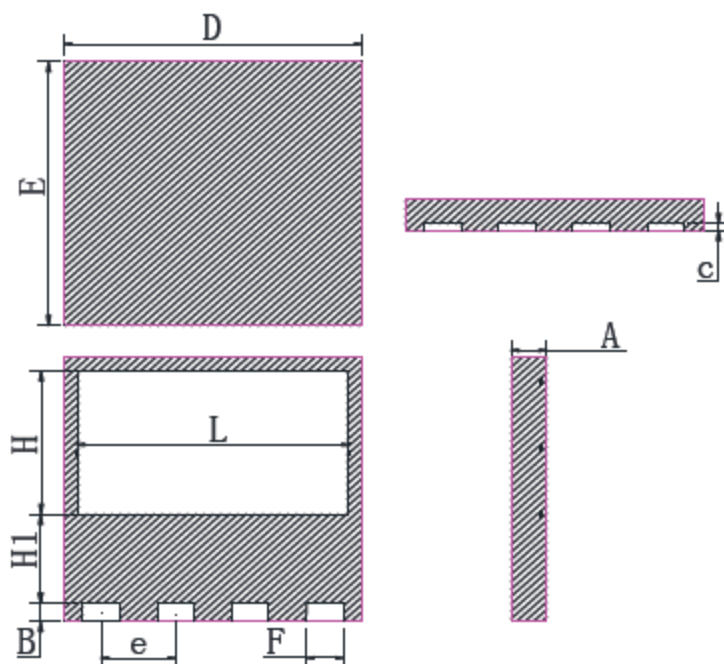
Thermal Characteristics

Symbol	Parameter	Value.	Unit
R _{θJC}	Thermal Resistance, Junction-to-Case	0.82	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Air	40	°C/W

The values are based on the junction-to case thermal impedance which is measured with the device mounted to a large heat sink assuming maximum junction temperature of T_J(max)=150°C

Electrical Characteristics (25°C unless noted)

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

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

Figure 3: Transfer characteristics

Figure 4 Normalized BVDSS vs. Temperature

Figure 5: Power dissipation

Figure 6: Gate charge vs gate-source voltage


Figure 7: Capacitance variations

Figure 8: Switching energy vs. drain current

Figure 9: Normalized Vth vs. T_J

Figure 10: Normalized Rdson vs. T_J

Figure 11: Body diode characteristics (T_J = 25 °C)

Figure 12: Body diode characteristics (T_J = 150 °C)

Package Drawing:

Dimensions (UNIT: mm)

Symbol	Min	Typ	Max
A	0.90	0.95	1.00
B	0.45	0.55	0.65
C	0.153	0.203	0.253
D	7.90	8.00	8.10
E	7.90	8.00	8.10
e	1.90	2.00	2.10
F	0.90	1.00	1.10
H	4.20	4.35	4.45
H1	2.60	2.70	2.80
L	7.10	7.20	7.3