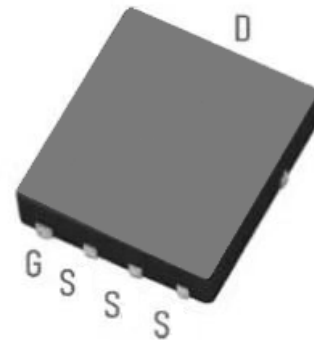


Description

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.

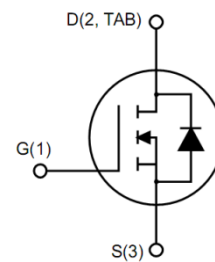
Features

- 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
ASR50N1200D88	ASR50N1200D88	DFN8*8	Tube

Absolute Maximum Ratings(Tc=25 °C)

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	1200	V
I _D	Drain Current(continuous)at Tc=25 °C	40	A
I _D	Drain Current(continuous)at Tc=100 °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 °C	152	W
T _J , Tstg	Junction and Storage Temperature Range	-55 to +150	°C

Electrical Characteristics(T_J = 25 °C 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 18V			250	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =5mA	1.5		3.5	V
R _{DS(on)}	Static Drain-source On Resistance	V _{GS} =18V, I _D =20A		50	60	mΩ
R _G	Gate Resistance	V _{GS} =0V, f=1MHz		3		Ω

Typical Performance-Dynamic

C _{iss}	Input Capacitance	V _{DS} =470V, f=1MHz, V _{GS} =0V		1648		pF
C _{oss}	Output Capacitance			86		pF
C _{rss}	Reverse Transfer Capacitance			12		pF
Q _g	Total Gate Charge	V _{DS} =470V, I _D =30A, V _{GS} =-5~20V		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} =470V, I _D =30A, V _{GS} =-5V~20V, R _G =0Ω,		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	$V_{GS}=0V, I_F=20A, T_J=25^{\circ}C$	3		6	V
		$V_{GS}=0V, I_F=20A, T_J=150^{\circ}C$	3		6	V
t_{rr}	Reverse Recovery Time	$V_{GS}=-5V, I_F=20A,$ $V_R=470V,$ $di/dt=-1000A/\mu s$		31		ns
Q_{rr}	Reverse Recovery Charge			242		nC
I_{rrm}	Peak Reverse Recovery Current			18		A

Thermal Characteristics

Symbol	Parameter	Value.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.82	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Air	40	$^{\circ}C/W$

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 $T_J(max)=150^{\circ}C$

Electrical Characteristics (25°C unless noted)

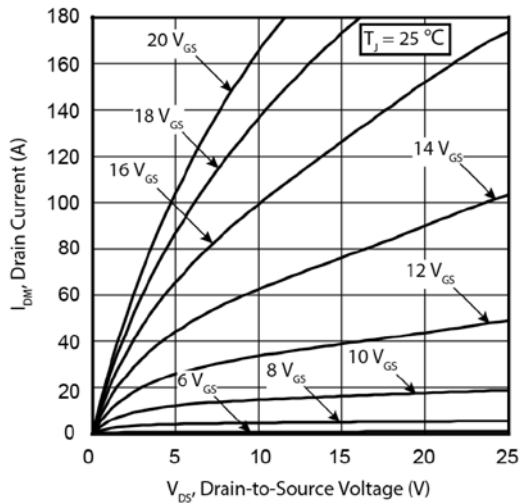


Figure 1: Output characteristics ($T_J = 25^\circ\text{C}$)

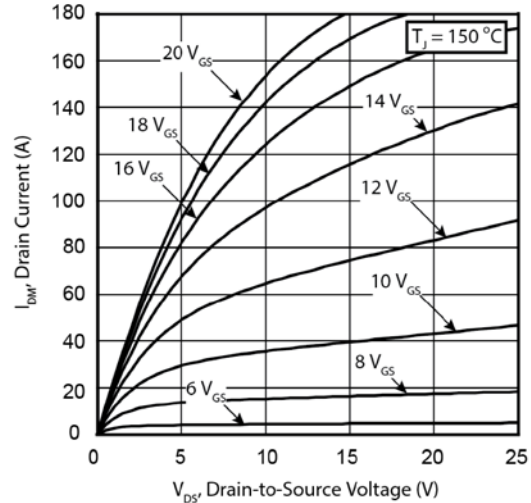


Figure 2: Output characteristics ($T_J = 150^\circ\text{C}$)

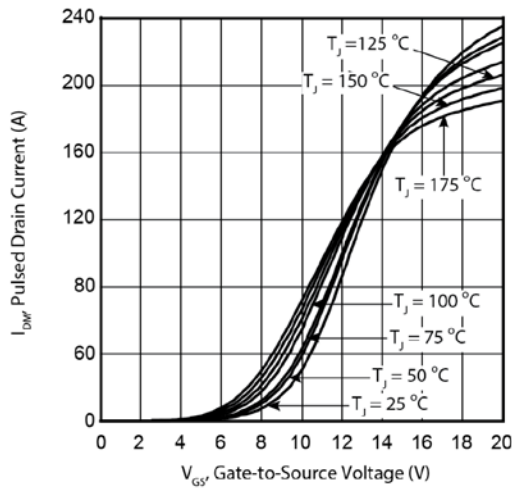


Figure 3: Transfer characteristics

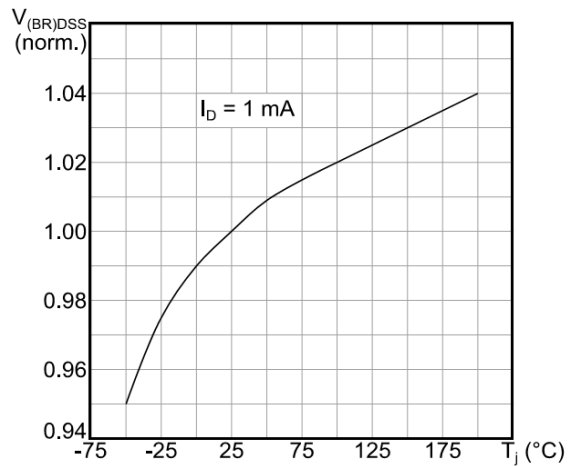


Figure 4: Normalized BVDSS vs. Temperature

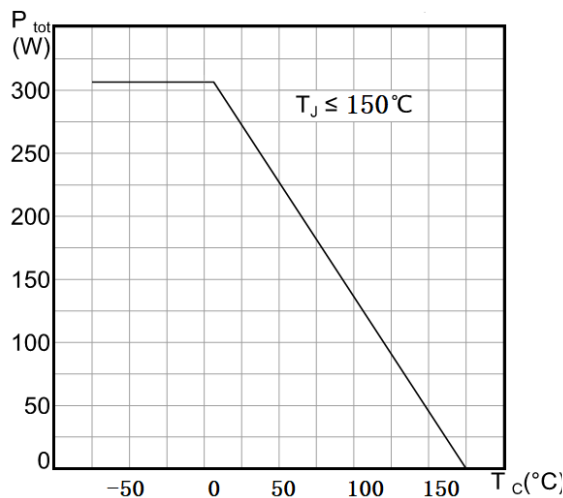


Figure 5: Power dissipation

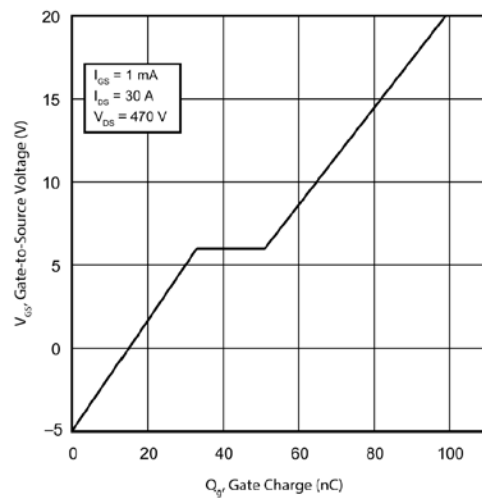


Figure 6: Gate charge vs gate-source voltage

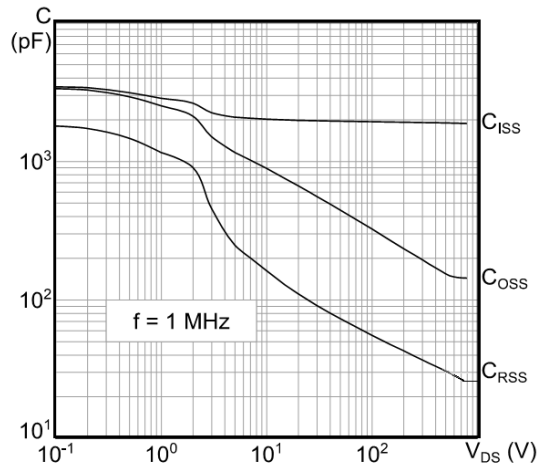


Figure 7: Capacitance variations

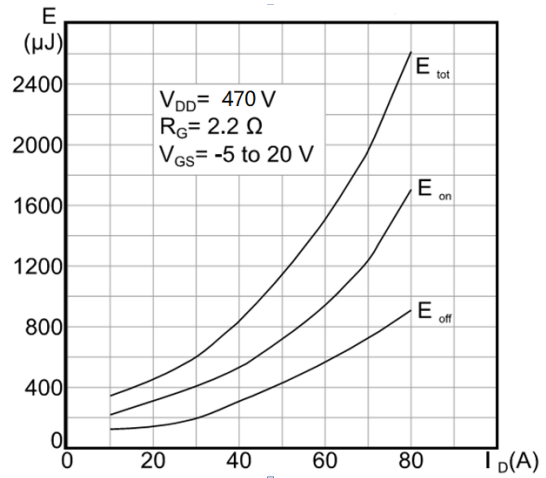


Figure 8: Switching energy vs. drain current

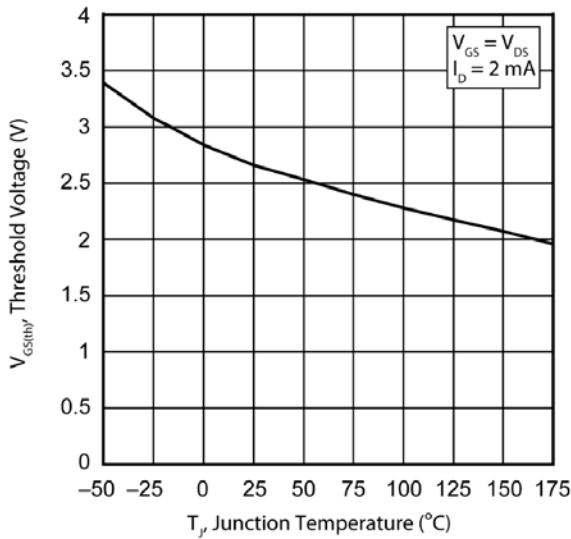


Figure 9: Normalized Vth vs. T_J

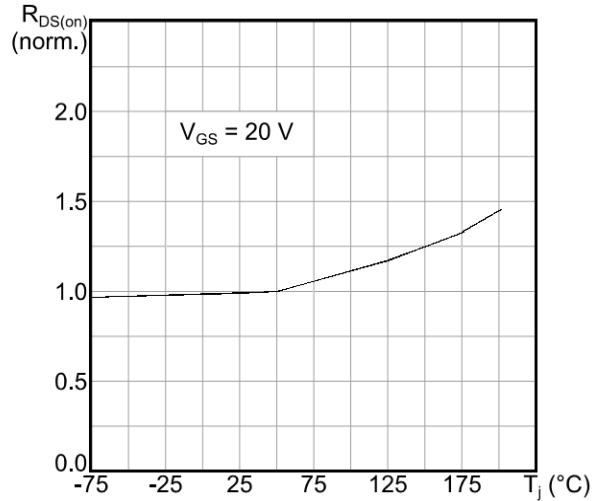


Figure 10: Normalized Rdson vs. T_J

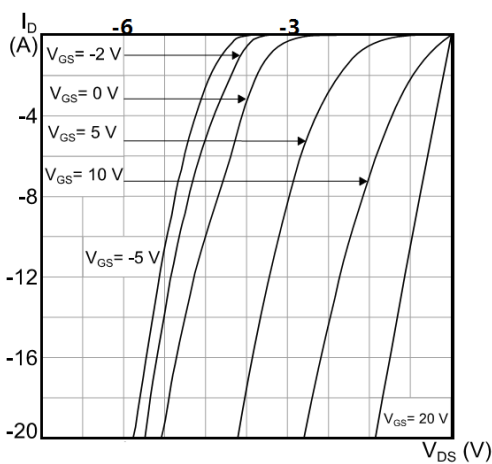


Figure 11: Body diode characteristics
($T_J = 25\text{ °C}$)

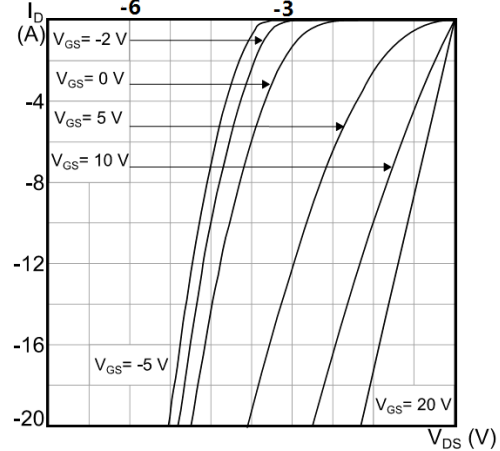
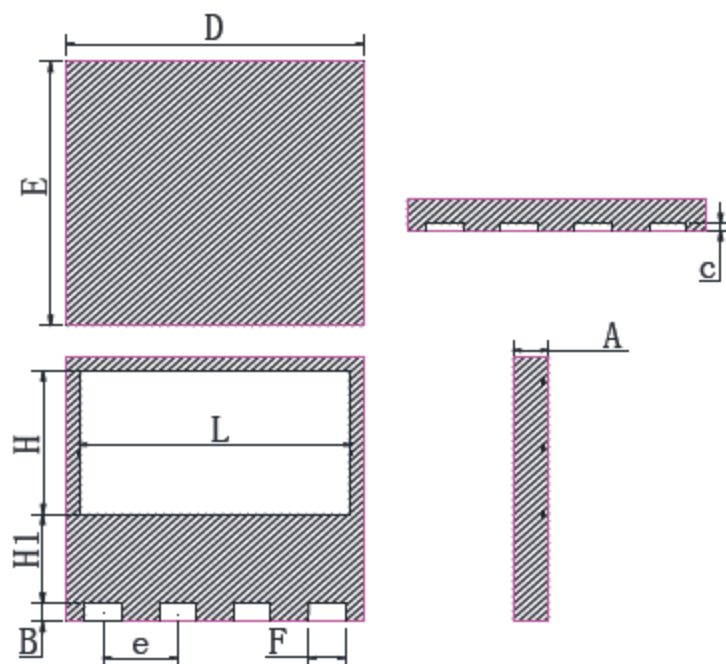


Figure 12: Body diode characteristics
($T_J = 150\text{ °C}$)

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