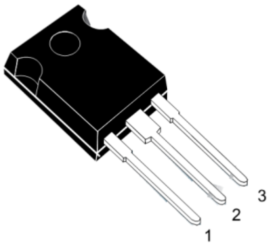
Description

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.

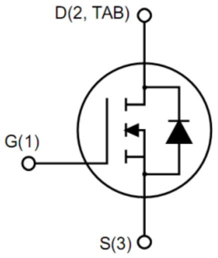
Features

- 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
ASC60N650MT3	ASC60N650MT3	TO-247	Tube

Absolute Maximum Ratings(Tc=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	650	V
I_D	Drain Current(continuous)at Tc=25℃	60	A
I_D	Drain Current(continuous)at Tc=100℃	40	A
I_{DM}	Drain Current (pulsed)	200	A
V_{GS}	Gate-Source Voltage	-10/+25	V
P_D	Power Dissipation T_C = 25°C	328	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	650			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =650V, 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=5mA	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=20V, I_D=30A		35	40	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,ID=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

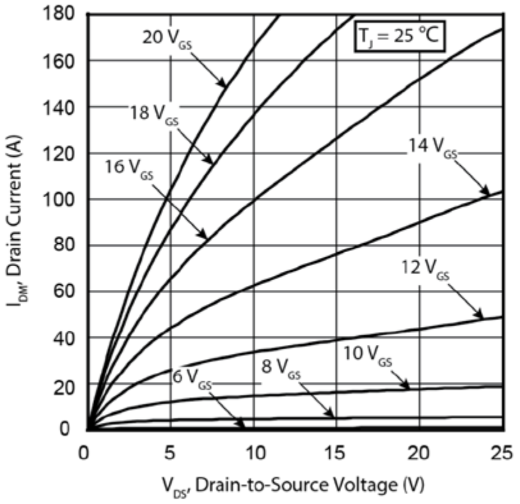
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{FSD}	Forward Voltage	V_{GS}=0V,I_F=30A,T_J=25°C	3		6	V
		V_{GS}=0V,I_F=30A,T_J=150°C	3		6	V
t_{rr}	Reverse Recovery Time	V_{GS}=-5 V, I_F=30 A, V_R=470 V, d*i*/d*t*= -1000 A/μs		31		ns
Q_{rr}	Reverse Recovery Charge			242		nC
I_{rrm}	Peak Reverse Recovery Current			18		A

Thermal Characteristics

Symbol	Parameter	Value.	Unit
$R_{θJC}$	Thermal Resistance, Junction-to-Case	0.38	°C/W
$R_{θJA}$	Thermal Resistance, Junction-to-Case	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 Tj(max)=150℃

Electrical Characteristics (25℃ unless noted)



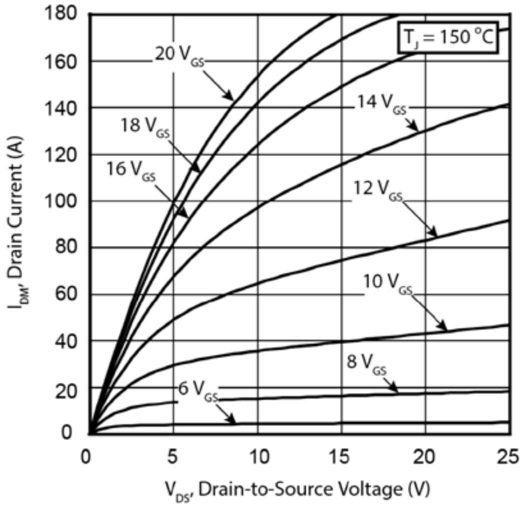
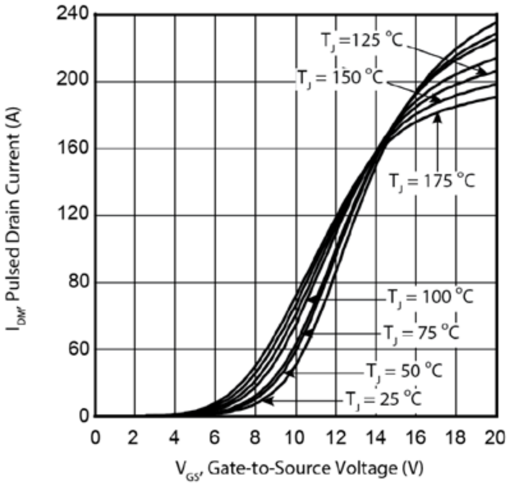


Figure 1: Output characteristics (T_J = 25 °C) Figure 2: Output characteristics (T_J = 150 °C)



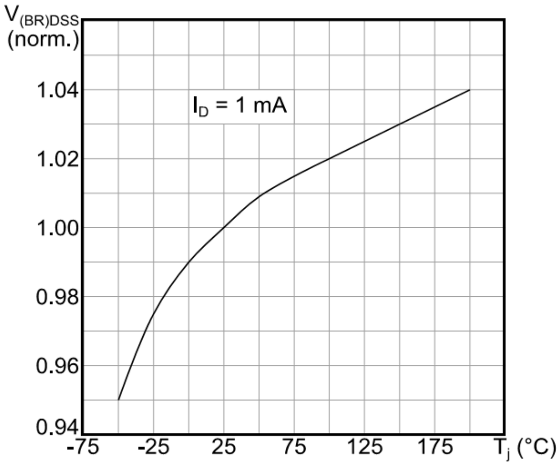
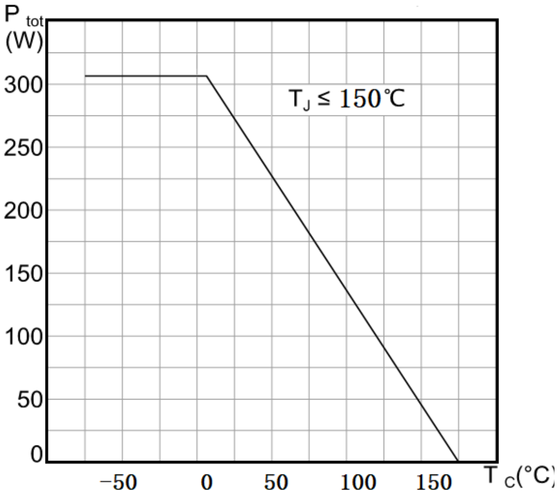


Figure 3: Transfer characteristics

Figure 4 Normalized BVDSS vs. Temperature



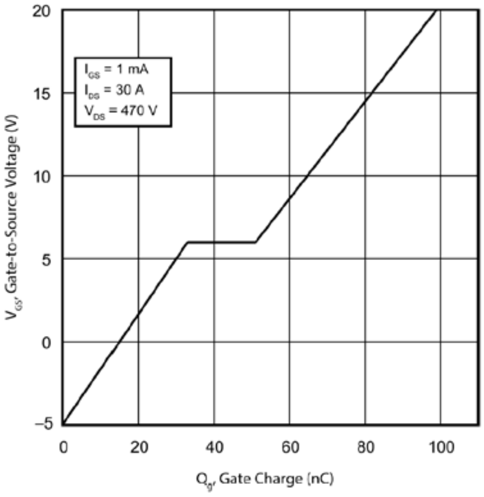


Figure 5: Power dissipation

Figure 6: Gate charge vs gate-source voltage

Figure 7: Capacitance variations

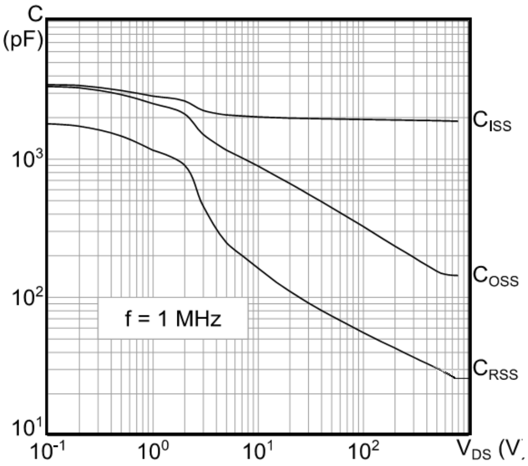


Figure 8: Switching energy vs. drain current

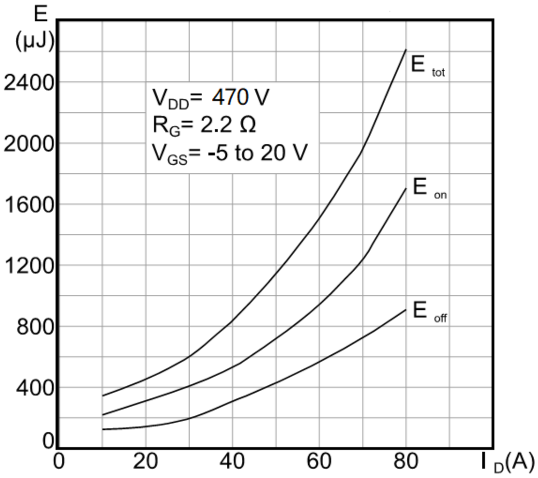


Figure 9: Normalized Vth vs. T_J

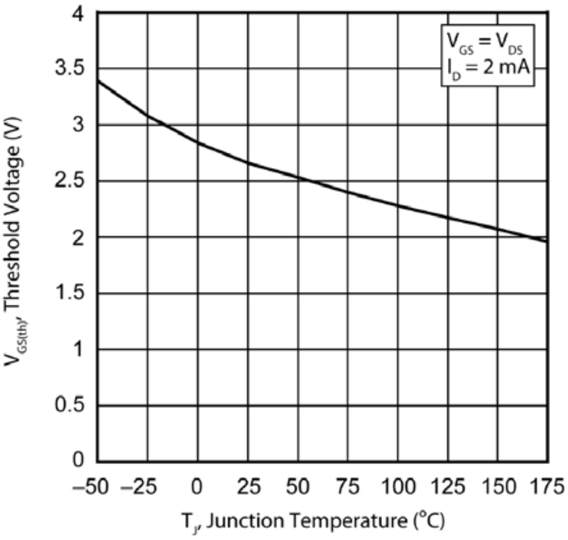


Figure 10: Normalized Rdson vs. T_J

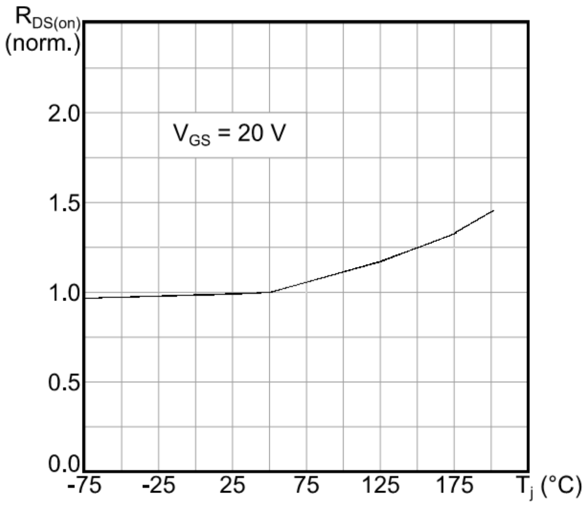


Figure 11: Body diode characteristics (T_J = 25 °C)

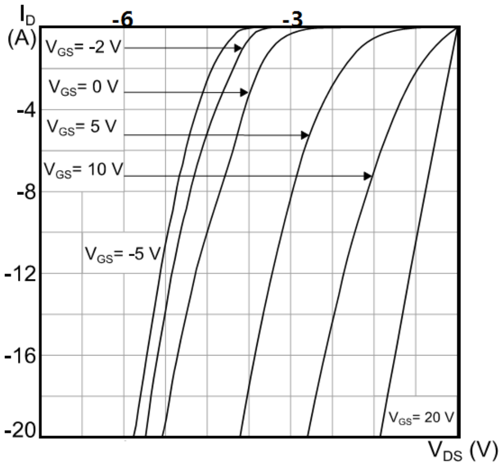


Figure 12: Body diode characteristics (T_J =150 °C)

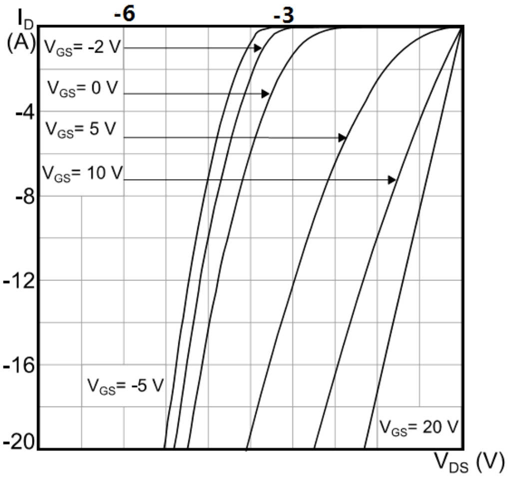


Figure 13: Safe operating area

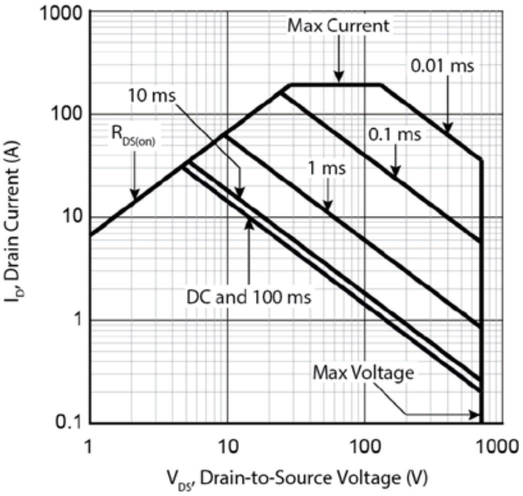
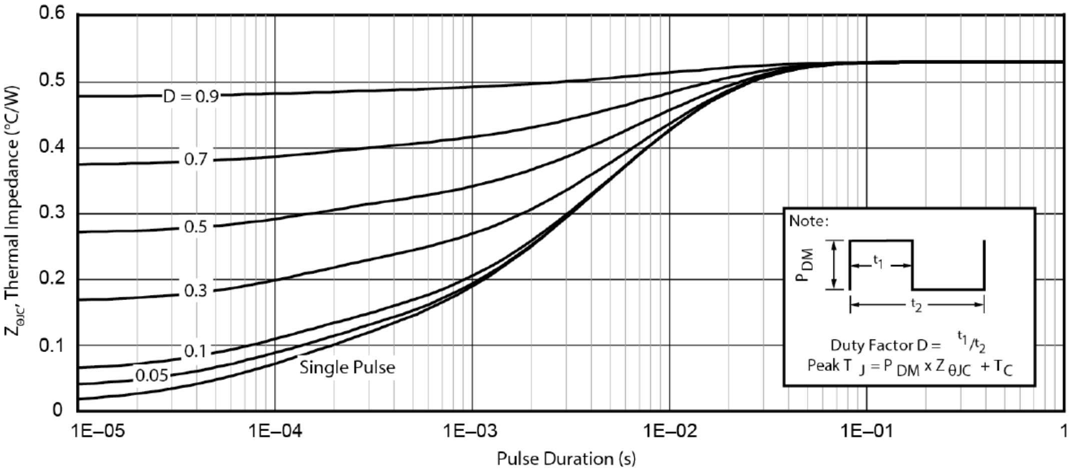
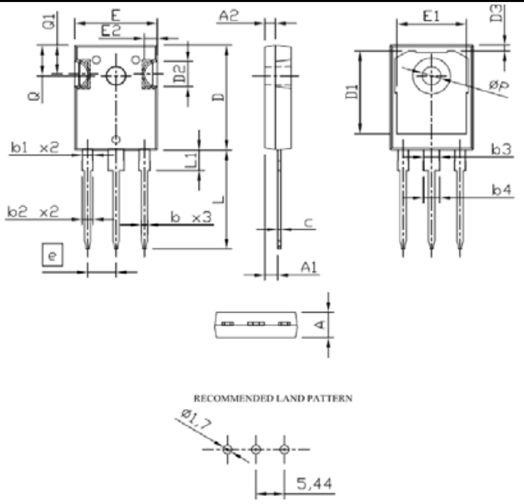


Figure 14: Maximum Transient Thermal impedance



Package Drawing:



Dimensions（ UNIT：mm）

SYMBDLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.90	5.00	5.10	0.193	0.197	0.201
A1	2.31	2.42	2.52	0.091	0.095	0.099
A2	1.90	2.00	2.10	0.075	0.079	0.083
b	1.16	1.22	1.27	0.046	0.048	0.050
b1	1.96	2.02	2.07	0.078	0.080	0.081
b2	2.00	2.10	2.20	0.079	0.083	0.087
b3	2.96	3.02	3.07	0.117	0.119	0.121
b4	3.00	3.10	3.20	0.118	0.122	0.126
C	0.59	0.62	0.66	0.023	0.024	0.026
D	20.90	21.00	21.10	0.823	0.827	0.831
D1	16.25	16.55	16.85	0.640	0.652	0.663
D2	5.00 TYP			0.197 TYP		
D3	1.05	1.20	1.35	0.041	0.047	0.053
e	5.44 BSC				0.214 BSC	
E	15.70	15.80	15.90	0.618	0.622	0.626
E1	13.06	13.26	13.50	0.514	0.522	0.530
E2	2.50 TYP				0.098 TYP	
L	19.72	19.92	20.12	0.776	0.784	0.792
L1	——	——	4.30	——	——	0.169
Q	6.15 BSC			0.242BSC		
Q1	5.60	5.80	6.00	0.220	0.228	0.236
ØP	3.55	3.60	3.70	0.140	0.142	0.146