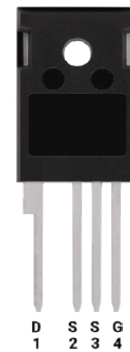


Description

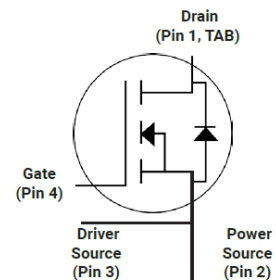
Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, 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
JX4S0040R120M	JX4S0040R120M	TO-247	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	60	A
I _D	Drain Current(continuous)at Tc=100°C	40	A
I _{DM}	Drain Current (pulsed)	160	A
V _{GS}	Gate-Source Voltage	-10/+22	V
P _D	Power Dissipation T _C = 25°C	328	W
T _J , T _{stg}	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 _{GS} =20V, V _{DS} =0V			250	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =10mA	2		4	V
R _{DSON}	Static Drain-source On Resistance	V _{GS} =20V, I _D =40A		33	45	mΩ
R _G	Gate Resistance	V _{GS} =0V, f=1MHz		5		Ω

Typical Performance-Dynamic

C _{iss}	Input Capacitance	V _{DS} =800V, f=1MHz, V _{GS} =0V		1950		pF
C _{oss}	Output Capacitance			185		pF
C _{rss}	Reverse Transfer Capacitance			28		pF
Q _g	Total Gate Charge	V _{DS} =800V, I _D =40A, V _{GS} =0~20V		126		nC
Q _{gs}	Gate-source Charge			20		nC
Q _{gd}	Gate-Drain Charge			38		nC
t _{d(on)}	Turn-on Delay Time	V _{DD} =800V, I _D =40A, V _{GS} =-5V~20V, R _G =0Ω, R _L =40Ω, T _J =25°C		22		ns
t _r	Rise Time			56		ns
t _{d(off)}	Turn-off Delay Time			32		ns
t _f	Fall Time			35		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} =0 V, I _F =30 A, V _R =800 V, di/dt= 2000 A/us		58		ns
Q _{rr}	Reverse Recovery Charge			287		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 T_J(max)=150°C

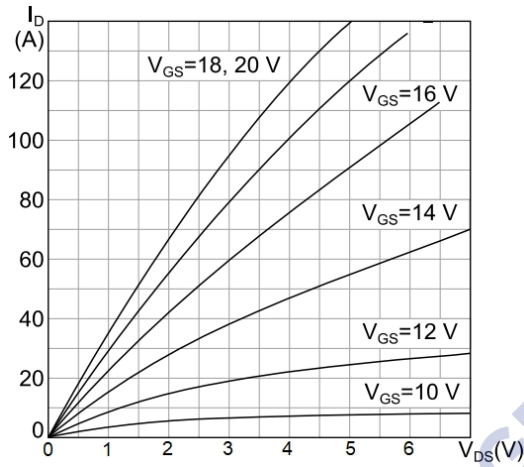
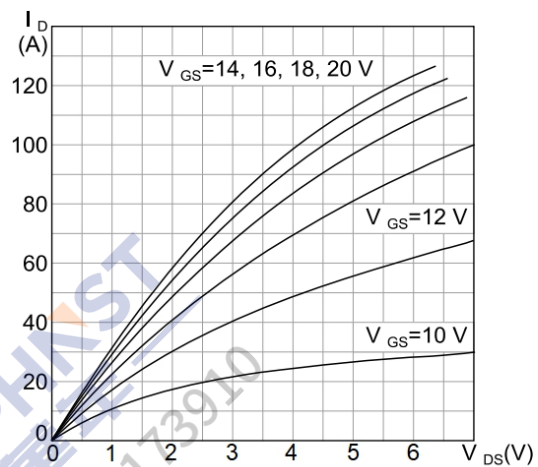
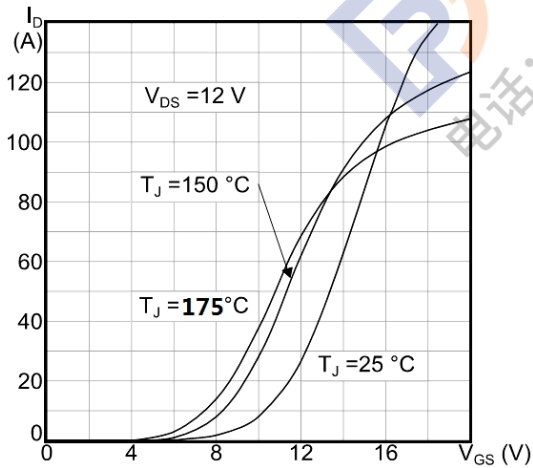
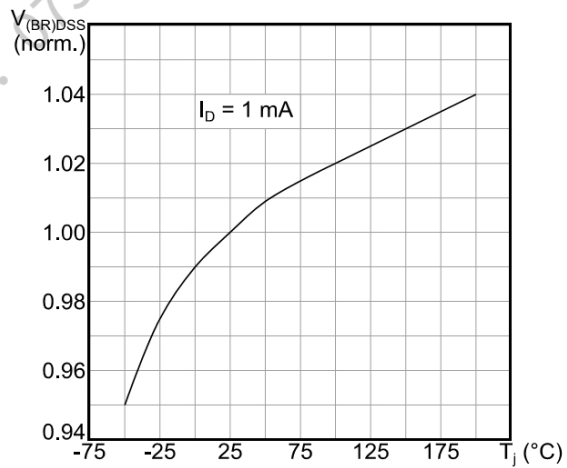
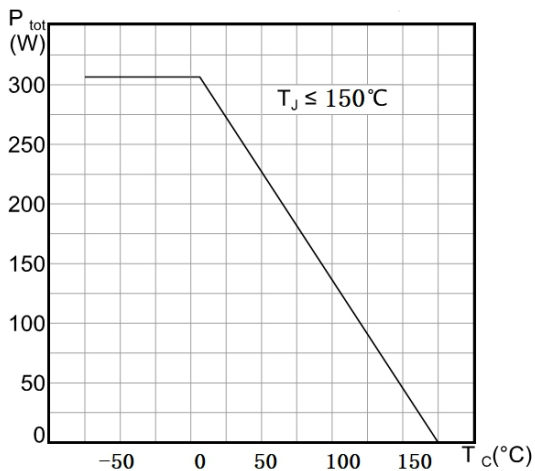
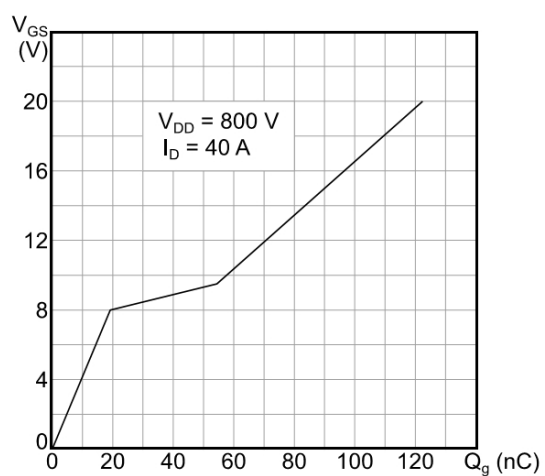
Electrical Characteristics (25 °C unless noted)
Figure 1: Output characteristics ($T_J = 25\text{ °C}$)

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

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

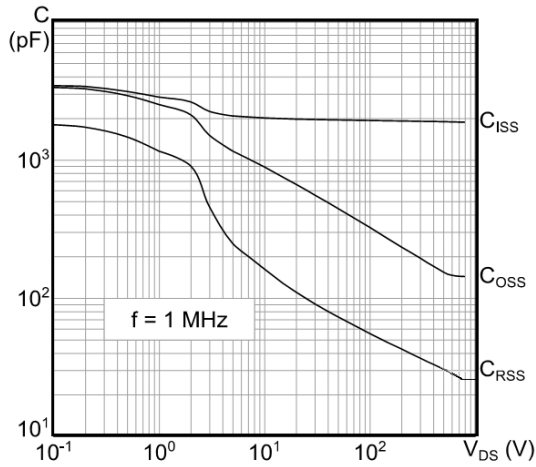


Figure 8: Switching energy vs. drain current

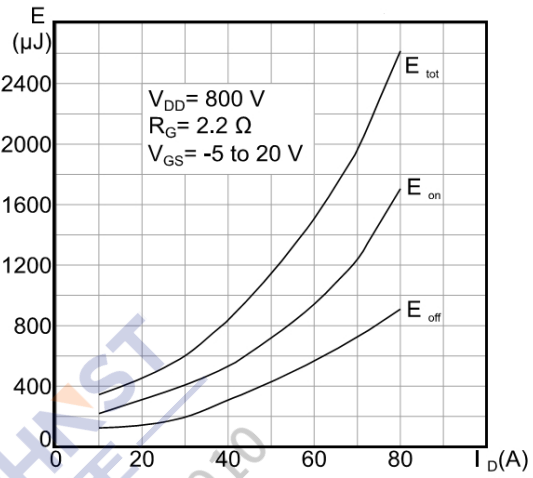


Figure 9: Normalized V_{th} vs. T_J

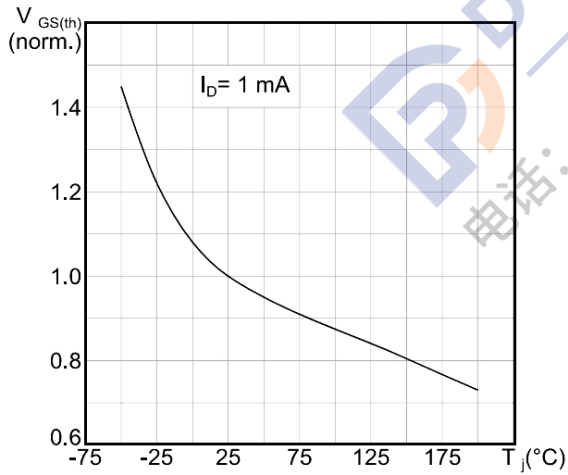


Figure 10: Normalized R_{DS(on)} vs. T_J

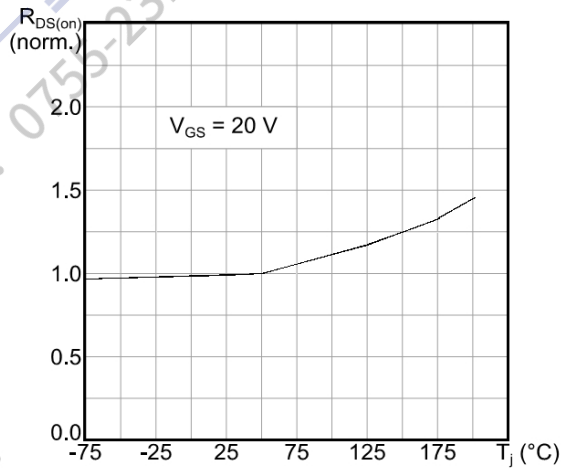


Figure 11: Body diode characteristics (T_J = 25 °C)

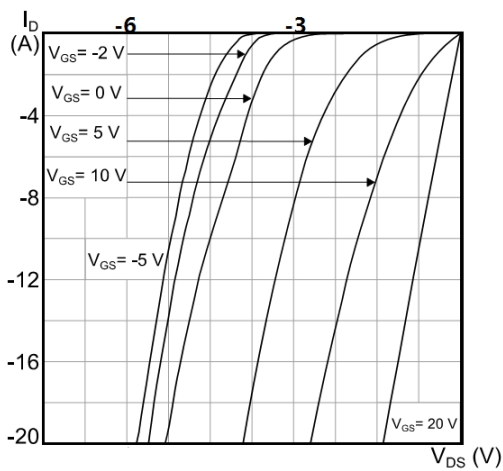


Figure 12: Body diode characteristics (T_J = 150 °C)

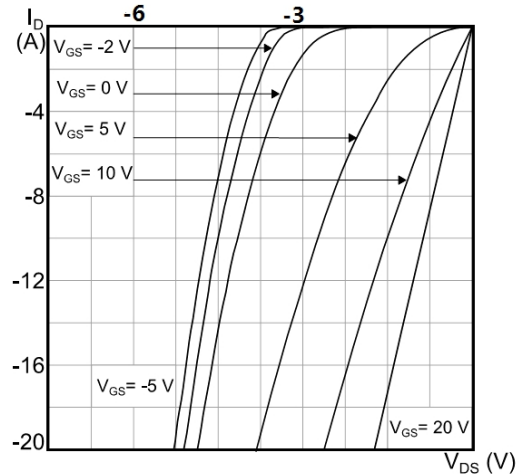


Figure 13: Safe operating area

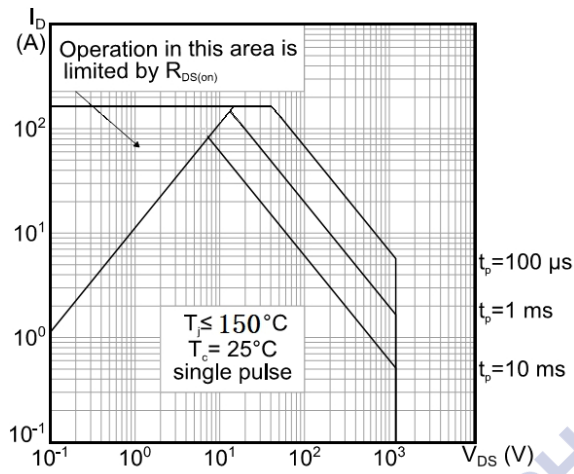


Figure 14: Continuous I_{DS} VS T_c

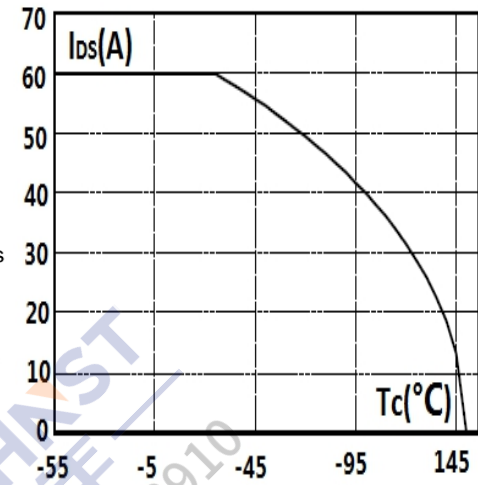
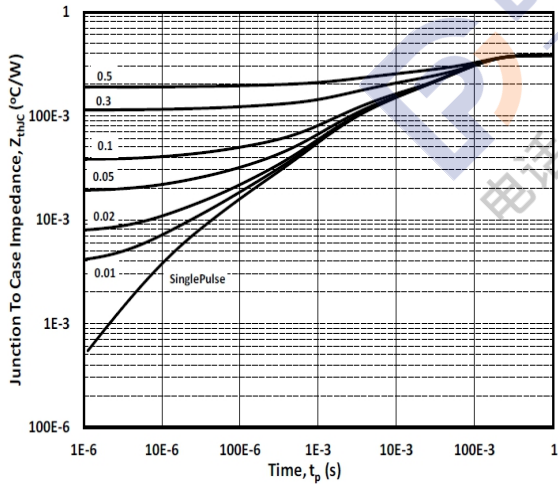
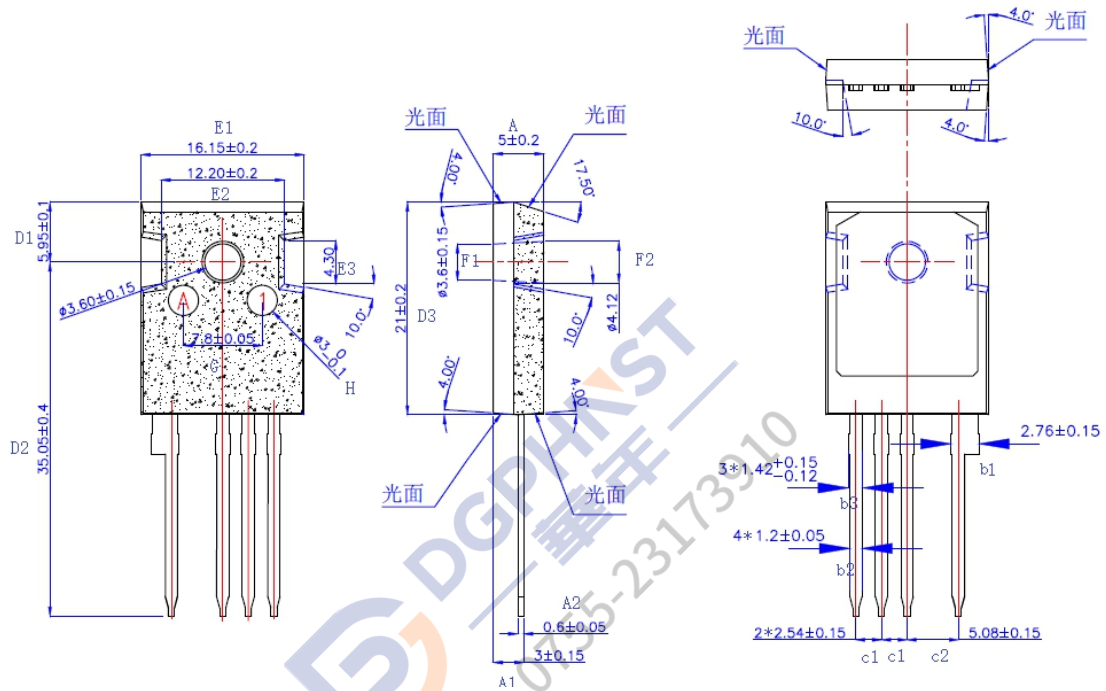


Figure 15: Thermal impedance



Package Drawing:

Dimensions (UNIT: mm)

SYM	MILLIMETERS		SYM	MILLIMETERS	
	MIN	MAX		MIN	MAX
A	4.98	5.02	D2	34.65	35.45
A1	2.85	3.15	D3	20.80	21.20
A2	0.55	0.65	E1	15.95	16.35
b1	2.61	2.91	E2	12.00	12.40
b2	1.15	1.25	F1	3.45	3.75
b3	1.30	1.57	F2	4.12	4.12
c1	2.39	2.69	G	7.75	7.85
c2	4.93	5.23	H	2.90	3.10
D1	5.85	6.05			