Description

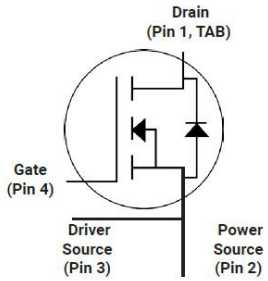
Silicon Carbide (SiC) MOSFET use a completely new technology that provide superior switching performance and higher reliability compared to Silicon. In addition, the low ON resistance and compact chip size ensure low capacitance and gate charge. Consequently, system benefits include highest efficiency, 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
JX4S0020090M	JX4S0020090M	TO-247	Tube

Absolute Maximum Ratings(Tc=25℃)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	900	V
I_D	Drain Current(continuous)at Tc=25℃	100	A
I_D	Drain Current(continuous)at Tc=100℃	70	A
I_{DM}	Drain Current (pulsed)	200	A
V_{GS}	Gate-Source Voltage	-10/+20	V
P_D	Power Dissipation T_C = 25°C	425	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	900			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =900V, 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=15mA	2		4	V
$R_{DS(on)}$	Static Drain-source On Resistance	V_{GS}=20V, I_D=50A		16	22	mΩ
R_G	Gate Resistance	V_{GS}=0V,f=1MHz		3		Ω

Typical Performance-Dynamic

C_{iss}	Input Capacitance	V_{DS}=600V,f=1000KHz,V_{GS}=0V		4910		pF
C_{oss}	Output Capacitance			129		pF
C_{rss}	Reverse Transfer Capacitance			27		pF
Q_g	Total Gate Charge	V_{DS}=600V, I_D=50A,V_{GS}=-4~20V		167		nC
Q_{gs}	Gate-source Charge			58		nC
Q_{gd}	Gate-Drain Charge			47		nC
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=600V,ID=50A, V_{GS}=-4V~20V, R_G=0Ω,		157		ns
t_r	Rise Time			28		ns
$t_{d(off)}$	Turn-off Delay Time			81		ns
t_f	Fall Time			27		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=600 V, d*i*/d*t*= 100 A/μs		86		ns
Q_{rr}	Reverse Recovery Charge			876		nC
I_{rrm}	Peak Reverse Recovery Current			20		A

Thermal Characteristics

Symbol	Parameter	Value.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.3	°C/W
$R_{\theta JA}$	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 characteristic curves

Fig.1 Typical Output Characteristics(I)

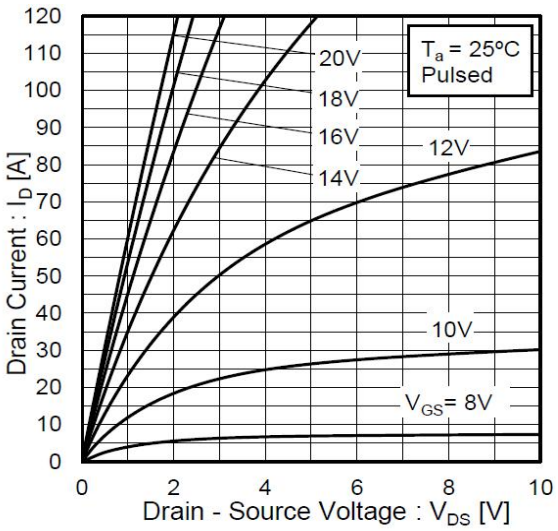


Fig.2 Typical Output Characteristics(II)

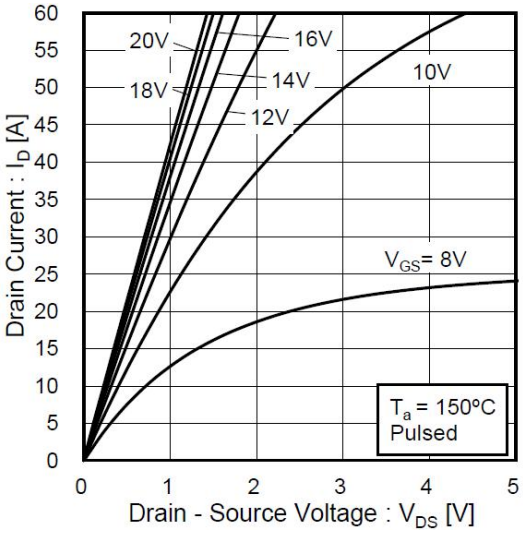


Figure 3. Normalized On-Resistance vs. Tj

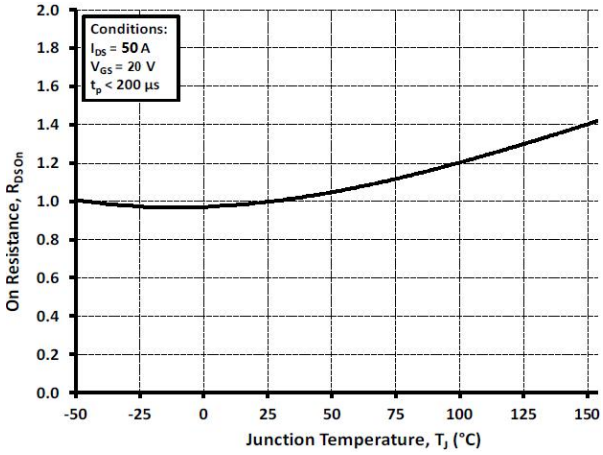


Figure 4. On-Resistance vs. Drain Current

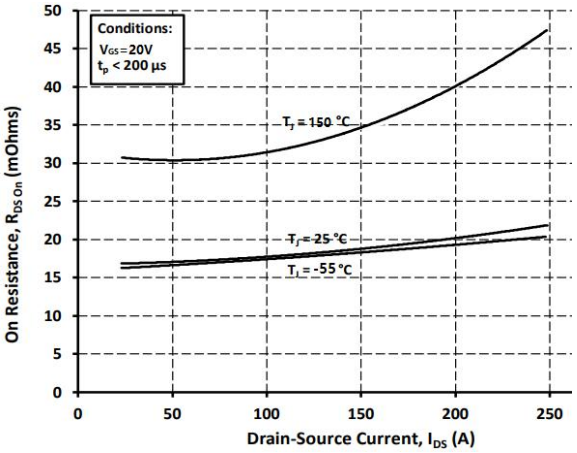


Figure 5. Transfer Characteristic for Various Tj

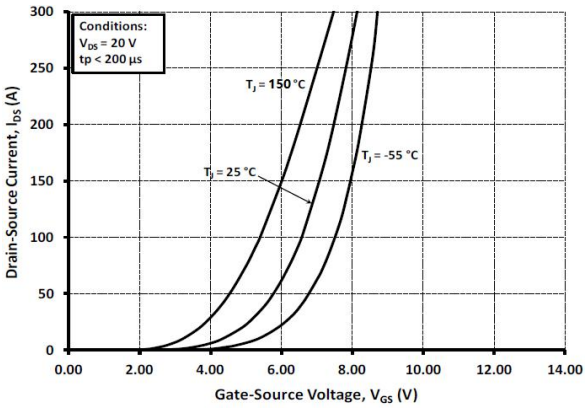


Figure 6. Body Diode Characteristic

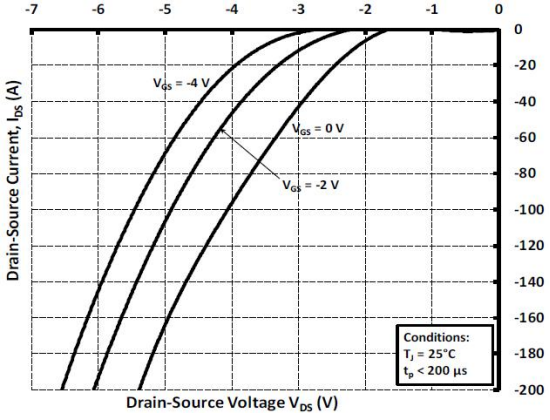


Figure 7. Threshold Voltage vs. Tj

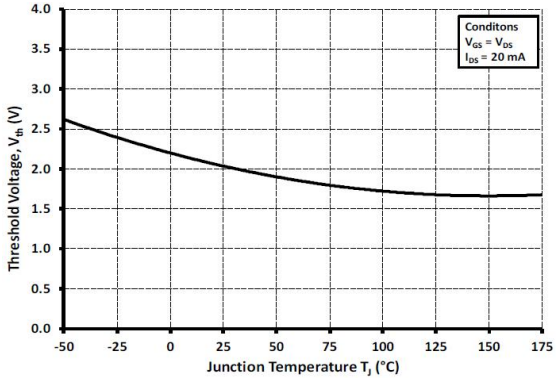


Figure 8. Gate Charge Characteristics

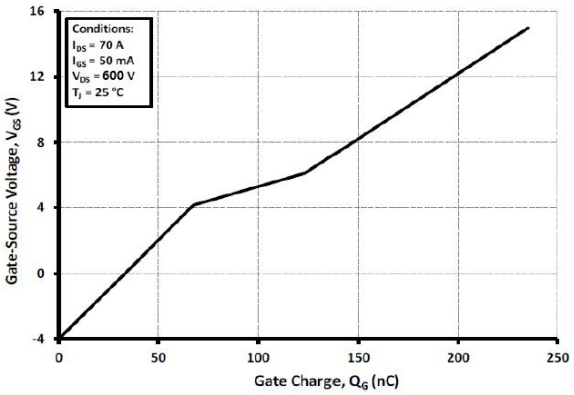


Figure 9. Output Capacitor Stored Energy

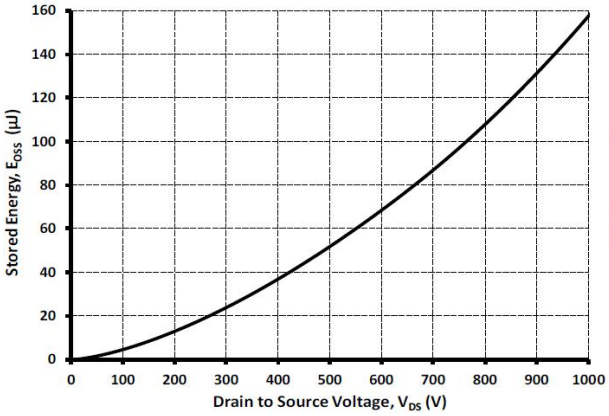


Figure 10. Capacitances vs.V_{DS}

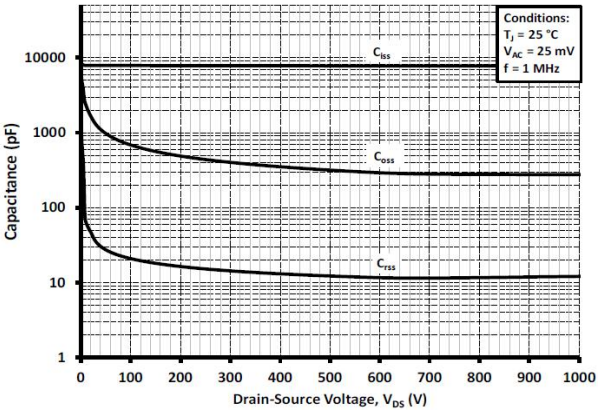


Figure 11. Continuous Drain Current vs. Tc

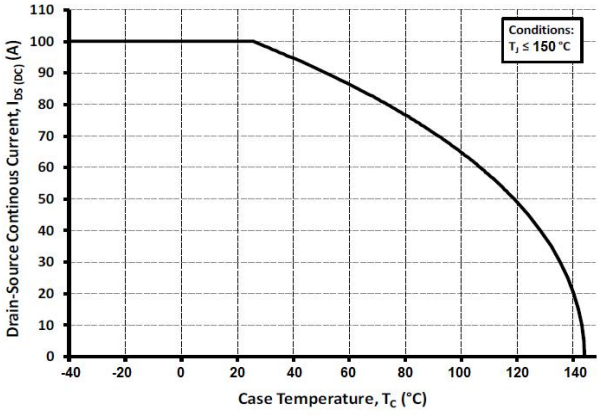


Figure 12. Maximum Power vs. Tc

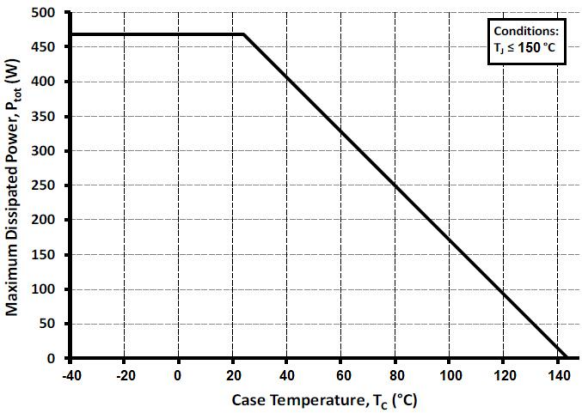


Figure 13. Transient Thermal Impedance

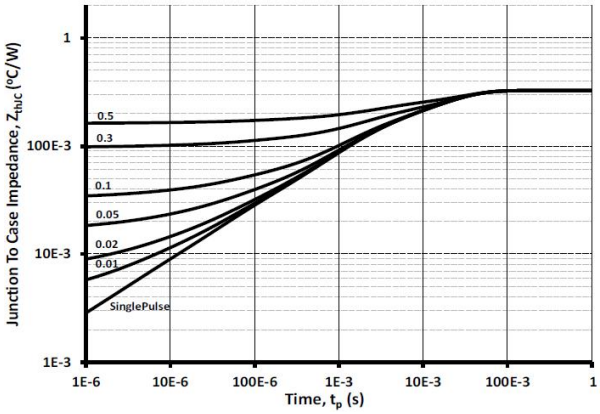


Figure 14. Safe Operating Area

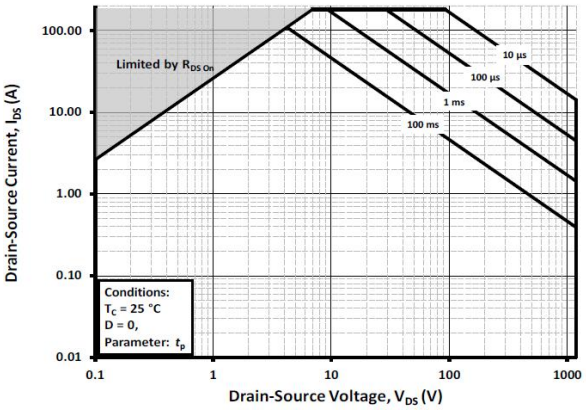


Figure 15.Switching Energy vs. RG(ext)

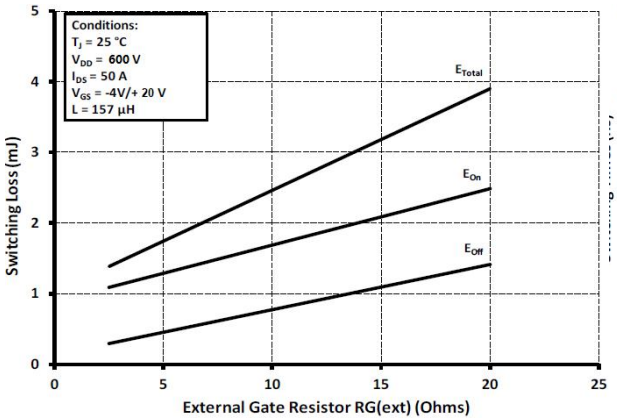
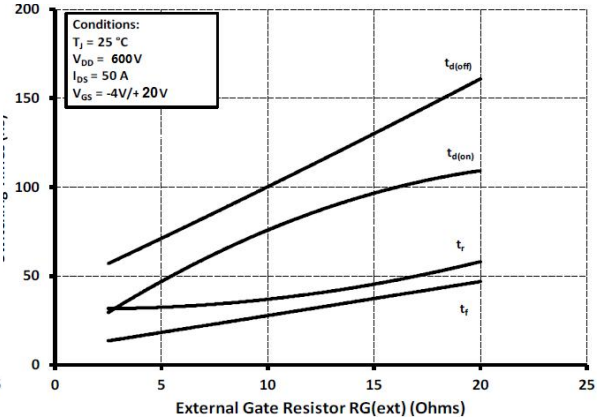
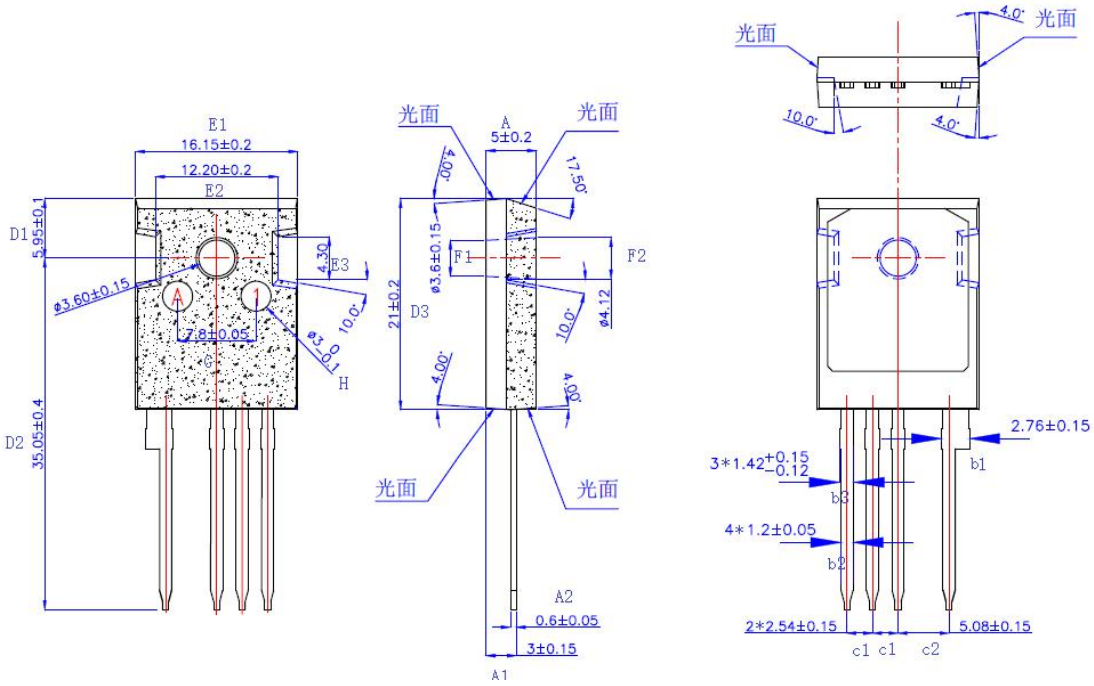


Figure 16. Switching Times vs. RG(ext)



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			