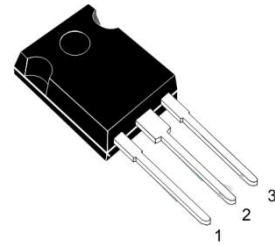


**Description**

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.

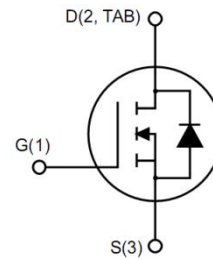
**Features**

- 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
JX3S0040090M	JX3S0040090M	TO-247	Tube

**Absolute Maximum Ratings(Tc=25°C)**

Symbol	Parameter	Value	Unit
V <sub>DS</sub>	Drain-Source Voltage	900	V
I <sub>D</sub>	Drain Current(continuous)at Tc=25°C	60	A
I <sub>D</sub>	Drain Current(continuous)at Tc=100°C	40	A
I <sub>DM</sub>	Drain Current (pulsed)	200	A
V <sub>GS</sub>	Gate-Source Voltage	-10/+25	V
P <sub>D</sub>	Power Dissipation T <sub>c</sub> = 25°C	328	W
T <sub>J</sub> , T <sub>stg</sub>	Junction and Storage Temperature Range	-55 to +150	°C

**Electrical Characteristics(T<sub>J</sub> = 25°C unless otherwise specified)**
**Typical Performance-Static**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
BV <sub>DS</sub>	Drain-source Breakdown Voltage	I <sub>D</sub> =250uA, V <sub>GS</sub> =0V	900			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =900V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			100	uA
I <sub>GSS</sub>	Gate-body Leakage Current	V <sub>DS</sub> =0V ; V <sub>GS</sub> =10 to 20V			250	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =5mA	2		4	V
R <sub>DS(on)</sub>	Static Drain-source On Resistance	V <sub>GS</sub> =20V, I <sub>D</sub> =30A		38	48	mΩ
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, f=1MHz		3		Ω

**Typical Performance-Dynamic**

C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =600V, f=1000KHz, V <sub>GS</sub> =0V		1668		pF
C <sub>oss</sub>	Output Capacitance			92		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			11		pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =600V, I <sub>D</sub> =30A, V <sub>GS</sub> =-5~20V		88		nC
Q <sub>gs</sub>	Gate-source Charge			22		nC
Q <sub>gd</sub>	Gate-Drain Charge			26		nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =600V, I <sub>D</sub> =30A, V <sub>GS</sub> =-5V~20V, R <sub>G</sub> =0Ω,		21		ns
t <sub>r</sub>	Rise Time			25		ns
t <sub>d(off)</sub>	Turn-off Delay Time			38		ns
t <sub>f</sub>	Fall Time			21		ns

**Typical Performance-Reverse Diode**

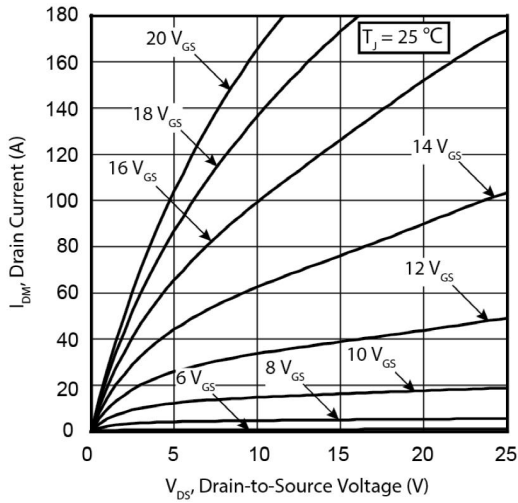
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>FSD</sub>	Forward Voltage	V <sub>GS</sub> =0V, I <sub>F</sub> =30A, T <sub>J</sub> =25°C	3		6	V
		V <sub>GS</sub> =0V, I <sub>F</sub> =30A, T <sub>J</sub> =150°C	3		6	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0 V, I <sub>F</sub> =30 A, V <sub>R</sub> =600 V, di/dt= 100 A/μs		33		ns
Q <sub>rr</sub>	Reverse Recovery Charge			251		nC
I <sub>rrm</sub>	Peak Reverse Recovery Current			19		A

**Thermal Characteristics**

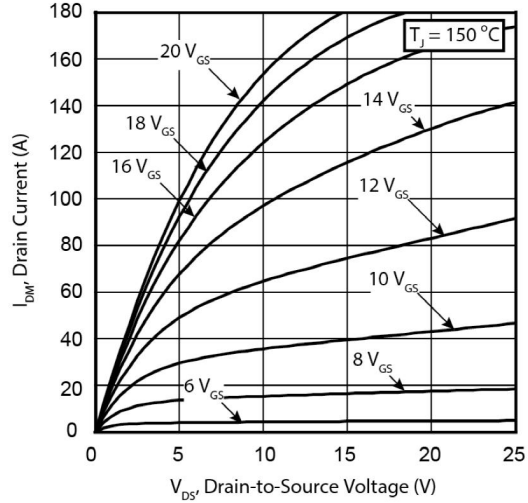
Symbol	Parameter	Value.	Unit
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	0.38	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Case	40	°C/W

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<sub>J</sub>(max)=150°C

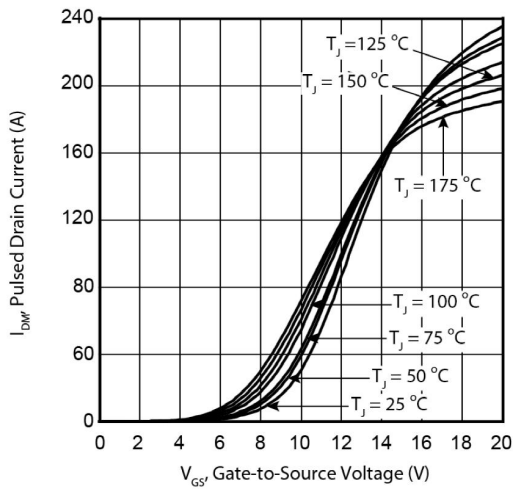
**Electrical Characteristics (25°C unless noted)**



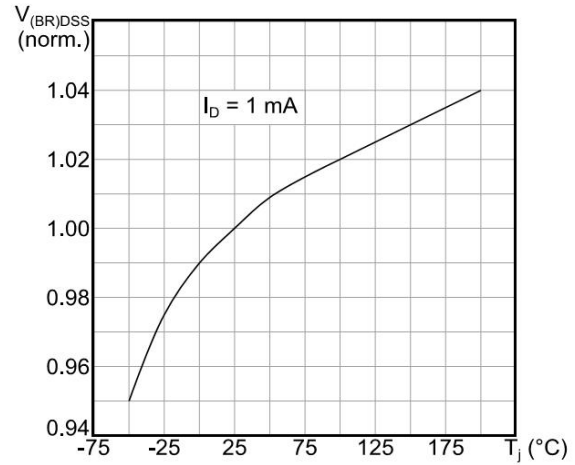
**Figure 1: Output characteristics ( $T_J = 25^\circ\text{C}$ )**



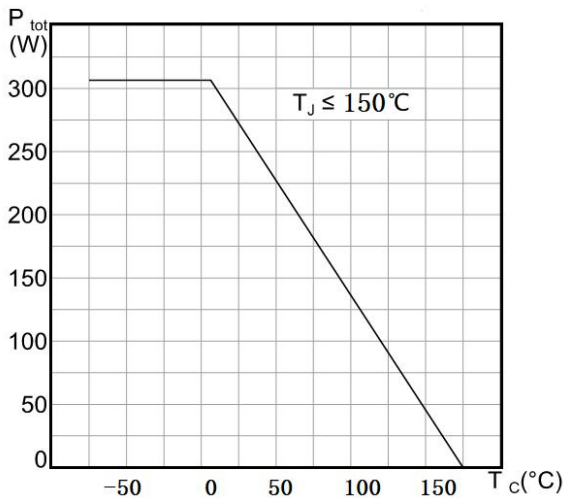
**Figure 2: Output characteristics ( $T_J = 150^\circ\text{C}$ )**



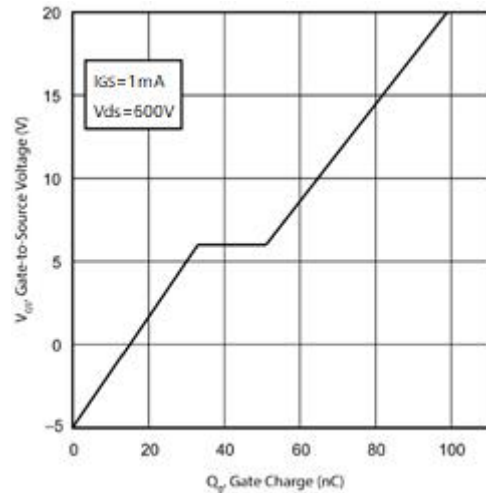
**Figure 3: Transfer characteristics**



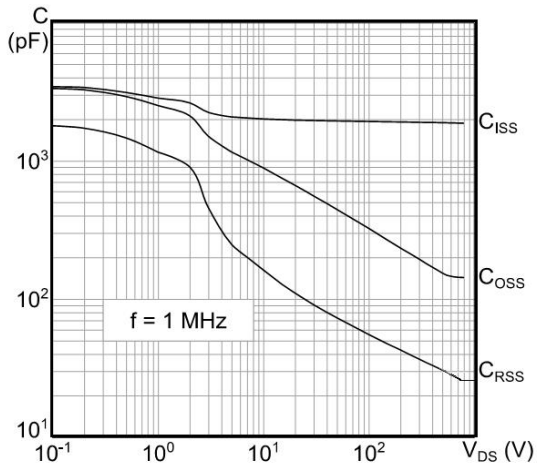
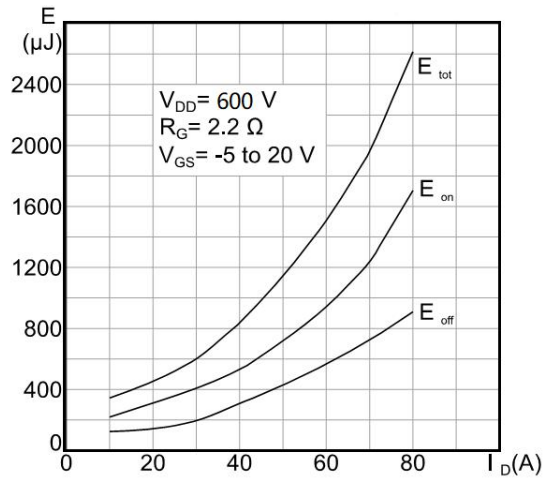
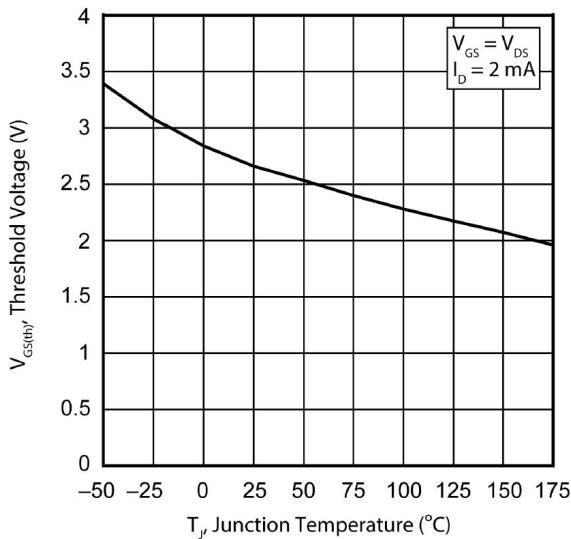
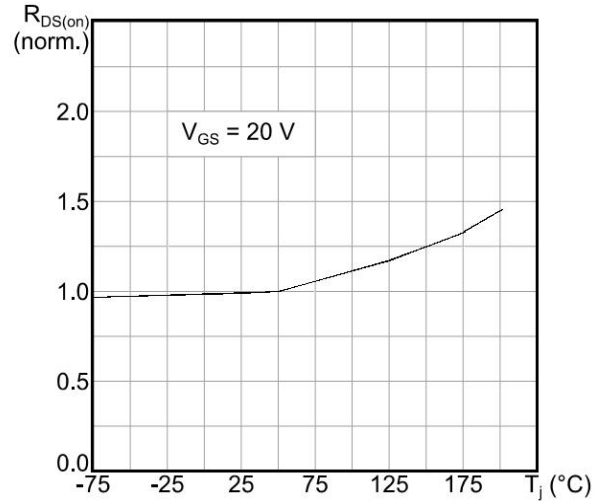
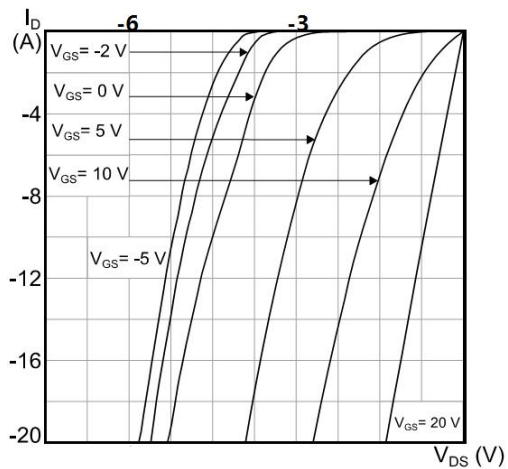
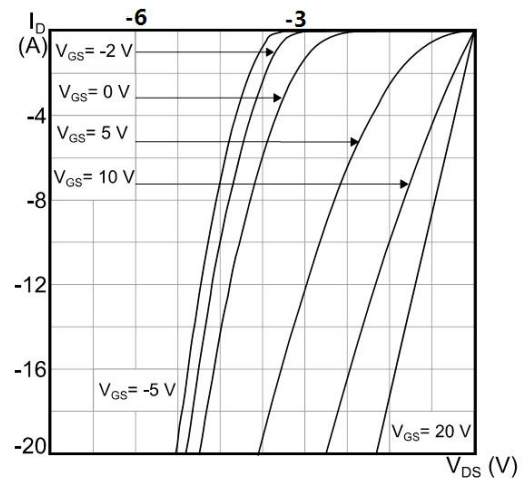
**Figure 4: Normalized BVDSS vs. Temperature**



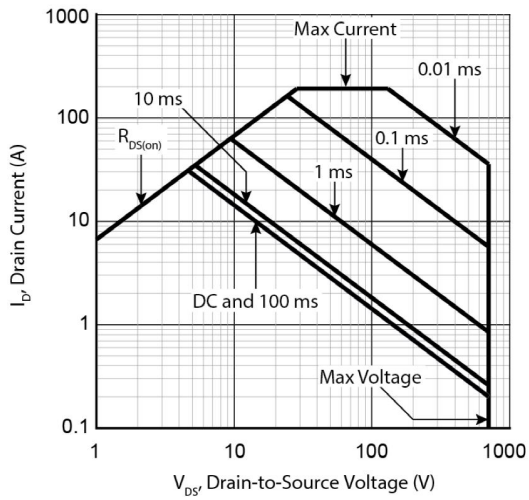
**Figure 5: Power dissipation**



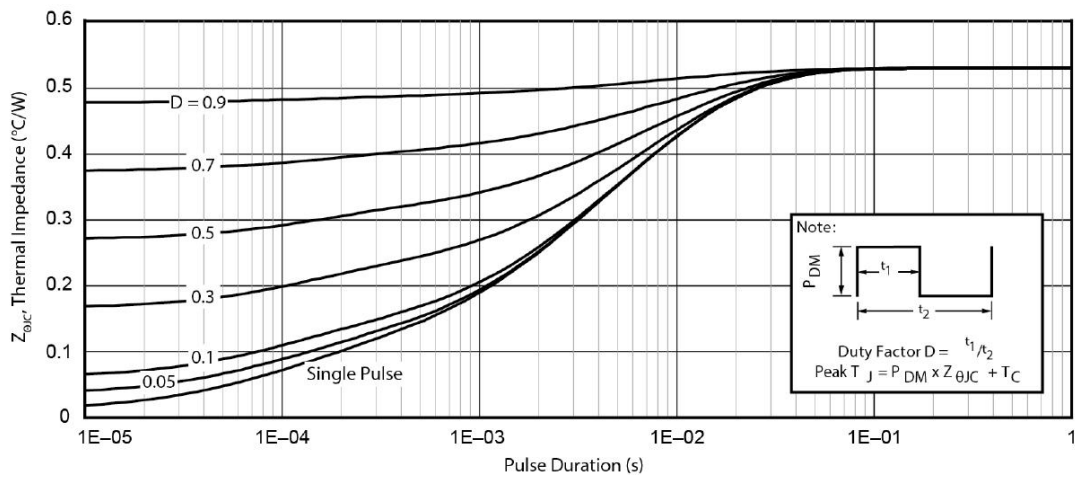
**Figure 6: Gate charge vs. gate-source voltage**

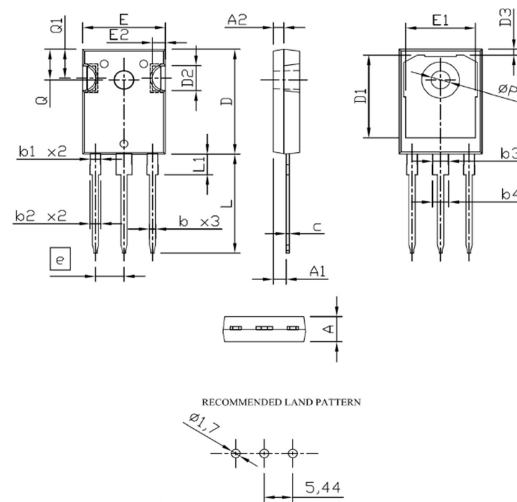
**Figure 7: Capacitance variations**

**Figure 8: Switching energy vs. drain current**

**Figure 9: Normalized V<sub>th</sub> vs. T<sub>J</sub>**

**Figure 10: Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>**

**Figure 11: Body diode characteristics (T<sub>J</sub> = 25 °C)**

**Figure 12: Body diode characteristics (T<sub>J</sub> = 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