SCQH025N120

1200V 25mΩ N-Channel SiC Power MOSFET

Features

- Typical on-Resistance: $R_{DS\ (on)}$=25mΩ(typ.)
- High Blocking Voltage
- 100% Avalanche Test
- Good Stability and Uniformity with High E_{AS}

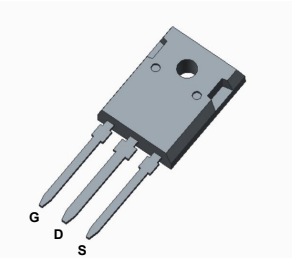
Description

The SCQH025N120 is a high blocking voltage N-Channel SiC power MOSFET. This device provide excellent performance for high voltage power supplies or pulse circuits.

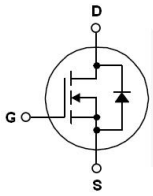
Applications

- Solar Inverters
- High Voltage DC/DC Converters
- Motor Drivers
- Switch Mode Power Supplies

Package Type & Internal Circuit



TO-247



Absolute Maximum Ratings @T_C=25 ℃ unless otherwise noted

Symbol	Parameter		Ratings	Unit
V_{DSS}	Drain to Source Voltage		1200	V
V_{GSS}	Gate to Source Voltage		-10/+25	V
V_{GSop}	Recommended operation Values of Gate −Source Voltage		-5/+20	V
I_D	Drain Current	T_C=25℃	90	A
		T_C=100℃	60	A
I_{DM}	Pulsed Drain Current (Note1)		240	A
P_D	Maximum Power Dissipation	T_C=25℃	500	W
	Derate above 25℃		3.33	W/℃
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		300	mJ
T_J	Operating Junction Temperature Range		-40~+175	℃
T_{STG}	Storage Temperature Range		-40~+175	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{th\ (J-C)}$	Thermal Resistance, Junction to case	0.3	℃/W
$R_{th\ (J-A)}$	Thermal Resistance, Junction to Ambient	40	℃/W

Electrical Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=100uA	1200	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=15mA	1.9	2.4	-	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS}=20V, I_D=50A	-	25	45	mΩ
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=V_{DSS}, V_{GS}=0V	-	-	100	uA
I_{GSS}	Gate to Source Leakage Current	V_{GS}=V_{GSS}, V_{DS}=0V	-	-	±500	nA

D-S Diode Characteristics and Maximum Rating @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=25A	-	5.4	-	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V, I_S=25A, di/dt=-1000A/us	-	55	-	ns
Q_{rr}	Reverse Recovery Charge		-	220	-	nC

Switching Characteristics @T_C=25 ℃ unless otherwise noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	I_D=50A , V_{DD}=800V, R_G=2.5Ω V_{GS} = −5/20V, (Note 3)	-	16	-	ns
t_r	Turn-on Rise Time		-	16.2	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	33	-	ns
t_f	Turn-off Fall Time		-	7.8	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=1000V, f=1.0MHz	-	3600	-	pF
C_{oss}	Output Capacitance		-	240	-	pF
C_{rss}	Reverse Transfer Capacitance		-	16	-	pF
Q_g	Total Gate Charge	I_D=50A, V_{DD}=800V V_{GS}=-5V/20V (Note 3)	-	195	-	nC
Q_{ge}	Gate to Source Charge		-	54	-	nC
Q_{gd}	Gate to Drain Charge		-	29	-	nC

Note:

1. Repetitive rating: pulse-width limited by maximum junction temperature
2. V_{DD}=100V, L=10mH, V_{clamp}=1600V, V_G=10V, I_D=23.0A
3. Essentially independent of operating temperature typical characteristics

Typical Performance Characteristics

Fig. 1. Typical on-Resistance Characteristics

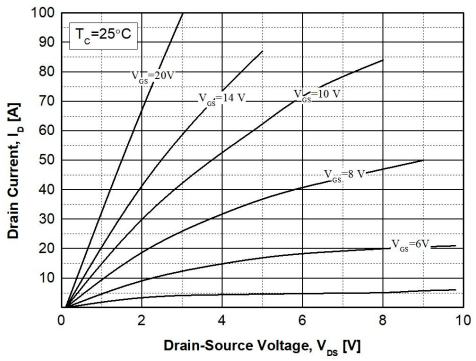


Fig. 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

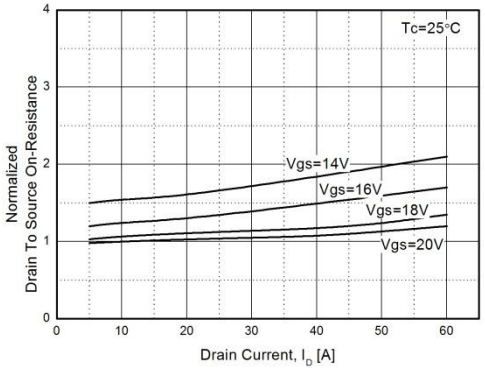


Fig. 3. Normalized On-Resistance vs. Junction Temperature

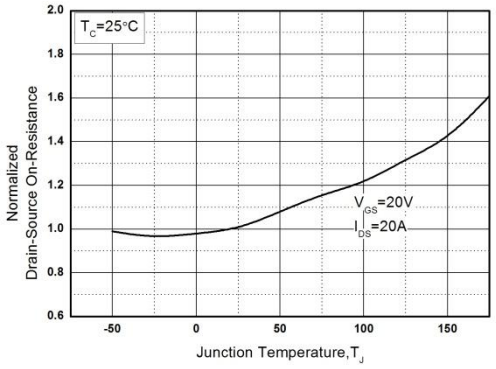


Fig. 4. On-Resistance vs. Gate-to-source Voltage

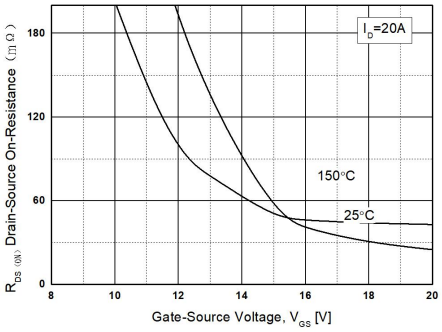


Fig. 5. Transfer Characteristics

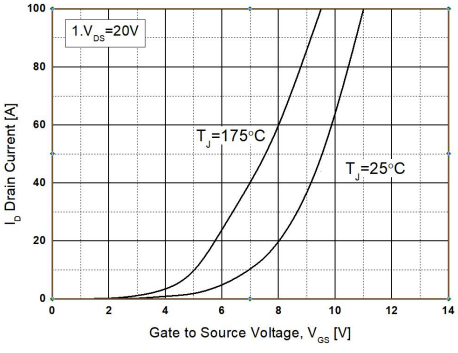
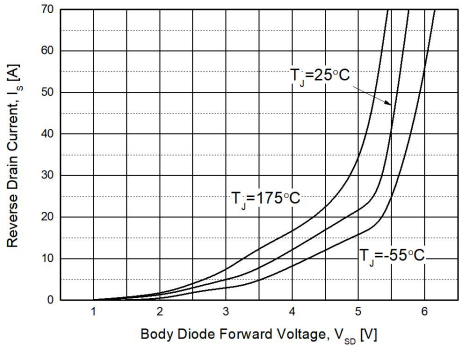


Fig. 6. Source-to-Drain Diode Forward Voltage vs. Source Current



Typical Performance Characteristics

Fig. 7. Gate Charge Characteristics

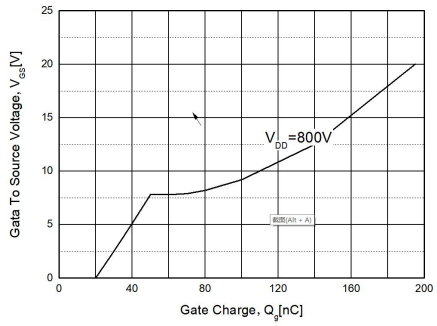


Fig. 8. Characteristics vs. Drain-to-Source Voltage

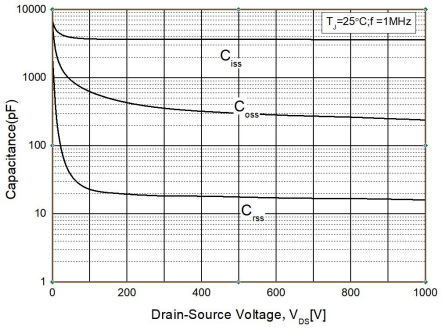
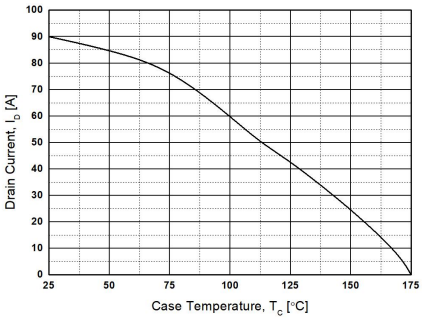


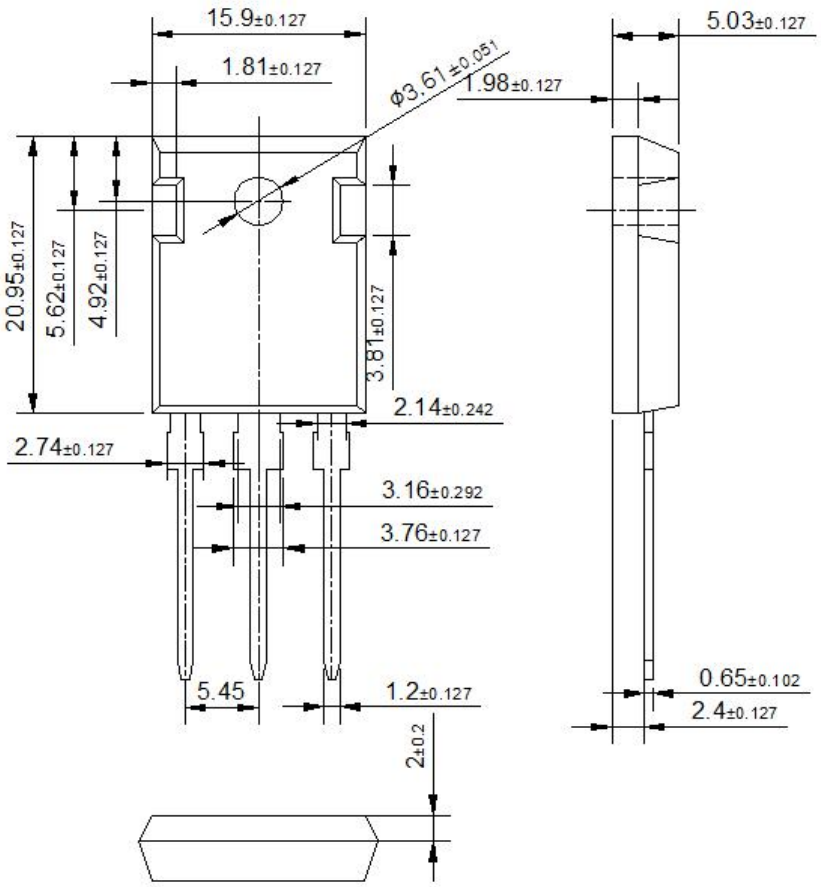
Fig. 9. Maximum Drain Current vs. Temperature



Package Dimensions

TO-247

(Dimensions in Millimeters)



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