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**Silicon Carbide (SiC)**  
**MOSFET** – **EliteSiC**,  
**160 mohm, 1200 V, M1,**  
**TO-247-3L**  
**NTHL160N120SC1**

**Features**

- Typ.  $R_{DS(on)} = 160 \text{ m}\Omega$
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# NTHL160N120SC1

## ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise stated)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 1 mA	1200	–	–	V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V <sub>(BR)DSS</sub> /T <sub>J</sub>	I <sub>D</sub> = 1 mA, referenced to 25°C	–	600	–	mV/°C
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 1200 V, T <sub>J</sub> = 25°C	–	–	100	μA
		V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 1200 V, T <sub>J</sub> = 175°C	–	–	250	
Gate-to-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = +25/-15 V, V <sub>DS</sub> = 0 V	–	–	±1	μA

### ON CHARACTERISTICS

Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 2.5 mA	1.8	3.1	4.3	V
Recommended Gate Voltage	V <sub>GOP</sub>		–5	–	+20	V
Drain-to-Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 20 V, I <sub>D</sub> = 12 A, T <sub>J</sub> = 25°C	–	162	224	mΩ
		V <sub>GS</sub> = 20 V, I <sub>D</sub> = 12 A, T <sub>J</sub> = 175°C	–	271	377	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 12 A	–	3	–	S

### CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> = 0 V, f = 1 MHz, V <sub>DS</sub> = 800 V	–	665	–	pF
Output Capacitance	C <sub>OSS</sub>		–	50	–	
Reverse Transfer Capacitance	C <sub>RSS</sub>		–	5	–	
Total Gate Charge	Q <sub>G(tot)</sub>	V <sub>GS</sub> = –5/20 V, V <sub>DS</sub> = 600 V, I <sub>D</sub> = 16 A	–	34	–	nC
Threshold Gate Charge	Q <sub>G(th)</sub>		–	6	–	
Gate-to-Source Charge	Q <sub>GS</sub>		–	12.5	–	
Gate-to-Drain Charge	Q <sub>GD</sub>		–	9.6	–	
Gate Resistance	R <sub>G</sub>		f = 1 MHz	–	1.4	

### SWITCHING CHARACTERISTICS

Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = –5/20 V, V <sub>DS</sub> = 800 V, I <sub>D</sub> = 16 A, R <sub>G</sub> = 6 Ω, Inductive Load	–	11	–	ns
Rise Time	t <sub>r</sub>		–	19	–	
Turn-Off Delay Time	t <sub>d(off)</sub>		–	15	–	
Fall Time	t <sub>f</sub>		–	8	–	
Turn-On Switching Loss	E <sub>ON</sub>		–	200	–	μJ
Turn-Off Switching Loss	E <sub>OFF</sub>		–	–	34	
Total Switching Loss	E <sub>TOT</sub>		–	234	–	

### DRAIN-SOURCE DIODE CHARACTERISTICS

Continuous Drain-to-Source Diode Forward Current	I <sub>SD</sub>	V <sub>GS</sub> = –5 V, T <sub>J</sub> = 25°C	–	–	11	A
Pulsed Drain-to-Source Diode Forward Current (Note 2)	I <sub>SDM</sub>	V <sub>GS</sub> = –5 V, T <sub>J</sub> = 25°C	–	–	69	A
Forward Diode Voltage	V <sub>SD</sub>	V <sub>GS</sub> = –5 V, I <sub>SD</sub> = 6 A, T <sub>J</sub> = 25°C	–	4	10	V
Reverse Recovery Time	t <sub>RR</sub>	V <sub>GS</sub> = –5/20 V, I <sub>SD</sub> = 16 A, dI <sub>S</sub> /dt = 1000 A/μs	–	15	–	ns
Reverse Recovery Charge	Q <sub>RR</sub>		–	45	–	nC
Reverse Recovery Energy	E <sub>REC</sub>		–	3.9	–	μJ
Peak Reverse Recovery Current	I <sub>RRM</sub>		–	6.2	–	A
Charge Time	T <sub>a</sub>		–	7.4	–	ns
Discharge Time	T <sub>b</sub>		–	7	–	ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



**NTHL160N120SC1**

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## TYPICAL CHARACTERISTICS (CONTINUED)




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