



# NTH4L080N120SC1

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise noted)

Symbol	Parameter		Ratings	Unit
V <sub>DSmax</sub>	Drain to Source Voltage		1200	V
V <sub>GSmax</sub>	Max. Gate to Source Voltage	@ T <sub>C</sub> < 150°C	15 / +25	V
V <sub>GSop(DC)</sub>	Recommended operation Values of Gate Source Voltage	@ T <sub>C</sub> < 150°C	5 / +20	V
V <sub>GSop(AC)</sub>	Recommended operation Values of Gate Source Voltage (f > 1 Hz)	@ T <sub>C</sub> < 150°C	5 / +20	V
I <sub>D</sub>	Continuous Drain Current	V <sub>GS</sub> = 20 V, T <sub>C</sub> = 25°C	29	A
		V <sub>GS</sub> = 20 V, T <sub>C</sub> = 100°C	21	
I <sub>D(Pulse)</sub>	Pulse Drain Current	Pulse width tp limited by T <sub>j</sub> max	125	A
E <sub>AS</sub>	Single Pulse Avalanche Energy (Note 1)		171	mJ
P <sub>tot</sub>	Power Dissipation	T <sub>C</sub> = 25°C	170	W
		T <sub>C</sub> = 150°C	28	
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range		55 to +175	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. E<sub>AS</sub> of 171 mJ is based on starting T<sub>J</sub> = 25°C, L = 1 mH, I<sub>AS</sub> = 18.5 A, V<sub>DD</sub>

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## ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

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

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = 100 \mu\text{A}, V_{GS} = 0 \text{ V}$	1200			V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 5 \text{ mA}$ , Referenced to $25^\circ\text{C}$		0.3		$\text{V}/^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 1200 \text{ V}, V_{GS} = 0 \text{ V}$ $T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$			100 1.0	$\mu\text{A}$ mA
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = 25 \text{ V}, V_{DS} = 0 \text{ V}$			1	$\mu\text{A}$
$I_{GSSR}$	Gate to Source Leakage Current, Reverse	$V_{GS} = 15 \text{ V}, V_{DS} = 0 \text{ V}$			1	$\mu\text{A}$

### ON CHARACTERISTICS

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5 \text{ mA}$	1.8	2.75	4.3	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 20 \text{ V}, I_D = 20 \text{ A}$		80	110	m $\Omega$
		$V_{GS} = 20 \text{ V}, I_D = 20 \text{ A}, T_C = 150^\circ\text{C}$		127	162	
$g_{FS}$	Forward Transconductance	$V_{DS} = 20 \text{ V}, I_D = 20 \text{ A}$		11.3		S
		$V_{DS} = 20 \text{ V}, I_D = 20 \text{ A}, T_C = 150^\circ\text{C}$		9.8		

### DYNAMIC CHARACTERISTICS

$C_{iss}$	Input Capacitance	$V_{DS} = 800 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		1112	1670	pF
$C_{oss}$	Output Capacitance			80	120	pF
$C_{rss}$	Reverse Transfer Capacitance			6.5	10	pF
$E_{oss}$	$C_{oss}$ Stored Energy			32		$\mu\text{J}$

### SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{CC} = 800 \text{ V}, I_C = 20 \text{ A}$ ,
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## TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

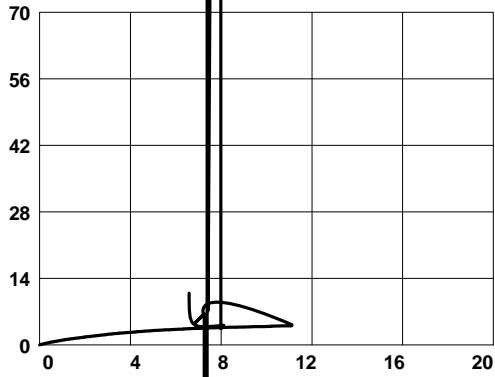


Figure 1. On Region Characteristics

Figure 2. Normalized On Resistance vs. Drain Current and Gate Voltage

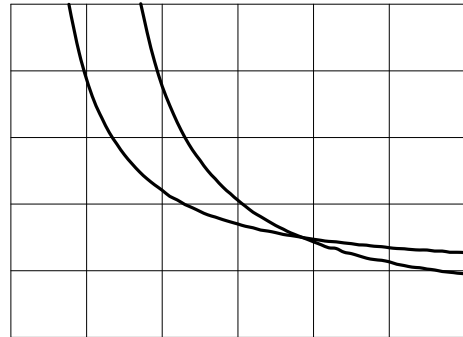


Figure 3. Normalized On Resistance vs. Junction Temperature

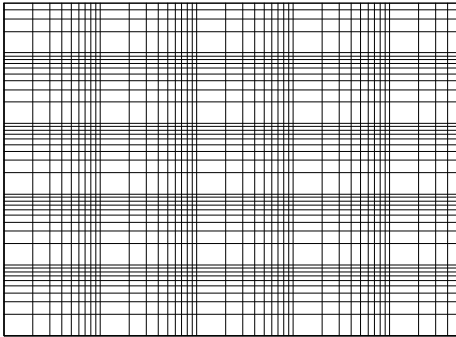
Figure 4. On Resistance vs. Gate to Source Voltage

Figure 5. Transfer Characteristics

Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

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**TYPICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED) (CONTINUED)



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TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED) (CONTINUED)

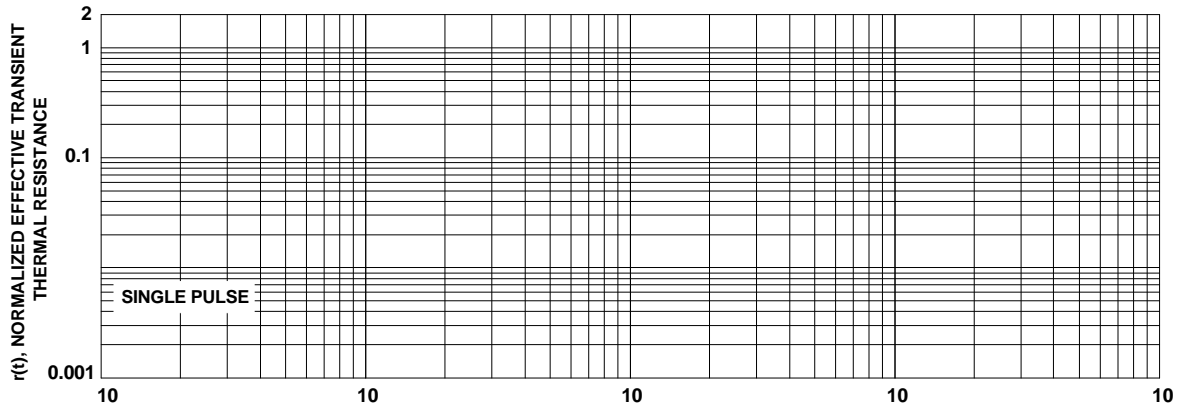


Figure 13. Junction to Case Transient Thermal Response Curve

TO-247-4LD  
CASE 340CJ  
ISSUE A

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A E A B  
A2 E1  $\emptyset$ p1  
D2

E/2 Q

D D1

$\emptyset$

L1

b2 A1

b1 (3X) L

1 4

e1 b(4X) c

e 2X

$\oplus$  0.254 (M) B A (M)

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