NTP8G206N

Power GaN Cascode Transistor 600 V, 150 mΩ

Features

- Fast Switching
- Extremely Low Q_{rr}
- Transphorm Inside
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

ON Semiconductor®

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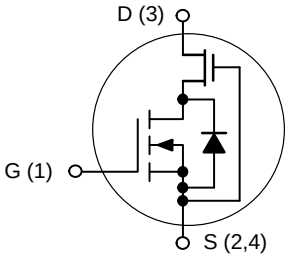
$V_{(BR)DSS}$	$R_{DS(ON)}$ TYP
600 V	150 mΩ @ 10 V

N−Channel MOSFET



ABSOLUTE MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

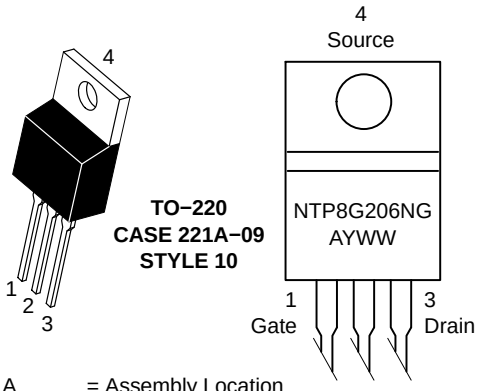
Parameter			Symbol	NDD	Unit
Drain−to−Source Voltage			V_{DSS}	600	V
Gate−to−Source Voltage			V_{GS}	±18	V
Continuous Drain Current $R_{\theta JC}$	Steady State	T_C = 25°C	I_D	17	A
		T_C = 100°C		12	
Power Dissipation – $R_{\theta JC}$	Steady State	T_C = 25°C	P_D	96	W
Pulsed Drain Current	t_p = 10 μs		I_{DM}	60	A
Operating Junction and Storage Temperature			T_J, T_{STG}	−55 to +150	°C
Lead Temperature for Soldering Leads			T_L	260	°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.

THERMAL RESISTANCE

Parameter	Symbol	Value	Unit
Junction−to−Case (Drain)	$R_{\theta JC}$	1.55	°C/W
Junction−to−Ambient Steady State	$R_{\theta JA}$	62	°C/W

MARKING DIAGRAM & PIN ASSIGNMENT



TO−220
CASE 221A−09
STYLE 10

A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
NTP8G206NG	TO−220 (Pb−Free)	50 Units / Rail

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 1 mA		600			V
Drain−to−Source Leakage Current	I_{DSS}	V_{DS} = 600 V, V_{GS} = 0 V	T_J = 25°C		2.5	90	μA
			T_J = 150°C		8.0		
Gate−to−Source Leakage Current	I_{GSS}	V_{GS} = ±18 V				±100	nA
ON CHARACTERISTICS (Note 1)							
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS} = V_{GS}, I_D = 500 μA		1.6	2.1	2.6	V
Static Drain-to-Source On Resistance	$R_{DS(on)}$	V_{GS} = 8 V, I_D = 11 A, T_J = 25°C			150	180	mΩ
		V_{GS} = 8 V, I_D = 11 A, T_J = 175°C			340		
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{iss}	V_{DS} = 480 V, V_{GS} = 0 V, f = 1 MHz			760		pF
Output Capacitance	C_{oss}				44		
Reverse Transfer Capacitance	C_{rss}				5.0		
Effective output capacitance, energy related (Note 3)	$C_{o(er)}$	V_{GS} = 0 V, V_{DS} = 0 to 480 V			64		
Effective output capacitance, time related (Note 4)	$C_{o(tr)}$	I_D = constant, V_{GS} = 0 V, V_{DS} = 0 to 480 V			105		
Total Gate Charge	Q_g	V_{DS} = 100 V, I_D = 11 A, V_{GS} = 4.5 V			6.2	9.3	nC
Gate-to-Source Charge	Q_{gs}				2.1		
Gate-to-Drain Charge	Q_{gd}				2.2		
SWITCHING CHARACTERISTICS (Note 2)							
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 480 V, I_D = 11 A, V_{GS} = 10 V, R_G = 2 Ω			6.2		ns
Rise Time	t_r				4.5		
Turn-off Delay Time	$t_{d(off)}$				9.7		
Fall Time	t_f				4.0		
SOURCE−DRAIN DIODE CHARACTERISTICS							
Diode Forward Voltage	V_{SD}	I_S = 11 A, V_{GS} = 0 V	T_J = 25°C		2.2		V
Reverse Recovery Time	t_{rr}	V_{GS} = 0 V, V_{DD} = 400 V, I_S = 11 A, d_i/d_t = 2000 A/μs			17		ns
Reverse Recovery Charge	Q_{rr}				53		nC

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.

1. Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperatures.
3. $C_{o(er)}$ is a fixed capacitance that gives the same stored energy as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$
4. $C_{o(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 to 80% $V_{(BR)DSS}$

TYPICAL CHARACTERISTICS

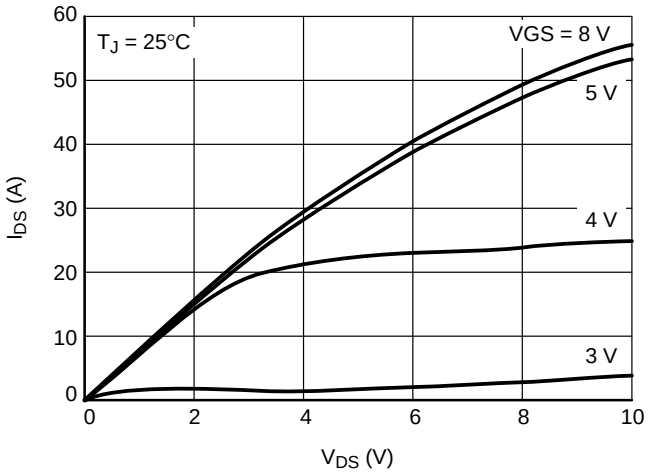


Figure 1. Typical Output Characteristics

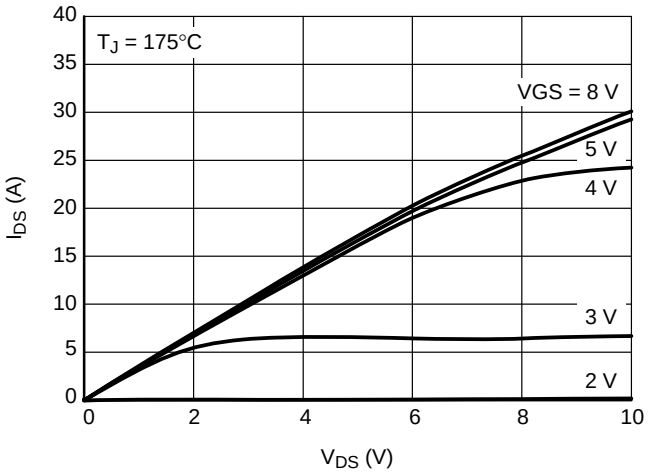


Figure 2. Typical Output Characteristics

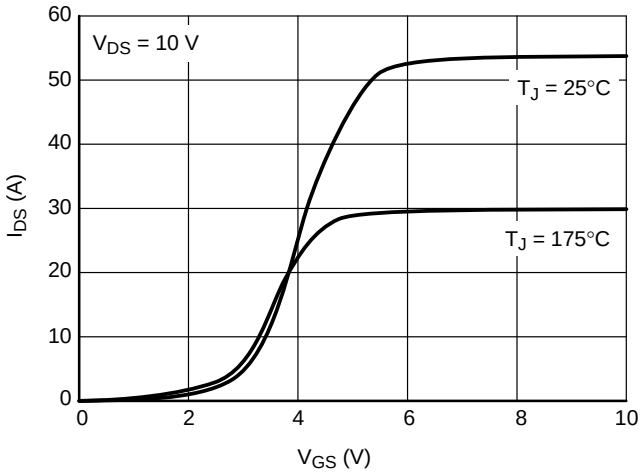


Figure 3. Typical Transfer Characteristics

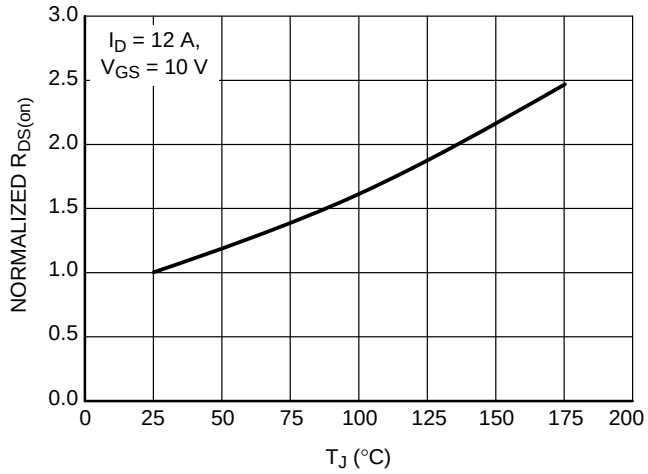


Figure 4. Normalized On−Resistance

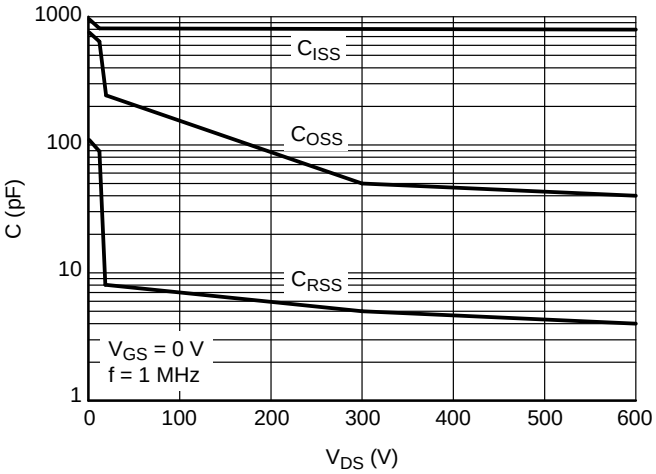


Figure 5. Typical Capacitance

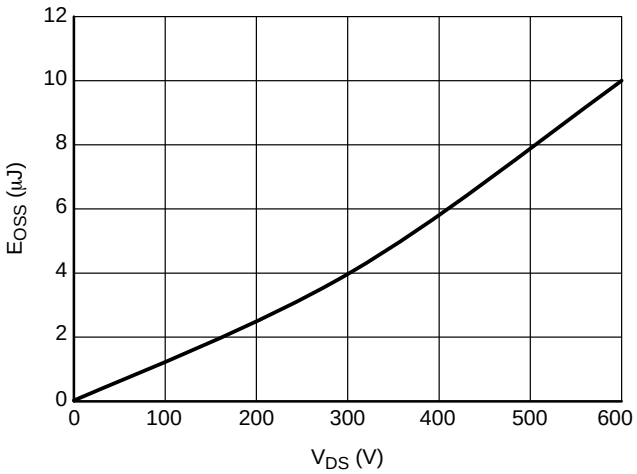


Figure 6. Typical C_{OSS} Stored Eneergy

TYPICAL CHARACTERISTICS

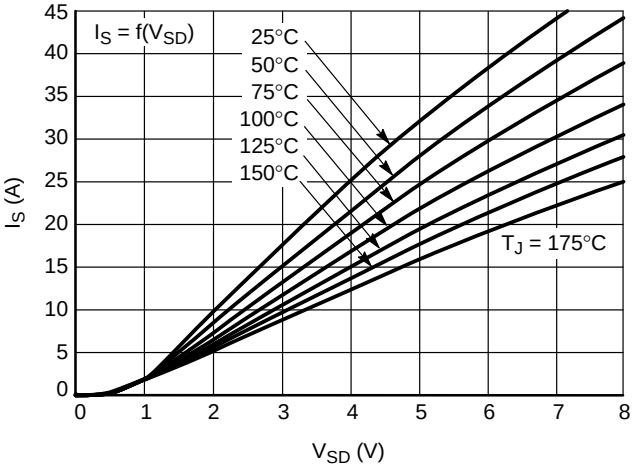


Figure 7. Forward Characteristics of Rev. Diode

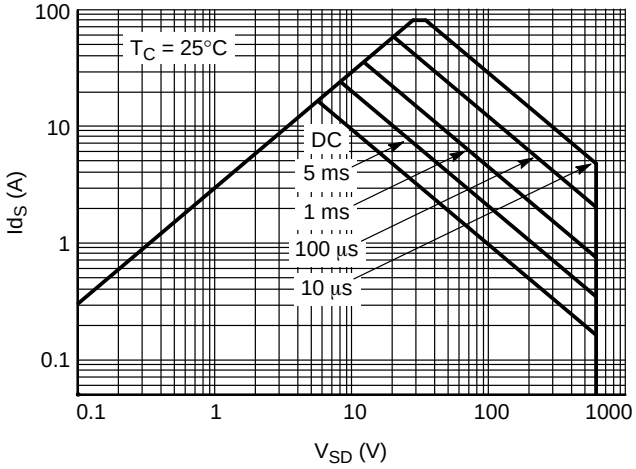


Figure 8. Safe Operating Area

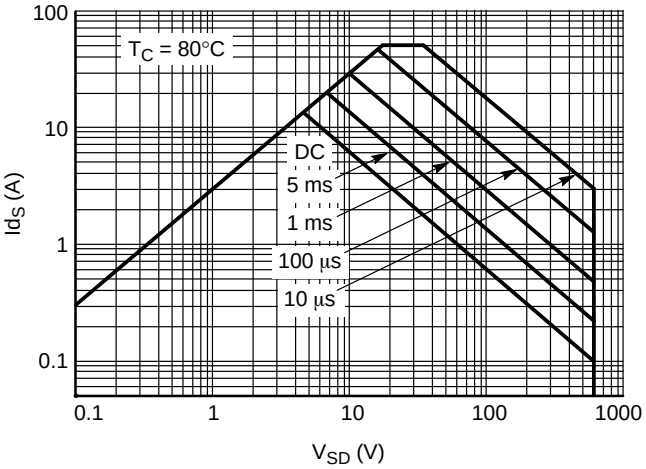


Figure 9. Safe Operating Area

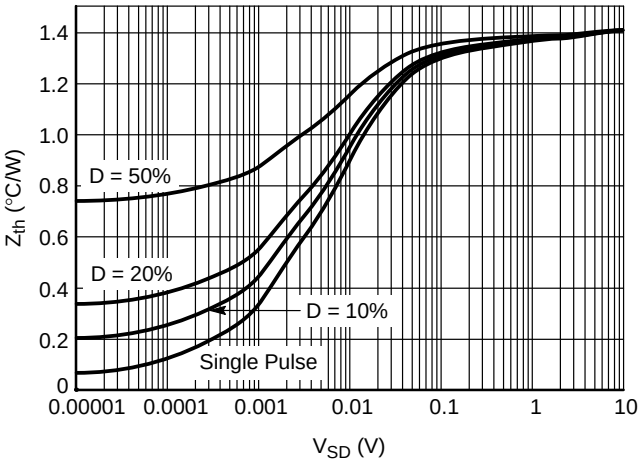


Figure 10. Transient Thermal Resistance

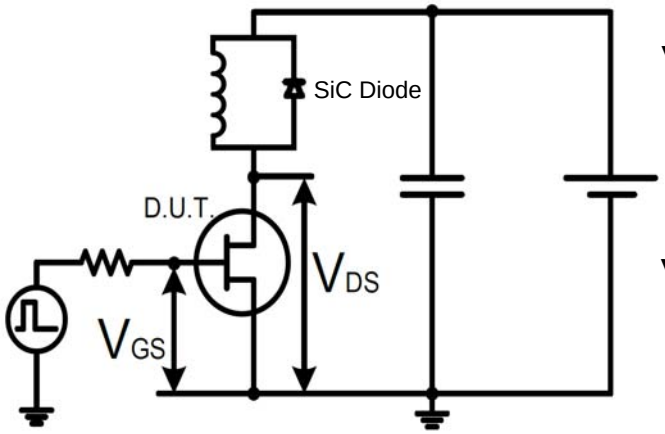


Figure 11. Switching Time Test Circuit

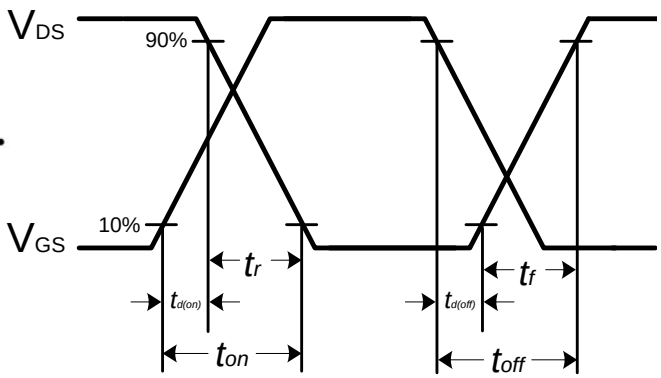


Figure 12. Switching Time Waveform

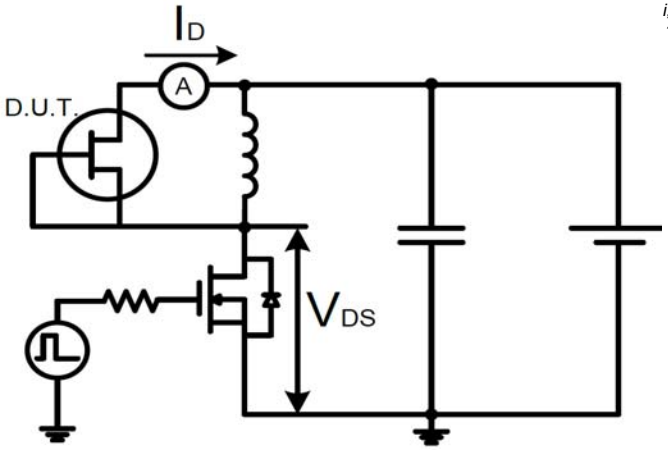


Figure 13. Test Circuit for Reverse Diode Characteristics

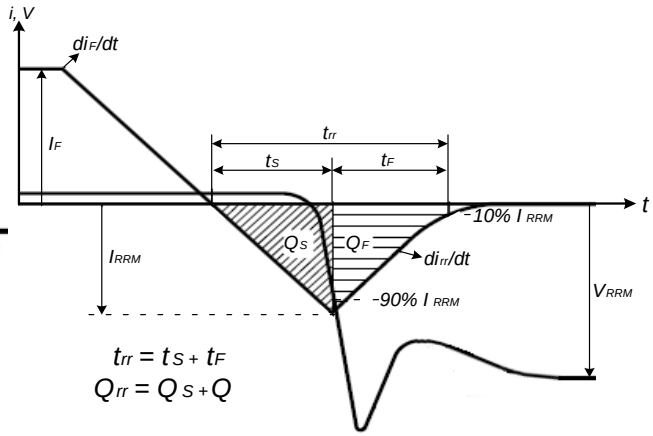
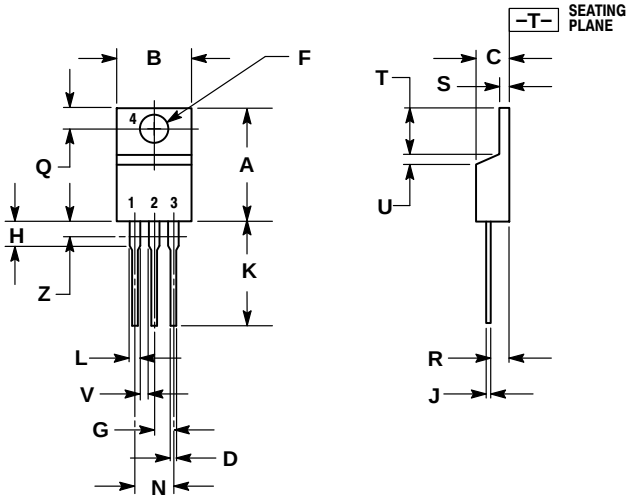


Figure 14. Diode Recovery Waveform

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AH



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

STYLE 10:
PIN 1. GATE
2. SOURCE
3. DRAIN
4. SOURCE

PUBLICATION ORDERING INFORMATION

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