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NDF06N62Z

N-Channel Power MOSFET 620 V, 1.2 Ω

Features

- Low ON Resistance
- Low Gate Charge
- ESD Diode−Protected Gate
- 100% Avalanche Tested
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

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

Rating	Symbol	NDF06N62Z	Unit
Drain−to−Source Voltage	V_{DSS}	620	V
Continuous Drain Current $R_{\theta JC}$ (Note 1)	I_D	6.0	A
Continuous Drain Current $R_{\theta JC}$, T_A = 100°C (Note 1)	I_D	3.8	A
Pulsed Drain Current, V_{GS} @ 10 V	I_{DM}	20	A
Power Dissipation $R_{\theta JC}$	P_D	31	W
Gate−to−Source Voltage	V_{GS}	±30	V
Single Pulse Avalanche Energy, I_D = 6.0 A	E_{AS}	113	mJ
ESD (HBM) (JESD 22−A114)	V_{esd}	3000	V
RMS Isolation Voltage (t = 0.3 sec., R.H. ≤ 30%, T_A = 25°C) (Figure 14)	V_{ISO}	4500	V
Peak Diode Recovery (Note 2)	dv/dt	4.5	V/ns
Continuous Source Current (Body Diode)	I_S	6.0	A
Maximum Temperature for Soldering Leads	T_L	260	°C
Operating Junction and Storage Temperature Range	T_J, T_{stg}	−55 to 150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Limited by maximum junction temperature
2. I_{SD} = 6.0 A, di/dt ≤ 100 A/μs, $V_{DD} \leq BV_{DSS}$, T_J = +150°C

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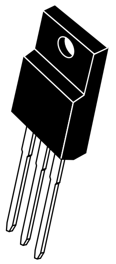
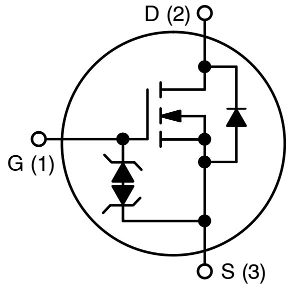
V_{DSS}	$R_{DS(ON)}$ (MAX) @ 3 A
620 V	1.2 Ω

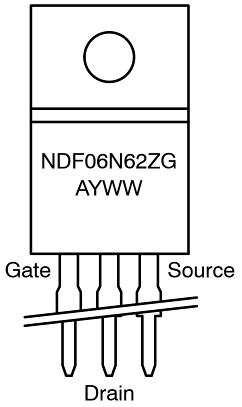


TO−220FP
CASE 221D
STYLE 1

N−Channel



MARKING DIAGRAM



A = Location Code
Y = Year
WW = Work Week
G = Pb−Free, Halogen−Free Package

ORDERING INFORMATION

Device	Package	Shipping
NDF06N62ZG	TO−220FP (Pb−Free, Halogen−Free)	50 Units / Rail

THERMAL RESISTANCE

Parameter	Symbol	NDF06N62Z	Unit
Junction–to–Case (Drain)	$R_{\theta JC}$	4.0	°C/W
Junction–to–Ambient Steady State (Note 3)	$R_{\theta JA}$	50	

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

Characteristic	Test Conditions		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain–to–Source Breakdown Voltage	V_{GS} = 0 V, I_D = 1 mA		BV_{DSS}	620			V
Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D = 1 mA		$\Delta BV_{DSS}/\Delta T_J$		0.6		V/°C
Drain–to–Source Leakage Current	V_{DS} = 620 V, V_{GS} = 0 V	25°C	I_{DSS}			1	µA
		125°C				50	
Gate–to–Source Forward Leakage	V_{GS} = ±20 V		I_{GSS}			±10	µA
ON CHARACTERISTICS (Note 4)							
Static Drain–to–Source On–Resistance	V_{GS} = 10 V, I_D = 3.0 A		$R_{DS(on)}$		0.98	1.2	Ω
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 100 µA		$V_{GS(th)}$	3.0		4.5	V
Forward Transconductance	V_{DS} = 15 V, I_D = 3.0 A		g_{FS}		5.0		S
DYNAMIC CHARACTERISTICS							
Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz		C_{iss}		923		pF
Output Capacitance			C_{oss}		106		
Reverse Transfer Capacitance			C_{rss}		23		
Total Gate Charge	V_{DD} = 310 V, I_D = 6.0 A, V_{GS} = 10 V		Q_g		32		nC
Gate–to–Source Charge			Q_{gs}		6.3		
Gate–to–Drain (“Miller”) Charge			Q_{gd}		17		
Plateau Voltage			V_{gp}		6.3		V
Gate Resistance			R_g		3.2		Ω
RESISTIVE SWITCHING CHARACTERISTICS							
Turn–On Delay Time	V_{DD} = 310 V, I_D = 6.0 A, V_{GS} = 10 V, R_G = 5 Ω		$t_{d(on)}$		13		ns
Rise Time			t_r		19		
Turn–Off Delay Time			$t_{d(off)}$		32		
Fall Time			t_f		28		
SOURCE–DRAIN DIODE CHARACTERISTICS (T_C = 25°C unless otherwise noted)							
Diode Forward Voltage	I_S = 6.0 A, V_{GS} = 0 V		V_{SD}			1.6	V
Reverse Recovery Time	V_{GS} = 0 V, V_{DD} = 30 V, I_S = 6.0 A, di/dt = 100 A/µs		t_{rr}		338		ns
Reverse Recovery Charge			Q_{rr}		2.0		µC

3. Insertion mounted
4. Pulse Width ≤ 380 µs, Duty Cycle ≤ 2%.

TYPICAL CHARACTERISTICS

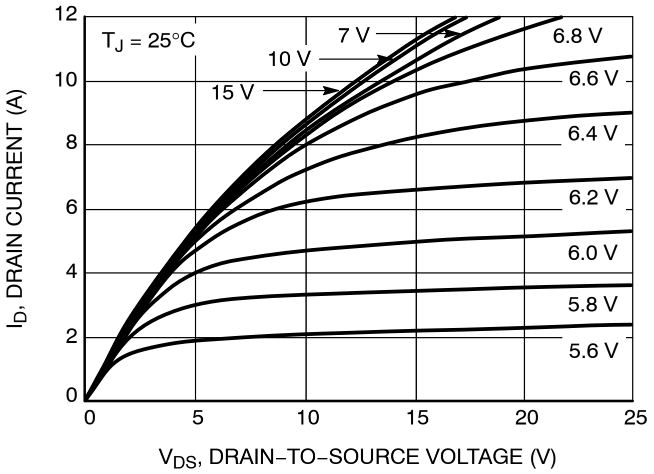


Figure 1. On−Region Characteristics

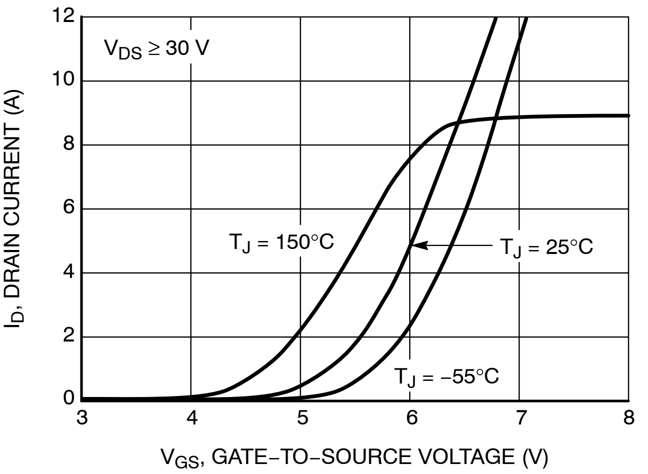


Figure 2. Transfer Characteristics

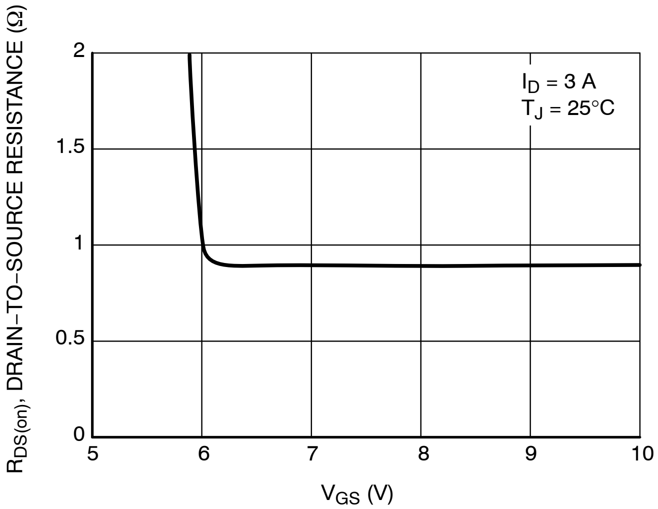


Figure 3. On−Resistance vs. V_{GS}

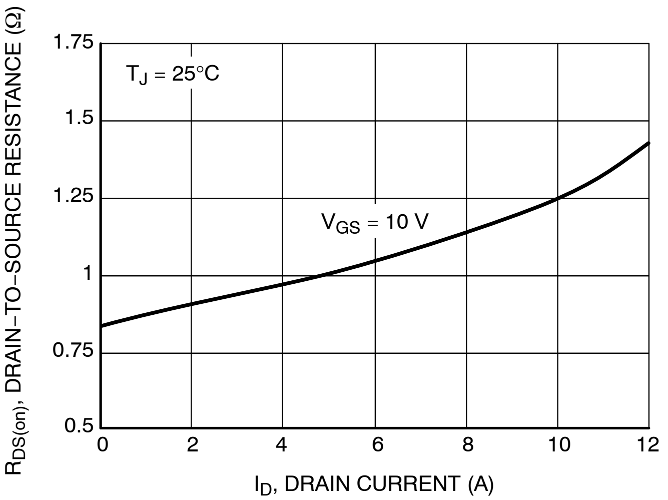


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

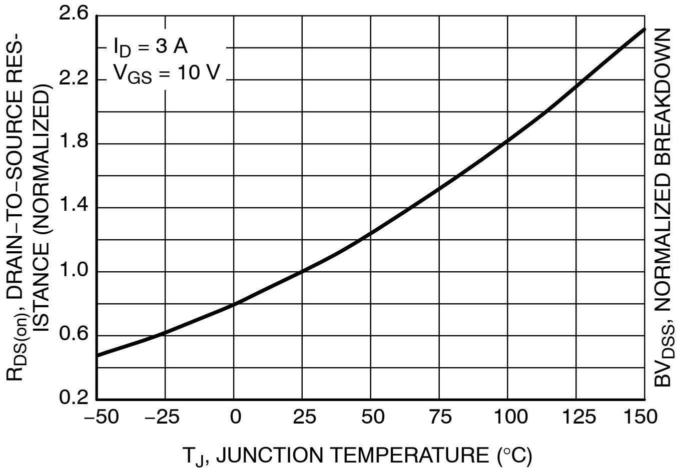


Figure 5. On−Resistance Variation with Temperature

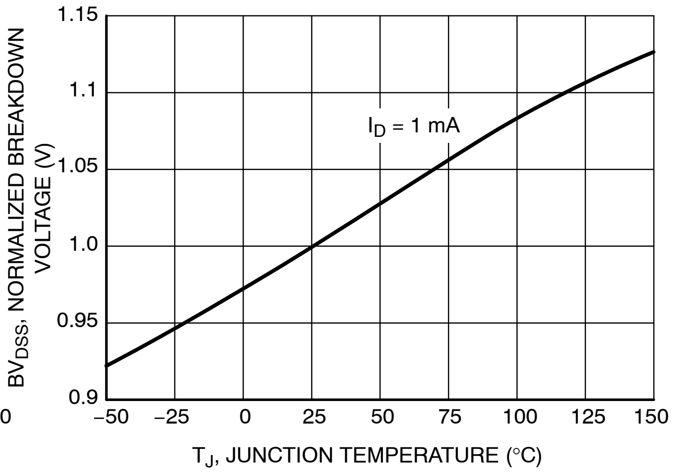


Figure 6. BVDSS Variation with Temperature

TYPICAL CHARACTERISTICS

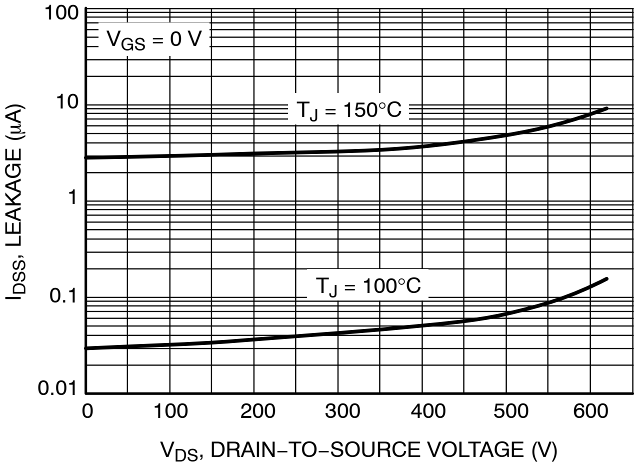


Figure 7. Drain−to−Source Leakage Current vs. Voltage

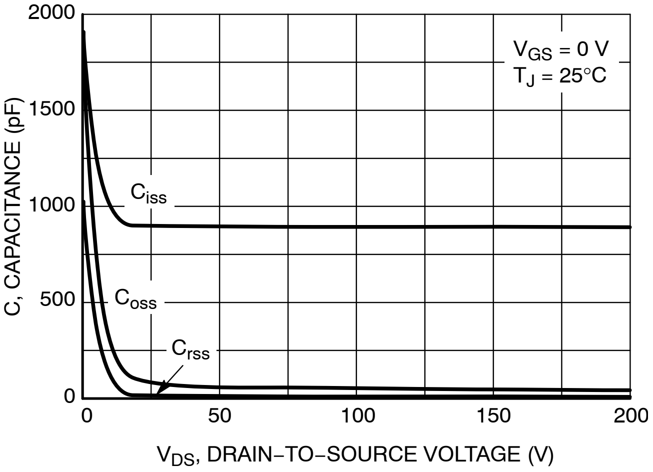


Figure 8. Capacitance Variation

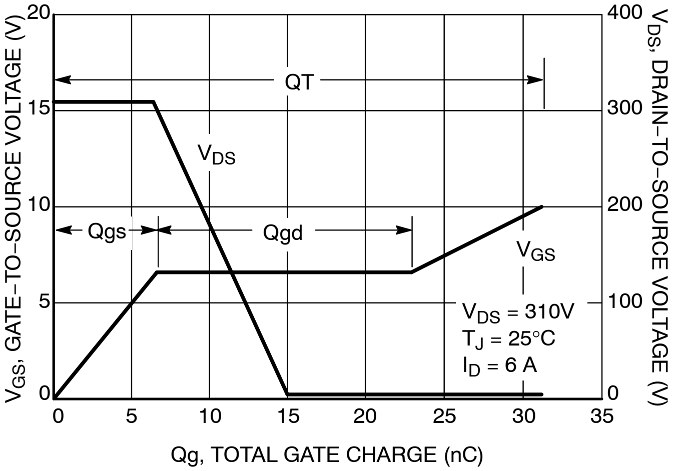


Figure 9. Gate−to−Source and Drain−to−Source Voltage vs. Total Charge

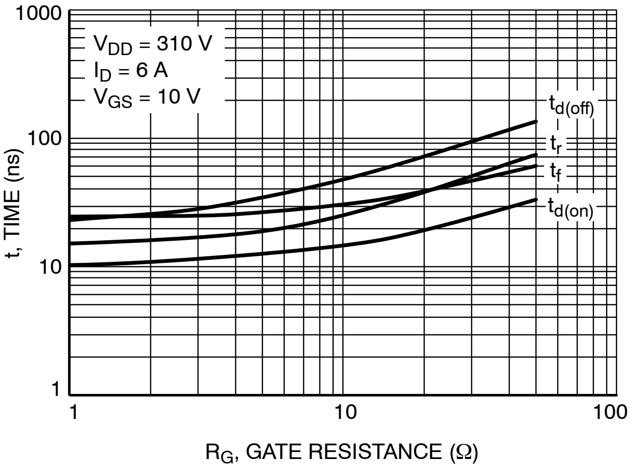


Figure 10. Resistive Switching Time Variation vs. Gate Resistance

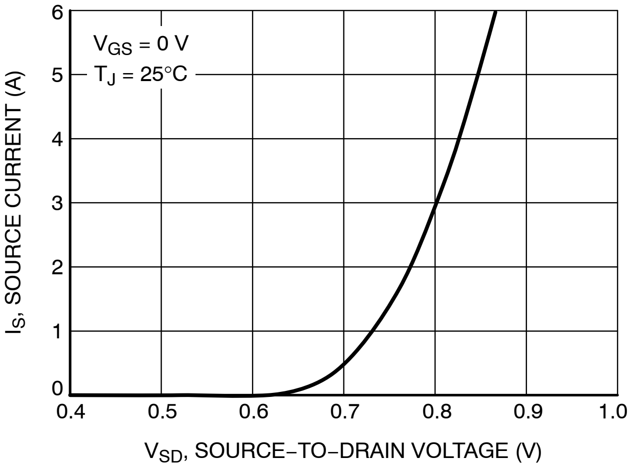


Figure 11. Diode Forward Voltage vs. Current

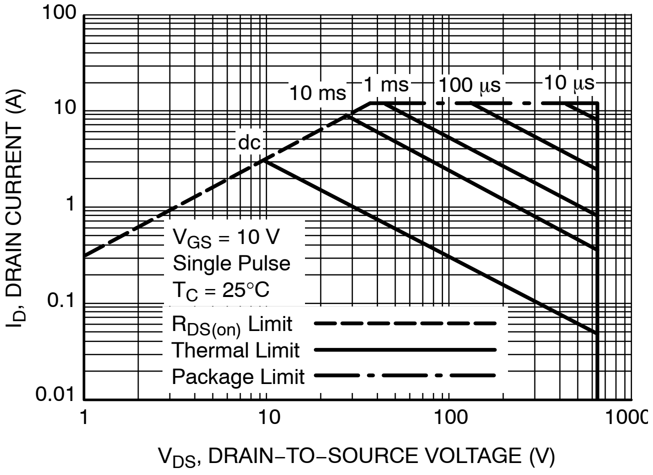


Figure 12. Maximum Rated Forward Biased Safe Operating Area for NDF06N62Z

TYPICAL CHARACTERISTICS

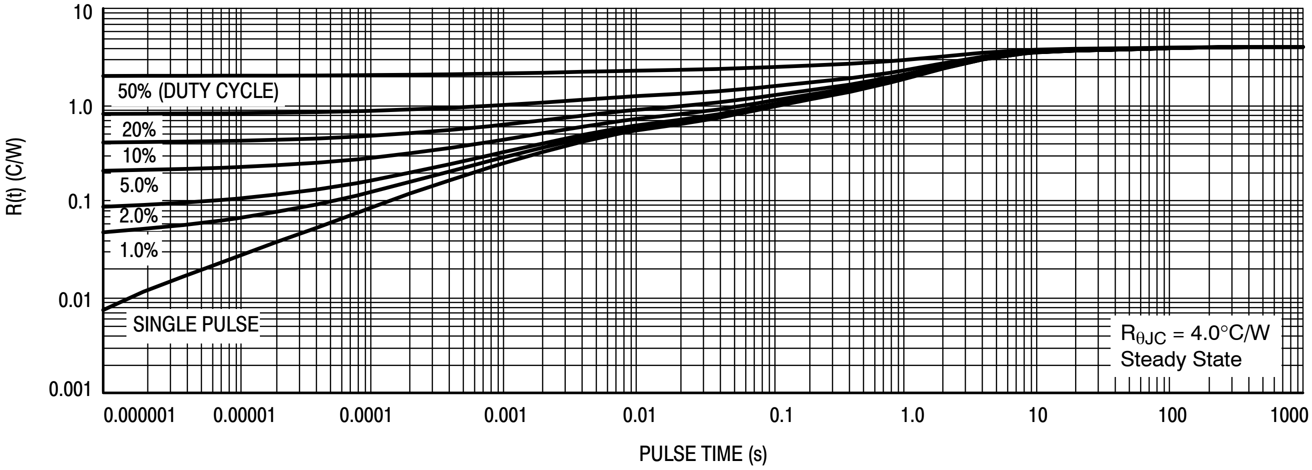


Figure 13. Thermal Impedance for NDF06N62Z

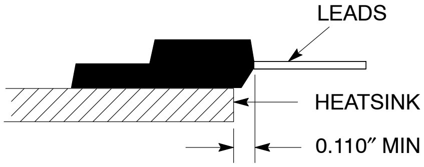


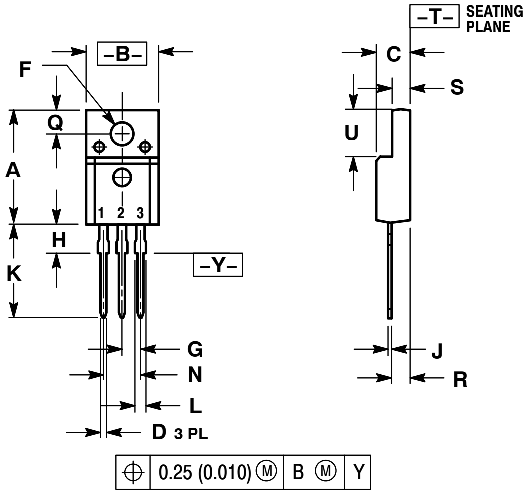
Figure 14. Isolation Test Diagram

Measurement made between leads and heatsink with all leads shorted together.

*For additional mounting information, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PACKAGE DIMENSIONS

TO−220FP
CASE 221D−03
ISSUE K



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH
3. 221D−01 THRU 221D−02 OBSOLETE, NEW STANDARD 221D−03.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.617	0.635	15.67	16.12
B	0.392	0.419	9.96	10.63
C	0.177	0.193	4.50	4.90
D	0.024	0.039	0.60	1.00
F	0.116	0.129	2.95	3.28
G	0.100 BSC		2.54 BSC	
H	0.118	0.135	3.00	3.43
J	0.018	0.025	0.45	0.63
K	0.503	0.541	12.78	13.73
L	0.048	0.058	1.23	1.47
N	0.200 BSC		5.08 BSC	
Q	0.122	0.138	3.10	3.50
R	0.099	0.117	2.51	2.96
S	0.092	0.113	2.34	2.87
U	0.239	0.271	6.06	6.88

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

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