

## N-Channel 80-V and 90-V (D-S) MOSFETS

<b>PRODUCT SUMMARY</b>				
Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (V)	$I_D$ (A)
2N6661	90	4 @ $V_{GS} = 10$ V	0.8 to 2	0.9
VN88AFD	80	4 @ $V_{GS} = 10$ V	0.8 to 2.5	1.29

### FEATURES

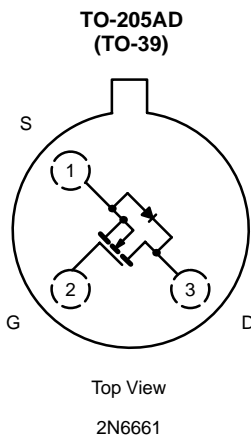
- Low On-Resistance: 3.6  $\Omega$
- Low Threshold: 1.6 V
- Low Input Capacitance: 35 pF
- Fast Switching Speed: 6 ns
- Low Input and Output Leakage

### BENEFITS

- Low Offset Voltage
- Low-Voltage Operation
- Easily Driven Without Buffer
- High-Speed Circuits
- Low Error Voltage

### APPLICATIONS

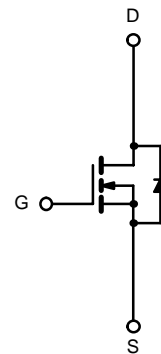
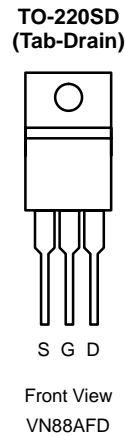
- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays



Device Marking  
Side View

2N6661  
"S" flxxyy

"S" = Siliconix Logo  
f = Factory Code  
ll = Lot Traceability  
xyyy = Date Code



Device Marking  
Front View

VN88AFD  
"S" xxyy

"S" = Siliconix Logo  
xyyy = Date Code

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	2N6661	VN88AFD	Unit
Drain-Source Voltage	$V_{DS}$	90	80	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 30$	
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$I_D$	$T_C = 25^\circ\text{C}$	0.9	A
		$T_C = 100^\circ\text{C}$	0.7	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	$\pm 3$	$\pm 3$	
Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	6.25	W
		$T_C = 100^\circ\text{C}$	2.5	
Thermal Resistance, Junction-to-Ambient <sup>b</sup>	$R_{thJA}$	170		$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{thJC}$		8.3	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$

#### Notes

- Pulse width limited by maximum junction temperature.
- This parameter not registered with JEDEC.



SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)								
Parameter	Symbol	Test Conditions	Typ <sup>a</sup>	Limits				Unit
				2N6661		VN88AFD		
				Min	Max	Min	Max	
<b>Static</b>								
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 10 μA	125	90		80		V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA	1.6	0.8	2	0.8	2.5	
		T <sub>J</sub> = -55 °C	1.8					
		T <sub>J</sub> = 125 °C	1.3					
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±15 V			±100		±100	nA
		T <sub>J</sub> = 125 °C			±500		±500	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 90 V, V <sub>GS</sub> = 0 V			10			μA
		V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V					10	
		V <sub>DS</sub> = 0.8 × V <sub>(BR)DSS</sub> , V <sub>GS</sub> = 0 V					1	
		T <sub>J</sub> = 125 °C			500		500	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V	1.8	1.5				A
		V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 10 V	1.8			1.5		
Drain-Source On-Resistance <sup>b</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 5 V, I <sub>D</sub> = 0.3 A	3.8		5.3		5.6	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 1 A	3.6		4		4	
		T <sub>J</sub> = 125 °C <sup>d</sup>	6.7		9		8	
Forward Transconductance <sup>b</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.5 A	350	170		170		mS
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 0.86 A, V <sub>GS</sub> = 0 V	0.9					V
<b>Dynamic</b>								
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V f = 1 MHz	35		50		50	pF
Output Capacitance	C <sub>oss</sub>		15		40		40	
Reverse Transfer Capacitance	C <sub>rss</sub>		2		10		10	
Drain-Source Capacitance	C <sub>ds</sub>		30		40			
<b>Switching<sup>c</sup></b>								
Turn-On Time	t <sub>ON</sub>	V <sub>DD</sub> = 25 V, R <sub>L</sub> = 23 Ω I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V R <sub>G</sub> = 25 Ω	6		10		15	ns
Turn-Off Time	t <sub>OFF</sub>		8		10		15	

Notes

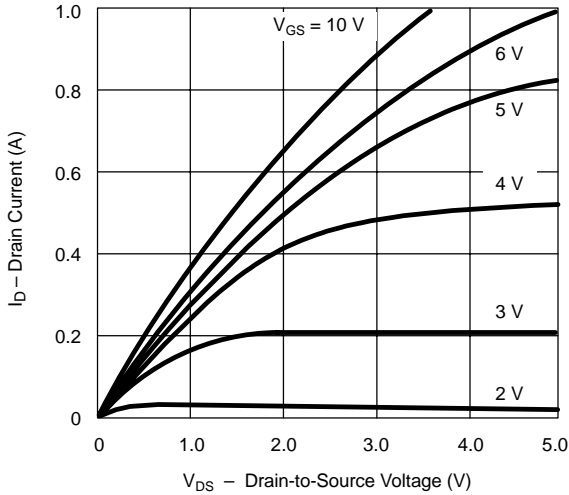
- a. For DESIGN AID ONLY, not subject to production testing.
- b. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- c. Switching time is essentially independent of operating temperature.
- d. This parameter not registered with JEDEC.

VNDQ09

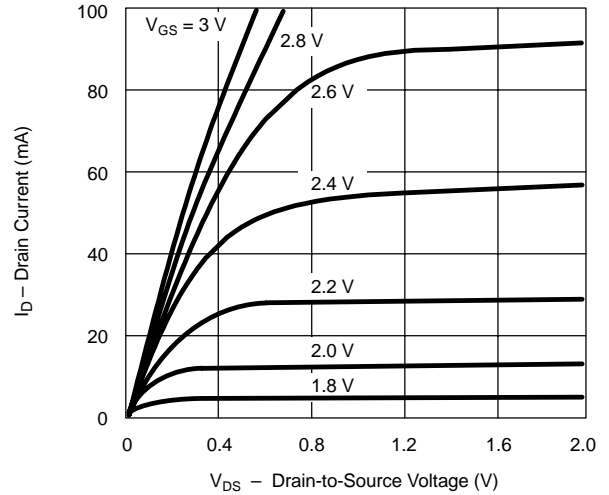


**TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

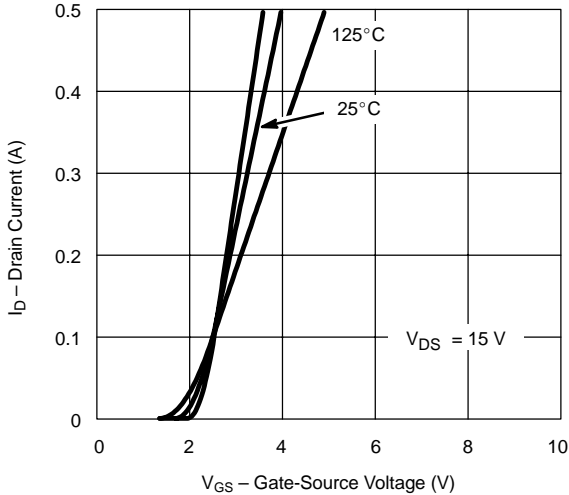
**Ohmic Region Characteristics**



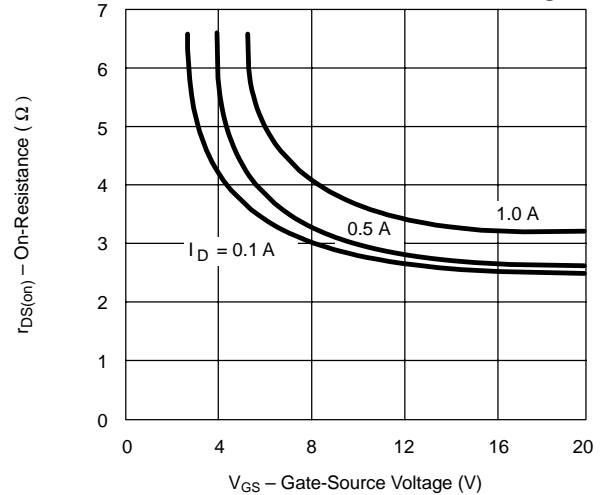
**Output Characteristics for Low Gate Drive**



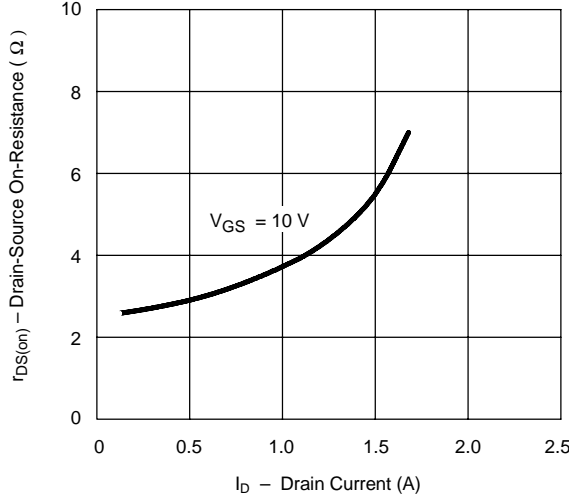
**Transfer Characteristics**



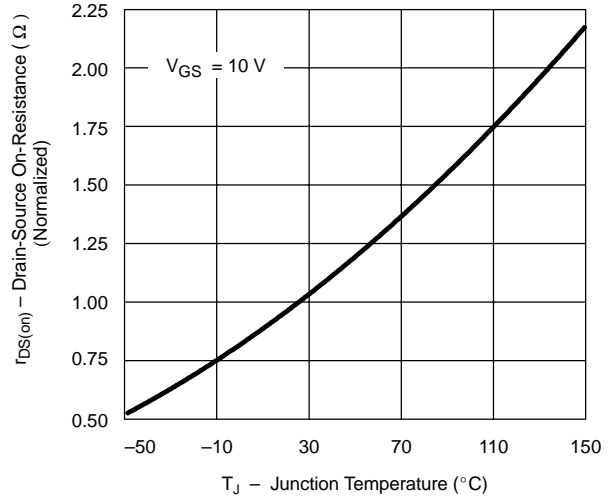
**On-Resistance vs. Gate-to-Source Voltage**



**On-Resistance vs. Drain Current**



**Normalized On-Resistance vs. Junction Temperature**





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

