N-Channel 20–V (D–S) MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
20	1.0 @ V_{GS} = 10 V 1.4 @ V_{GS} = 4.5 V	1.0 to 3.0	0.39

FEATURES

- Low On-Resistance: 0.75 Ω
- Low Threshold: <1.75 V
- Low Input Capacitance: 65 pF
- Fast Switching Speed: 15 ns
- Low Input and Output Leakage

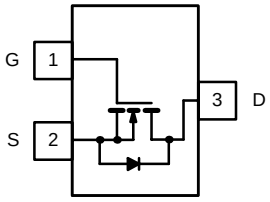
BENEFITS

- 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

TO-236
(SOT-23)



Top View

Marking Code: N1*wll*

N1 = Part Number Code for TN0201T
w = Week Code
ll = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150°C)	T_A= 25°C	I_D	0.39	A
	T_A= 70°C		0.25	
Pulsed Drain Current[a]		I_{DM}	0.75	
Power Dissipation	T_A= 25°C	P_D	0.35	W
	T_A= 70°C		0.22	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	357	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

Notes
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

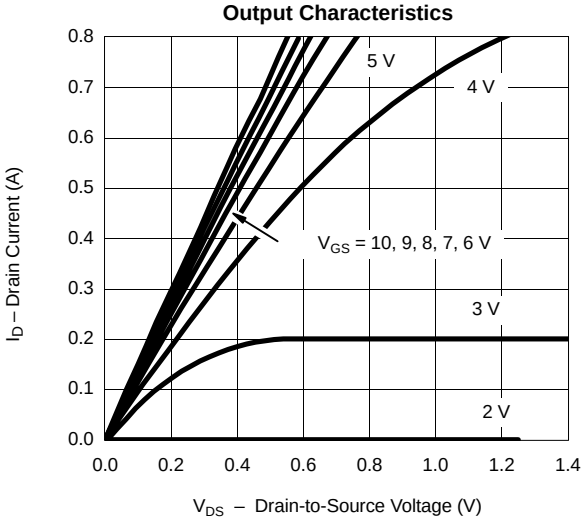
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ[a]	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 10 µA	20	40		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 0.25 mA	1.0	1.90	3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1	µA
		V_{DS} = 14 V, V_{GS} = 0 V, T_J = 55°C			10	
On-State Drain Current[b]	$I_{D(on)}$	V_{DS} = 10 V, V_{GS} = 10 V	0.5	0.75		A
Drain-Source On-Resistance[b]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.1 A		1	1.4	Ω
		V_{GS} = 10 V, I_D = 0.3 A		0.75	1.0	
Forward Transconductance[b]	g_{fs}	V_{DS} = 10 V, I_D = 0.2 A		450		mS
Diode Forward Voltage	V_{SD}	I_S = 0.3 A, V_{GS} = 0 V		0.85		V
Dynamic[a]						
Total Gate Charge	Q_g	V_{DS} = 16 V, V_{GS} = 10 V I_D ≅ 0.3 A		1400		pC
Gate-Source Charge	Q_{gs}			300		
Gate-Drain Charge	Q_{gd}			200		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		65		pF
Output Capacitance	C_{oss}			35		
Reverse Transfer Capacitance	C_{rss}			6		
Switching[a, c]						
Turn-On Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 50 Ω I_D ≅ 0.3 A, V_{GEN} = 10 V R_G = 6 Ω		5		ns
	t_r			10		
Turn-Off Time	$t_{d(off)}$			12		
	t_f			6		

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.

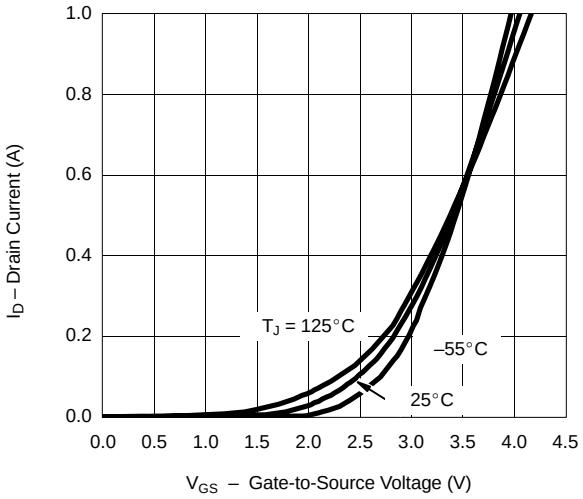
VNBP02

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

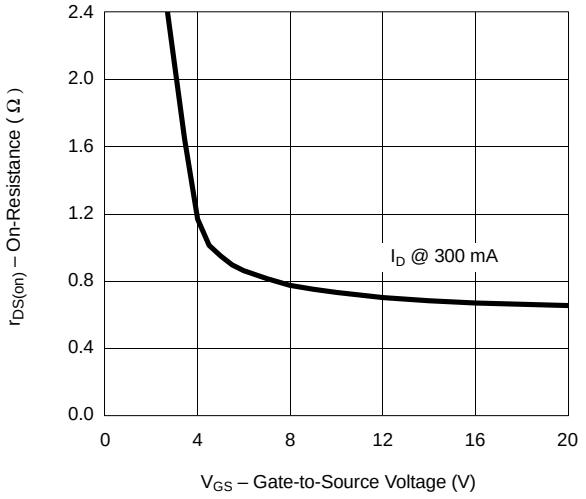
Output Characteristics



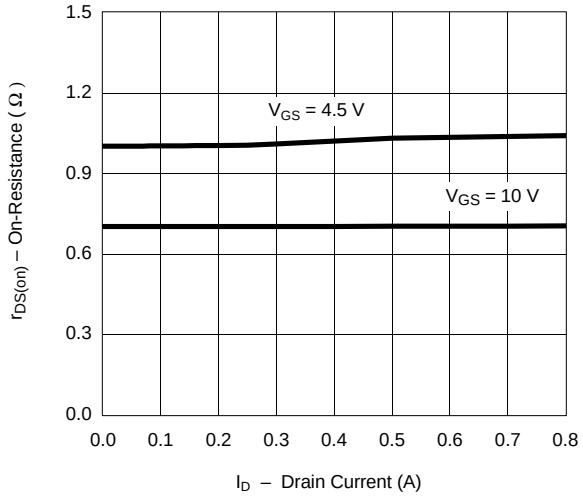
Transfer Characteristics



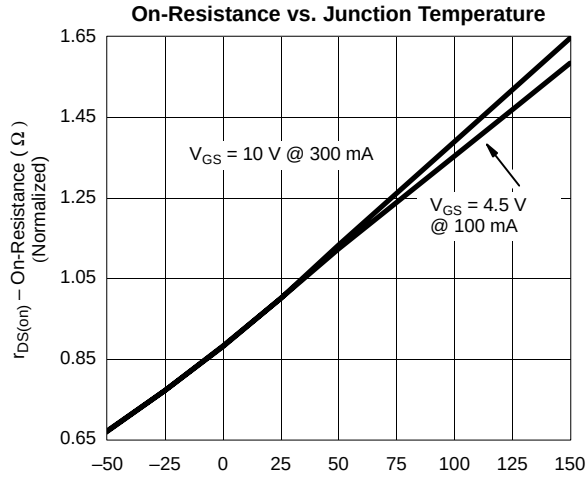
On-Resistance vs. Gate-Source Voltage



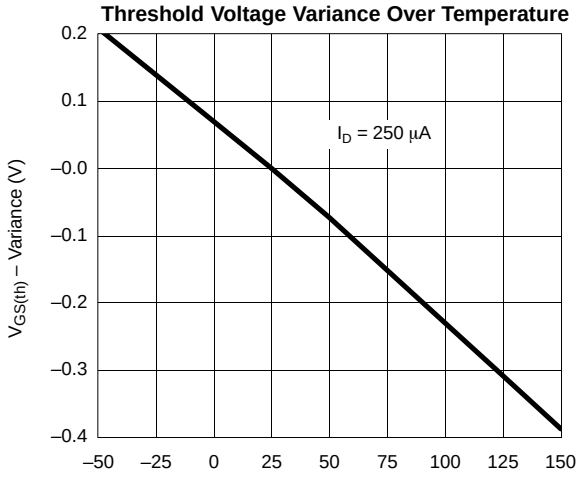
On-Resistance vs. Drain Current



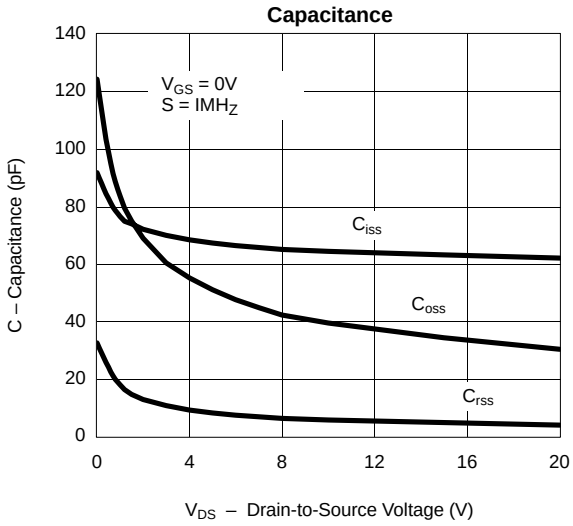
On-Resistance vs. Junction Temperature

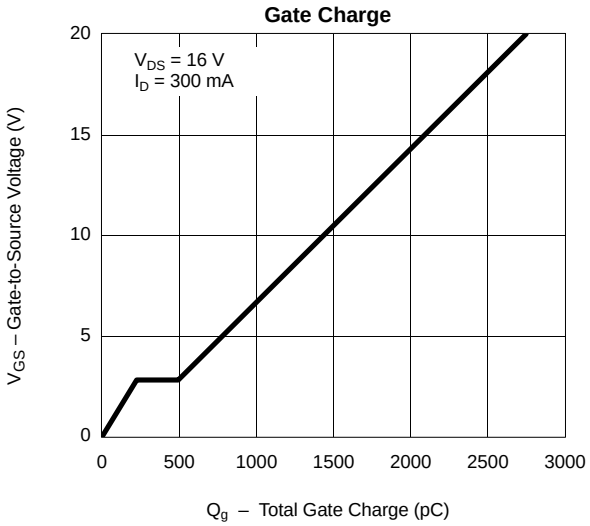


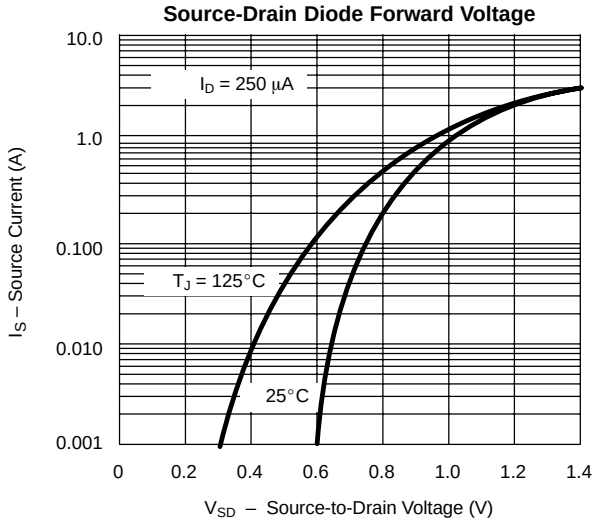
Threshold Voltage Variance Over Temperature



TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)







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