

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	1.0 to 3.0	0.39
	1.4 @ $V_{GS} = 4.5$ V		

FEATURES

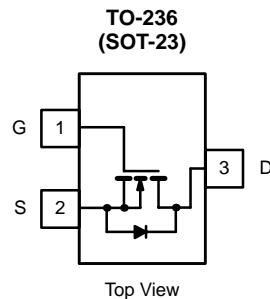
- Low On-Resistance: 0.75 Ω
- Low Threshold: <1.75 V
- Low Input Capacitance: 65 pF
- Fast Switching Speed: 15 ns
- Low Input and Output Leakage

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



Marking Code: N1 w//
 N1 = Part Number Code for TN0201T
 w = Week Code
 // = Lot Traceability

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

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		

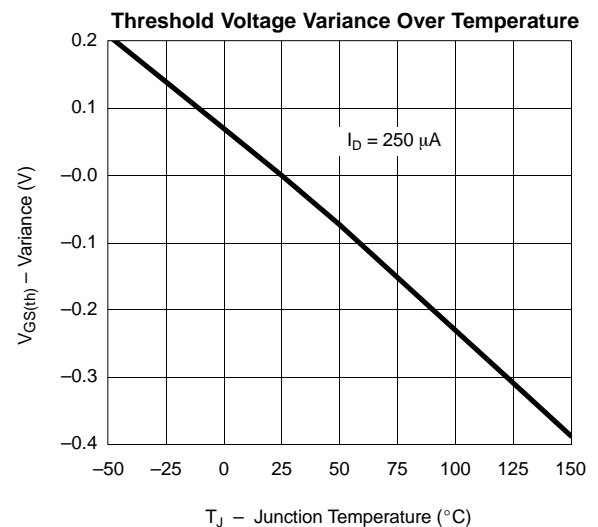
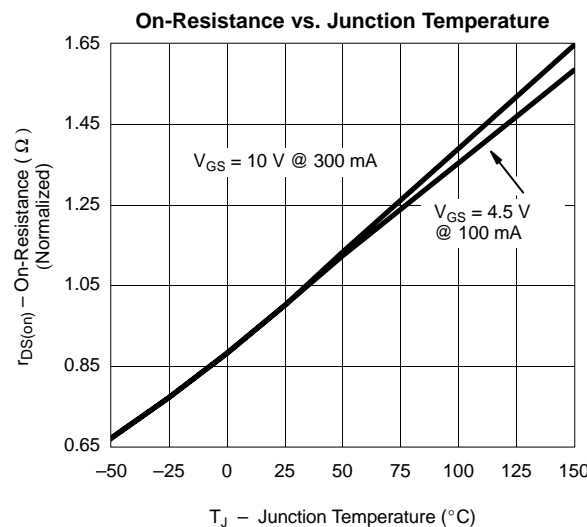
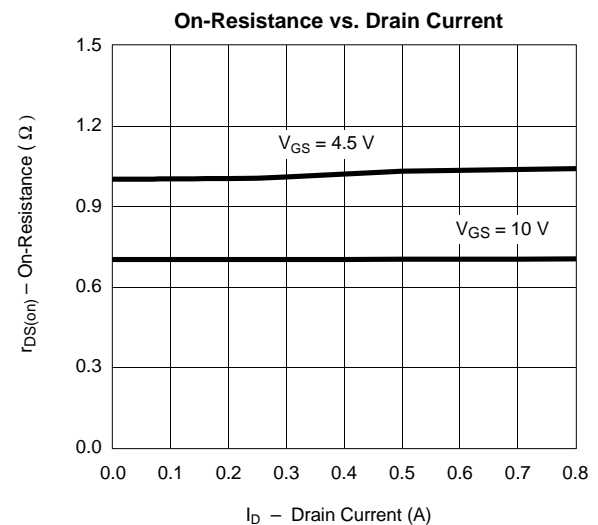
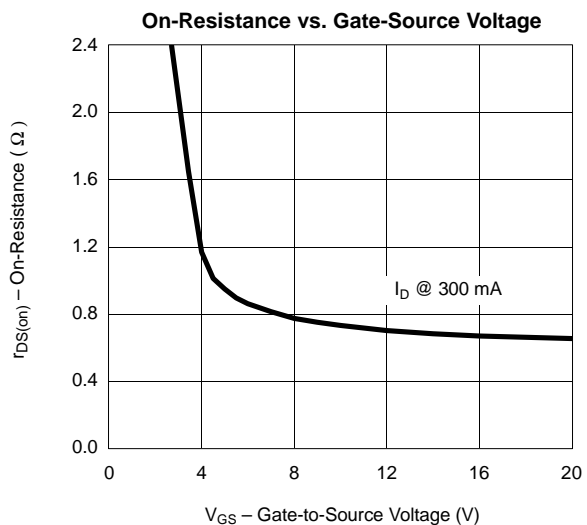
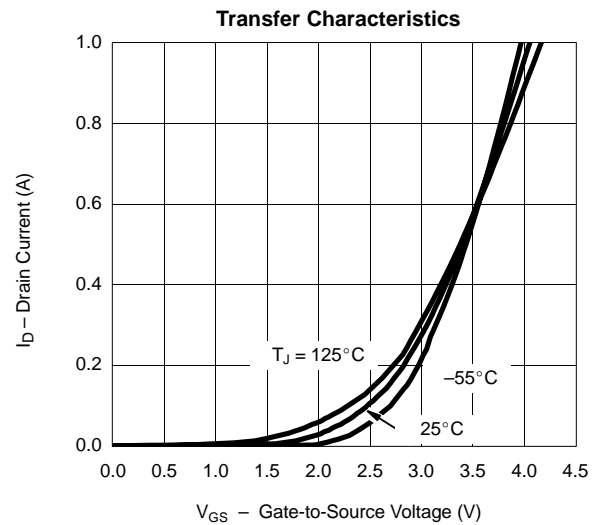
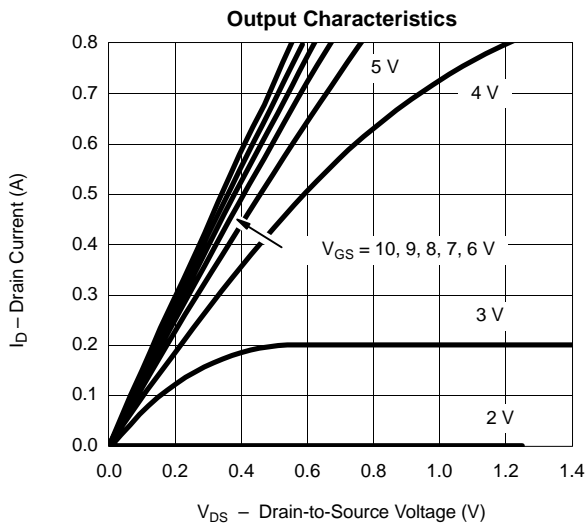
Notes

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



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