

N-Channel Enhancement-Mode MOS Transistor

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	0.3
	1.4 @ $V_{GS} = 4.5$ V		

Features

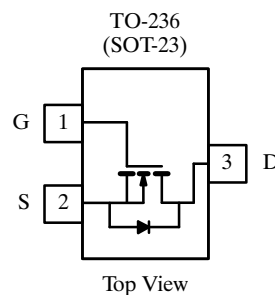
- Low On-Resistance: 0.75 Ω
- Low Threshold: <1.75 V
- Low Input Capacitance: 65 pF
- Fast Switching Speed: 15 ns
- Low Input and Output Leakage

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



TN0201T (N1)*

*Marking Code for TO-236

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	$T_A = 25^\circ\text{C}$	A
		$T_A = 70^\circ\text{C}$	
Pulsed Drain Current	I_{DM}	0.75	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	W
		$T_A = 70^\circ\text{C}$	
Maximum Junction-to-Ambient	R_{thJA}	625	$^\circ\text{C}/\text{W}$
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.

TN0201T

Specifications^a

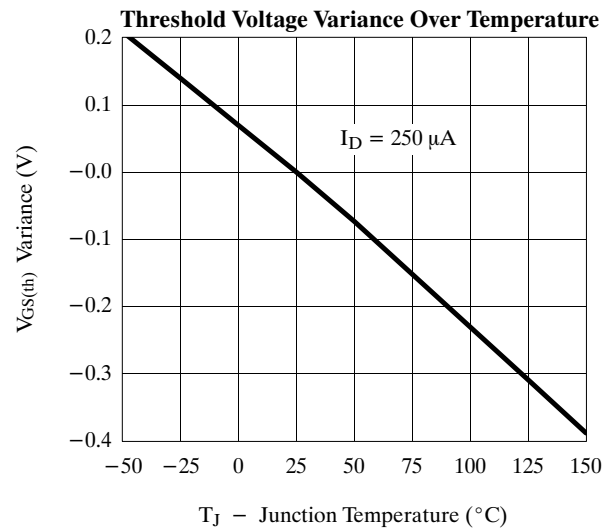
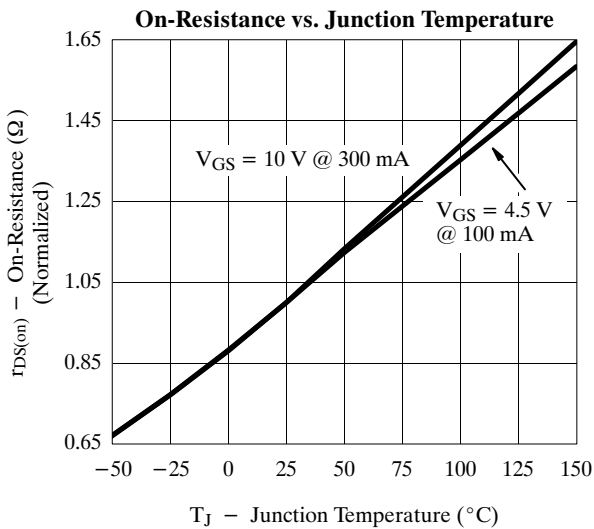
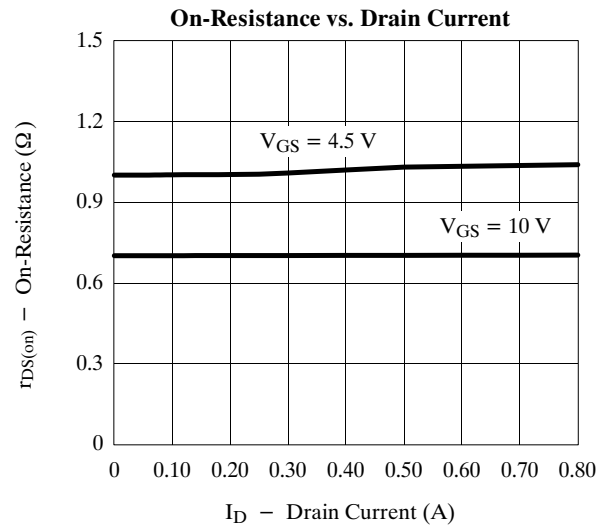
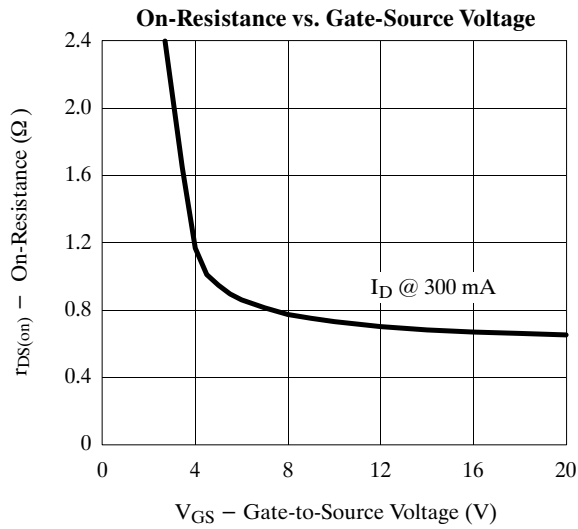
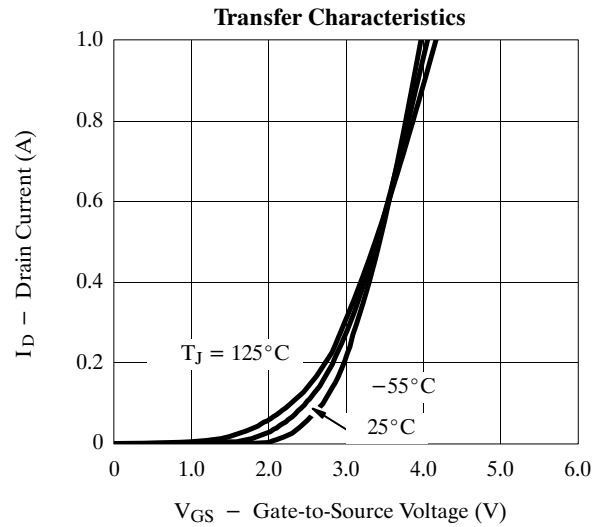
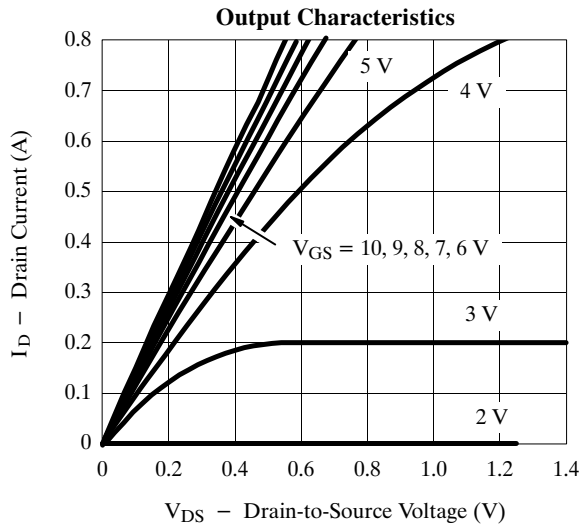
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ ^b	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	20	40		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 0.25\ \text{mA}$	1.0	1.90	3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS}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

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VNBP02

Typical Characteristics (25°C Unless Otherwise Noted)



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