

# TEMIC

Siliconix

# TN0201T

## N-Channel Enhancement-Mode MOS Transistor

### Product Summary

$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (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

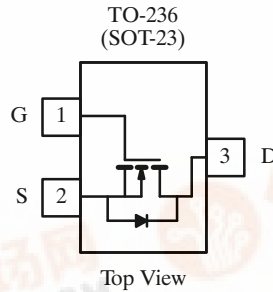
- Low On-Resistance: 0.75  $\Omega$
- Low Threshold: <1.75 V
- Low Input Capacitance: 65 pF
- Fast Switching Speed: 15 ns
- Low Input and Output Leakage

### 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	$V_{GS}$	$\pm 20$	
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

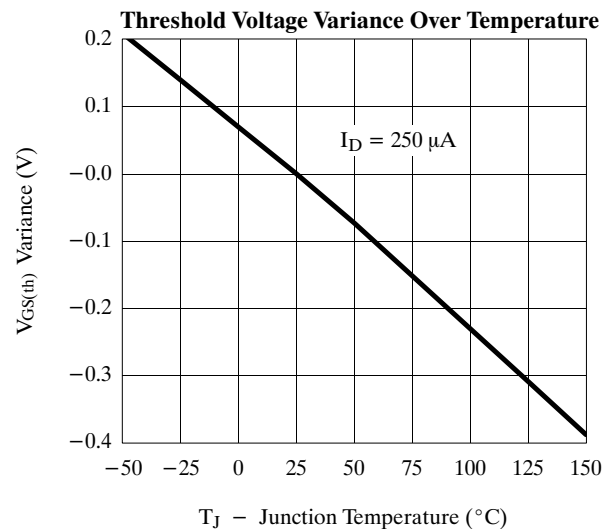
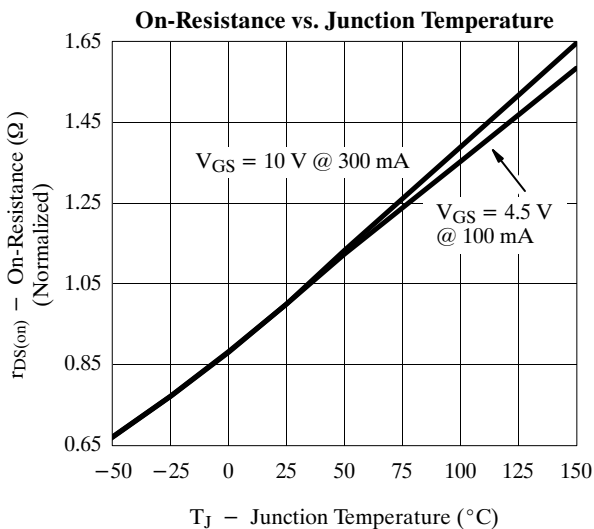
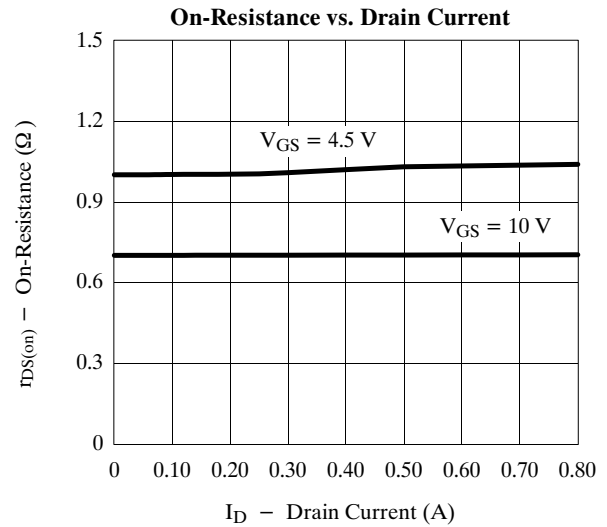
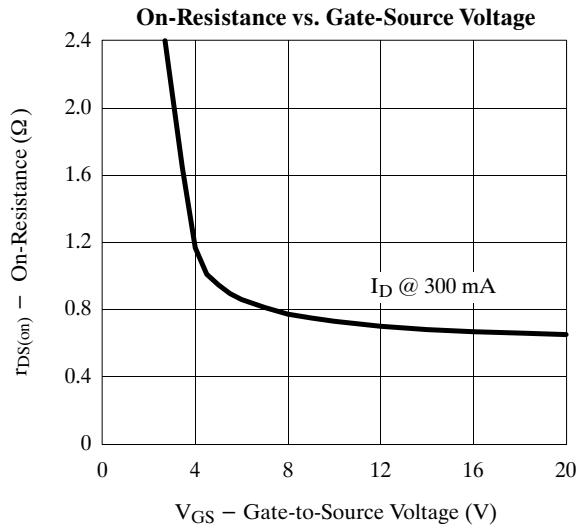
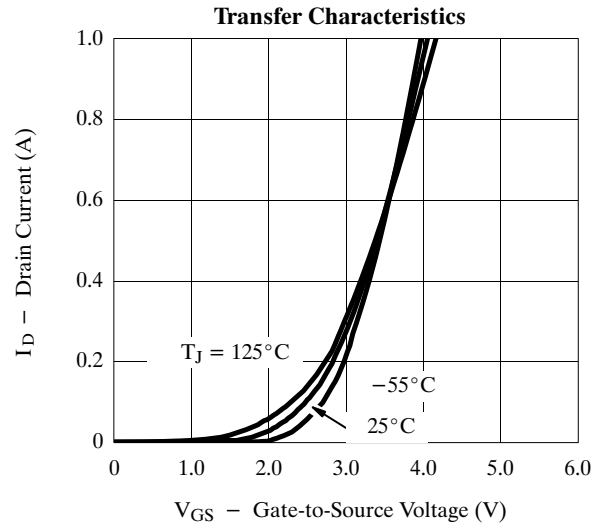
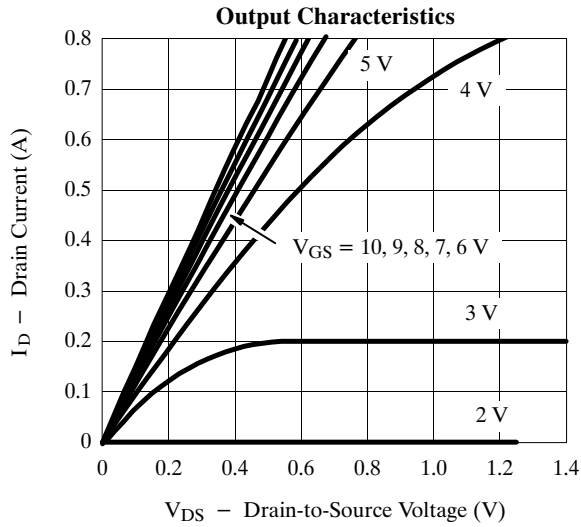
## Specifications<sup>a</sup>

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ <sup>b</sup>	Max	
<b>Static</b>						
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	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 16\ \text{V}, V_{GS} = 0\ \text{V}$			1	$\mu\text{A}$
		$V_{DS} = 14\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			10	
On-State Drain Current <sup>c</sup>	$I_{D(on)}$	$V_{DS} = 10\ \text{V}, V_{GS} = 10\ \text{V}$	0.5	0.75		A
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(on)}$	$V_{GS} = 4.5\ \text{V}, I_D = 0.1\ \text{A}$		1	1.4	$\Omega$
		$V_{GS} = 10\ \text{V}, I_D = 0.3\ \text{A}$		0.75	1.0	
Forward Transconductance <sup>c</sup>	$g_{fs}$	$V_{DS} = 10\ \text{V}, I_D = 0.2\ \text{A}$		450		mS
Diode Forward Voltage	$V_{SD}$	$I_S = 0.3\ \text{A}, V_{GS} = 0\ \text{V}$		0.85		V
<b>Dynamic<sup>b</sup></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		
<b>Switching<sup>b, d</sup></b>						
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.

## Typical Characteristics (25°C Unless Otherwise Noted)



## TN0201T

### Typical Characteristics (25°C Unless Otherwise Noted)

