



## N-Channel 20-V (D-S) MOSFET

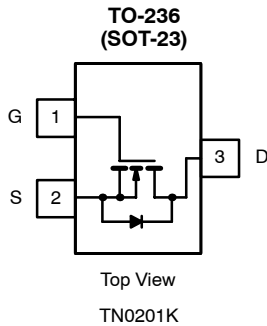
PRODUCT SUMMARY				
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (V)	$I_D$ (A)	
			TN0201K	TN0201KL
20	1.0 @ $V_{GS} = 10$ V	1.0 to 3.0	0.42	0.64
	1.4 @ $V_{GS} = 4.5$ V		0.35	0.53

### FEATURES

- TrenchFET® Power MOSFET

### APPLICATIONS

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



Marking Code: K3ywI

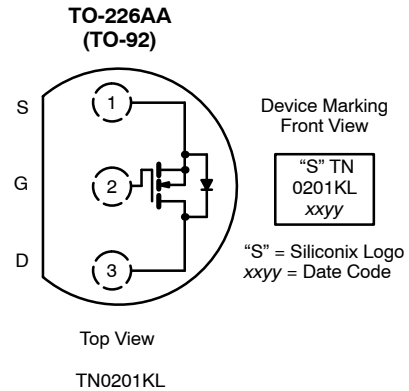
K3 = Part Number Code for TN0201K

y = Year Code

w = Week Code

I = Lot Traceability

Ordering Information: TN0201K-T1—E3 (Lead Free)



Ordering Information: TN0201KL-TR1

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)					
Parameter	Symbol	Limit		Unit	
		TN0201K	TN0201KL		
Drain-Source Voltage	$V_{DS}$	20		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$			
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$I_D$	$T_A = 25^\circ\text{C}$	0.42	0.64	A
		$T_A = 70^\circ\text{C}$	0.33	0.51	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	0.8	1.5		
Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	0.35	0.8	W
		$T_A = 70^\circ\text{C}$	0.22	0.51	
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	357	156	$^\circ\text{C}/\text{W}$	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150		$^\circ\text{C}$	

Notes

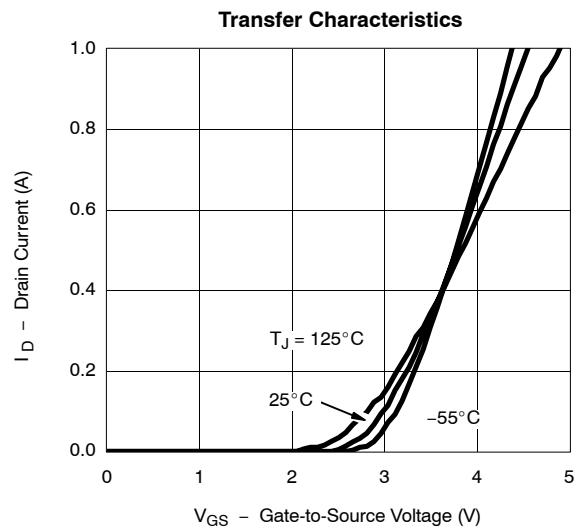
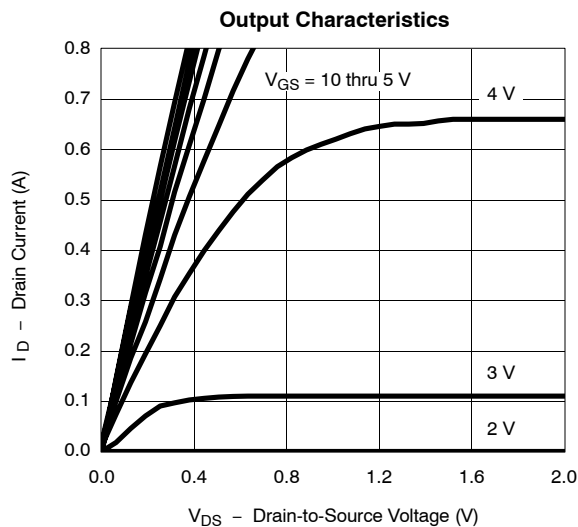
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T <sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	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	20			V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 0.25 mA	1.0	2.0	3.0	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V			1	μA
		V <sub>DS</sub> = 20 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55 °C			10	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 10 V	TN0201K	0.5		A
			TN0201KL	0.8		
Drain-Source On-Resistance <sup>a</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 0.1 A		0.8	1.4	Ω
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.3 A		0.47	1.0	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.3 A		550		mS
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 0.3 A, V <sub>GS</sub> = 0 V		0.85	1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 10 V I <sub>D</sub> ≅ 0.3 A		1000	1500	pC
Gate-Source Charge	Q <sub>gs</sub>			205		
Gate-Drain Charge	Q <sub>gd</sub>			200		
Gate Resistance	R <sub>g</sub>			48		Ω
Turn-On Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 50 Ω I <sub>D</sub> ≅ 0.3 A, V <sub>GEN</sub> = 10 V R <sub>G</sub> = 6 Ω		4.5	8	ns
	t <sub>r</sub>			8	15	
Turn-Off Time	t <sub>d(off)</sub>			9	15	
	t <sub>f</sub>			6.3	12	

Notes

- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

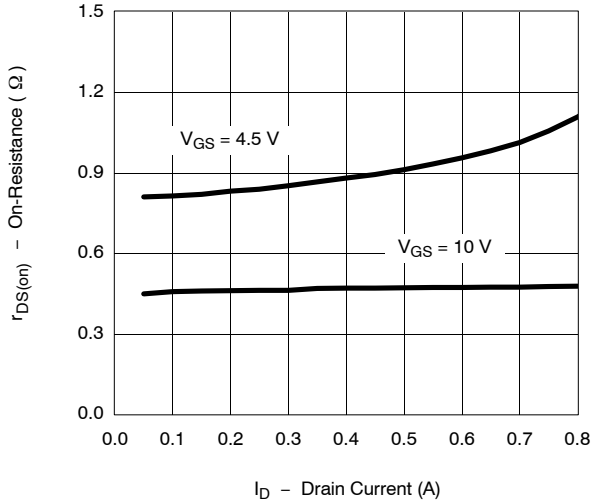
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



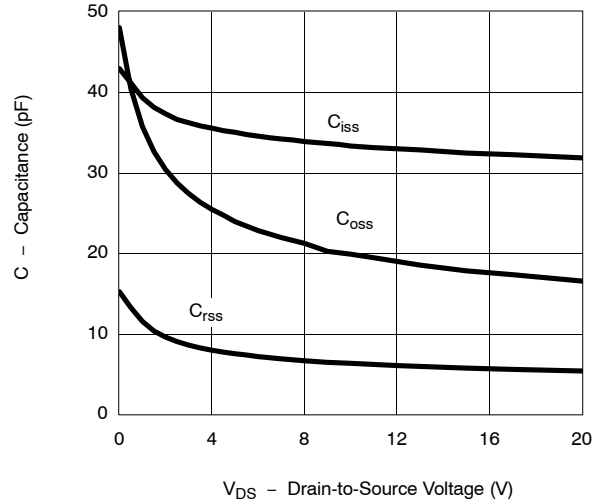


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

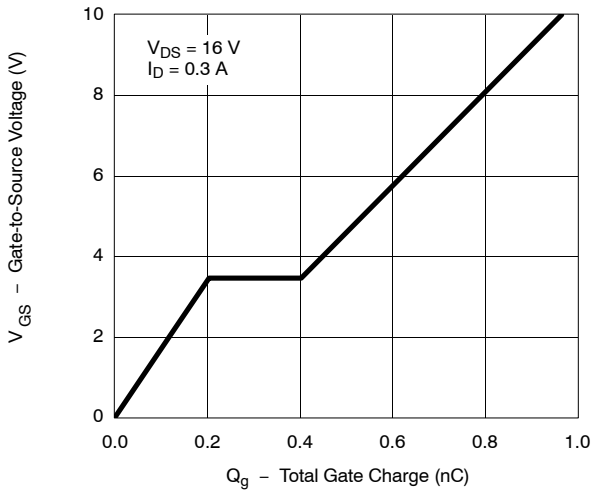
**On-Resistance vs. Drain Current**



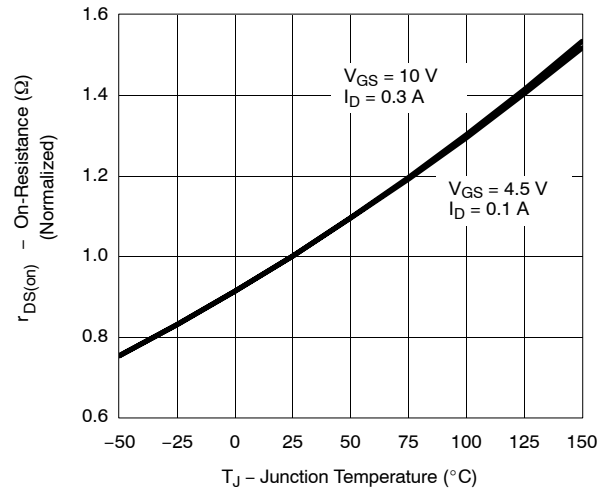
**Capacitance**



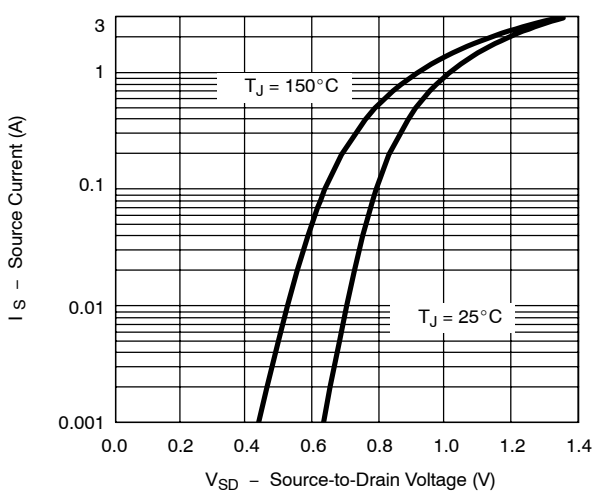
**Gate Charge**



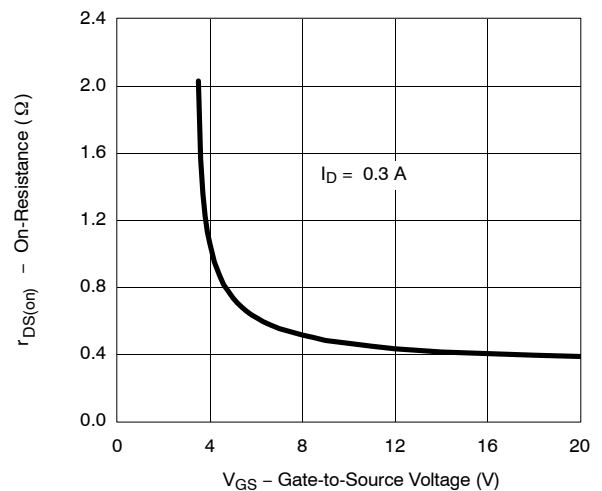
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**

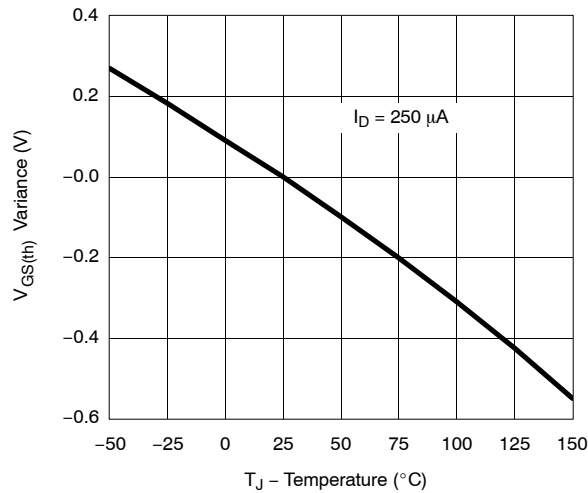


**On-Resistance vs. Gate-to-Source Voltage**

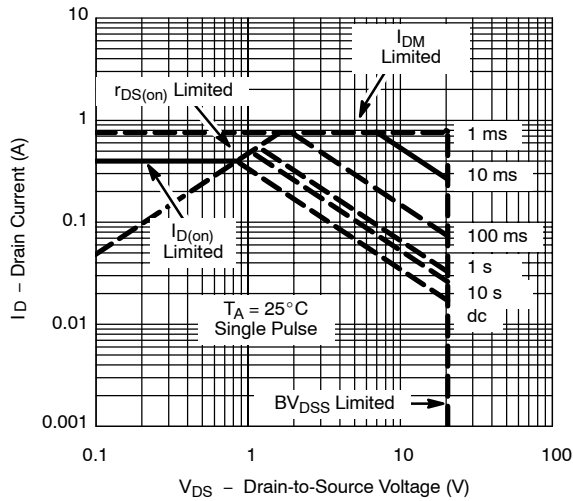


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

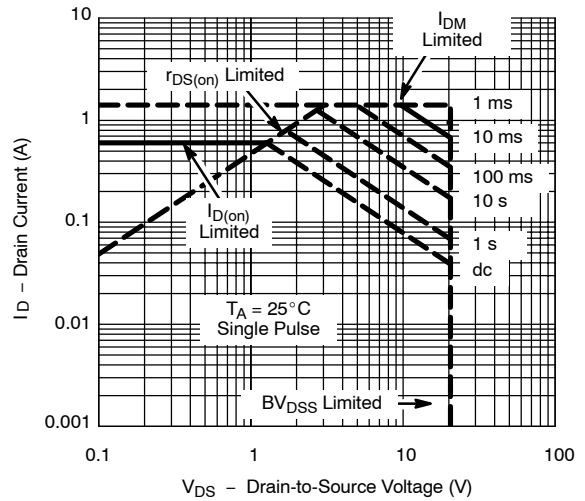
Threshold Voltage



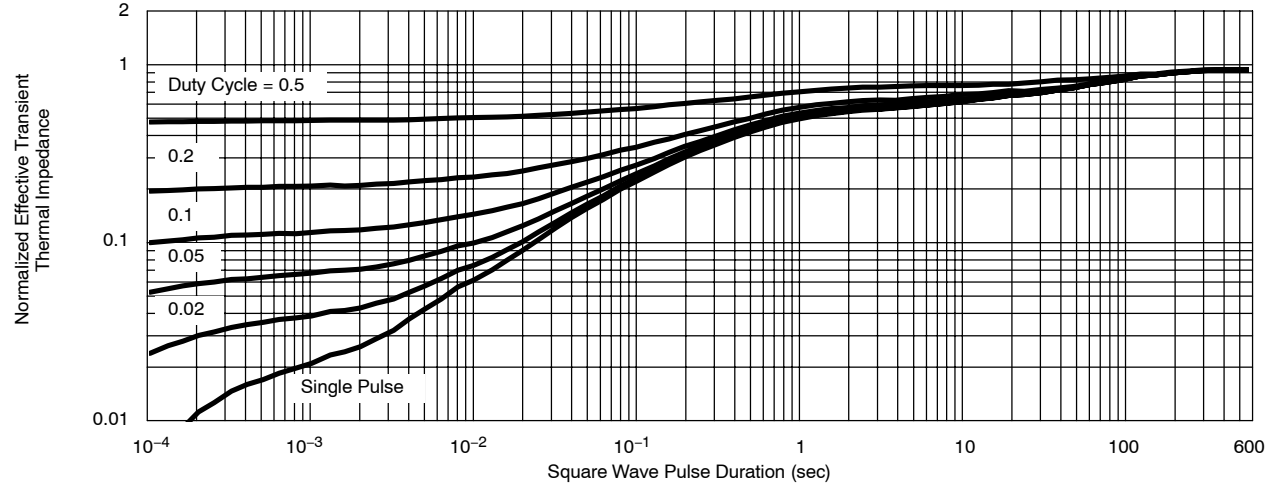
Safe Operating Area (TO-236, TN0201K Only)



Safe Operating Area (TO-226AA, TN0201KL Only)



Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-236, TN0201K Only)





**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-226AA, TN0201KL Only)

