



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

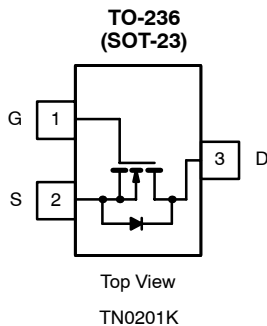
PRODUCT SUMMARY				
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (V)	$I_D$ (A)	
			TN0201K	TN0201KL
20	1.0 @ $V_{GS} = 10$ V	1.0 to 3.0	0.42	0.64
	1.4 @ $V_{GS} = 4.5$ V		0.35	0.53

### 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

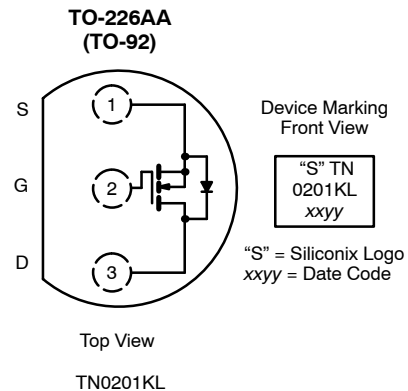
K3 = Part Number Code for TN0201K

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

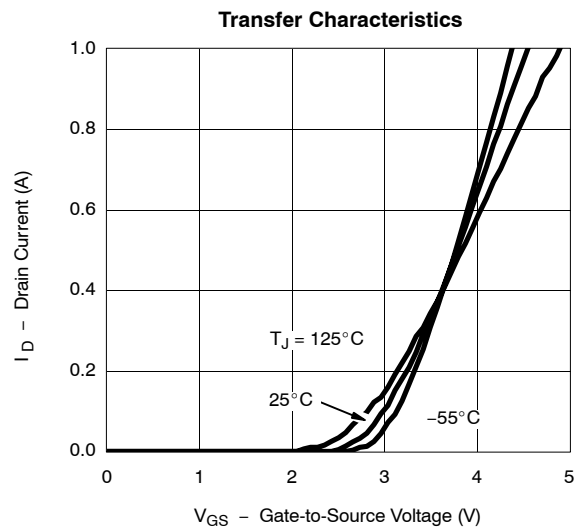
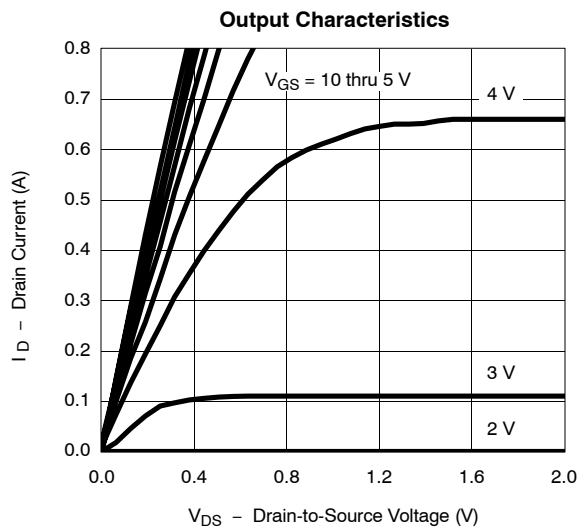
a. Pulse width limited by maximum junction temperature.

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.

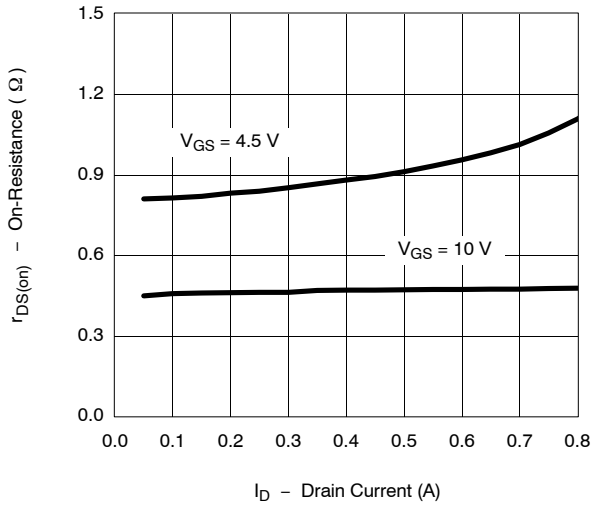
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



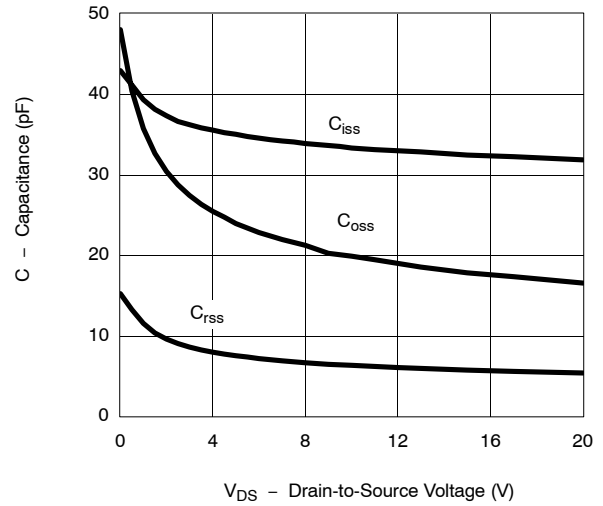


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

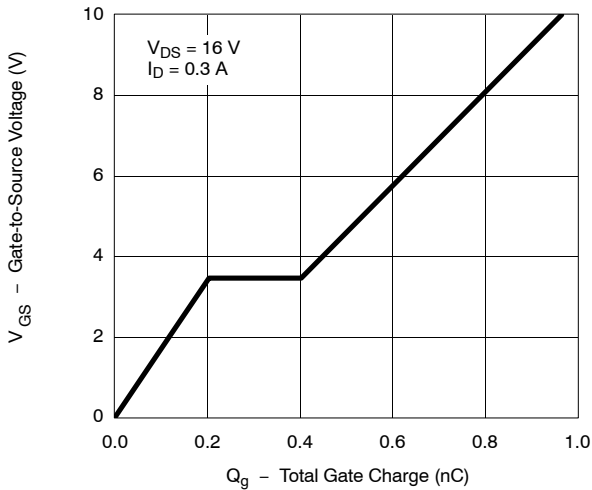
**On-Resistance vs. Drain Current**



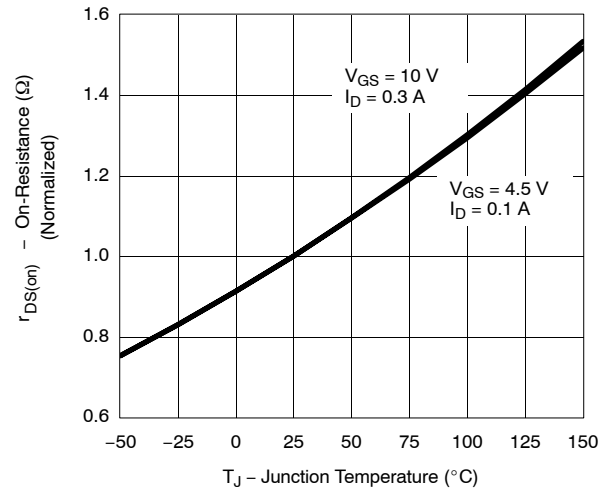
**Capacitance**



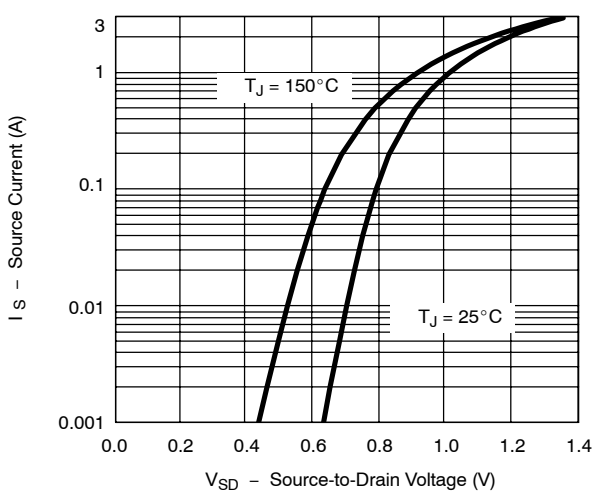
**Gate Charge**



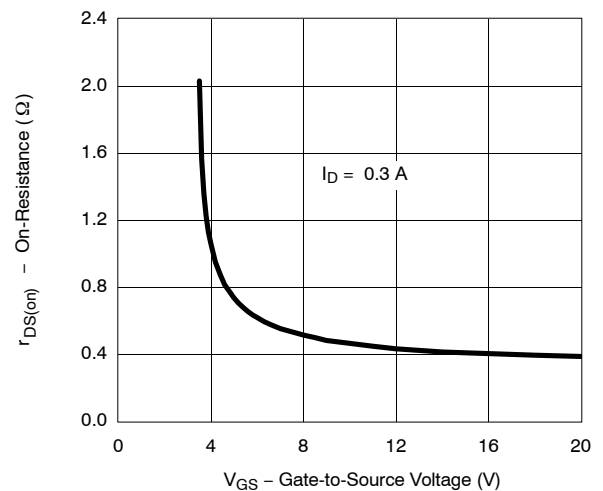
**On-Resistance vs. Junction Temperature**



**Source-Drain Diode Forward Voltage**

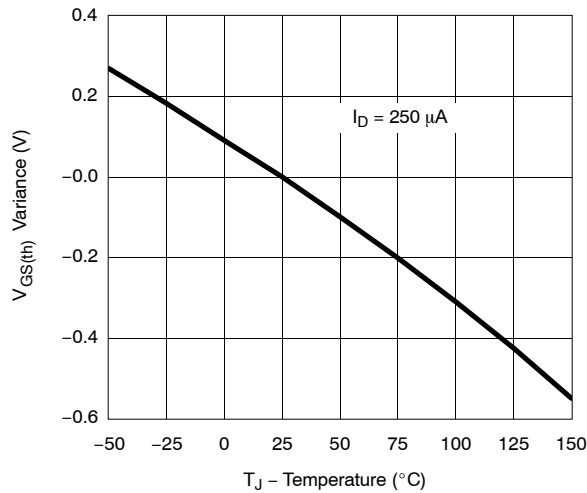


**On-Resistance vs. Gate-to-Source Voltage**

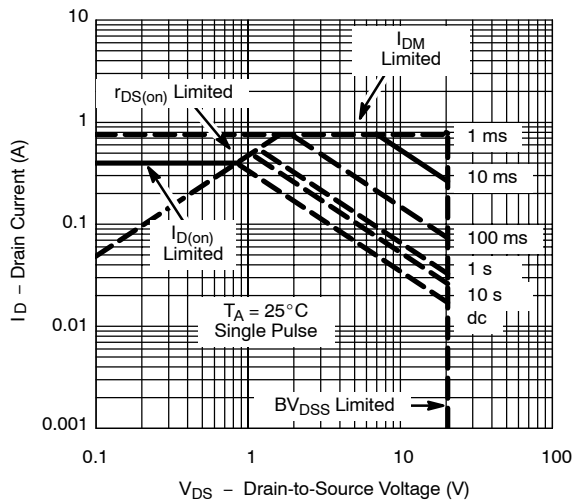


#### TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

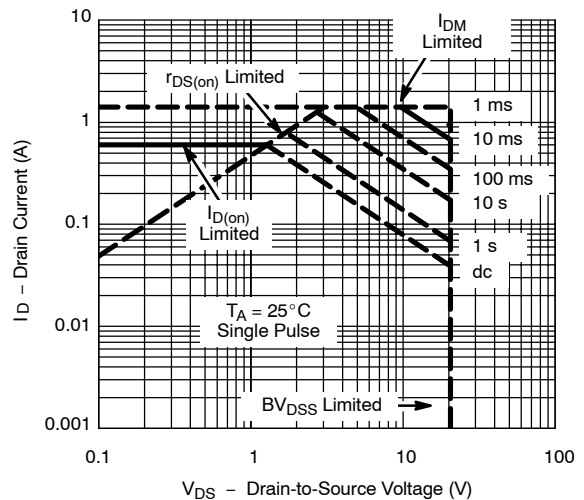
Threshold Voltage



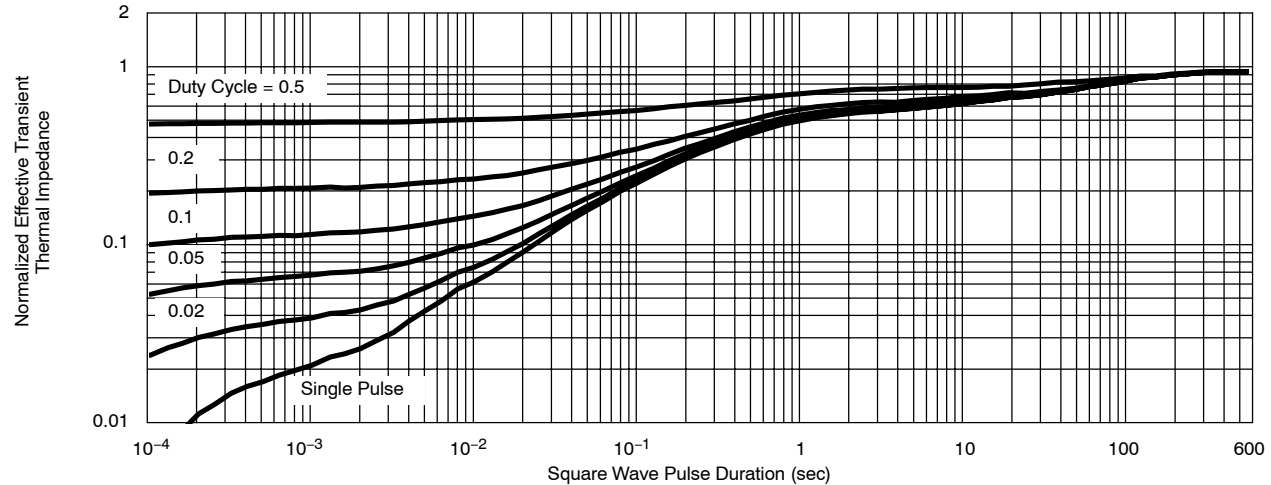
Safe Operating Area (TO-236, TN0201K Only)



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



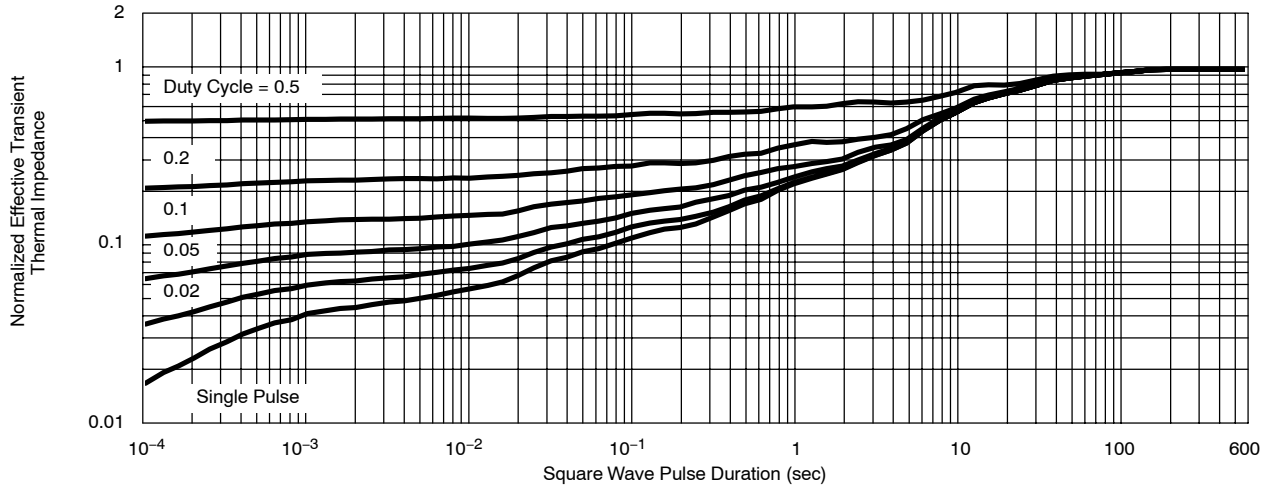
Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-236, TN0201K Only)





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

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





## Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.