



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

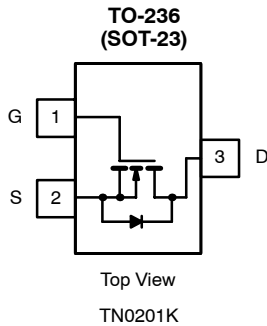
PRODUCT SUMMARY				
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)	
			TN0201K	TN0201KL
20	1.0 @ $V_{GS} = 10$ V	1.0 to 3.0	0.42	0.64
	1.4 @ $V_{GS} = 4.5$ V		0.35	0.53

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

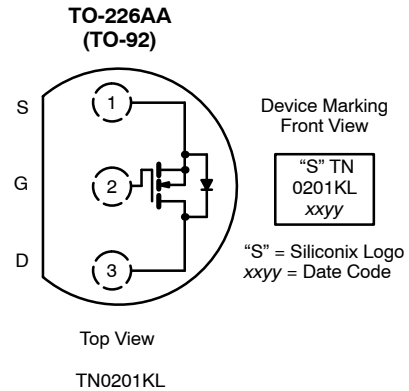
K3 = Part Number Code for TN0201K

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}	± 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 ^a	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

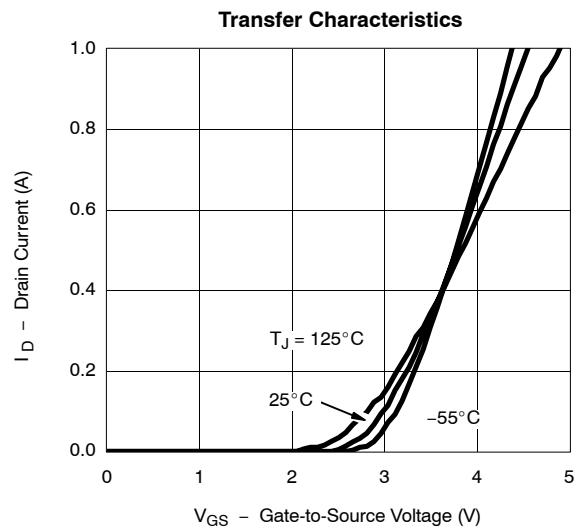
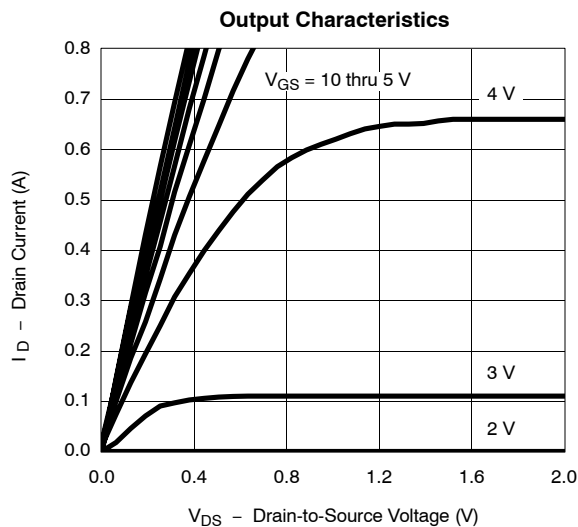
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 10 μA	20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 0.25 mA	1.0	2.0	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} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 10 V	TN0201K	0.5		A
			TN0201KL	0.8		
Drain-Source On-Resistance ^a	r _{DS(on)}	V _{GS} = 4.5 V, I _D = 0.1 A		0.8	1.4	Ω
		V _{GS} = 10 V, I _D = 0.3 A		0.47	1.0	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 0.3 A		550		mS
Diode Forward Voltage	V _{SD}	I _S = 0.3 A, V _{GS} = 0 V		0.85	1.2	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = 16 V, V _{GS} = 10 V I _D ≅ 0.3 A		1000	1500	pC
Gate-Source Charge	Q _{gs}			205		
Gate-Drain Charge	Q _{gd}			200		
Gate Resistance	R _g			48		Ω
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		4.5	8	ns
	t _r			8	15	
Turn-Off Time	t _{d(off)}			9	15	
	t _f			6.3	12	

Notes

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

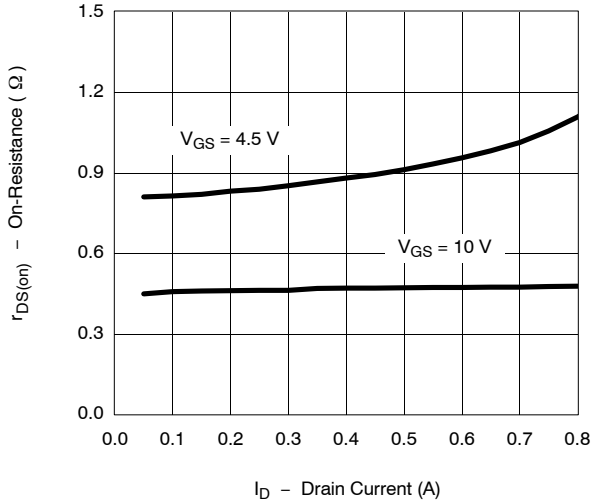
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



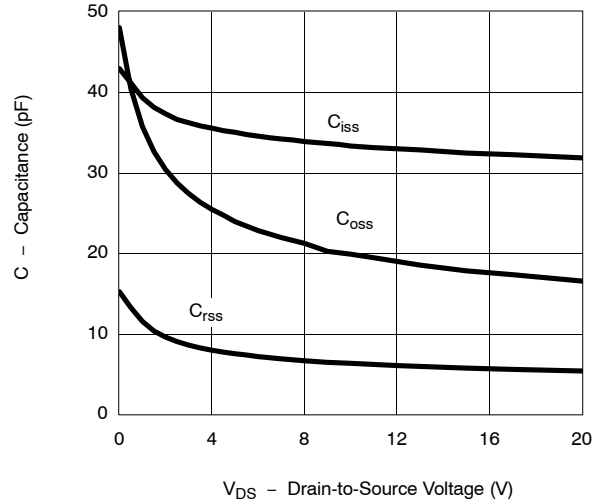


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

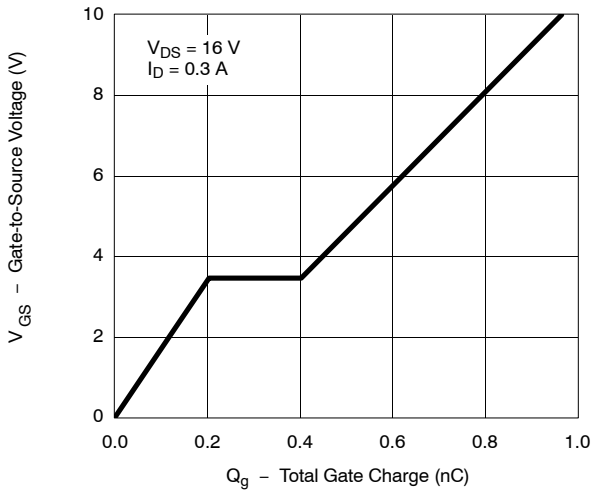
On-Resistance vs. Drain Current



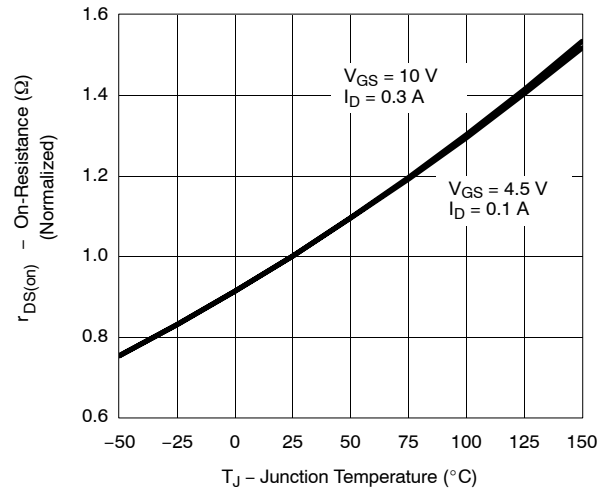
Capacitance



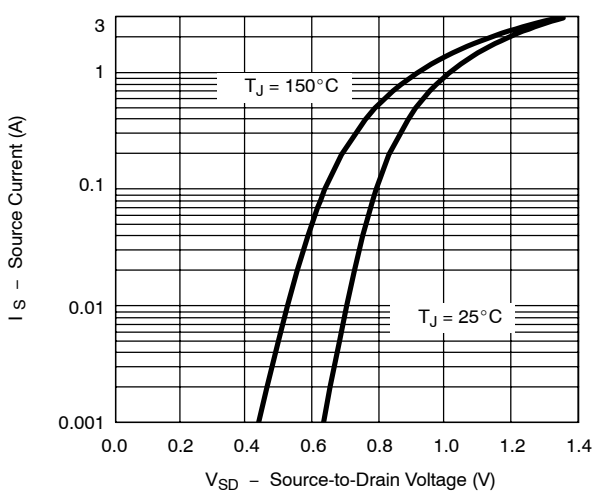
Gate Charge



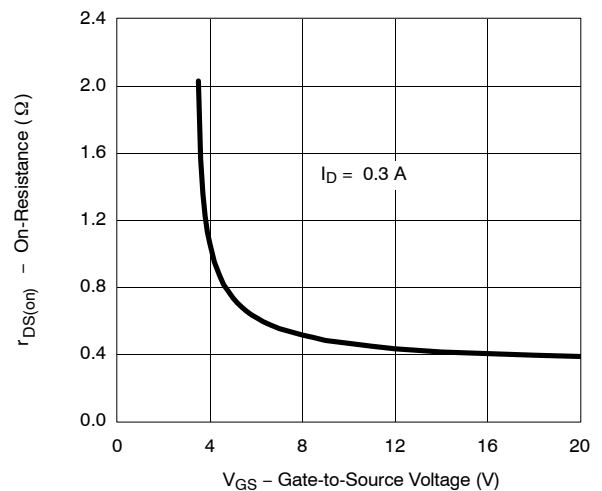
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

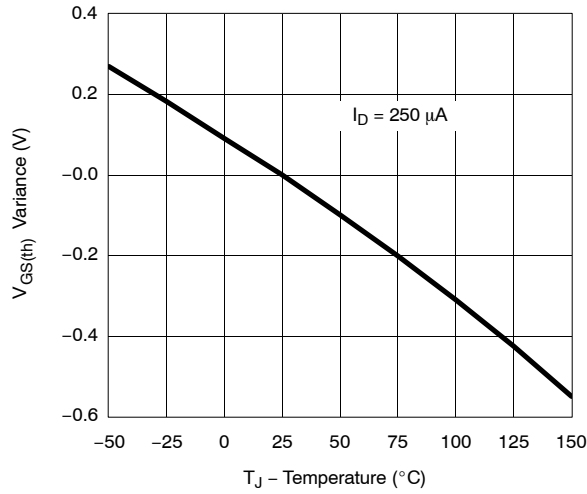


On-Resistance vs. Gate-to-Source Voltage

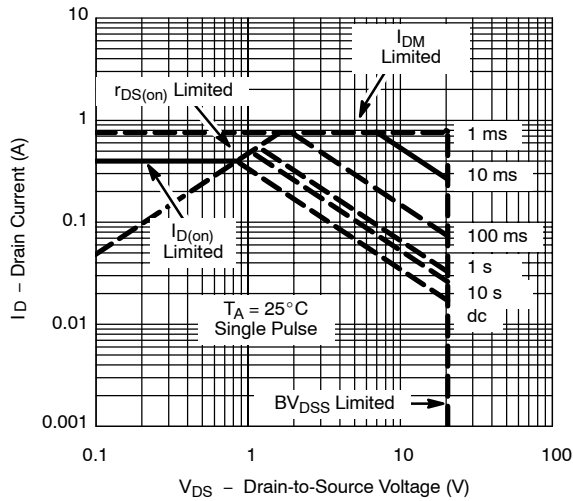


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

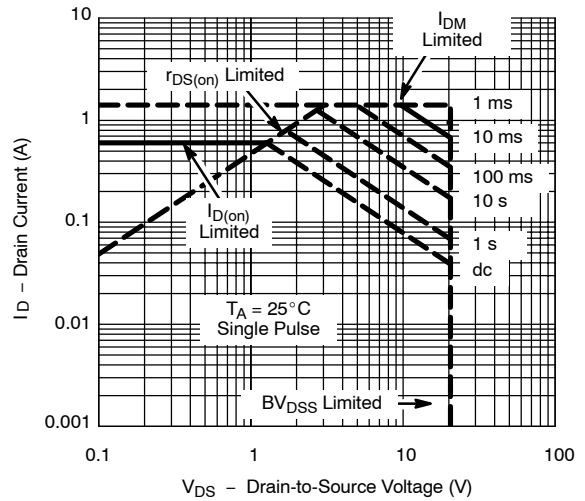
Threshold Voltage



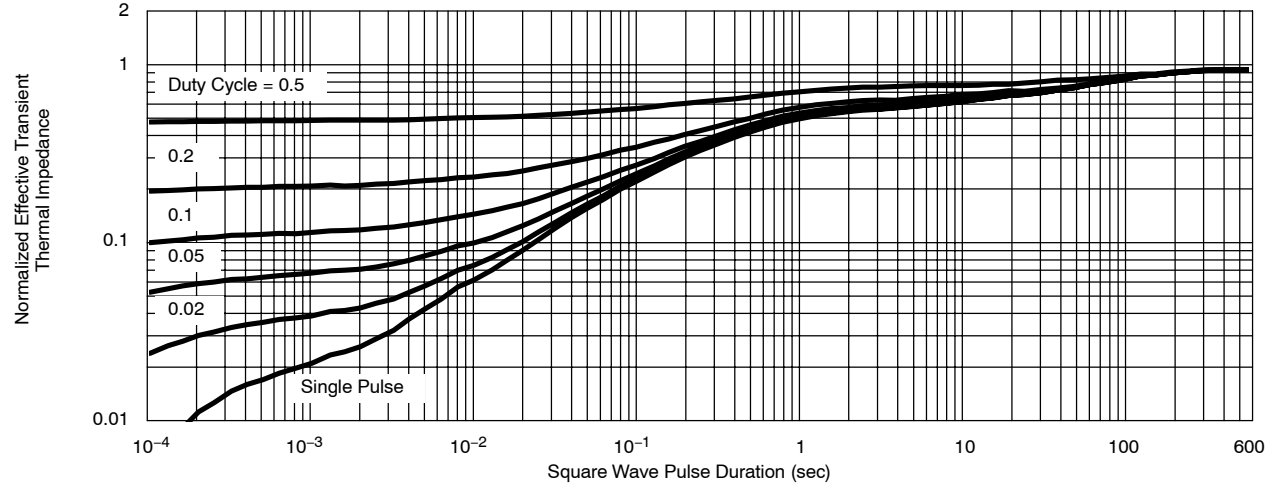
Safe Operating Area (TO-236, TN0201K Only)



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)

