New Product

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

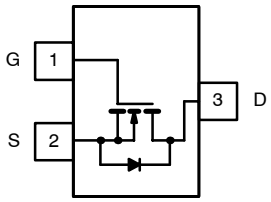
FEATURES

- 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

TO-236
(SOT-23)



Top View

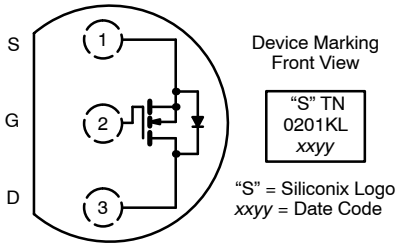
TN0201K

Marking Code: K3*ywl*

K3 = Part Number Code for TN0201K
y = Year Code
w = Week Code
l = Lot Traceability

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

TO-226AA
(TO-92)



Top View

TN0201KL

Ordering Information: TN0201KL-TR1

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C)	T_A= 25°C	I_D	0.42	0.64	A
	T_A= 70°C		0.33	0.51	
Pulsed Drain Current[a]		I_{DM}	0.8	1.5	
Power Dissipation	T_A= 25°C	P_D	0.35	0.8	W
	T_A= 70°C		0.22	0.51	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	357	156	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C

Notes
a. Pulse width limited by maximum junction temperature.

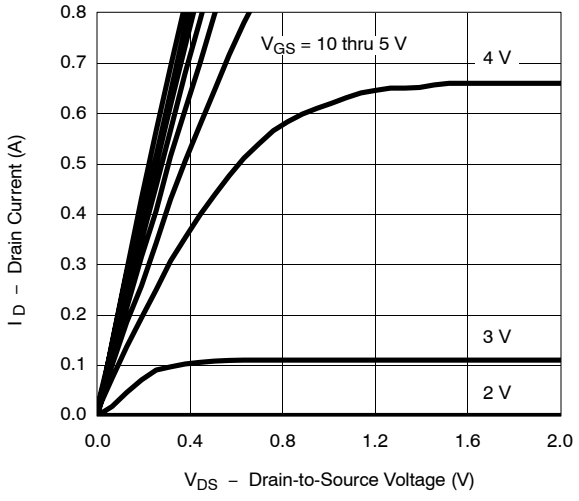
SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Conditions		Limits Min	Limits Typ	Limits Max	Unit
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	V
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	

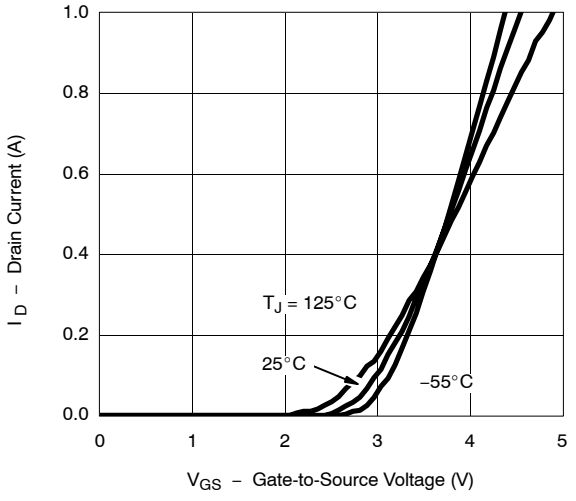
Notes
a. Pulse test: PW ≤300 μs duty cycle ≤2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

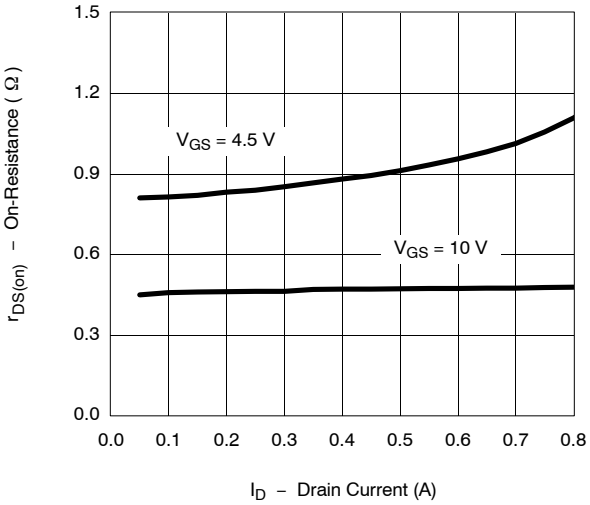


Transfer Characteristics

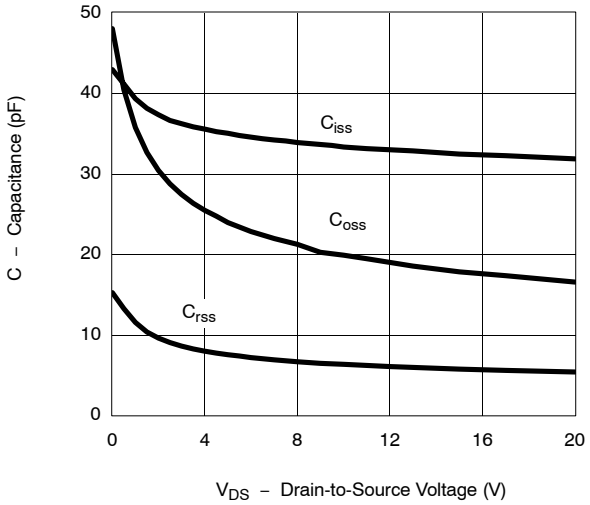


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

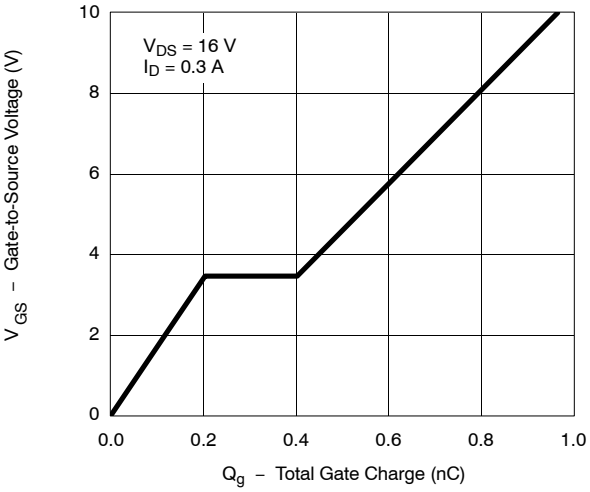
On-Resistance vs. Drain Current



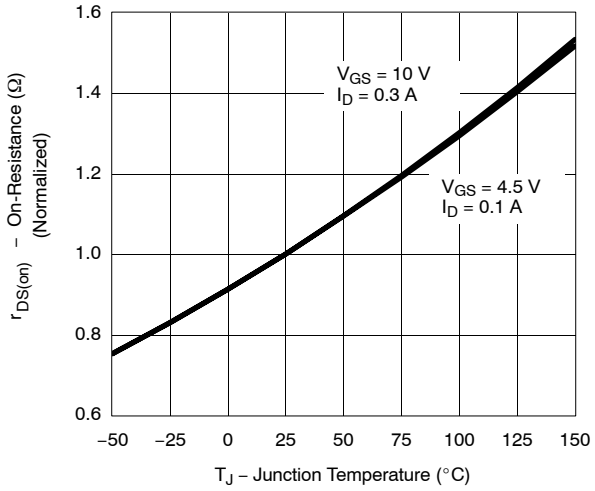
Capacitance



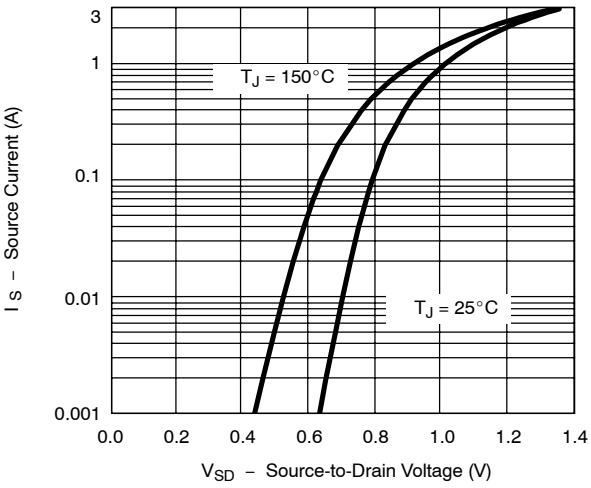
Gate Charge



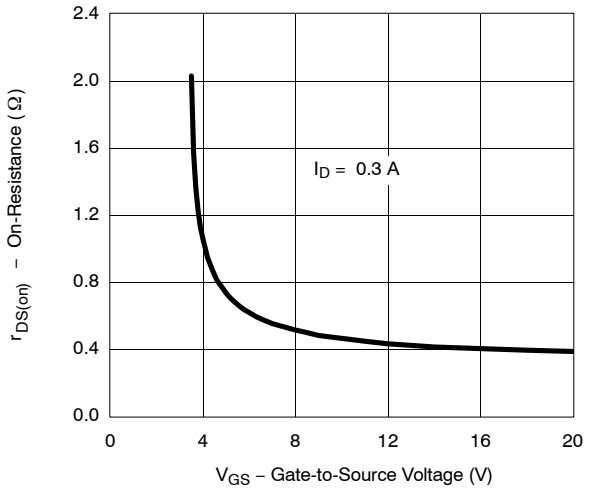
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

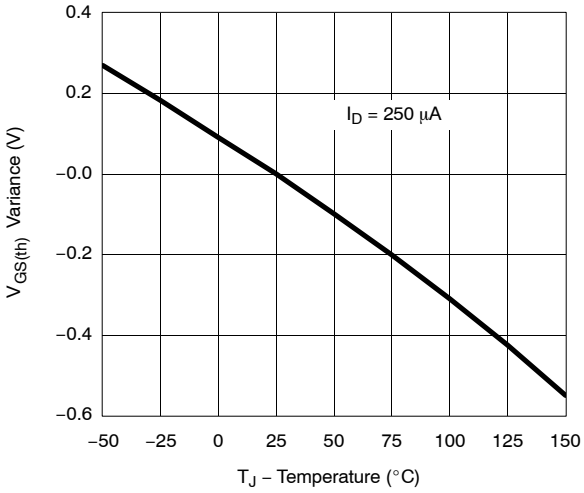


On-Resistance vs. Gate-to-Source Voltage

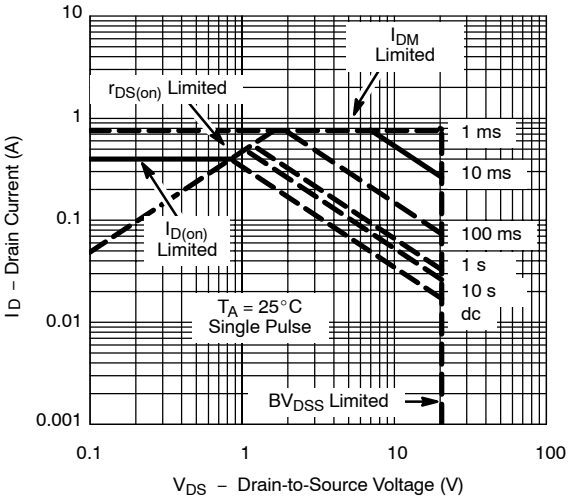


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

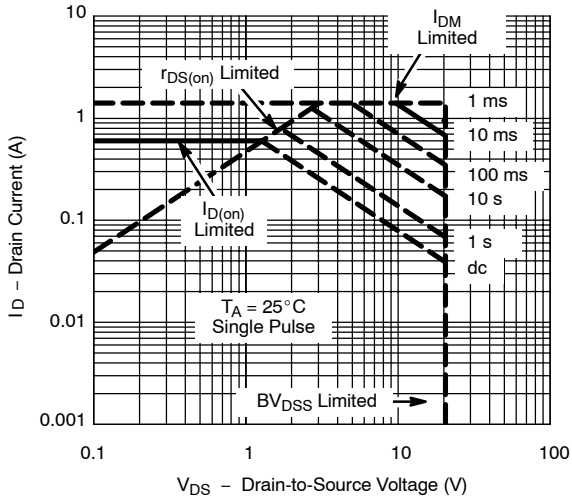
Threshold Voltage



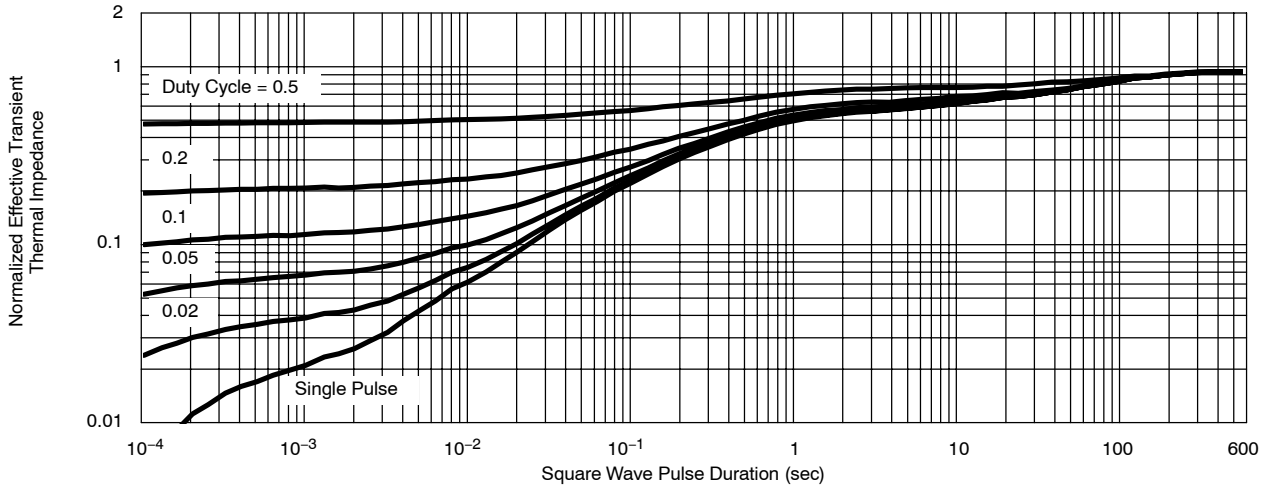
Safe Operating Area (TO-236, TN0201K Only)



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

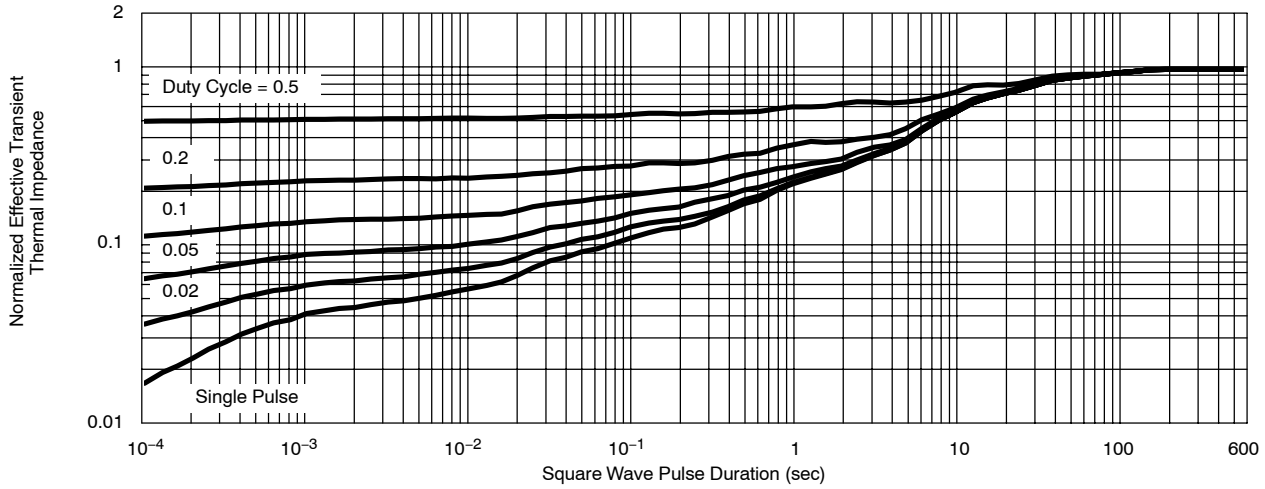


Normalized Thermal Transient Impedance, Junction-to-Ambient (TO-236, TN0201K Only)



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

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



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