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

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
20	0.4 at V_{GS} = 4.5 V	0.73
	0.5 at V_{GS} = 2.5 V	0.65

FEATURES

- TrenchFET® Power MOSFET
- ESD Protected: 4000 V

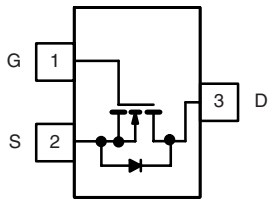
Pb-free

RoHS COMPLIANT

APPLICATIONS

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers
- Battery Operated Systems, DC/DC Converters
- Solid-State Relays
- Load/Power Switching-Cell Phones, Pagers

TO-236
(SOT-23)

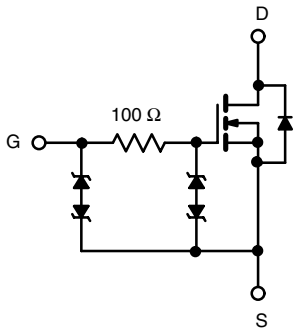


Top View

Marking Code: K2ywl

K2 = Part Number Code for TN0200K

y = Year Code
w = Week Code
l = Lot Traceability



Ordering Information: TN0200K-T1-E3 (Lead (Pb)-free)

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current (T_J = 150 °C)[b]	T_A = 25 °C	I_D	0.73	A
	T_A = 70 °C		0.58	
Pulsed Drain Current[a]		I_{DM}	4	
Continuous Source Current (Diode Conduction)[b]		I_S	0.3	
Power Dissipation[b]	T_A = 25 °C	P_D	0.35	W
	T_A = 70 °C		0.22	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Limit**	**Unit**
Maximum Junction-to-Ambient[b]	R_{thJA}	357	°C/W

Notes:

a. Pulse width limited by maximum junction temperature.

b. Surface Mounted on FR4 Board, t ≤ 10 sec.

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 = 50 µA	0.45	0.6	1.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 4.5 V			± 5	µA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V			0.1	
		T_J = 55 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 4.5 V	2.5			A
		$V_{DS} \geq$ 5 V, V_{GS} = 2.5 V	1.5			
Drain-Source On-Resistance[a]	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 0.6 A		0.2	0.4	Ω
		V_{GS} = 2.5 V, I_D = 0.6 A		0.25	0.5	
Forward Transconductance[a]	g_{fs}	V_{DS} = 5 V, I_D = 0.6 A		2.2		S
Diode Forward Voltage[a]	V_{SD}	I_S = 0.3 A, V_{GS} = 0 V		0.8	1.2	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V I_D = 0.6 A		1400	2000	pC
Gate-Source Charge	Q_{gs}			190		
Gate-Drain Charge	Q_{gd}			300		
Gate Resistance	R_g			105		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 10 V, R_L = 16 Ω $I_D \cong$ 0.6 A, V_{GEN} = 4.5 V R_g = 6 Ω		17	25	ns
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			55	85	
Fall TIme	t_f			30	45	

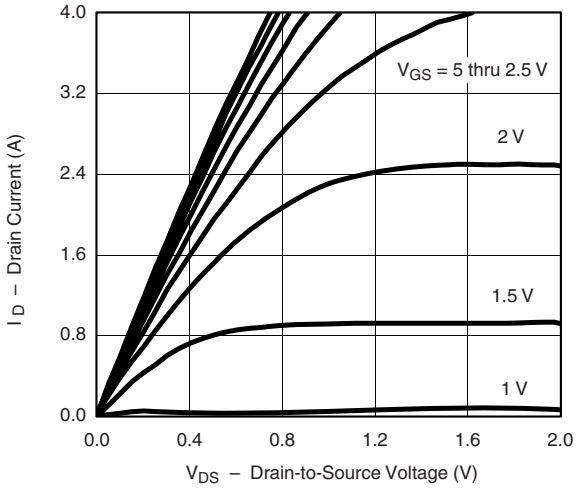
Notes:

a. Pulse test: PW ≤ 300 µs duty cycle ≤ 2 %.

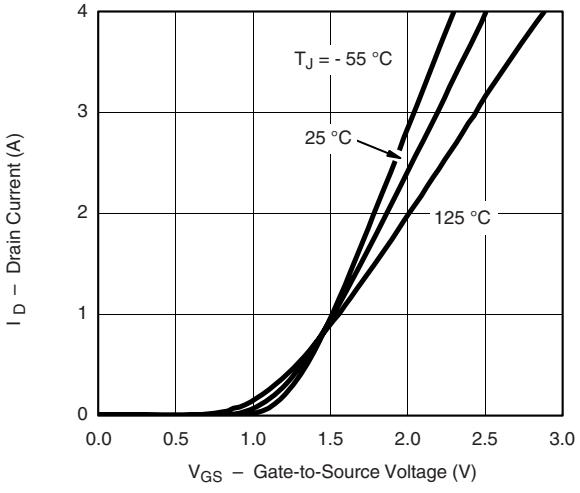
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

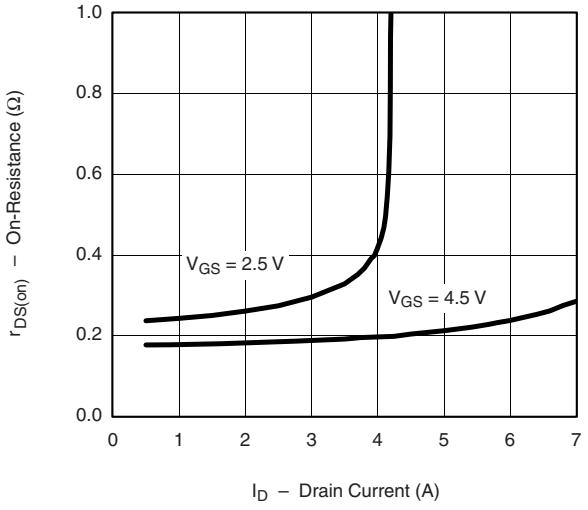


Output Characteristics

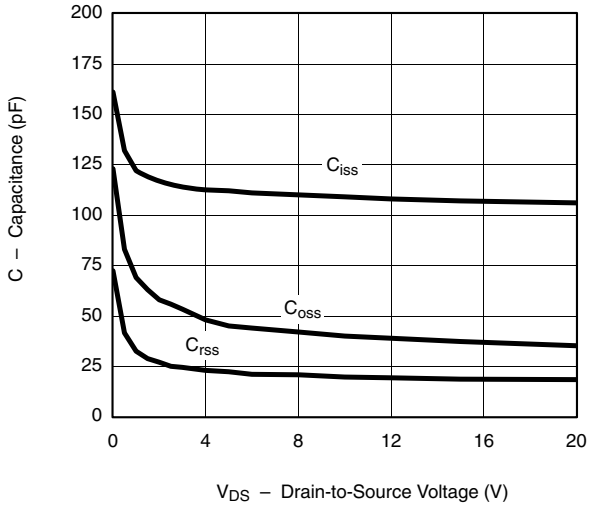


Transfer Characteristics

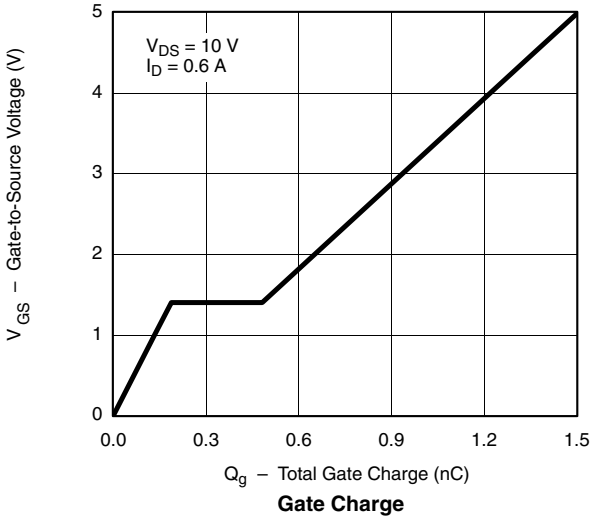
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



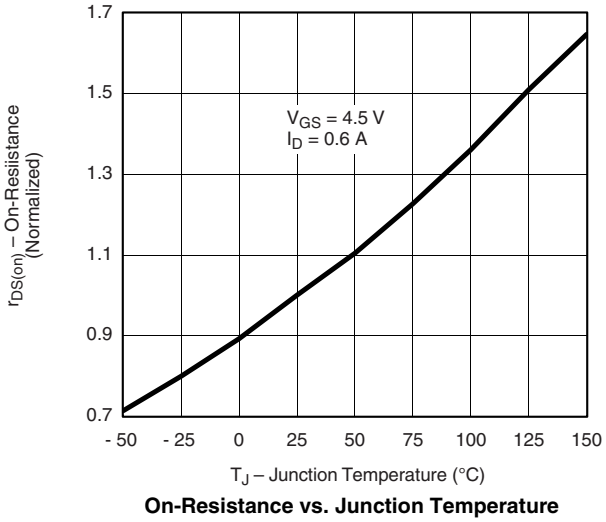
On-Resistance vs. Drain Current



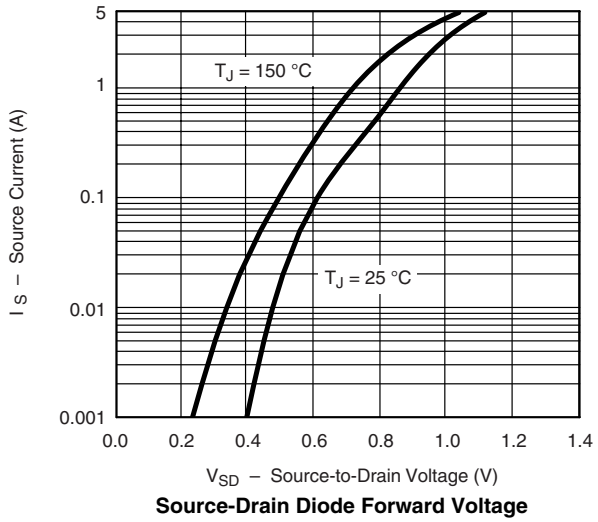
Capacitance



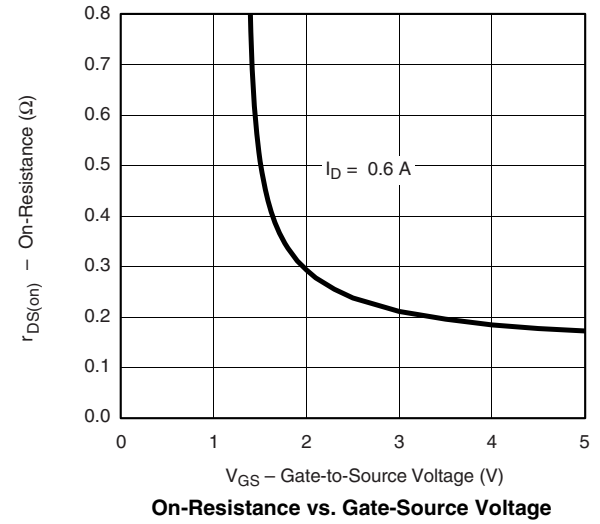
Gate Charge



On-Resistance vs. Junction Temperature

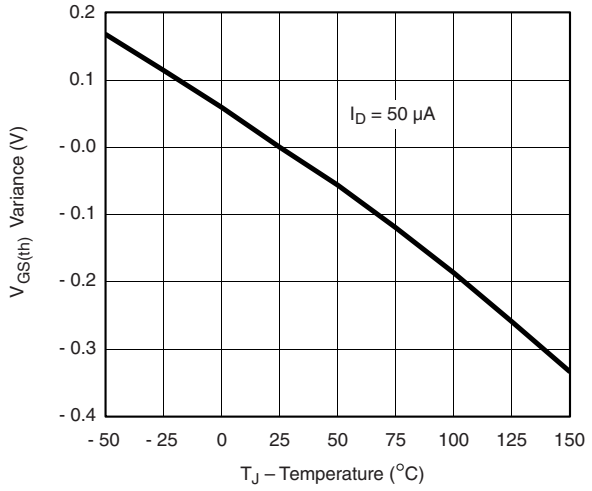


Source-Drain Diode Forward Voltage

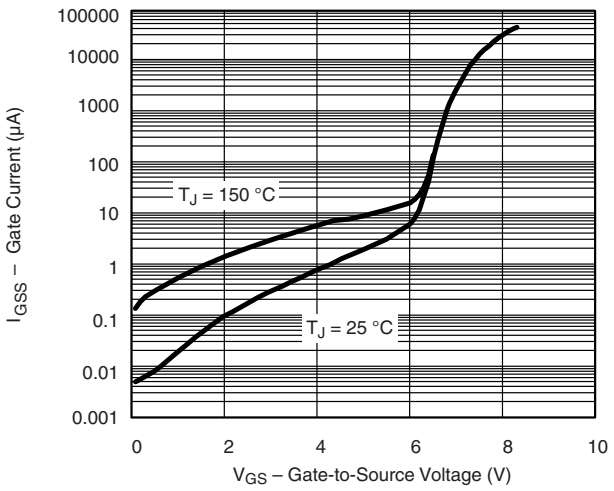


On-Resistance vs. Gate-Source Voltage

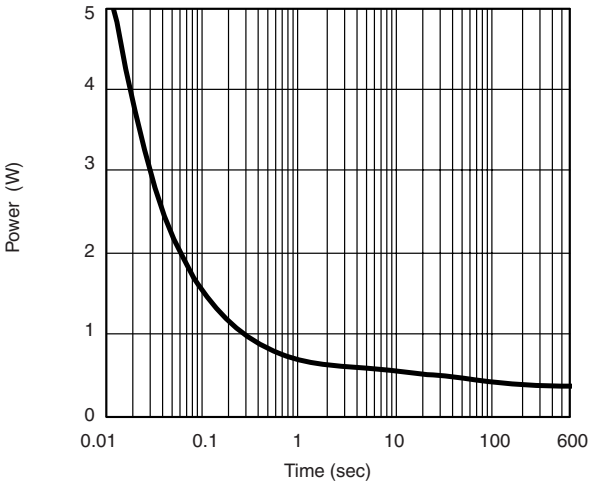
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



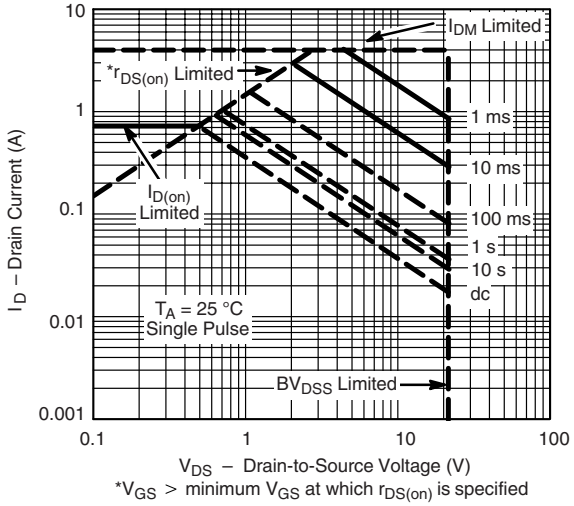
Threshold Voltage



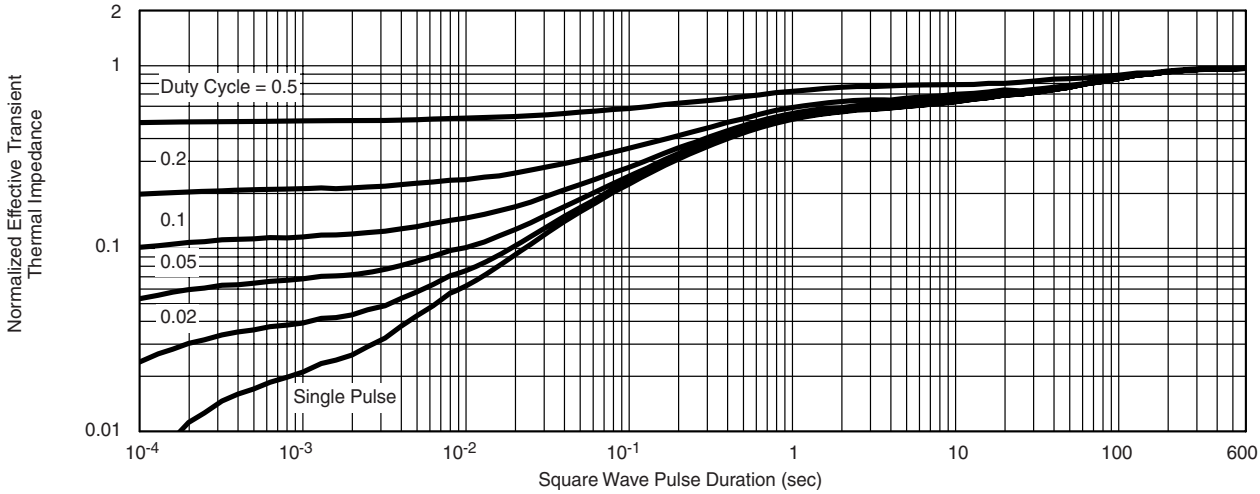
Gate Current vs. Gate-Source Voltage



Single Pulse Power, Junction-to-Ambient



Safe Operating Area



Normalized Effective Transient Thermal Impedance, Junction-to-Ambient

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