

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

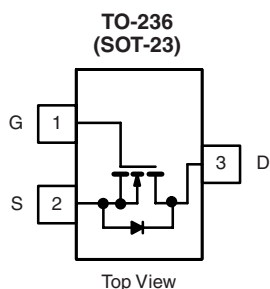
FEATURES

- TrenchFET® Power MOSFET
- ESD Protected: 4000 V


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

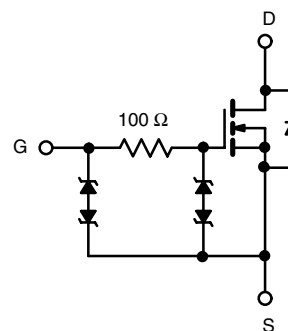

Marking Code: K2ywl

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	I_D	0.73	A
		0.58	
Pulsed Drain Current ^a	I_{DM}	4	
Continuous Source Current (Diode Conduction) ^b	I_S	0.3	
Power Dissipation ^b	P_D	0.35	W
		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, $t \leq 10$ sec.

SPECIFICATIONS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

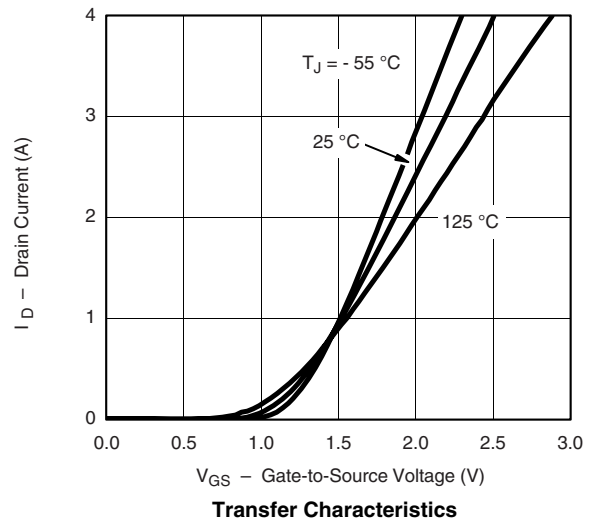
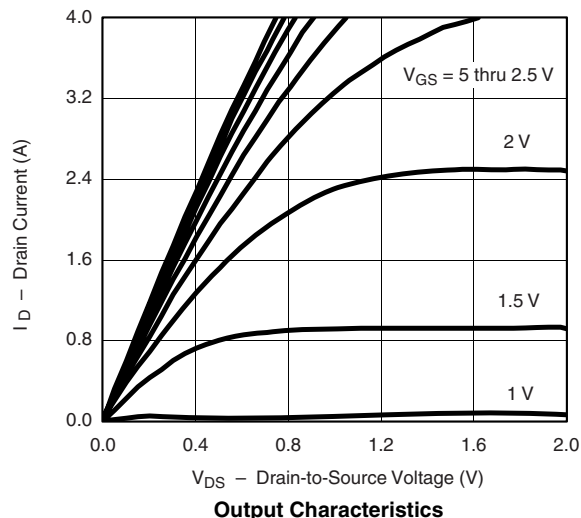
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 10 μA	20			V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 50 μA	0.45	0.6	1.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 4.5 V			± 5	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V T _J = 55 °C			0.1 10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 4.5 V	2.5			A
		V _{DS} ≥ 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 ≅ 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:

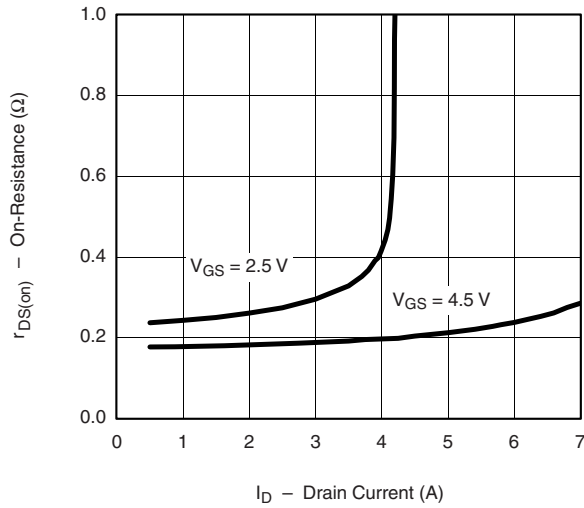
a. Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.

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

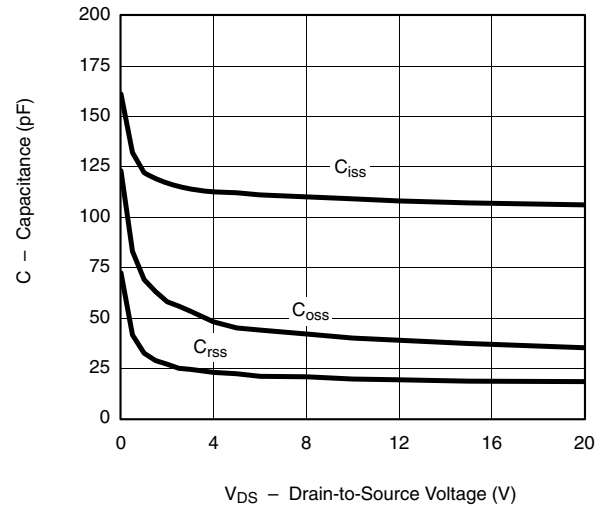
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS $25\text{ }^{\circ}\text{C}$, unless otherwise noted

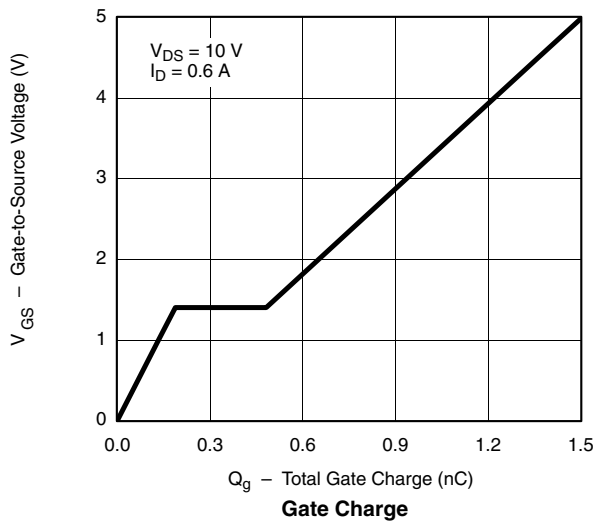
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



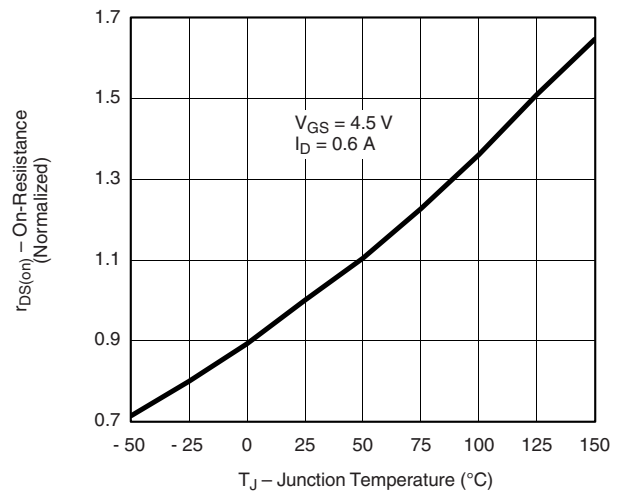
On-Resistance vs. Drain Current



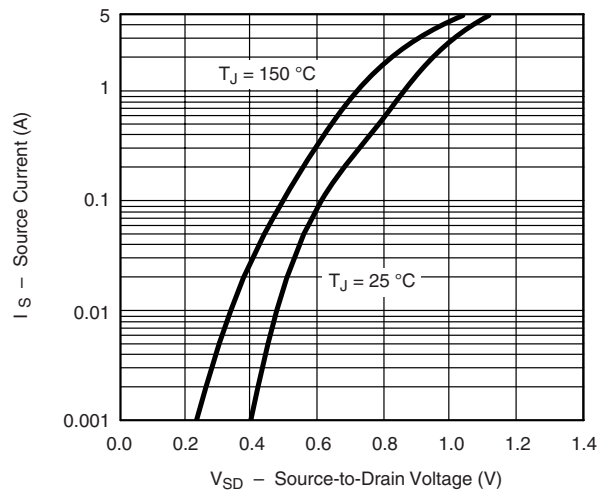
Capacitance



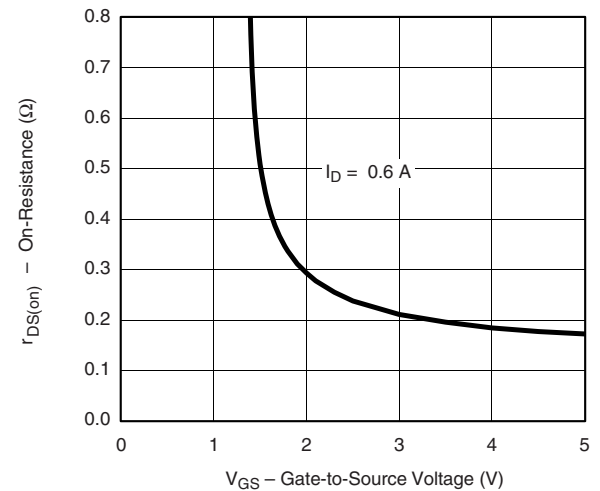
Gate Charge



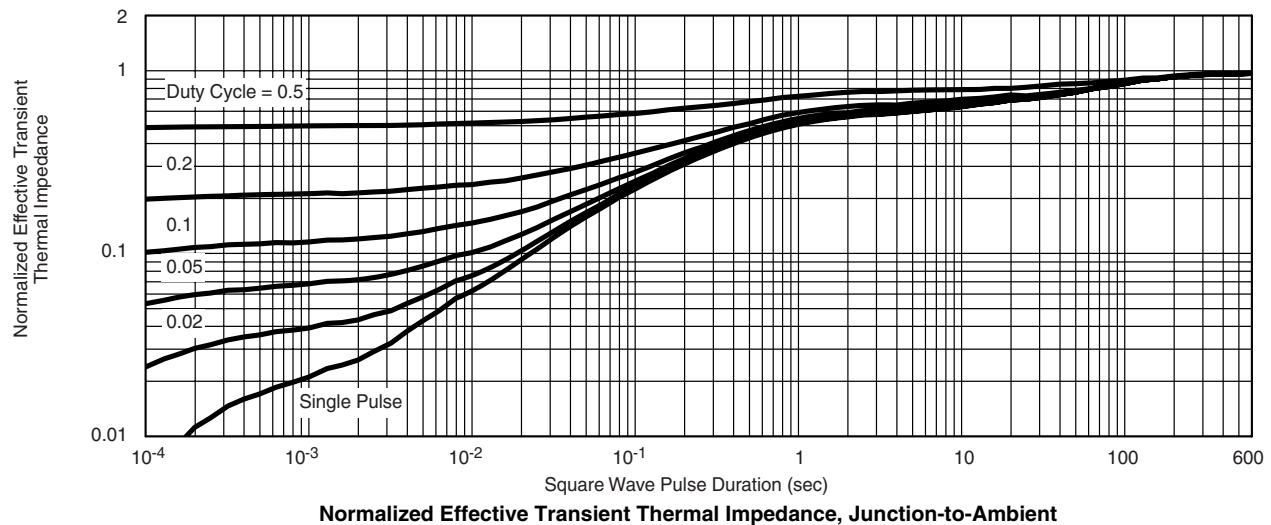
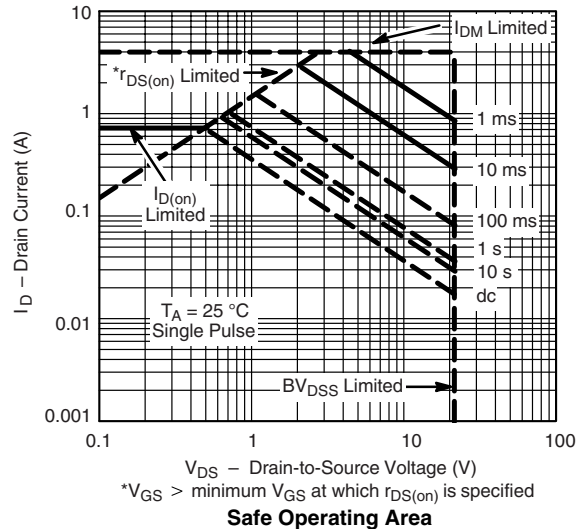
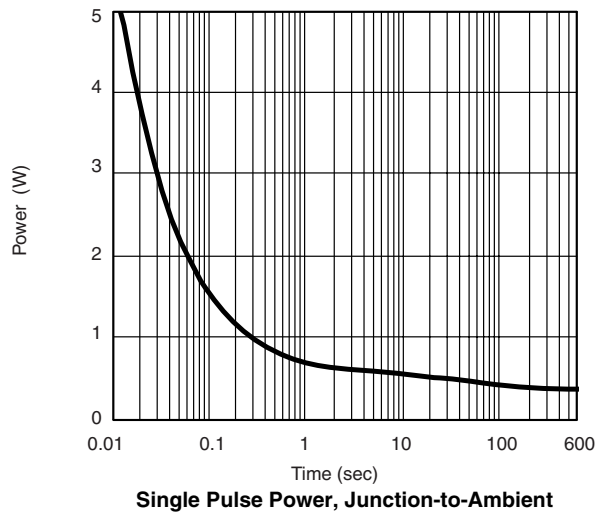
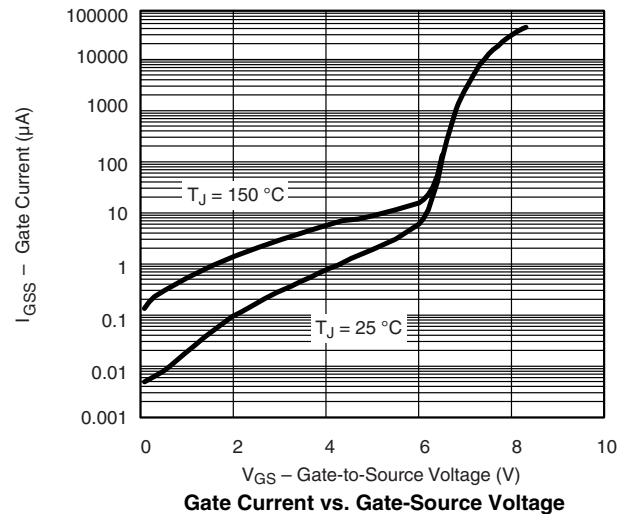
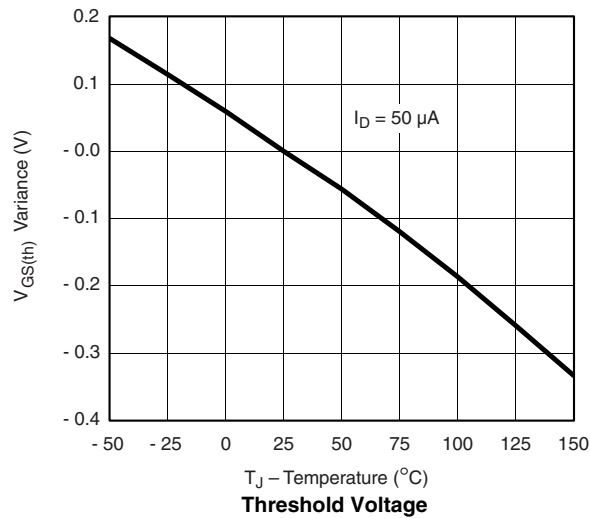
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

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