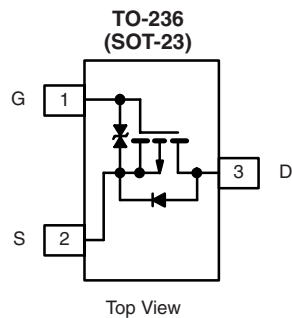


P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (Ω)	V _{GS(th)} (V)	I _D (mA)	Q _g (Typ.)
- 30	1.4 at V _{GS} = - 10 V	- 1.3 to - 3.0	- 385	1000
	3.5 at V _{GS} = - 4.5 V	- 1.3 to - 3.0	- 240	



Marking Code: 2Kw//

2K = Part Number Code for TP0202K
w = Week Code
// = Lot Traceability

Ordering Information: TP0202K-T1-E3 (Lead (Pb)-free)
TP0202K-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

- Halogen-free According to IEC 61249-2-21 Available
- TrenchFET® Power MOSFET
- High-Side Switching
- Low On-Resistance: 1.2 Ω (typ.)
- Low Threshold: - 2 V (typ.)
- Fast Switching Speed: 14 ns (typ.)
- Low Input Capacitance: 31 pF (typ.)
- 2000 V ESD Protection



RoHS
COMPLIANT
HALOGEN
FREE
Available

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Power Supply Converter Circuits
- Solid-State Relays

BENEFITS

- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Circuits
- Easily Driven without Buffer

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	- 30	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C) ^a	I _D	- 385	mA
		- 280	
Pulsed Drain Current ^b	I _{DM}	- 750	
Power Dissipation ^a	P _D	350	mW
		185	
Maximum Junction-to-Ambient ^a	R _{thJA}	350	°C/W
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

Notes:

a. Surface Mounted on FR4 board.

b. Pulse width limited by maximum junction temperature.

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_{DS}	$V_{GS} = 0\text{ V}$, $I_D = -100\text{ }\mu\text{A}$	-30	-38		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-1.3	-2	-3.0	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 5\text{ V}$			± 50	nA
		$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 10\text{ V}$			± 300	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$			-100	μA
		$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 85\text{ }^{\circ}\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{GS} = -10\text{ V}$, $V_{DS} = -10\text{ V}$	-500			mA
Drain-Source On-Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}$, $I_D = -50\text{ mA}$		2.1	3.5	Ω
		$V_{GS} = -10\text{ V}$, $I_D = -500\text{ mA}$		1.25	1.4	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}$, $I_D = -200\text{ mA}$		315		mS
Diode Forward Voltage ^a	V_{SD}	$I_S = -250\text{ mA}$, $V_{GS} = 0\text{ V}$			-1.2	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = -16\text{ V}$, $V_{GS} = -10\text{ V}$ $I_D \cong -200\text{ mA}$		1000		pC
Gate-Source Charge	Q_{gs}			225		
Gate-Drain Charge	Q_{gd}			175		
Input Capacitance	C_{iss}	$V_{DS} = -15\text{ V}$, $V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$		31		pF
Output Capacitance	C_{oss}			11		
Reverse Transfer Capacitance	C_{rss}			4		
Switching ^b						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}$, $R_L = 75\text{ }\Omega$ $I_D \cong -200\text{ mA}$, $V_{GEN} = -10\text{ V}$, $R_G = 6\text{ }\Omega$		9		ns
	t_r			6		
Turn-Off Time	$t_{d(off)}$			30		
	t_f			20		

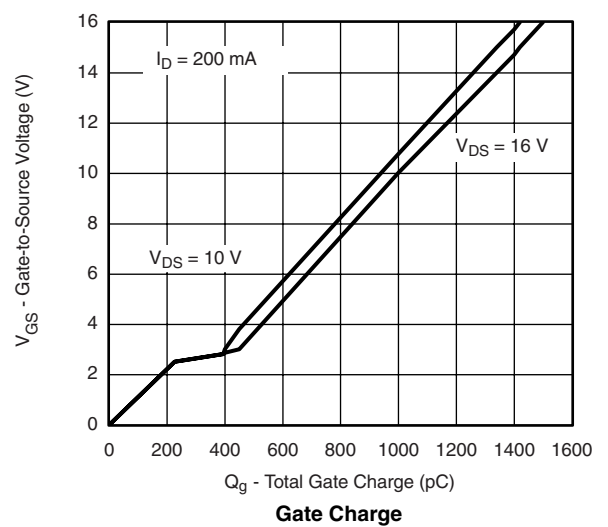
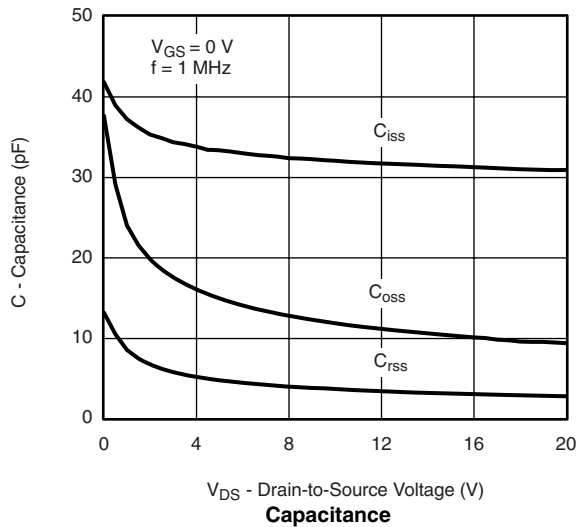
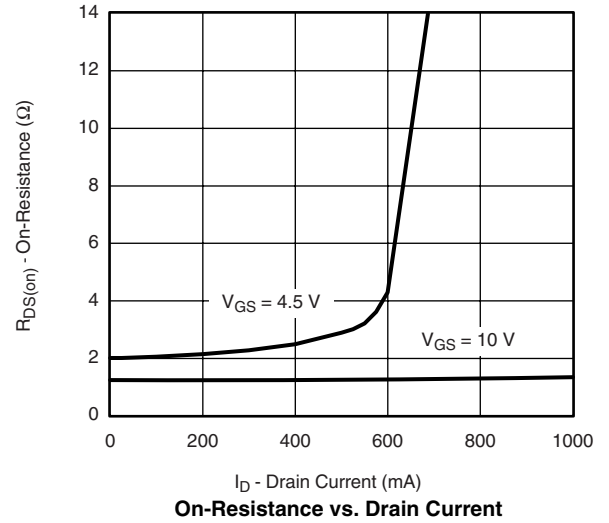
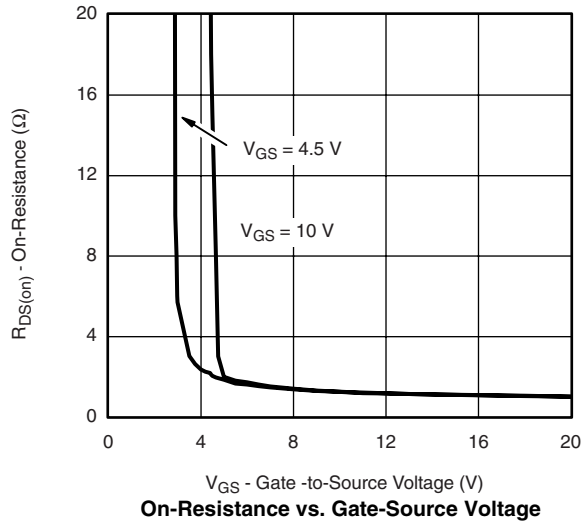
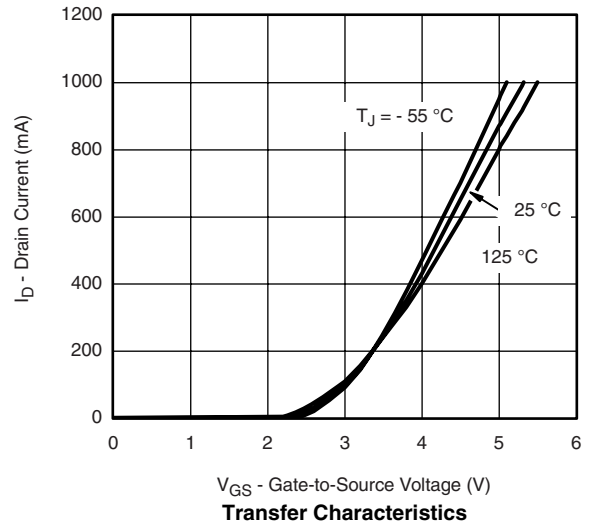
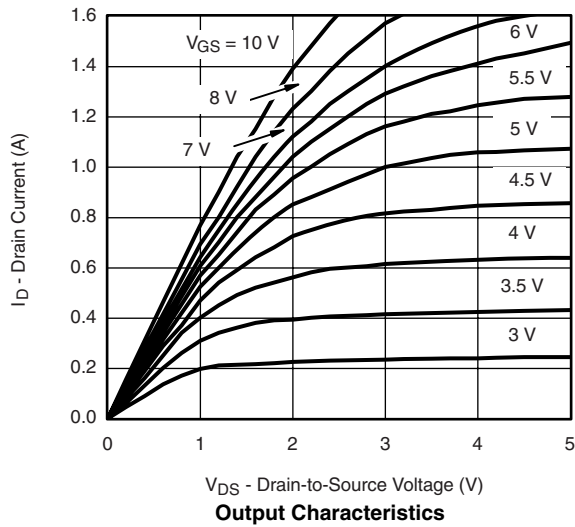
Notes:

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

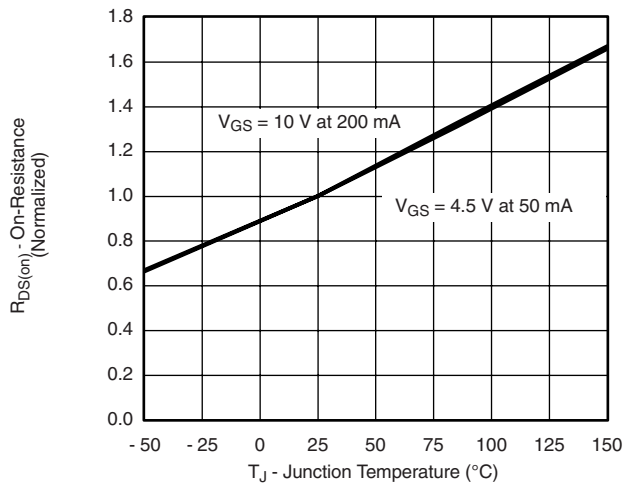
b. Switching time is essentially independent of operating temperature.

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.

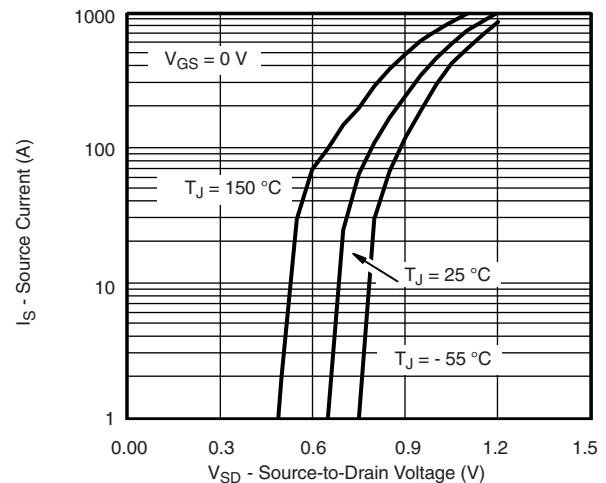
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



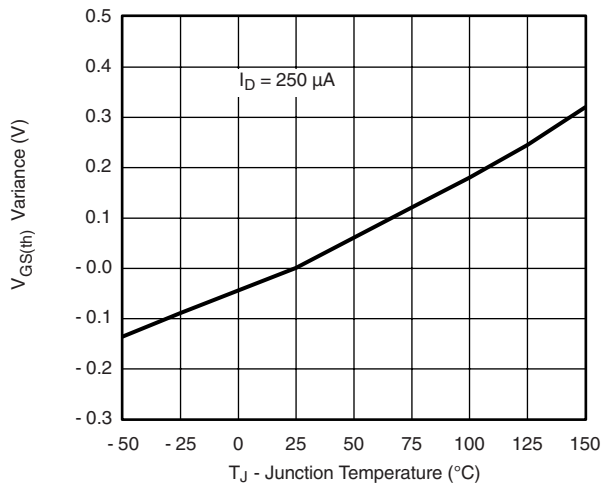
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



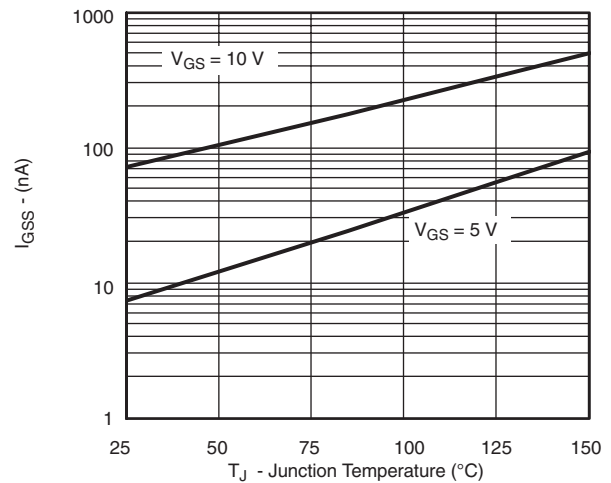
On-Resistance vs. Junction Temperature



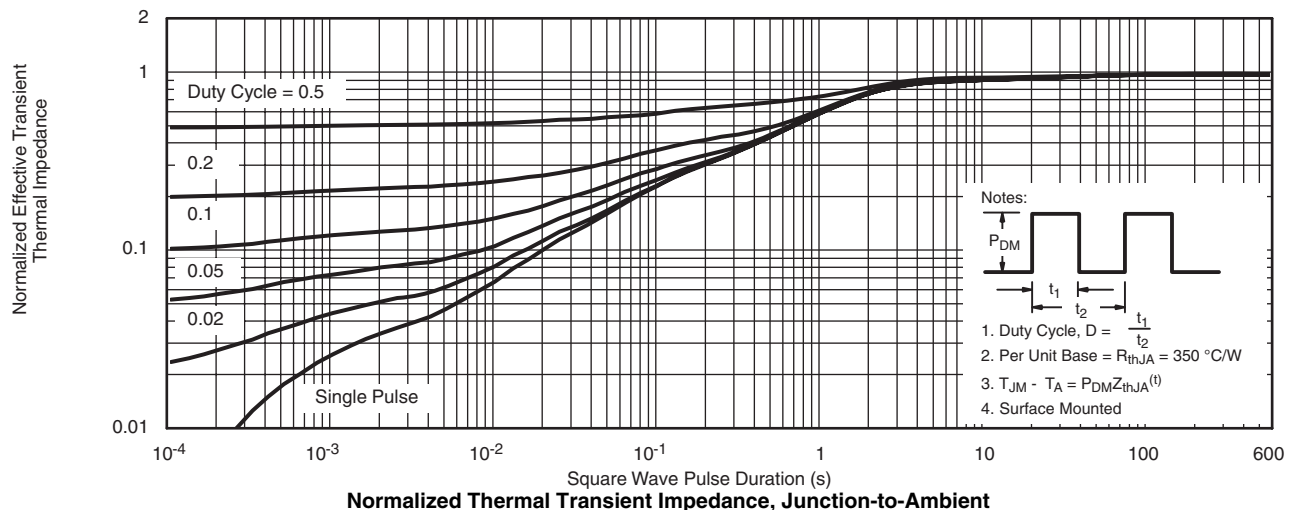
Source-Drain Diode Forward Voltage



Threshold Voltage Variance Over Temperature



I_{GSS} vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient

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