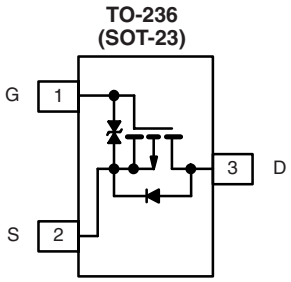
P-Channel 30-V (D-S) MOSFET

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: 2K*wll*

2K = Part Number Code for TP0202K
w = Week Code
ll = 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 Swtiching Speed: 14 ns (typ.)
- Low Input Capacitance: 31 pF (typ.)
- 2000 V ESD Protection

Pb-free
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]	T_A = 25 °C	I_D	- 385	mA
	T_A = 85 °C		- 280	
Pulsed Drain Current[b]		I_{DM}	- 750	
Power Dissipation[a]	T_A = 25 °C	P_D	350	mW
	T_A = 85 °C		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

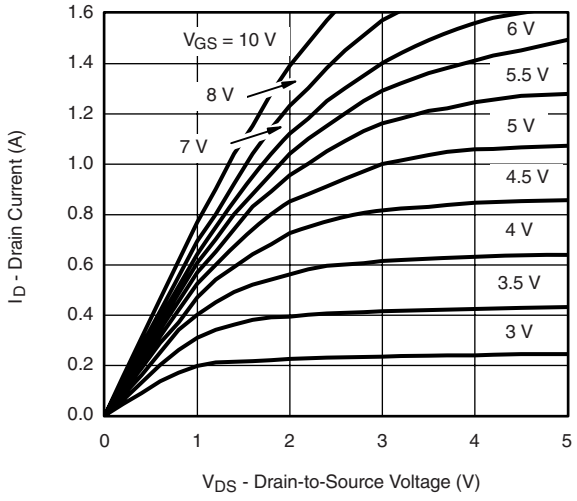
Notes:
a. Surface Mounted on FR4 board.
b. Pulse width limited by maximum junction temperature.

SPECIFICATIONS T_A = 25 °C, unless otherwise noted						
			Limits			
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 100 µA	- 30	- 38		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1.3	- 2	- 3.0	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 5 V			± 50	nA
		V_{DS} = 0 V, V_{GS} = ± 10 V			± 300	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V			- 100	
		V_{DS} = - 30 V, V_{GS} = 0 V, T_J = 85 °C			- 10	µA
On-State Drain Current[a]	$I_{D(on)}$	V_{GS} = - 10 V, V_{DS} = - 10 V	- 500			mA
Drain-Source On-Resistance[a]	$R_{DS(on)}$	V_{GS} = - 4.5 V, I_D = - 50 mA		2.1	3.5	Ω
		V_{GS} = - 10 V, I_D = - 500 mA		1.25	1.4	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 5 V, I_D = - 200 mA		315		mS
Diode Forward Voltage[a]	V_{SD}	I_S = - 250 mA, V_{GS} = 0 V			- 1.2	V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = - 16 V, V_{GS} = - 10 V $I_D \cong$ - 200 mA		1000		pC
Gate-Source Charge	Q_{gs}			225		
Gate-Drain Charge	Q_{gd}			175		
Input Capacitance	C_{iss}	V_{DS} = - 15 V, V_{GS} = 0 V f = 1 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 V, R_L = 75 Ω $I_D \cong$ - 200 mA, V_{GEN} = - 10 V, R_G = 6 Ω		9		ns
	t_r			6		
Turn-Off Time	$t_{d(off)}$			30		
	t_f			20		

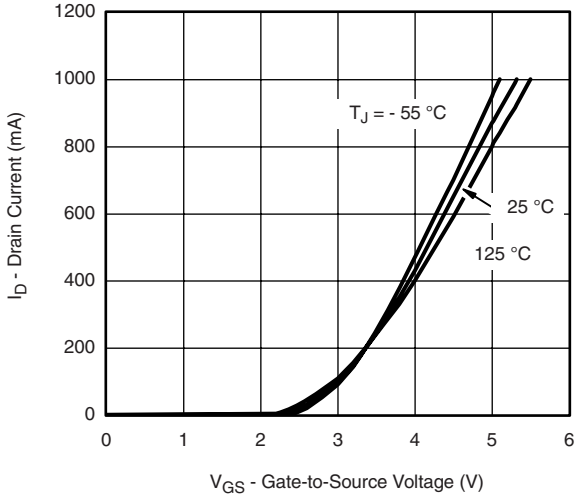
Notes:
a. Pulse test: PW ≤ 300 µs duty cycle ≤ 2 %.
b. Switching time is essentially independent of operating temperature.

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.

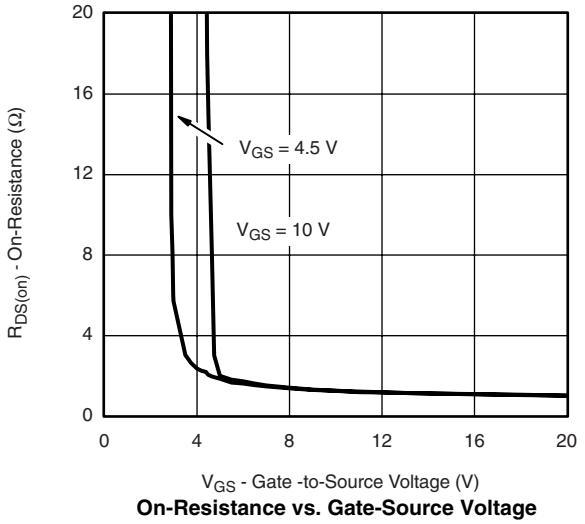
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



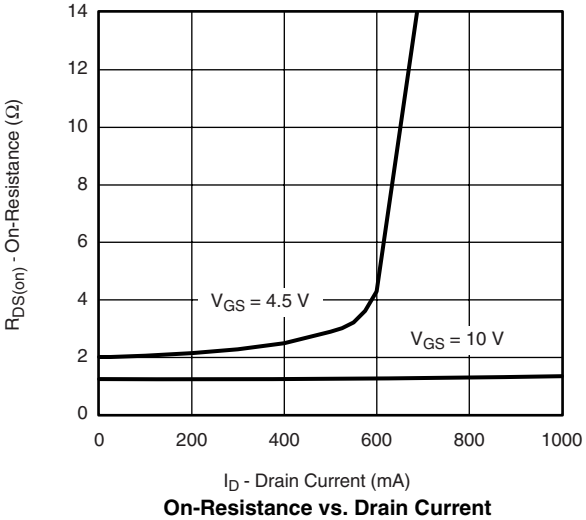
Output Characteristics



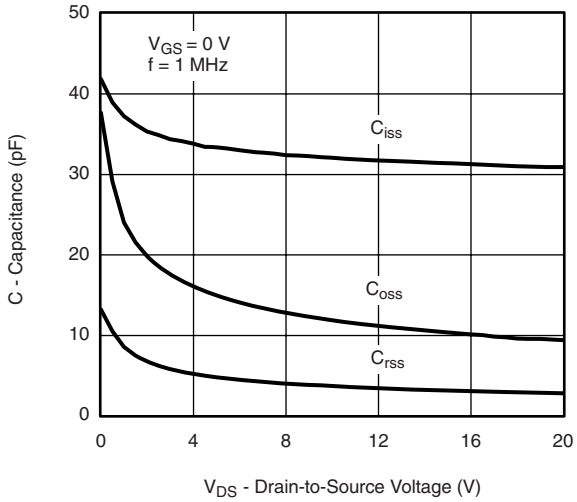
Transfer Characteristics



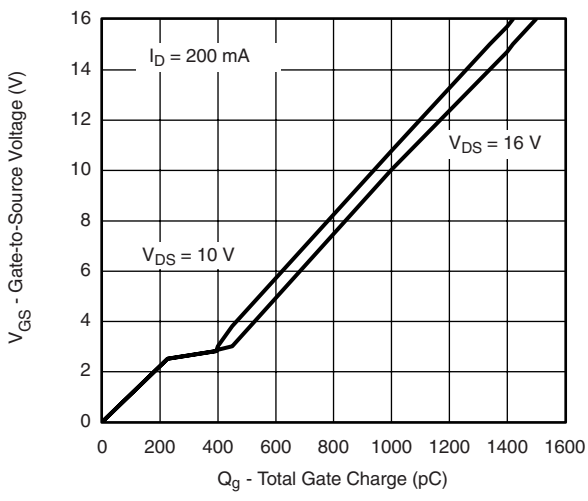
On-Resistance vs. Gate-Source Voltage



On-Resistance vs. Drain Current

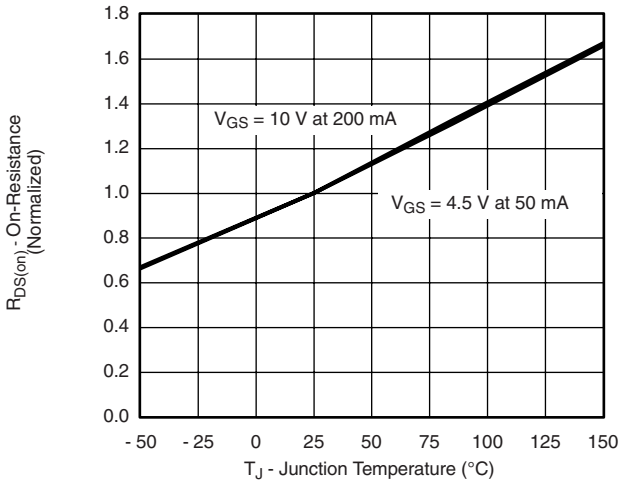


Capacitance

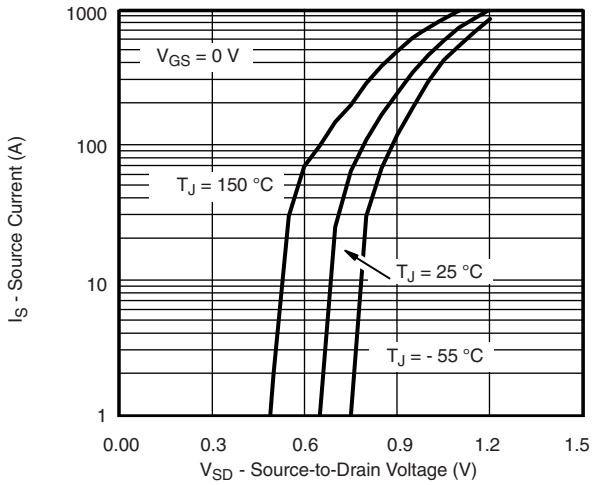


Gate Charge

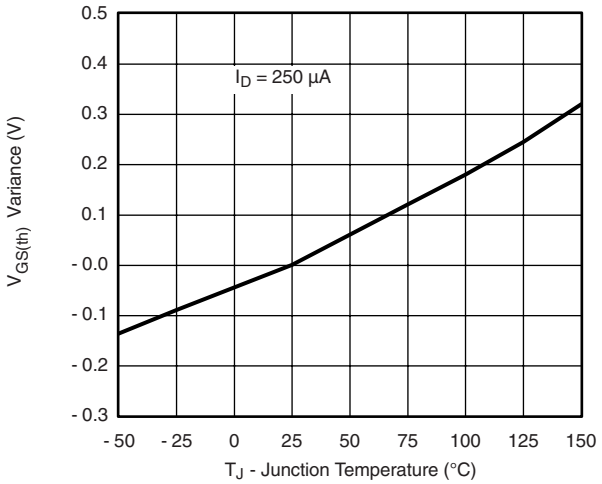
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



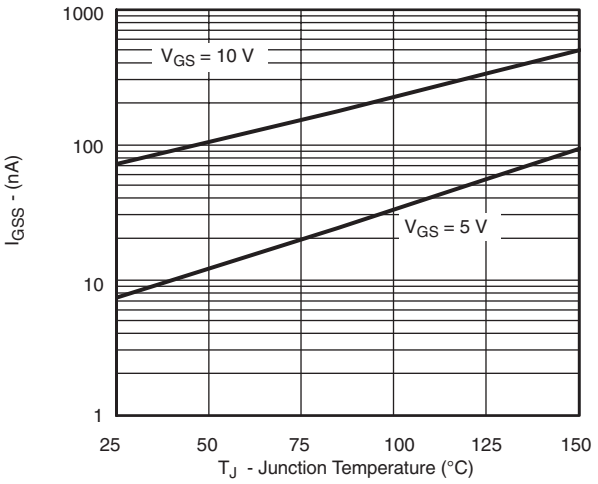
On-Resistance vs. Junction Temperature



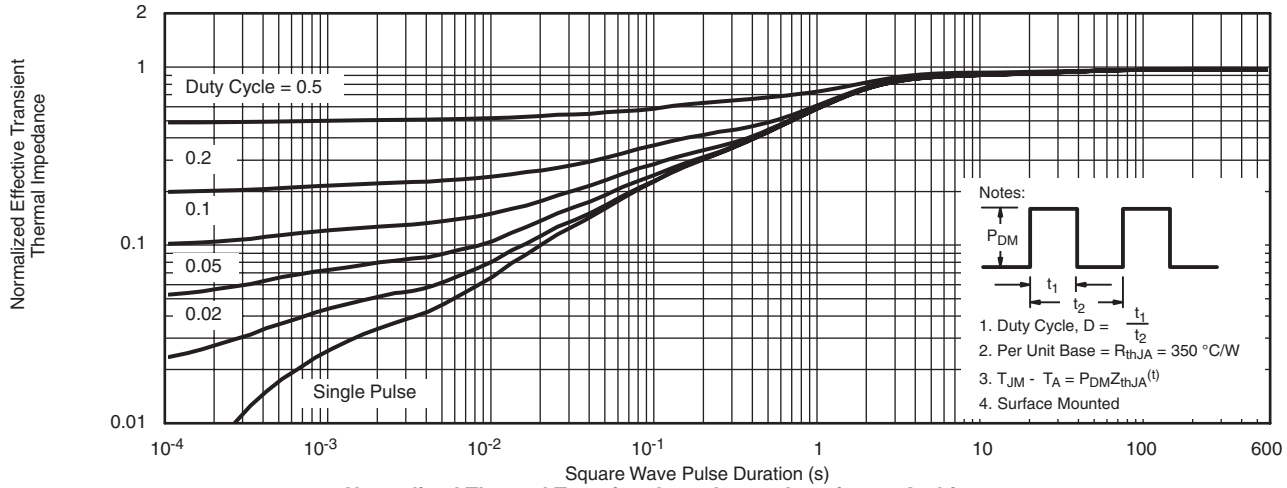
Source-Drain Diode Forward Voltage



Threshold Voltage Variance Over Temperature



I_{GSS} vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient

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