



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

TrenchFET[®]
MOSFETs



ESD Protected
2000 V

PRODUCT SUMMARY			
$V_{(BR)DSS(min)}$ (V)	$r_{DS(on)}$ (Ω)	$V_{GS(th)}$ (V)	I_D (mA)
-30	1.4 @ $V_{GS} = -10$ V	-1.3 to -3.0	-385
	3.5 @ $V_{GS} = -4.5$ V	-1.3 to -3.0	-240

FEATURES

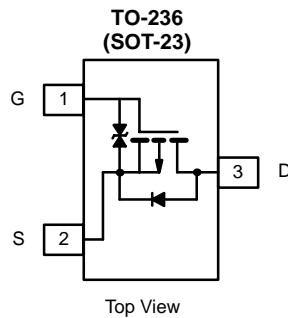
- High-Side Switching
- Low On-Resistance: 1.2 Ω (typ)
- Low Threshold: -2.0 V (typ)
- Fast Switching Speed: 14 ns (typ)
- Low Input Capacitance: 31 pF (typ)
- Gate-Source ESD Protection

BENEFITS

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

APPLICATIONS

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



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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	$T_A = 25^\circ\text{C}$	-385
		$T_A = 85^\circ\text{C}$	-280
Pulse Drain Current ^b	I_{DM}	-750	mA
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	350
		$T_A = 85^\circ\text{C}$	185
Maximum Junction-to-Ambient ^a	R_{thJA}	350	$^\circ\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Notes

- Surface mounted on FR4 board.
- Pulse width limited by maximum junction temperature.



SPECIFICATIONS (T _A = 25 °C UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	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} = -24 V, V _{GS} = 0 V			-100	μA
		V _{DS} = -24 V, V _{GS} = 0 V, T _J = 85 °C			-10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = -10 V, V _{GS} = -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 ≅ -200 mA		175		pC
Gate-Source Charge	Q _{gs}			225		
Gate-Drain Charge	Q _{gd}			1000		
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 ≅ -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

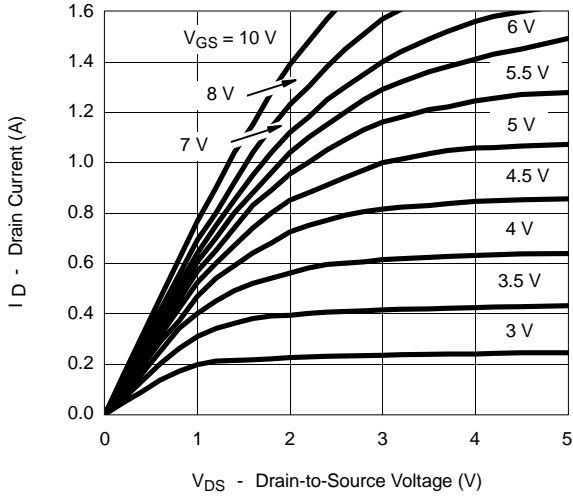
- a. Pulse test: PW ≤ 300 ms duty cycle ≤ 2%.
- b. Switching time is essentially independent of operating temperature.



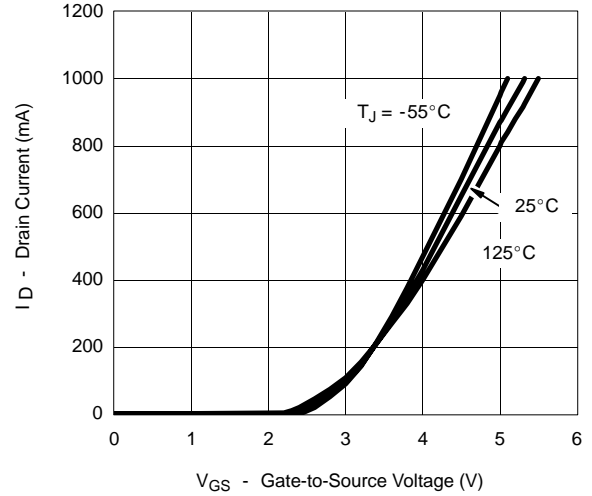
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

For the following graphs, p-channel negative polarities for all voltage and current values are represented as positive values.

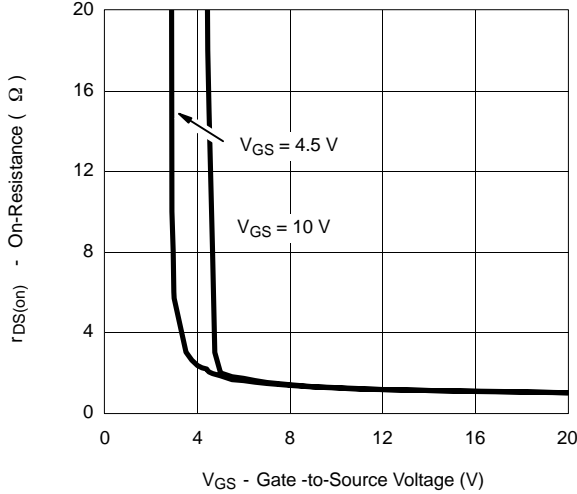
Output Characteristics



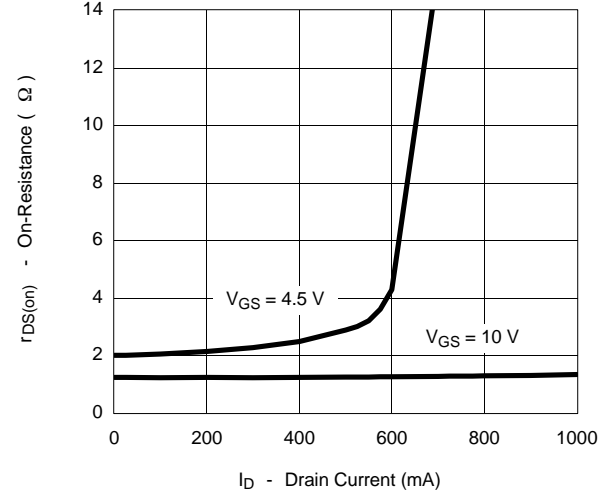
Transfer Characteristics



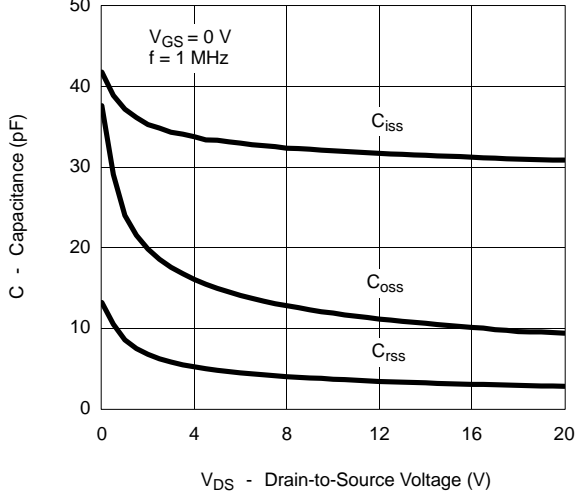
On-Resistance vs. Gate-Source Voltage



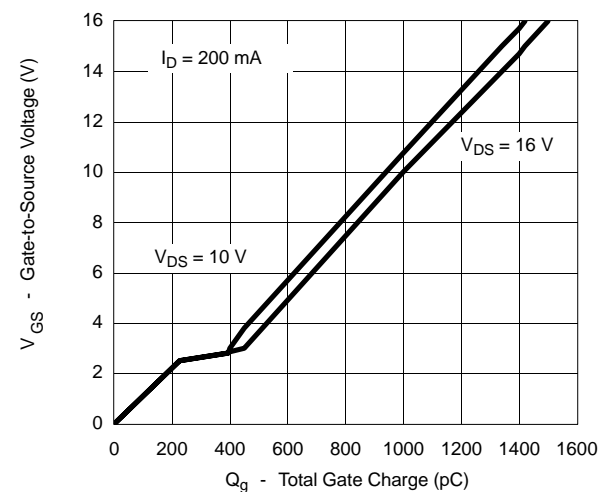
On-Resistance vs. Drain Current



Capacitance



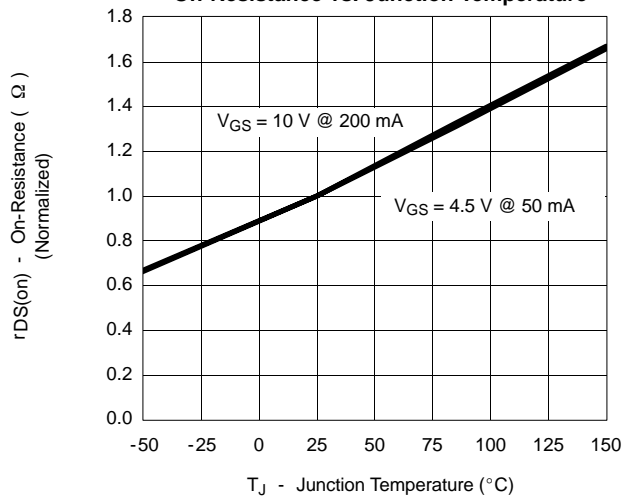
Gate Charge



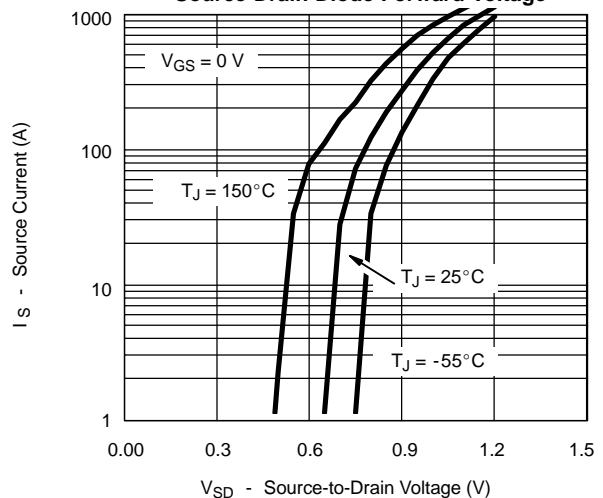
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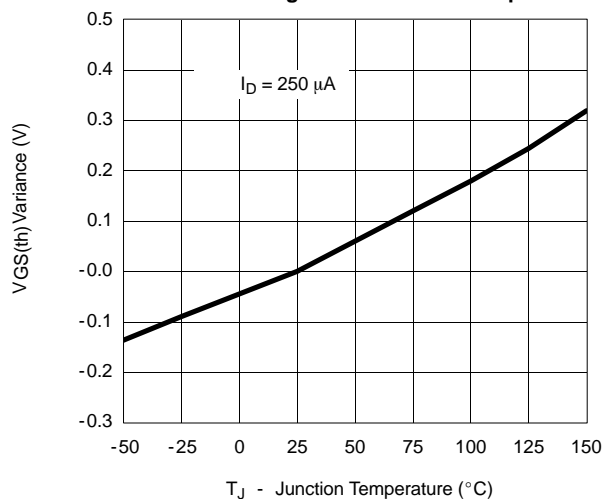
On-Resistance vs. Junction Temperature



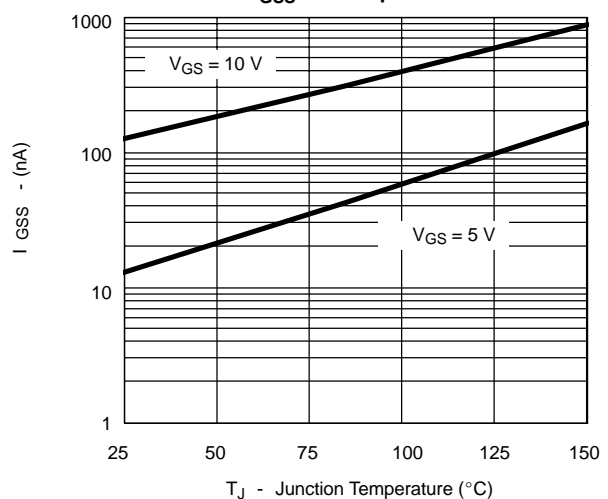
Source-Drain Diode Forward Voltage



Threshold Voltage Variance Over Temperature



I_GSS vs. Temperature



Normalized Thermal Transient Impedance, Junction-to-Ambient

