



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

TrenchFET®
MOSFETs

PRODUCT SUMMARY				
$V_{(BR)DSS(min)}$ (V)	$r_{DS(on)}$ (Ω)	$V_{GS(th)}$ (V)	I_D (mA)	Q_g (Typ)
-30	1.4 @ $V_{GS} = -10$ V	-1.3 to -3.0	-385	1000
	3.5 @ $V_{GS} = -4.5$ V	-1.3 to -3.0	-240	



ESD Protected
2000 V

FEATURES

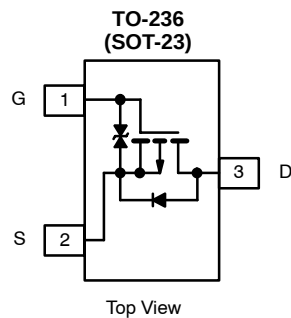
- High-Side Switching
- Low On-Resistance: 1.2 Ω (typ)
- Low Threshold: -2.0 V (typ)
- Fast Switching Speed: 14 ns (typ)
- Low Input Capacitance: 31 pF (typ)
- Gate-Source ESD Protection

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



Ordering Information: TP0202K-T1
TP0202K-T1—E3 (Lead (Pb)-Free)

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	$T_A = 25^\circ\text{C}$	I_D	-385	mA
	$T_A = 85^\circ\text{C}$		-280	
Pulse Drain Current ^b		I_{DM}	-750	
Power Dissipation ^a	$T_A = 25^\circ\text{C}$	P_D	350	mW
	$T_A = 85^\circ\text{C}$		185	
Maximum Junction-to-Ambient ^a		R_{thJA}	350	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Notes

- a. Surface mounted on FR4 board.
b. 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} = -30 V, V _{GS} = 0 V			-100	μA
		V _{DS} = -30 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		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 ≅ -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: $PW \leq 300\text{ ms}$ duty cycle $\leq 2\%$.

b. Switching time is essentially independent of operating temperature.

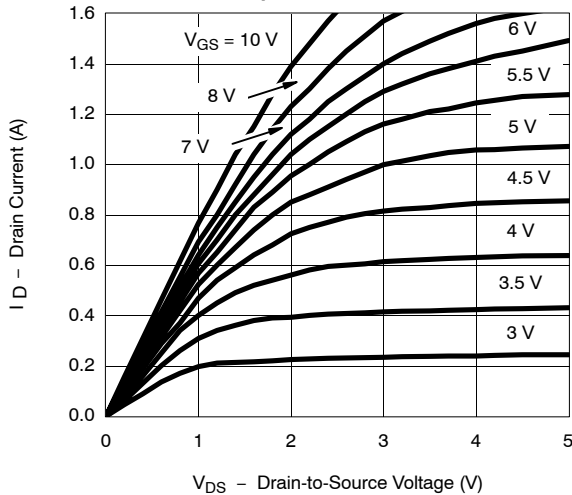
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



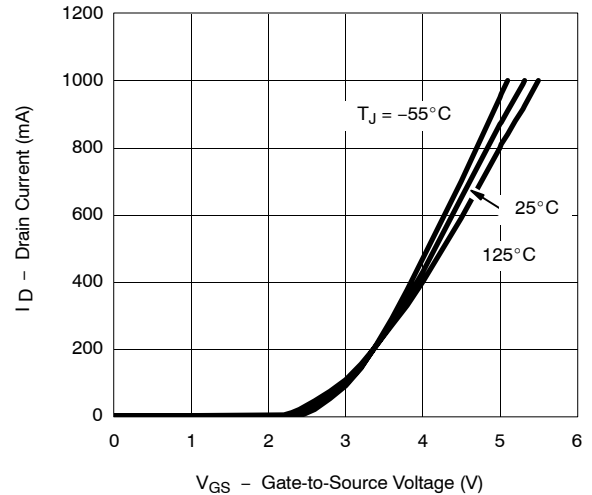
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

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

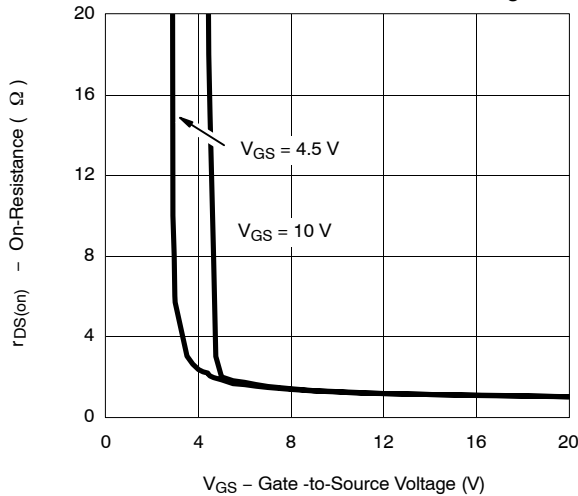
Output Characteristics



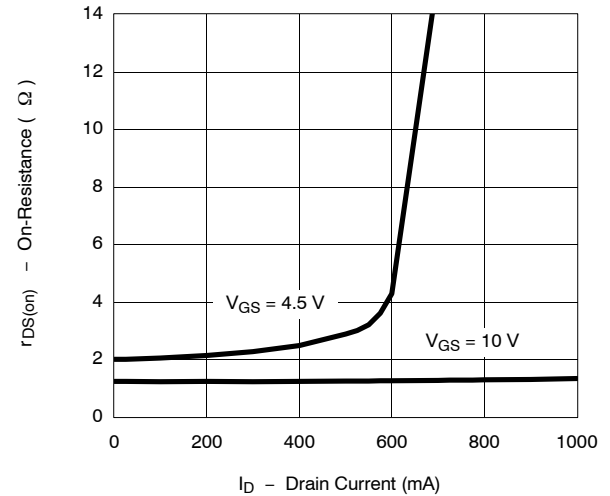
Transfer Characteristics



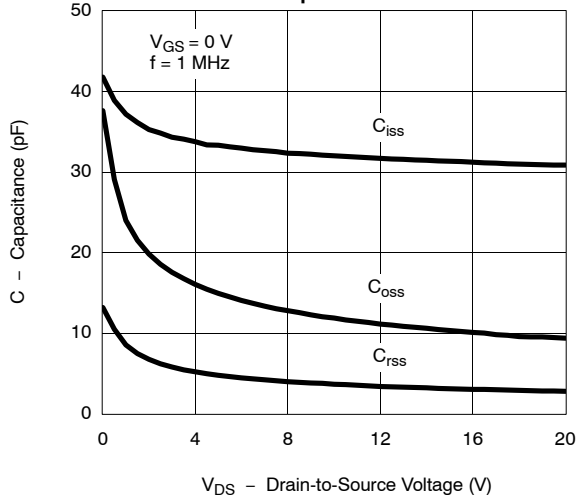
On-Resistance vs. Gate-Source Voltage



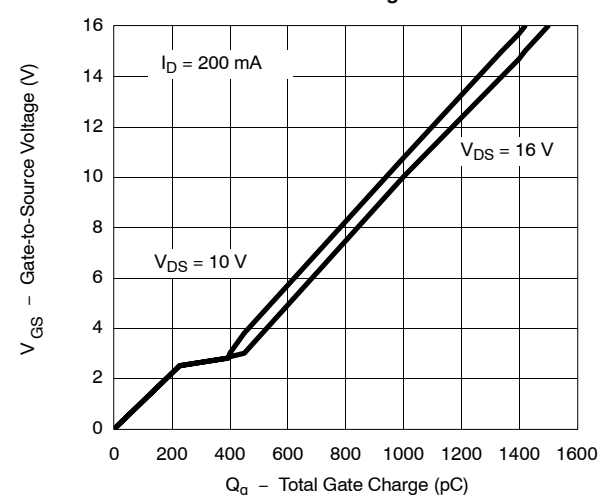
On-Resistance vs. Drain Current



Capacitance

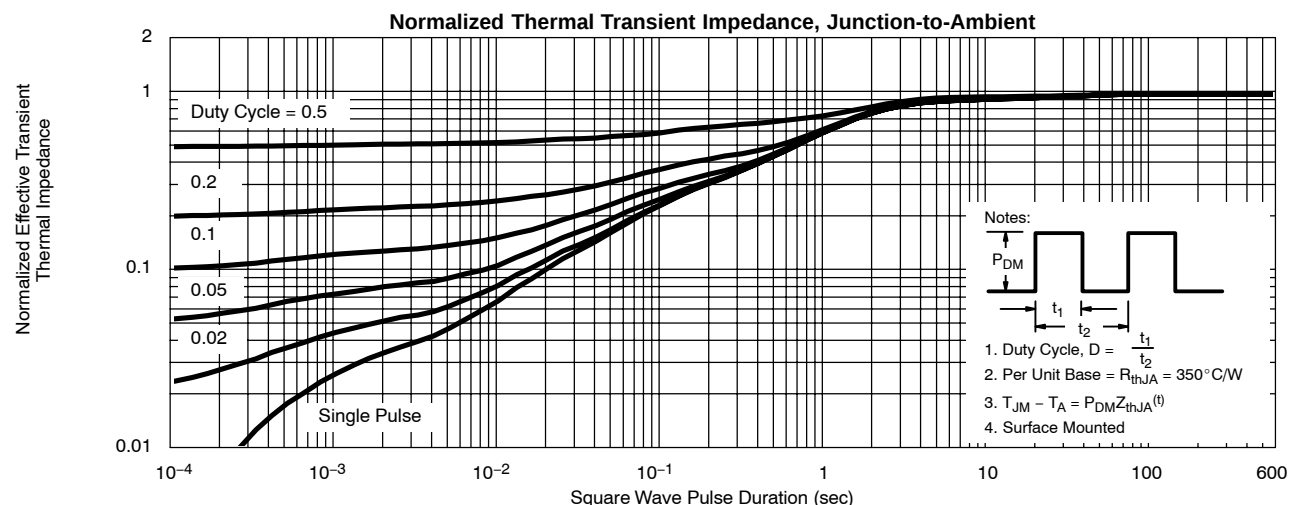
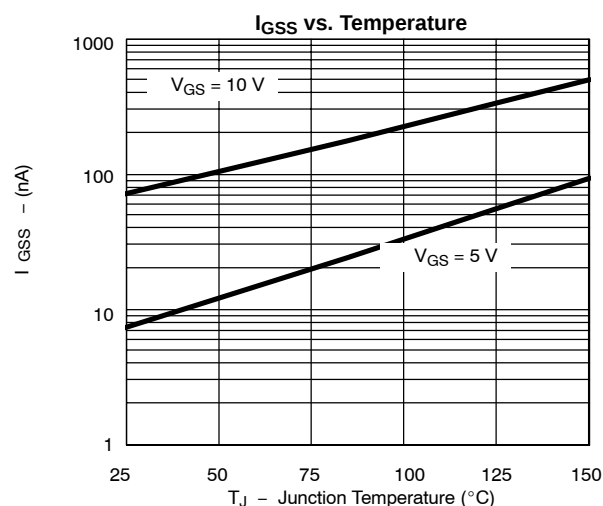
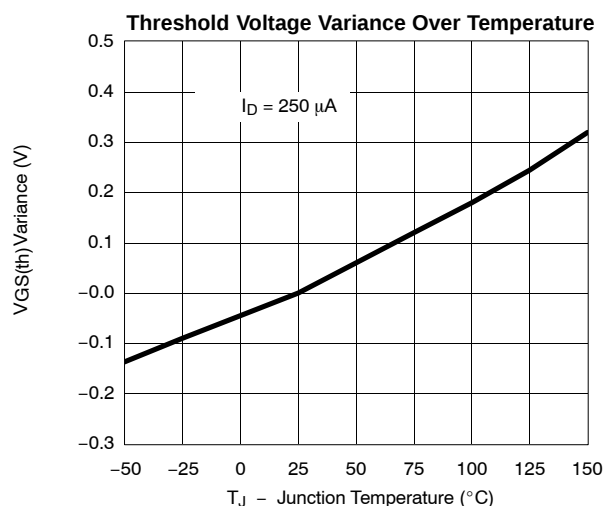
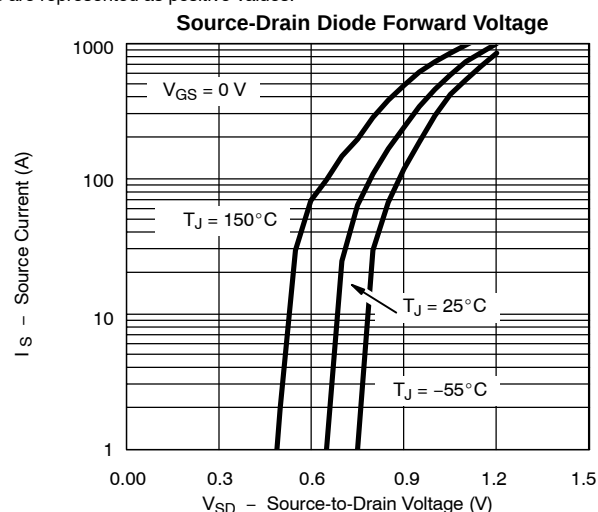
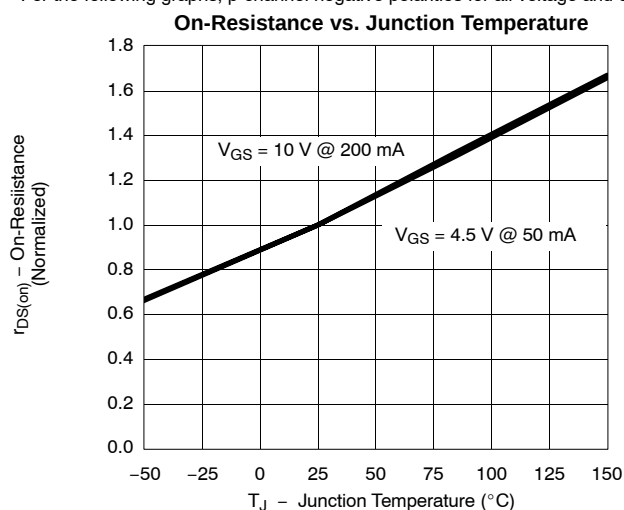


Gate Charge



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.



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see <http://www.vishay.com/ppg771609>.