

P-Channel 20-V (D-S) MOSFET

PRODUCT SUMMARY			
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
-20	1.4 @ $V_{GS} = -10$ V	-1.3 to -3 V	-0.41
	3.5 @ $V_{GS} = -4.5$ V	-1.3 to -3 V	-0.27

FEATURES

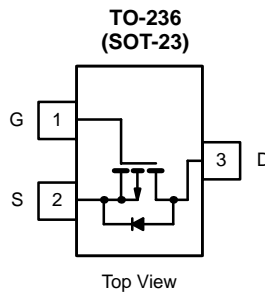
- High-Side Switching
- Low On-Resistance: 0.9 Ω
- Low Threshold: -2.1 V
- Fast Switching Speed: 18 ns
- Low Input Capacitance: 55 pF

BENEFITS

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

APPLICATIONS

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



Marking Code: P3w//

P3 = Part Number Code for TP0202T
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}	-20	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	-0.41
		$T_A = 70^\circ\text{C}$	-0.26
Pulsed Drain Current ^a	I_{DM}	-0.75	A
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.35
		$T_A = 70^\circ\text{C}$	0.22
Thermal Resistance, Junction-to-Ambient	R_{thJA}	357	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

Notes

a. Pulse width limited by maximum junction temperature.

For applications information see AN804.

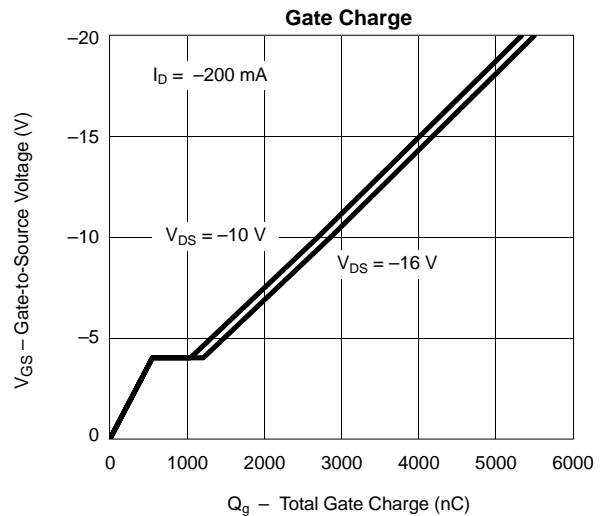
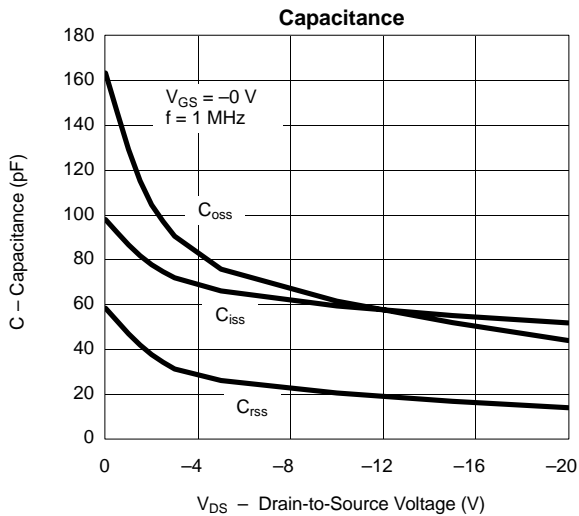
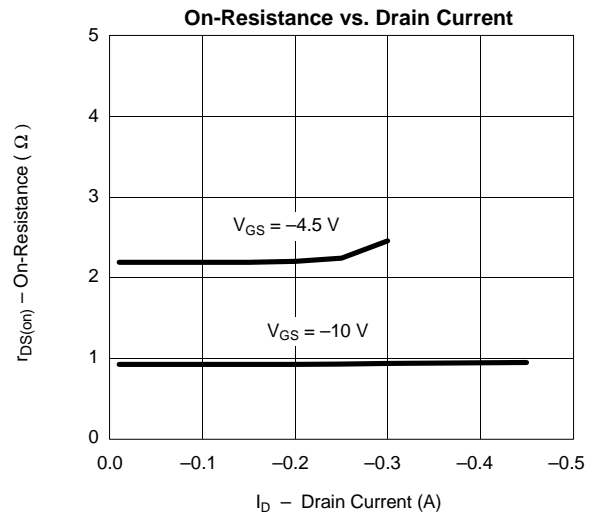
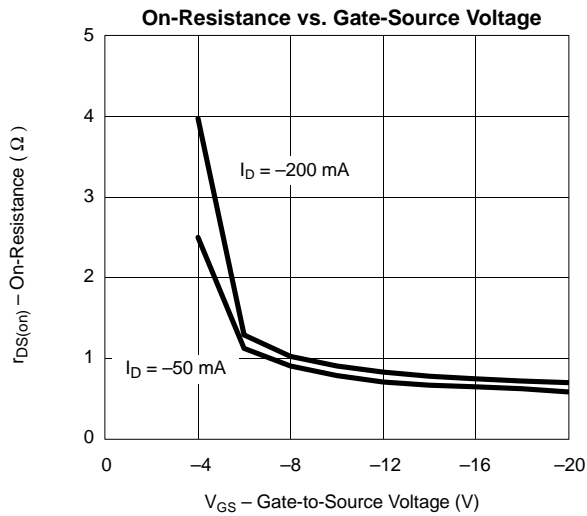
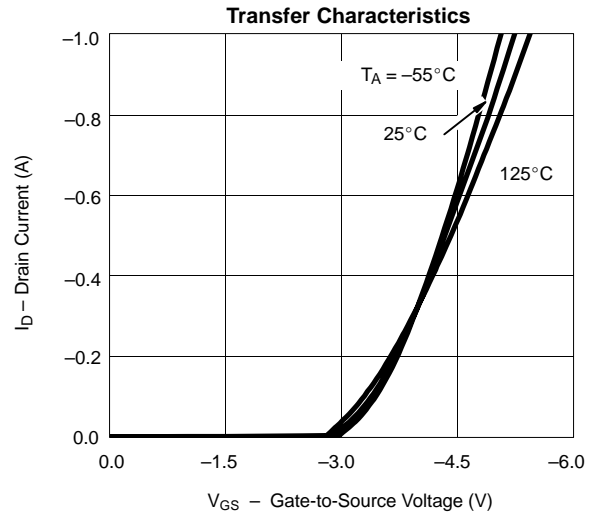
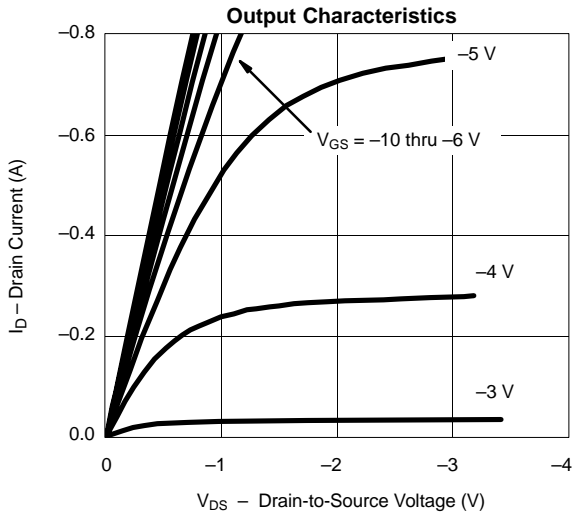
SPECIFICATIONS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ ^a	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -10\ \mu\text{A}$	-20	-25		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -0.25\ \text{mA}$	-1.3	-2.1	-3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$ $T_J = 55^\circ\text{C}$			-1	μA
					-10	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} = -10\text{ V}, V_{GS} = -10\text{ V}$	-0.5	-0.75		A
Drain-Source On-Resistance ^b	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -0.05\text{ A}$		1.7	3.5	Ω
		$V_{GS} = -10\text{ V}, I_D = -0.2\text{ A}$		0.9	1.4	
Forward Transconductance ^b	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -0.2\text{ A}$	250	600		mS
Diode Forward Voltage	V_{SD}	$I_S = -0.25\text{ A}, V_{GS} = 0\text{ V}$		-0.9	-1.5	V
Dynamic						
Total Gate Charge	Q_g	$V_{DS} = -16\text{ V}, V_{GS} = -10\text{ V}, I_D \cong -200\text{ mA}$		2700		pC
Gate-Source Charge	Q_{gs}			500		
Gate-Drain Charge	Q_{gd}			600		
Input Capacitance	C_{iss}	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		55		pF
Output Capacitance	C_{oss}			50		
Reverse Transfer Capacitance	C_{rss}			18		
Switching^c						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 75\ \Omega$ $I_D \cong -0.2\text{ A}, V_{GEN} = -10\text{ V}$ $R_G = 6\ \Omega$		8	12	ns
	t_r			20	30	
Turn-Off Time	$t_{d(off)}$			20	35	
	t_f			30	40	

Notes

- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VPBP02

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



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