

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

<b>PRODUCT SUMMARY</b>			
$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (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

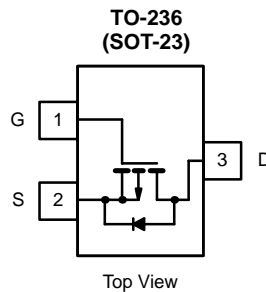
- High-Side Switching
- Low On-Resistance: 0.9  $\Omega$
- Low Threshold: -2.1 V
- Fast Switching Speed: 18 ns
- Low Input Capacitance: 55 pF

### 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

<b>ABSOLUTE MAXIMUM RATINGS (<math>T_A = 25^\circ\text{C}</math> UNLESS OTHERWISE NOTED)</b>			
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
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 <sup>a</sup>	$I_{DM}$	-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.

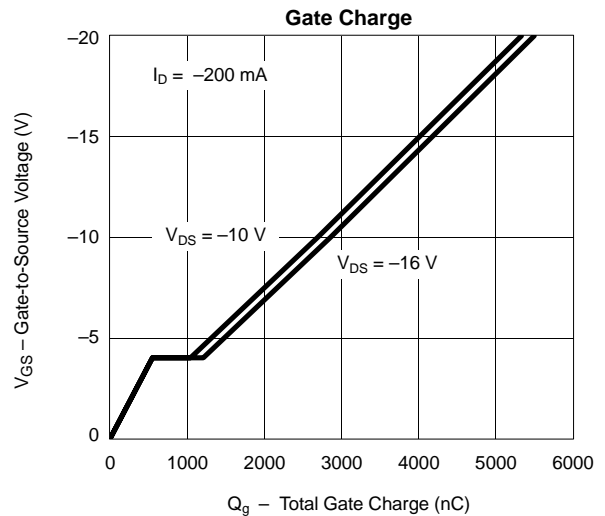
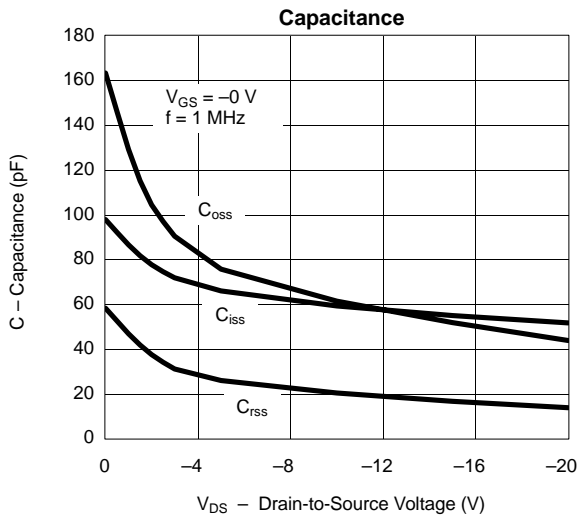
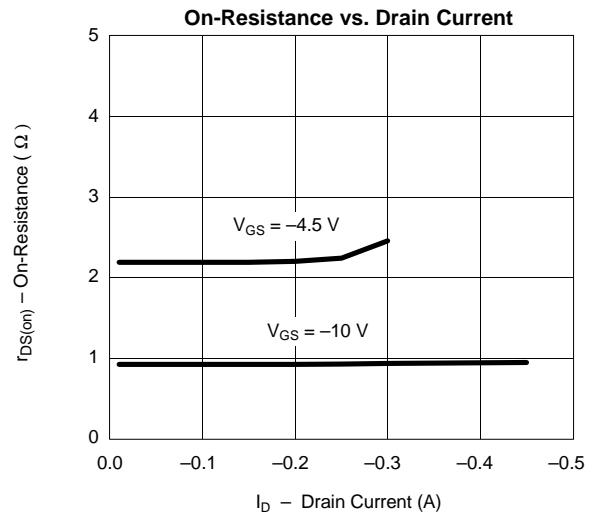
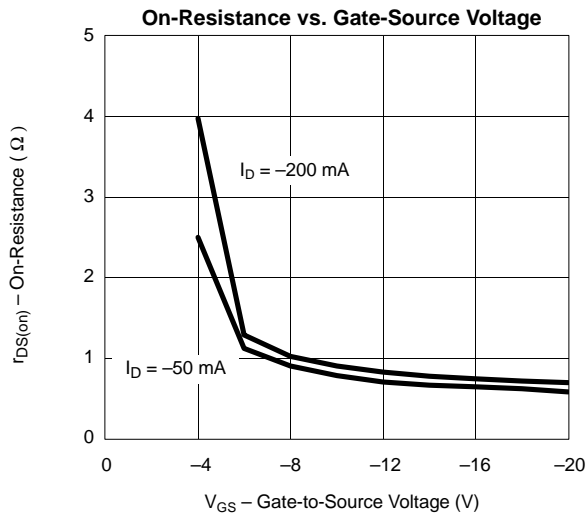
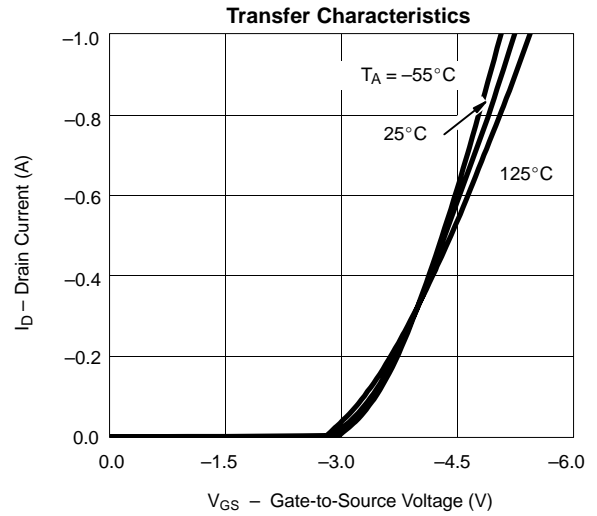
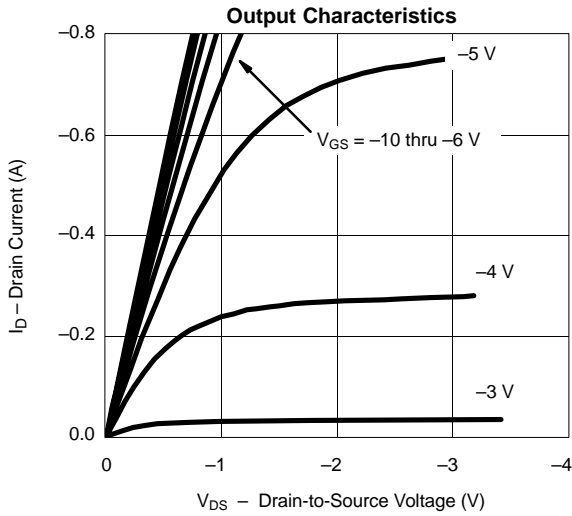
SPECIFICATIONS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)						
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ <sup>a</sup>	Max	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -10\ \mu\text{A}$	-20	-25		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -0.25\ \text{mA}$	-1.3	-2.1	-3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	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	$\mu\text{A}$
					-10	
On-State Drain Current <sup>b</sup>	$I_{D(on)}$	$V_{DS} = -10\text{ V}, V_{GS} = -10\text{ V}$	-0.5	-0.75		A
Drain-Source On-Resistance <sup>b</sup>	$r_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -0.05\text{ A}$		1.7	3.5	$\Omega$
		$V_{GS} = -10\text{ V}, I_D = -0.2\text{ A}$		0.9	1.4	
Forward Transconductance <sup>b</sup>	$g_{fs}$	$V_{DS} = -10\text{ V}, I_D = -0.2\text{ A}$	250	600		mS
Diode Forward Voltage	$V_{SD}$	$I_S = -0.25\text{ A}, V_{GS} = 0\text{ V}$		-0.9	-1.5	V
<b>Dynamic</b>						
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		
<b>Switching<sup>c</sup></b>						
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

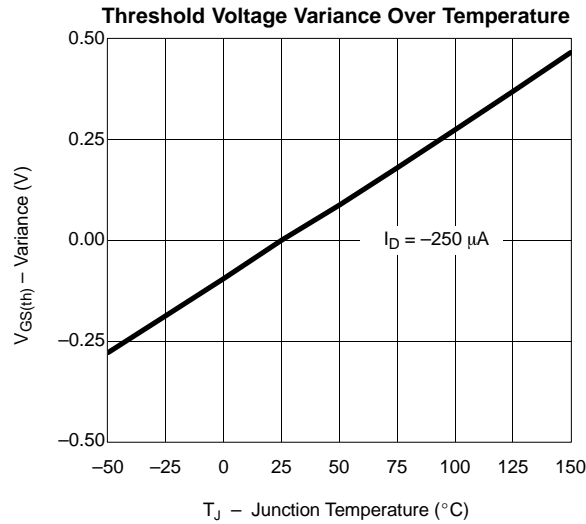
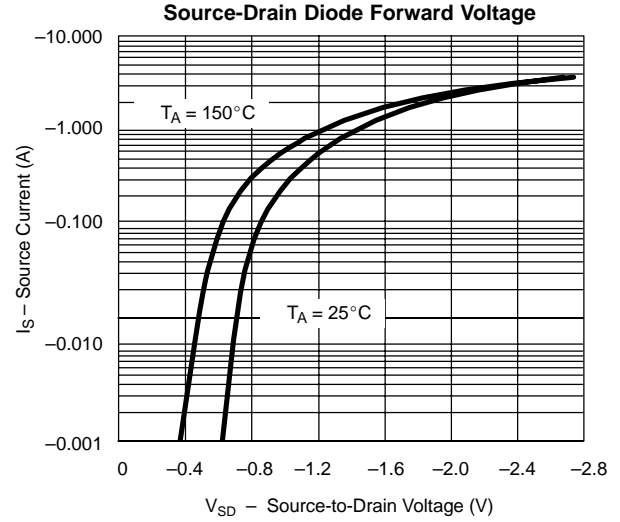
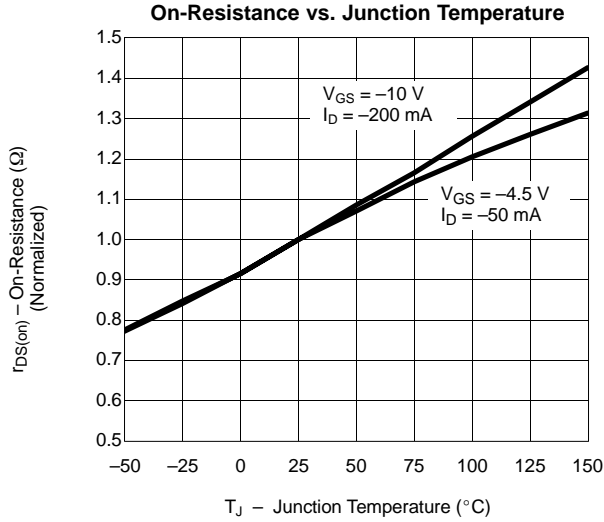
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test:  $PW \leq 300\ \mu\text{s}$  duty cycle  $\leq 2\%$ .
- Switching time is essentially independent of operating temperature.

VPBP02

**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25°C UNLESS OTHERWISE NOTED)**



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





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