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

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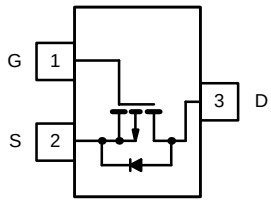
(SOT-23)



Top View

Marking Code: P3*wll*

P3 = Part Number Code for TP0202T
w = Week Code
ll = Lot Traceability

ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C)	T_A= 25°C	I_D	–0.41	A
	T_A= 70°C		–0.26	
Pulsed Drain Current[a]		I_{DM}	–0.75	
Power Dissipation	T_A= 25°C	P_D	0.35	W
	T_A= 70°C		0.22	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	357	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150	°C

Notes
a. Pulse width limited by maximum junction temperature.

For applications information see AN804.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

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

Notes
a. For DESIGN AID ONLY, not subject to production testing.
b. Pulse test: PW ≤300 µs duty cycle ≤2%.
c. Switching time is essentially independent of operating temperature.

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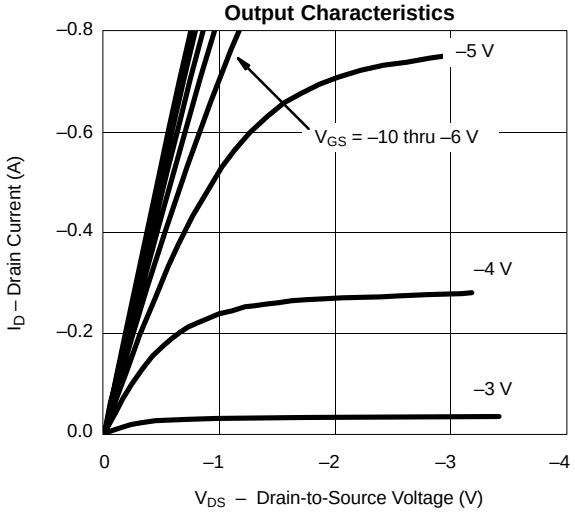
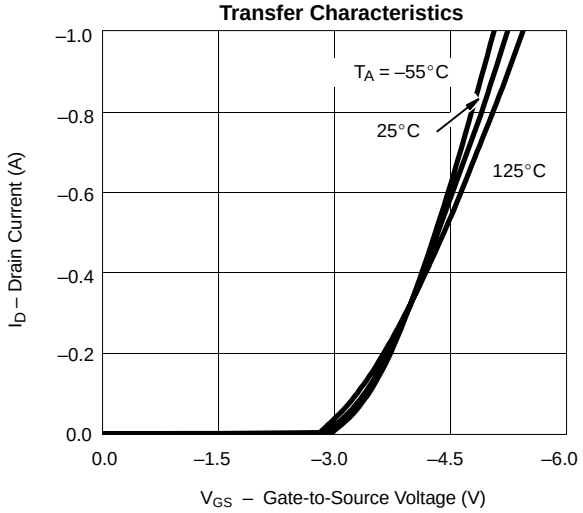
TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

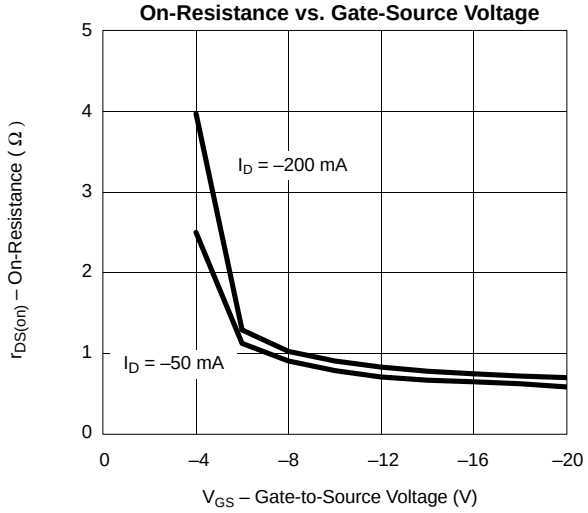
Output Characteristics



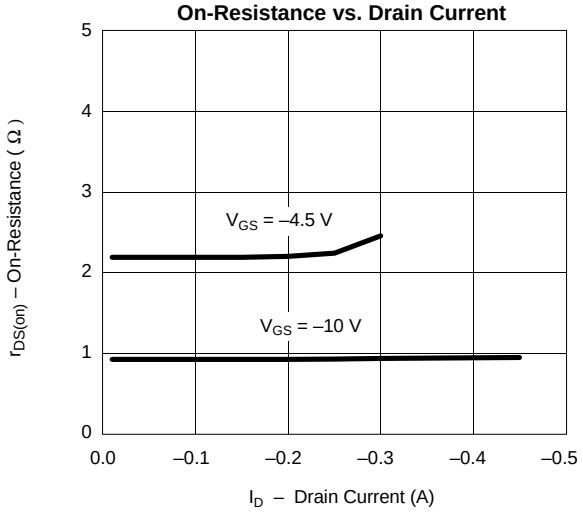
Transfer Characteristics



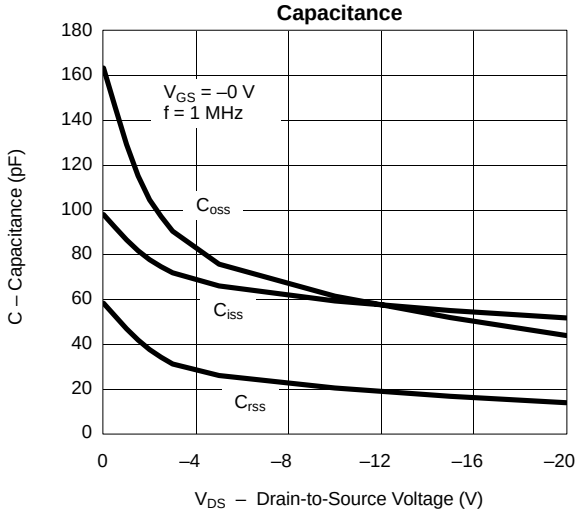
On-Resistance vs. Gate-Source Voltage



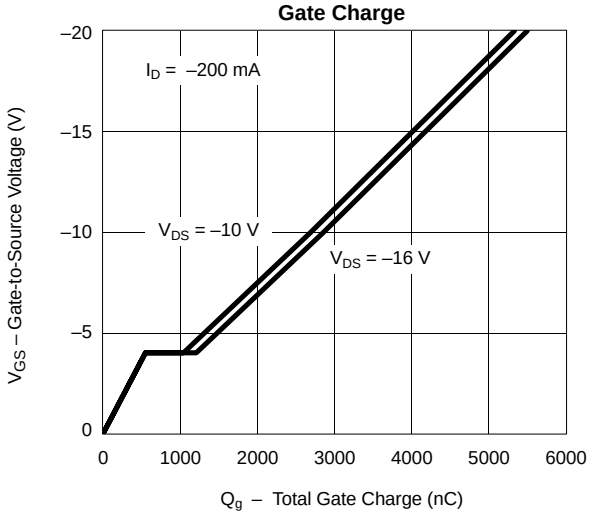
On-Resistance vs. Drain Current



Capacitance

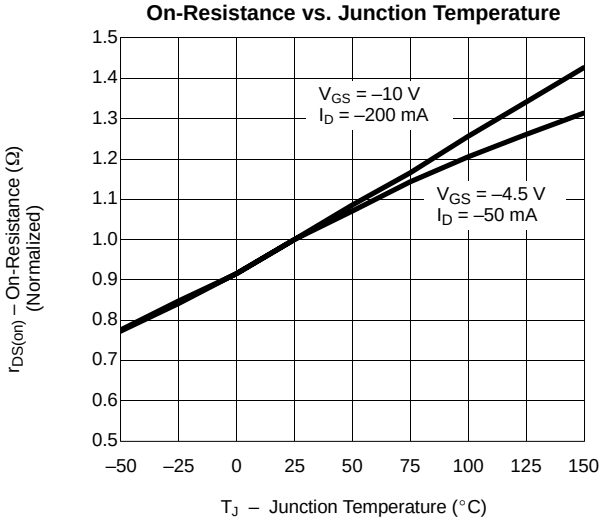


Gate Charge

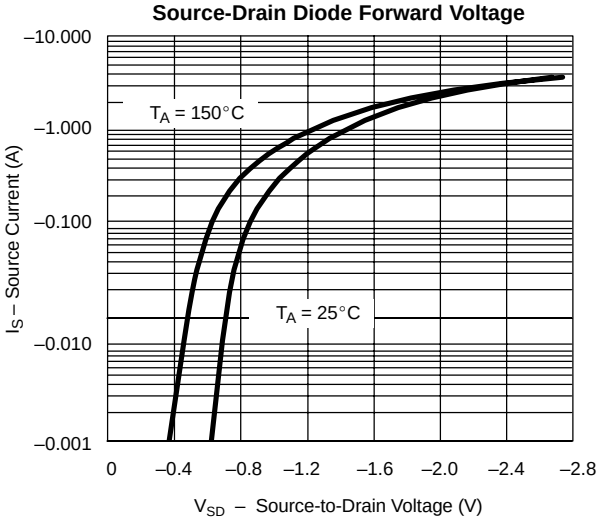


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage



Threshold Voltage Variance Over Temperature