P-Channel Enhancement-Mode MOS Transistor

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	–0.31
	3.5 @ V_{GS} = –4.5 V	–1.3 to – 3 V	–0.16

For applications information see AN804.

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

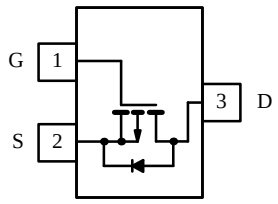
Benefits

- 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

TO-236
(SOT-23)



Top View
TP0202T (P3)*

*Marking Code for TO-236

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	–0.31	A
	T_A= 70°C		–0.25	
Pulsed Drain Current[a]		I_{DM}	–0.75	
Power Dissipation	T_A= 25°C	P_D	0.2	W
	T_A= 70°C		0.128	
Maximum Junction-to-Ambient		R_{thJA}	625	°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.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #2812. Applications information may also be obtained via FaxBack, request document #9804.

Specifications[a]

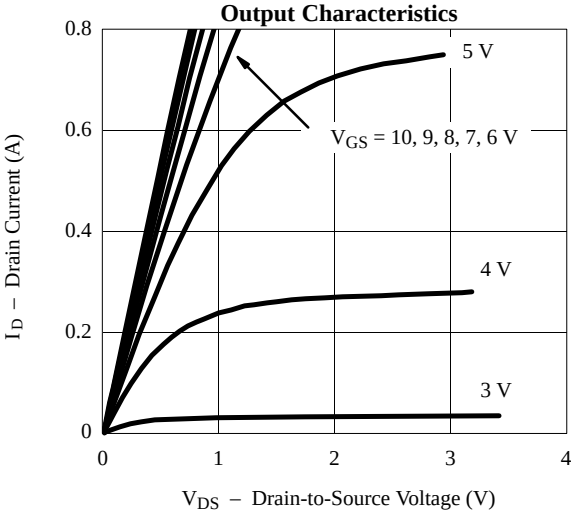
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ[b]	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –10 µA	–20	–25		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = –0.25 mA	–1.3	–2.1	–3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = –16 V, V_{GS} = 0 V			–1	µA
		T_J = 55°C			–10	µA
On-State Drain Current[c]	$I_{D(on)}$	V_{DS} = –10 V, V_{GS} = –10 V	–0.5	–0.75		A
Drain-Source On-Resistance[c]	$r_{DS(on)}$	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	Ω
Forward Transconductance[c]	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		pC
Gate-Drain Charge	Q_{gd}			600		pC
Input Capacitance	C_{iss}	V_{DS} = –15 V, V_{GS} = 0 V, f = 1 MHz		55		pF
Output Capacitance	C_{oss}			50		pF
Reverse Transfer Capacitance	C_{rss}			18		pF
Switching[d]						
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	ns
Turn-Off Time	$t_{d(off)}$			20	35	ns
	t_f			30	40	ns

Notes
a. T_A = 25°C unless otherwise noted.
b. For DESIGN AID ONLY, not subject to production testing.
c. Pulse test: PW ≤300 µs duty cycle ≤2%.
d. Switching time is essentially independent of operating temperature.

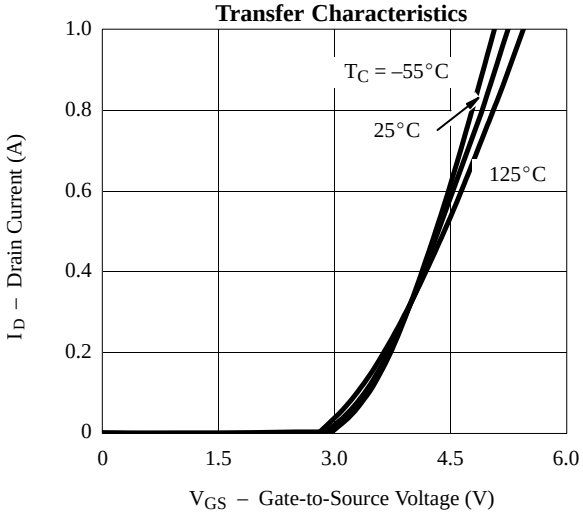
VPBP02

Typical Characteristics (25°C Unless Otherwise Noted)

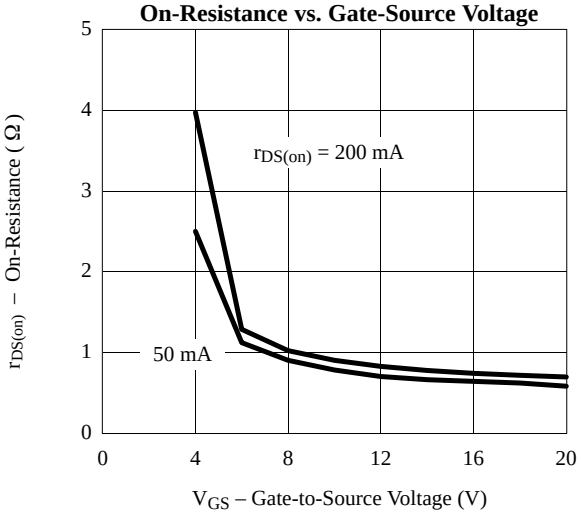
Output Characteristics



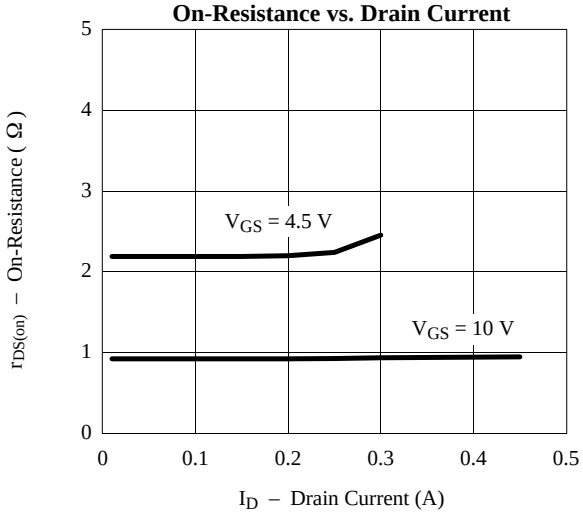
Transfer Characteristics



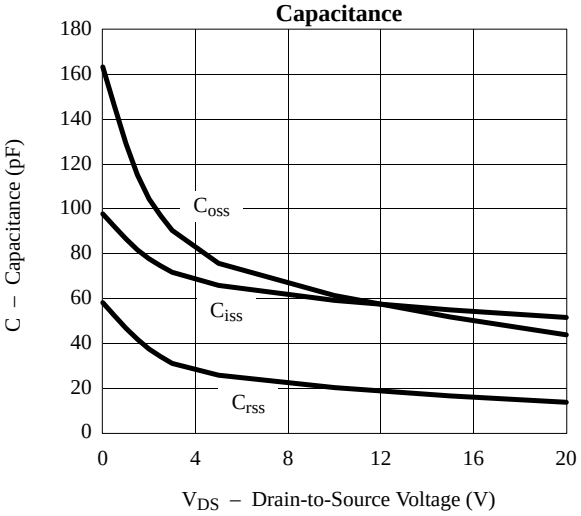
On-Resistance vs. Gate-Source Voltage



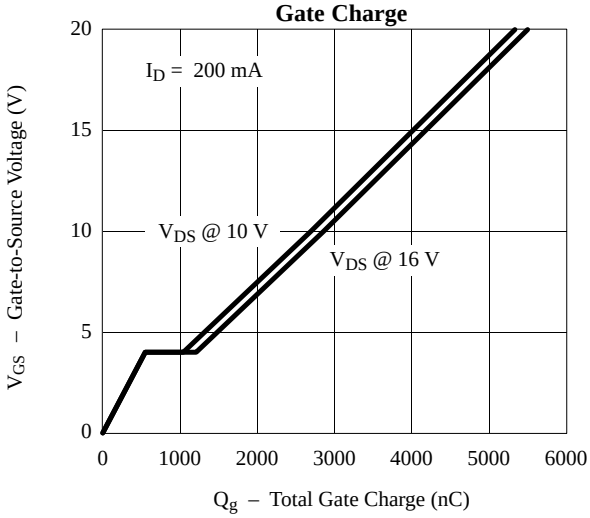
On-Resistance vs. Drain Current



Capacitance

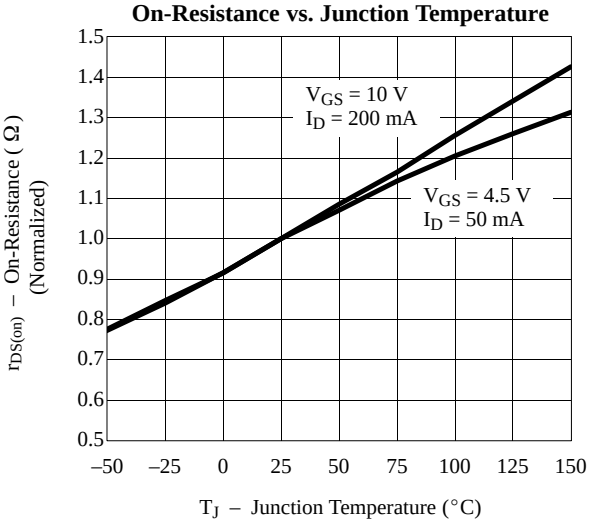


Gate Charge

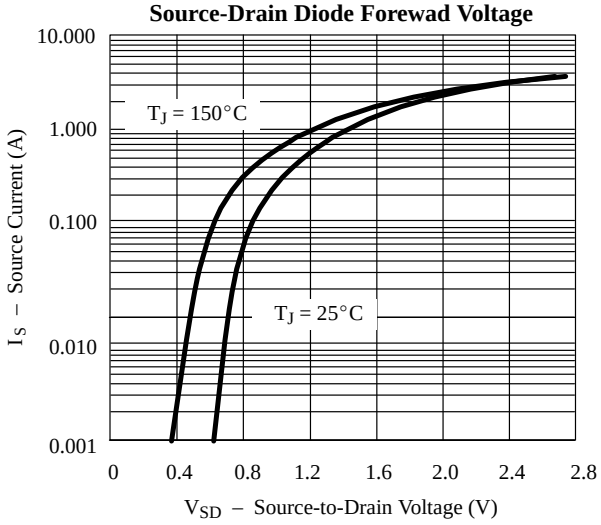


Typical Characteristics (25°C Unless Otherwise Noted)

On-Resistance vs. Junction Temperature



Source-Drain Diode Forewad Voltage



Threshold Voltage Variance Over Temperature