

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

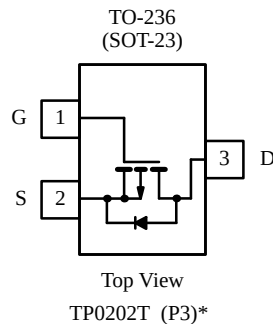
- High-Side Switching
- Low On-Resistance: 0.9 Ω
- Low Threshold: -2.1 V
- Fast Switching Speed: 18 ns
- Low Input Capacitance: 55 pF

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



*Marking Code for TO-236

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	$T_A = 25^\circ\text{C}$ -0.31	A
		$T_A = 70^\circ\text{C}$ -0.25	
Pulsed Drain Current ^a	I_{DM}	-0.75	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$ 0.2	W
		$T_A = 70^\circ\text{C}$ 0.128	
Maximum Junction-to-Ambient	R_{thJA}	625	$^\circ\text{C/W}$
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.

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

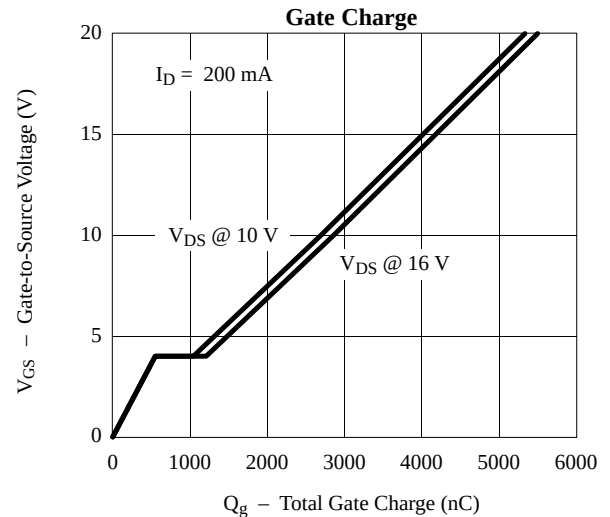
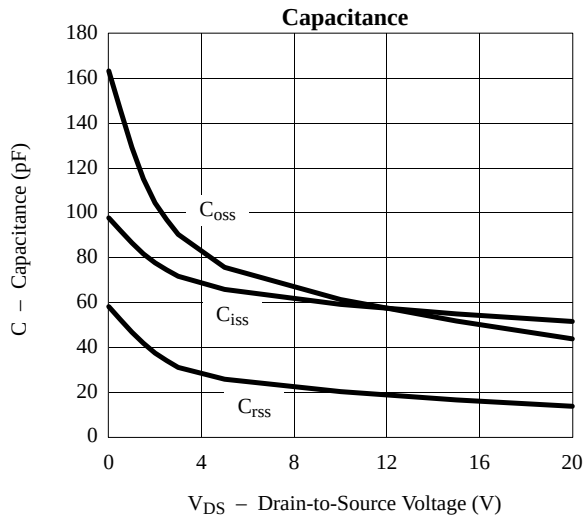
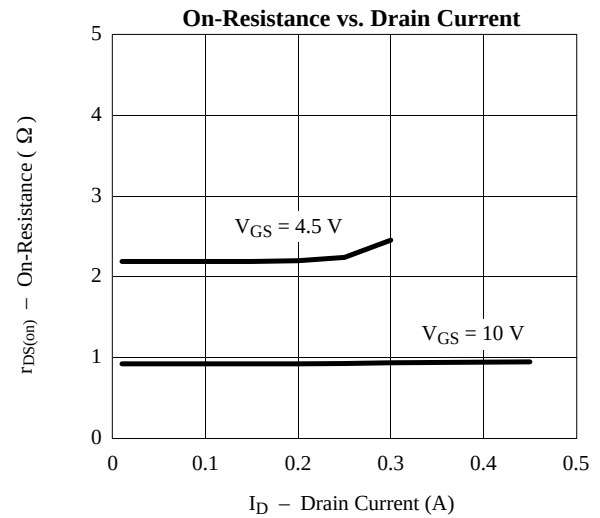
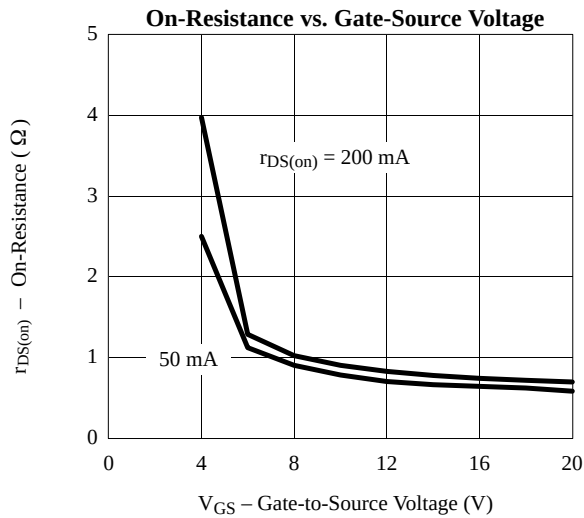
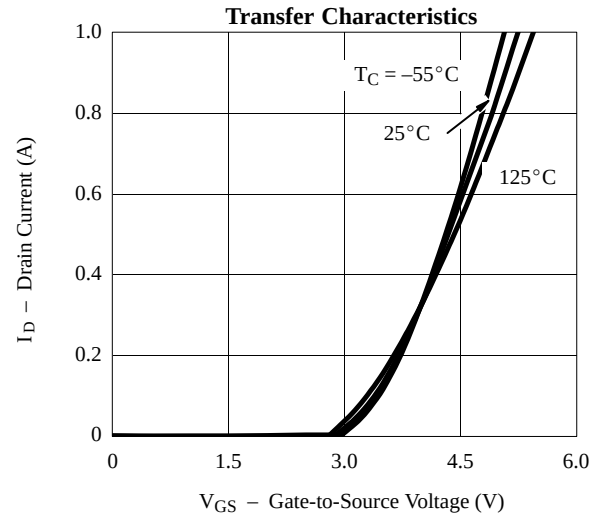
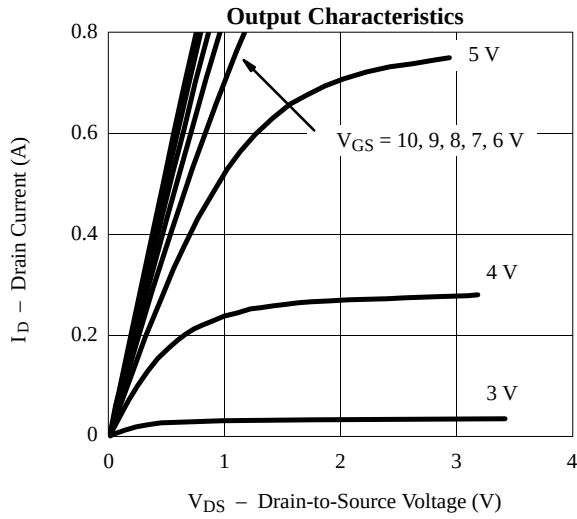
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ ^b	Max	
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = −10 μA	−20	−25		V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = −0.25 mA	−1.3	−2.1	−3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 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 ^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	
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		
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 ^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	
Turn-Off Time	t _{d(off)}			20	35	
	t _f			30	40	

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VPBP02

Typical Characteristics (25°C Unless Otherwise Noted)



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