

P-Channel Enhancement-Mode MOSFET Transistors

Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
VP0300B	-30	2.5 @ $V_{GS} = -12$ V	-2 to -4.5	-1.25
VP0300L		2.5 @ $V_{GS} = -12$ V	-2 to -4.5	-0.32
VP0300M		2.5 @ $V_{GS} = -12$ V	-2 to -4.5	-0.5
VQ2001J		2 @ $V_{GS} = -12$ V	-2 to -4.5	-0.6
VQ2001P		2 @ $V_{GS} = -12$ V	-2 to -4.5	-0.6

Features

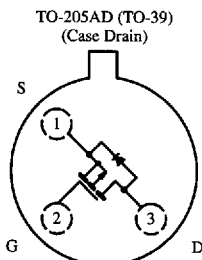
- High-Side Switching
- Low On-Resistance: 1.5 Ω
- Moderate Threshold: -3.1 V
- Fast Switching Speed: 17 ns
- Low Input Capacitance: 60 pF

Benefits

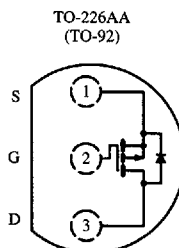
- Ease in Driving Switches
- Low Offset (Error) Voltage
- Low-Voltage Operation
- High-Speed Switching
- Easily Driven Without Buffer

Applications

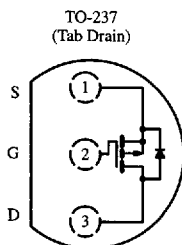
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Battery Operated Systems
- Power Supply, Converter Circuits
- Motor Control



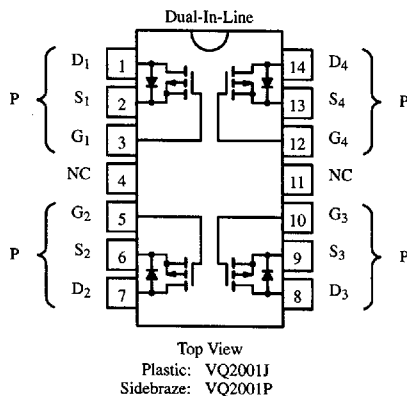
Top View
VP0300B



Top View
VP0300L



Top View
VP0300M



Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70217. Applications information may also be obtained via FaxBack, request document #70611.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	VP0300B	VP0300L	VP0300M	VQ2001J/P		Unit
					Single	Total Quad	
Drain-Source Voltage	V_{DS}	-30	-30	-30	-30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	± 20	± 20	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	I_D	-1.25 ^b	-0.32	-0.5	-0.6	A
	$T_A = 100^\circ\text{C}$		-0.79 ^b	-0.2	-0.32	-0.37	
Pulsed Drain Current ^a	I_{DM}	-3	-2.4	-3	-2	-2	
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	6.25 ^b	0.8	1	2	W
	$T_A = 100^\circ\text{C}$		2.5 ^b	0.32	0.4	0.52	
Maximum Junction-to-Ambient	$R_{\theta JA}$	20 ^b	156	125	96	62.5	$^\circ\text{C/W}$
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.
b. Power dissipation and continuous drain current at $T_C = 25^\circ\text{C}$; $R_{\theta JC} = 20^\circ\text{C/W}$.

Specifications^a

Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VP0300B/L/M		VQ2001J/P		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -10 μA	-55	-30		-30		V
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -1 mA	-3.1	-2	-4.5	-2	-4.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 16 V					± 100	nA
		T _J = 125°C					± 500	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100			μA
		V _{DS} = -24 V, V _{GS} = 0 V			-10			
		T _J = 125°C			-500		-500	
		V _{DS} = -30 V, V _{GS} = 0 V					-10	
On-State Drain Current ^c	I _{D(on)}	V _{DS} = -10 V, V _{GS} = -12 V	-2.8	-1.5		-1.5		A
Drain-Source On-Resistance ^c	r _{DS(on)}	V _{GS} = -12 V, I _D = -1 A	1.5		2.5		2	Ω
		T _J = 125°C	2.6		3.6		3.6	
Forward Transconductance ^c	g _{fs}	V _{DS} = -10 V, I _D = -0.5 A	370	200		200		mS
Common Source Output Conductance ^c	g _{os}	V _{DS} = -7.5 V, I _D = -0.05 A	0.25					
Dynamic								
Input Capacitance	C _{iss}	V _{DS} = -15 V, V _{GS} = 0 V f = 1 MHz	60		150		150	pF
Output Capacitance	C _{oss}		40		100		100	
Reverse Transfer Capacitance	C _{rss}		10		60		60	

Specifications^a

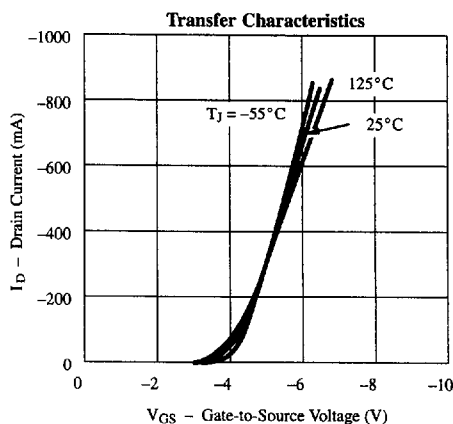
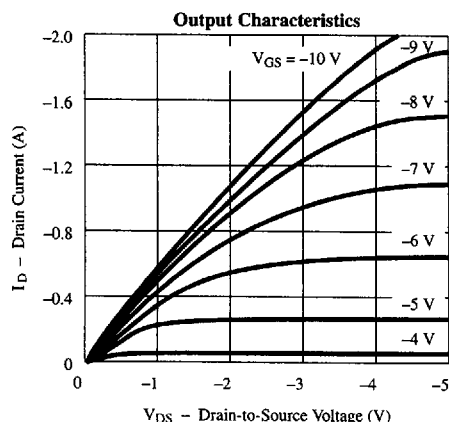
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VP0300B/L/M		VQ2001J/P		
				Min	Max	Min	Max	
Switching ^d								
Turn-On Time	t _{ON}	V _{DD} = -25 V, R _L = 23 Ω I _D ≅ -1 A, V _{GEN} = -10 V R _G = 25 Ω	19		30			ns
Turn-Off Time	t _{OFF}		17		30			
Turn-On Time	t _{ON}	V _{DD} = -15 V, R _L = 23 Ω I _D ≅ -0.6 A, V _{GEN} = -10 V R _G = 25 Ω	19				30	
Turn-Off Time	t _{OFF}		16				30	

Notes

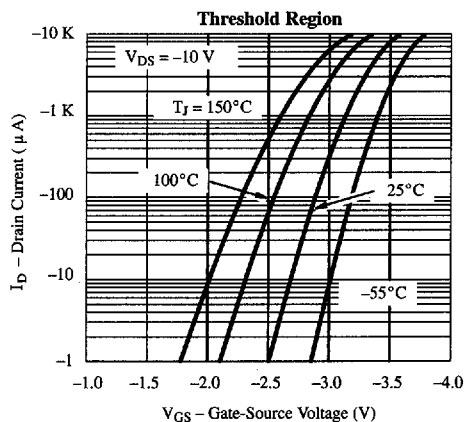
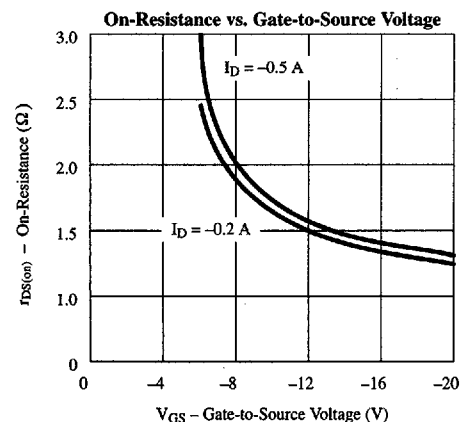
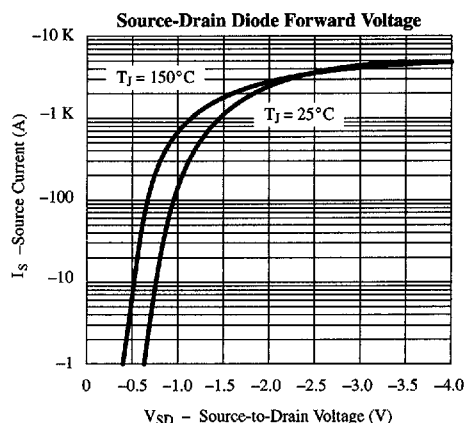
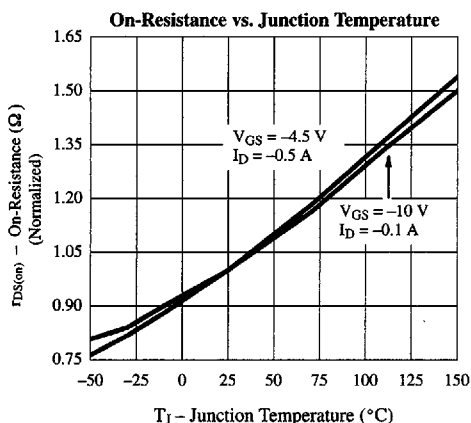
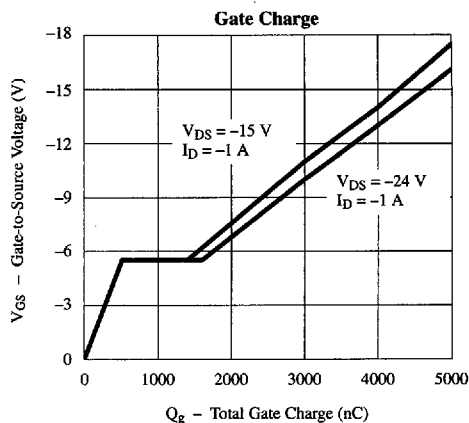
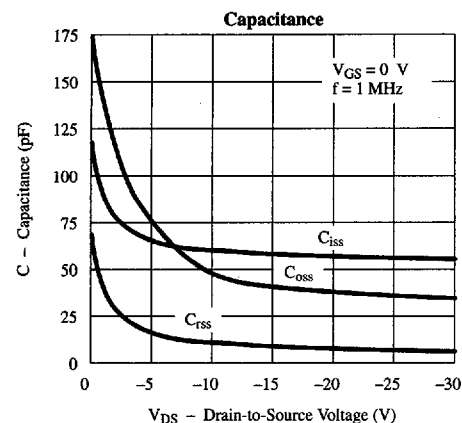
- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VPEA03

Typical Characteristics (25°C Unless Otherwise Noted)

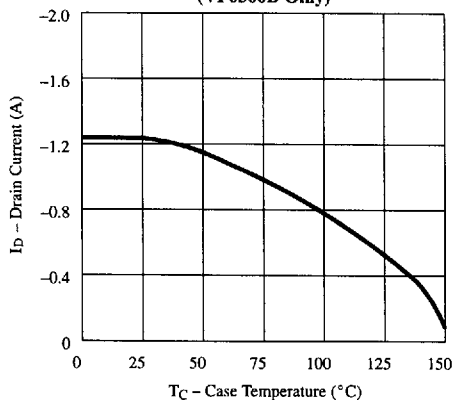


Typical Characteristics (25°C Unless Otherwise Noted)

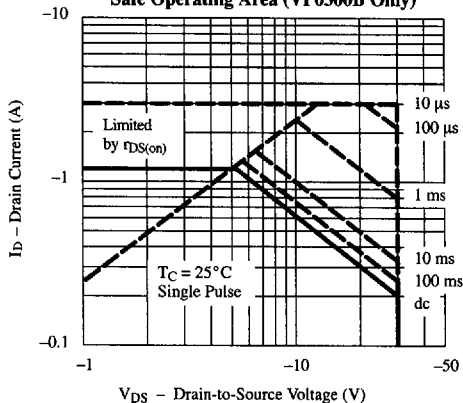


Thermal Ratings

Maximum Drain Current vs. Case Temperature
(VP0300B Only)



Safe Operating Area (VP0300B Only)



Normalized Effective Transient Thermal Impedance, Junction-to-Ambient (TO-226AA, VP0300L Only)

