

P-Channel Enhancement-Mode MOS 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

For applications information see AN804

Features

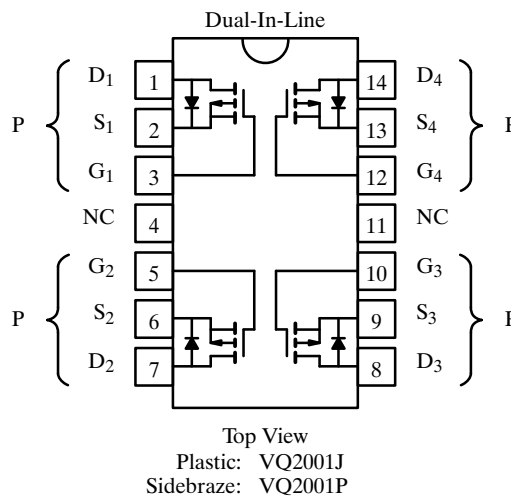
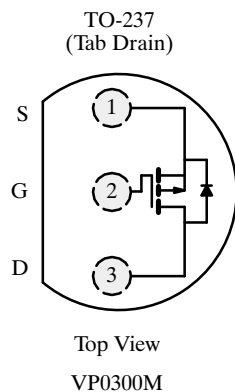
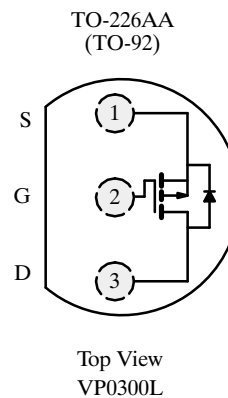
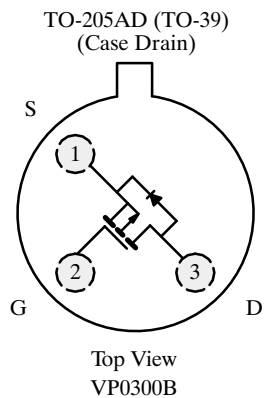
- High-Side Switching
- Low On-Resistance: 1.5 Ω
- Moderate Threshold: -3.1 V
- Fast Switching Speed: 17 ns
- Low Input Capacitance: 60 pF

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



VP0300B/L/M, VQ2001J/P

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 ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	-1.25 ^b	-0.32	-0.5	-0.6	-0.6	A
		$T_A = 100^\circ\text{C}$	-0.79 ^b	-0.2	-0.32	-0.37	-0.37	
Pulsed Drain Current ^a	I_{DM}	-3	-2.4	-3	-2	-2		
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	6.25 ^b	0.8	1	1.3	2	W
		$T_A = 100^\circ\text{C}$	2.5 ^b	0.32	0.4	0.52	0.8	
Maximum Junction-to-Ambient	R_{thJA}	20 ^b	156	125	96	62.5	$^\circ\text{C}/\text{W}$	
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 $T_C = 25^\circ\text{C}$; $R_{thJC} = 20^\circ\text{C}/\text{W}$.

Specifications^a

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

Specifications^a

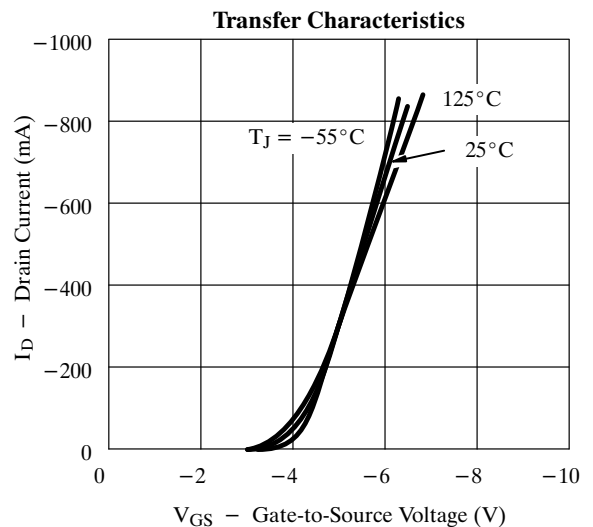
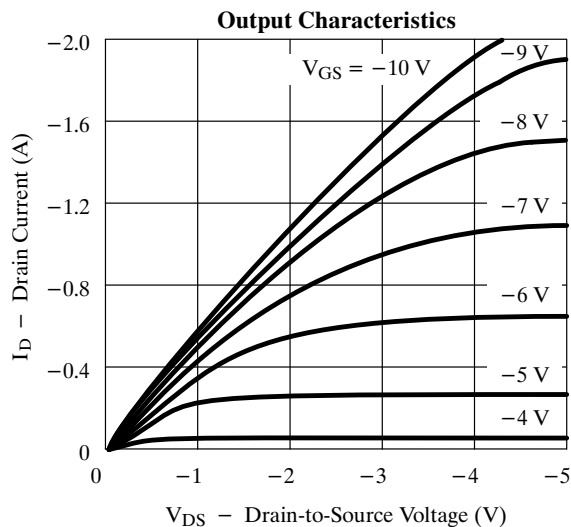
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VP0300B/L/M		VQ2001J/P		
				Min	Max	Min	Max	
Switching^d								
Turn-On Time	t_{ON}	$V_{DD} = -25\text{ V}, R_L = 23\ \Omega$ $I_D \cong -1\text{ A}, V_{GEN} = -10\text{ V}$ $R_G = 25\ \Omega$	19		30			ns
Turn-Off Time	t_{OFF}		17		30			
Turn-On Time	t_{ON}	$V_{DD} = -15\text{ V}, R_L = 23\ \Omega$ $I_D \cong -0.6\text{ A}, V_{GEN} = -10\text{ V}$ $R_G = 25\ \Omega$	19				30	
Turn-Off Time	t_{OFF}		16				30	

Notes

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

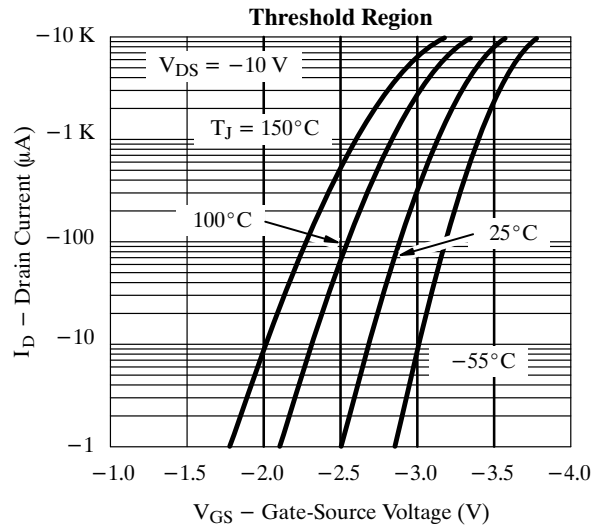
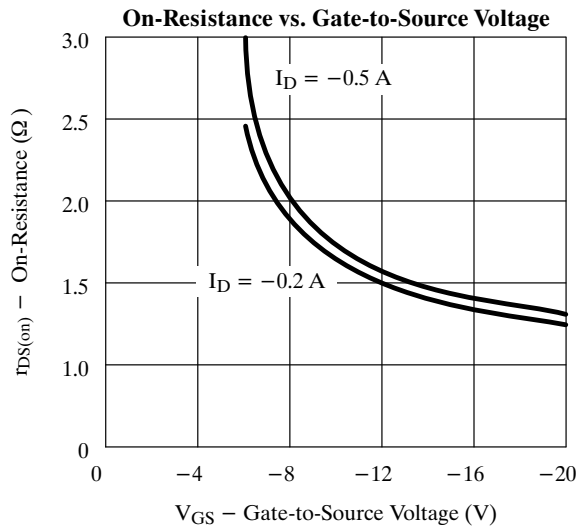
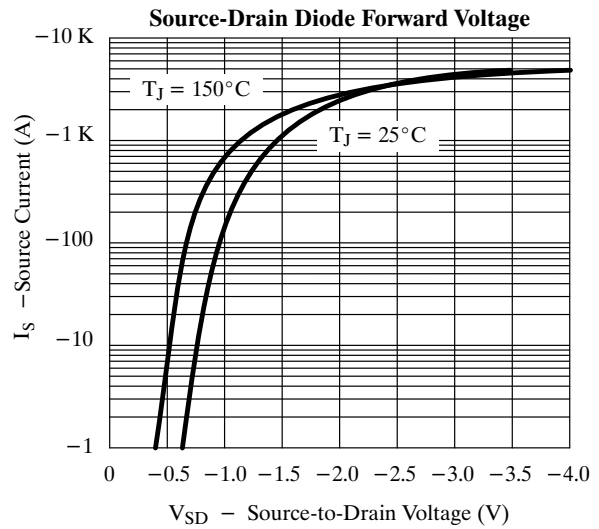
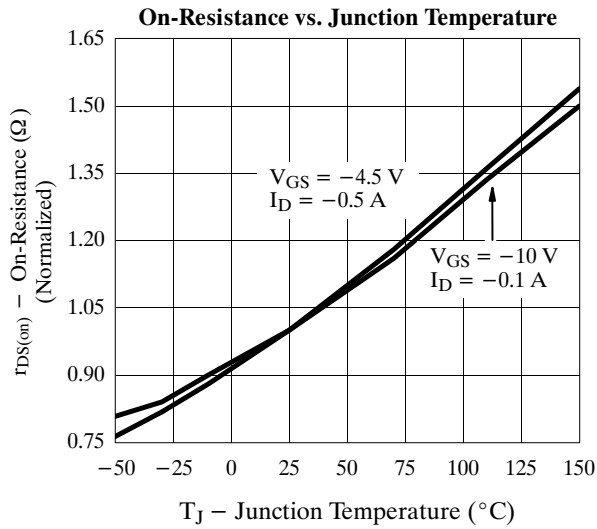
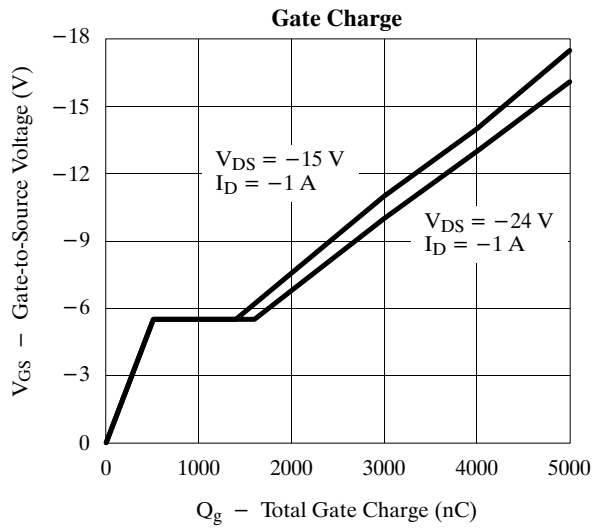
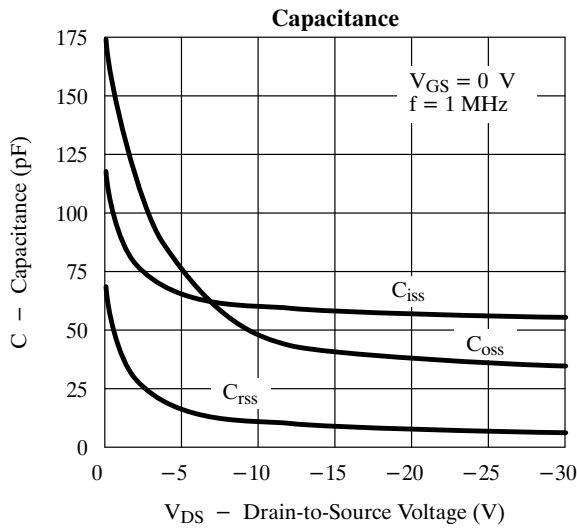
VPEA03

Typical Characteristics (25°C Unless Otherwise Noted)



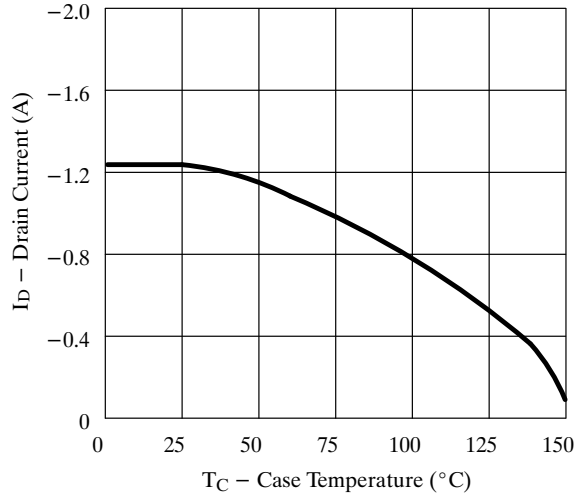
VP0300B/L/M, VQ2001J/P

Typical Characteristics (25°C Unless Otherwise Noted)

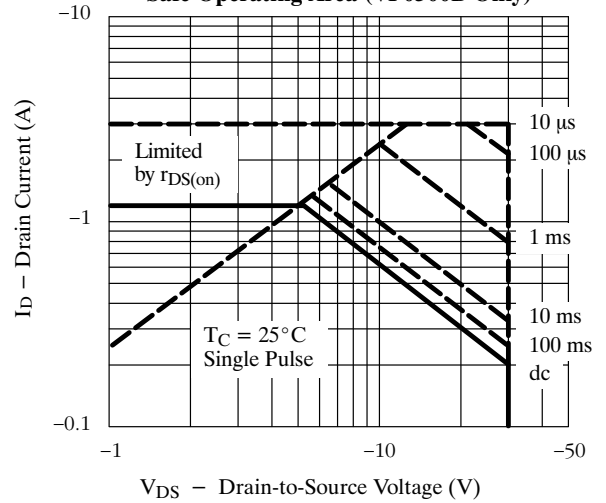


Thermal Ratings

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)

