

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)
-60	5 @ $V_{GS} = -10$ V	-2 to -4.5	-0.41

Features

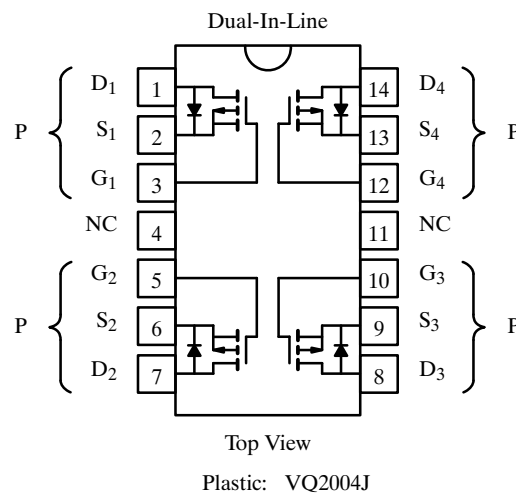
- High-Side Switching
- Low On-Resistance: 2.5 Ω
- Moderate Threshold: -3.4 V
- Fast Switching Speed: 40 ns
- Low Input Capacitance: 75 pF

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



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

Parameter	Symbol	Single	Total Quad	Unit	
Drain-Source Voltage	V_{DS}	-60		V	
Gate-Source Voltage	V_{GS}	± 30			
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	-0.41	A	
		$T_A = 100^\circ\text{C}$	-0.23		
Pulsed Drain Current	I_{DM}	-3			
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	1.3	2	W
		$T_A = 100^\circ\text{C}$	0.52	0.8	
Maximum Junction-to-Ambient	R_{thJA}	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.

VQ2004J

Specifications^a

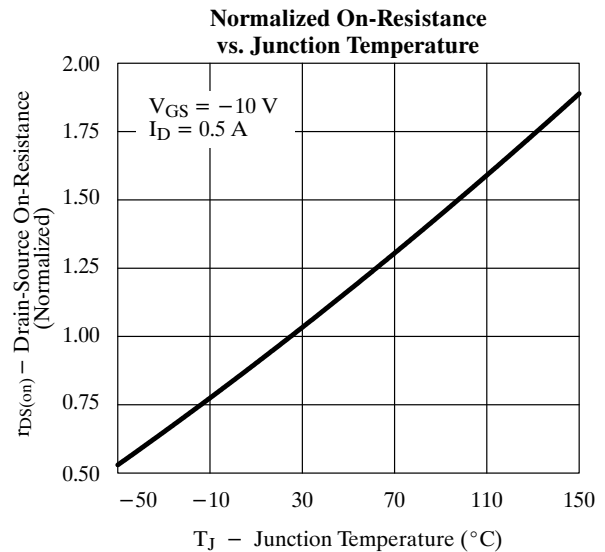
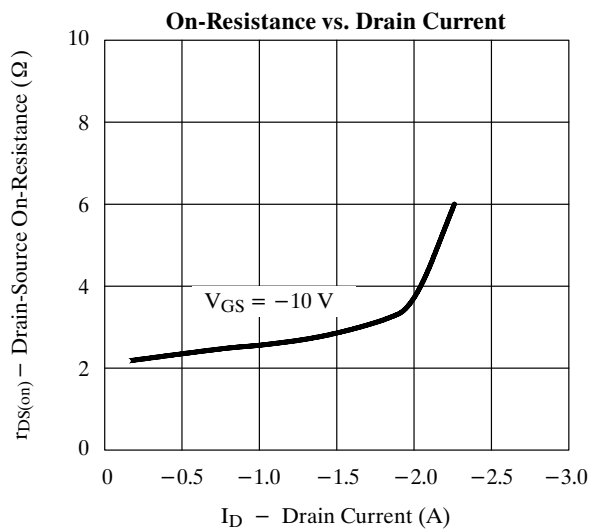
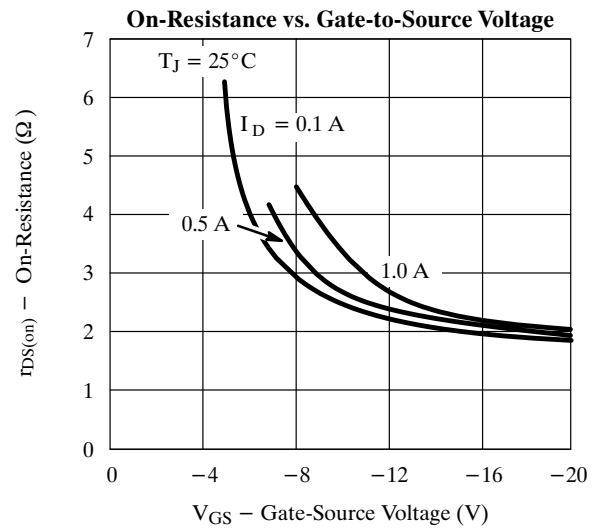
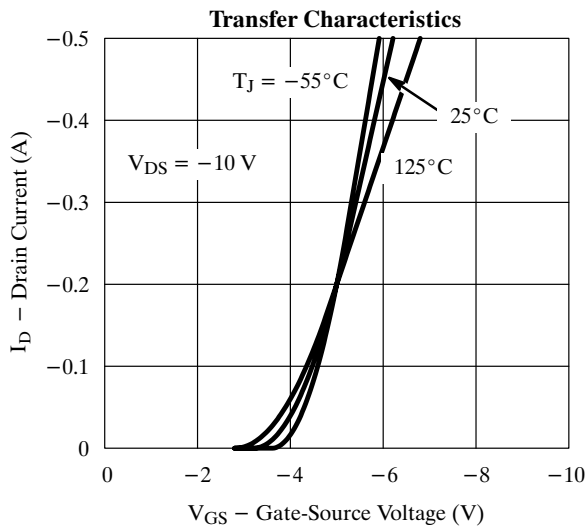
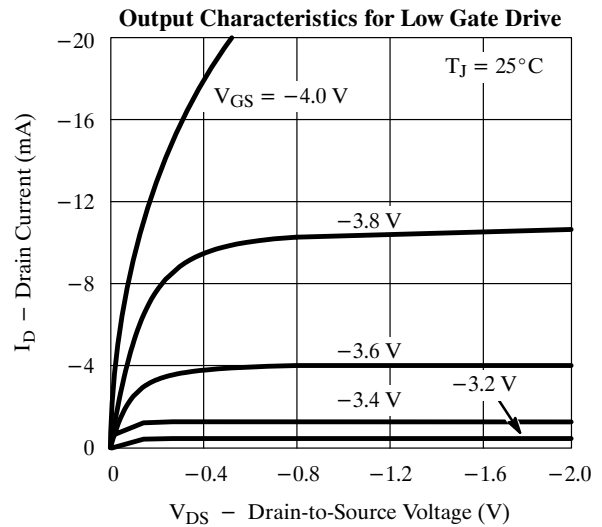
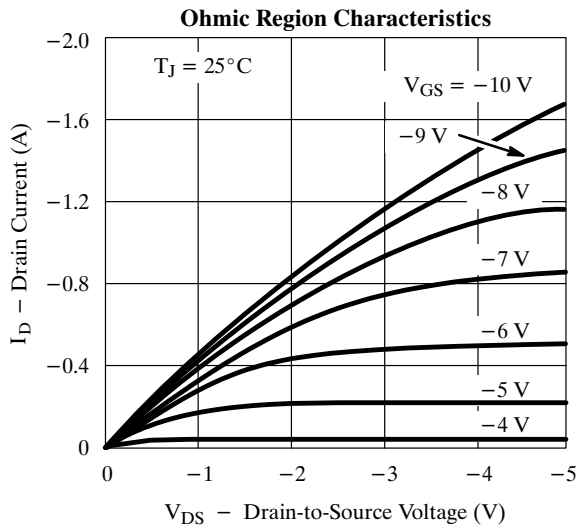
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ ^b	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -10\text{ }\mu\text{A}$	-60	-110		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -1\text{ mA}$	-2	-3.4	-4.5	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 30\text{ V}$ $T_J = 125^\circ\text{C}$			± 100	nA
					± 500	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-10	μA
		$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			-500	
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = -10\text{ V}, V_{GS} = -10\text{ V}$	-1	-2		A
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -1\text{ A}$ $T_J = 125^\circ\text{C}$		2.5	5	Ω
				4.4	8	
Forward Transconductance ^c	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -0.5\text{ A}$	200	325		mS
Common Source Output Conductance ^c	g_{os}	$V_{DS} = -7.5\text{ V}, I_D = -0.1\text{ A}$		0.45		
Dynamic						
Input Capacitance	C_{iss}	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$		75	150	pF
Output Capacitance	C_{oss}			40	60	
Reverse Transfer Capacitance	C_{rss}			18	25	
Switching^d						
Turn-On Time	$t_{d(on)}$	$V_{DD} = -25\text{ V}, R_L = 47\text{ }\Omega$ $I_D \cong -0.5\text{ A}, V_{GEN} = -10\text{ V}$ $R_G = 25\text{ }\Omega$		11	15	ns
	t_r			30	40	
Turn-Off Time	$t_{d(off)}$			20	30	
	t_f			20	30	

Notes

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

VPDV10

Typical Characteristics (25°C Unless Otherwise Noted)



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Typical Characteristics (25°C Unless Otherwise Noted) (Cont'd)

