



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)
VP2020L	-200	20 @ $V_{GS} = -4.5$ V	-0.8 to -2.5	-0.12
BSS92	-200	20 @ $V_{GS} = -10$ V	-0.8 to -2.8	-0.15

FEATURES

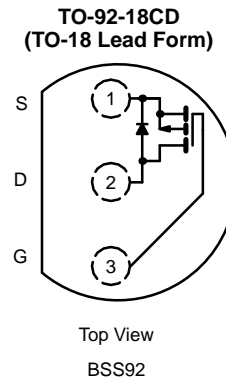
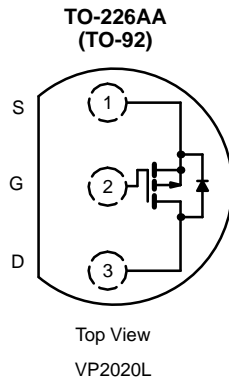
- High-Side Switching
- Secondary Breakdown Free: -220 V
- Low On-Resistance: 11.5 Ω
- Low-Power/Voltage Driven
- Excellent Thermal Stability

BENEFITS

- Ease in Driving Switches
- Full-Voltage Operation
- Low Offset Voltage
- Easily Driven Without Buffer
- No High-Temperature “Run-Away”

APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.
- Power Supply, Converters
- Motor Control
- Switches



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter	Symbol	VP2020L	BSS92	Unit
Drain-Source Voltage	V_{DS}	-200	-200	V
Gate-Source Voltage	V_{GS}	± 20	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	-0.12	A
		$T_A = 100^\circ\text{C}$	-0.08	
Pulsed Drain Current ^a	I_{DM}	-0.48	-0.6	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.8	W
		$T_A = 100^\circ\text{C}$	0.32	
Maximum Junction-to-Ambient	R_{thJA}	156	125	$^\circ\text{C}/\text{W}$
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.



SPECIFICATIONS ^a								
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VP2020L		BSS92		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	-220			-200		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -1\ \text{mA}$	-1.9	-0.8	-2.5	-0.8	-2.8	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$ $T_J = 125^\circ\text{C}$			± 10 ± 50		± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0\ \text{V}$ $T_J = 125^\circ\text{C}$			-1			μA
		$V_{DS} = -200\ \text{V}, V_{GS} = 0\ \text{V}$ $T_J = 125^\circ\text{C}$			-100			
		$V_{DS} = -60\ \text{V}, V_{GS} = 0\ \text{V}$					-60	
							-200	
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = -10\ \text{V}, V_{GS} = -4.5\ \text{V}$	-250	-100				mA
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = -10\ \text{V}, I_D = -0.1\ \text{A}$	11.5				20	Ω
		$V_{GS} = -4.5\ \text{V}, I_D = -0.1\ \text{A}$ $T_J = 125^\circ\text{C}$	15		20			
		$V_{GS} = -4.5\ \text{V}, I_D = -0.05\ \text{A}$ $T_J = 125^\circ\text{C}$	15					
			28		40			
Forward Transconductance ^c	g_{fs}	$V_{DS} = -10\ \text{V}, I_D = -0.1\ \text{A}$	170	100				mS
		$V_{DS} = -25\ \text{V}, I_D = -0.1\ \text{A}$	170			60		
Diode Forward Voltage	V_{SD}	$I_S = -0.3\ \text{A}, V_{GS} = 0\ \text{V}$	-0.9				-1.2	V
Dynamic								
Input Capacitance	C_{iss}	$V_{DS} = -25\ \text{V}, V_{GS} = 0\ \text{V}$ $f = 1\ \text{MHz}$	30		70		130	pF
Output Capacitance	C_{oss}		10		20		30	
Reverse Transfer Capacitance	C_{rss}		3		10		15	
Switching^d								
Turn-On Time	t_{ON}	$V_{DD} = -25\ \text{V}, R_L = 250\ \Omega$ $I_D \cong -0.1\ \text{A}, V_{GEN} = -10\ \text{V}$ $R_G = 25\ \Omega$	14					ns
	$t_{d(on)}$		6		10			
	t_r		8		15			
Turn-Off Time	t_{OFF}		35					
	$t_{d(off)}$		18		30			
	t_f		17		25			

Notes

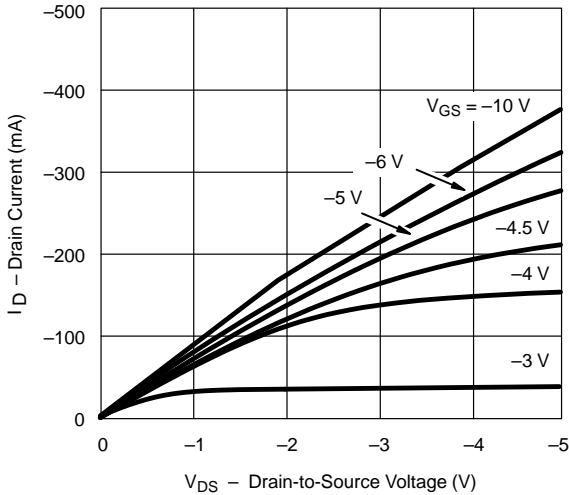
- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VPDQ20

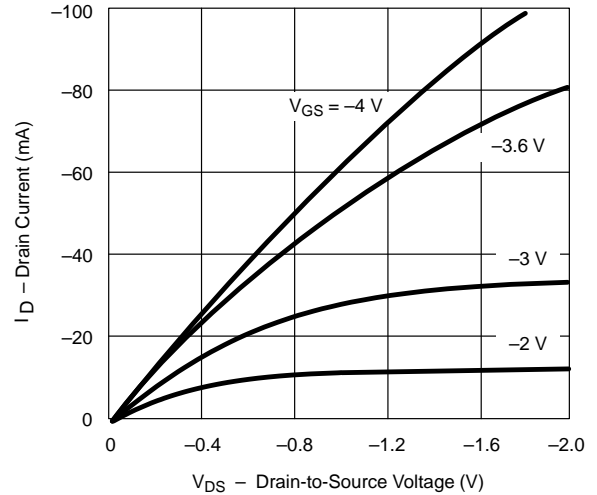


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

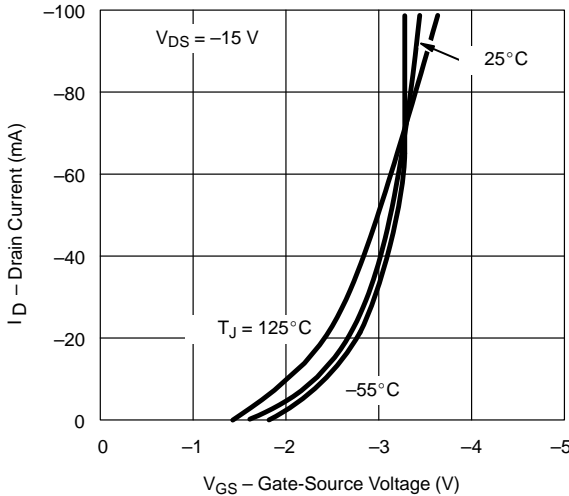
Ohmic Region Characteristics



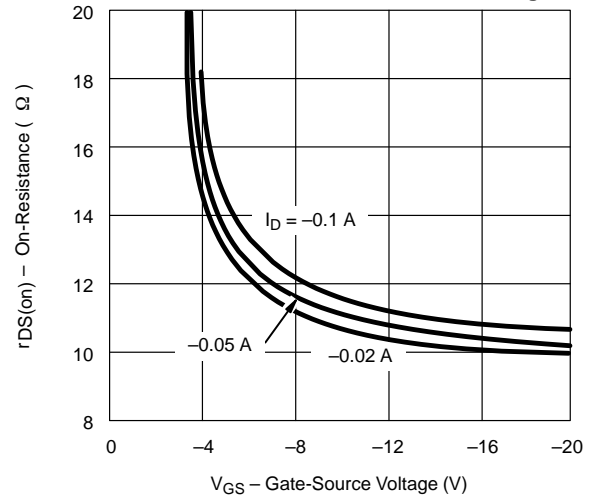
Output Characteristics for Low Gate Drive



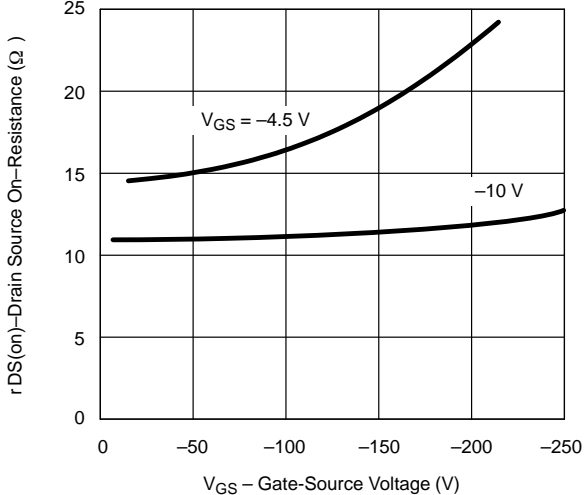
Transfer Characteristics



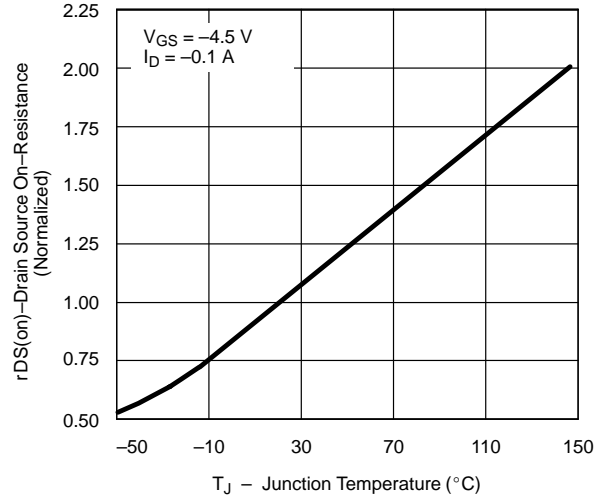
On-Resistance vs. Gate-to-Source Voltage



On-Resistance



Normalized On-Resistance vs. Junction Temperature





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

