

P-Channel 200-V (D-S) MOSFETs

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

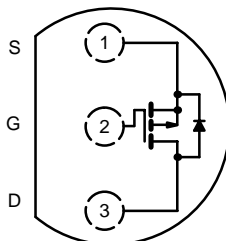
BENEFITS

- 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

**TO-226AA
(TO-92)**



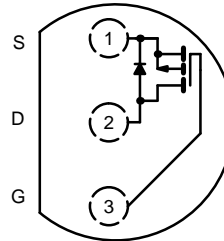
Top View
VP2020L

Device Marking
Front View

"S" VP
2020L
xxyy

"S" = Siliconix Logo
xxyy = Date Code

**TO-92-18CD
(TO-18 Lead Form)**



Top View
BSS92

Device Marking
Front View

"S" BS
S92
xxyy

"S" = Siliconix Logo
xxyy = Date Code

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	
Thermal Resistance, 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 (T _A = 25 °C UNLESS OTHERWISE NOTED)								
Parameter	Symbol	Test Conditions	Typ ^a	Limits				Unit
				VP2020L		BSS92		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -10 μA		-220				V
		V _{GS} = 0 V, I _D = -250 μA	-220			-200		
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -1 mA	-1.9	-0.8	-2.5	-0.8	-2.8	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±10		±100	nA
		T _J = 125 °C			±50			
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 0.8 × V _{(BR)DSS} , V _{GS} = 0 V			-1			μA
		T _J = 125 °C			-100			
		V _{DS} = -200 V, V _{GS} = 0 V					-60	
		T _J = 125 °C					-200	
		V _{DS} = -60 V, V _{GS} = 0 V					-0.2	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = -10 V, V _{GS} = -4.5 V	-250	-100				mA
Drain-Source On-Resistance ^b	r _{DS(on)}	V _{GS} = -10 V, I _D = -0.1 A	11.5				20	Ω
		V _{GS} = -4.5 V, I _D = -0.1 A	15		20			
		T _J = 125 °C	28		40			
		V _{GS} = -4.5 V, I _D = -0.05 A	15					
		T _J = 125 °C	28					
Forward Transconductance ^b	g _{fs}	V _{DS} = -10 V, I _D = -0.1 A	170	100				mS
		V _{DS} = -25 V, I _D = -0.1 A	170			60		
Diode Forward Voltage	V _{SD}	I _S = -0.3 A, V _{GS} = 0 V	-0.9				-1.2	V
Dynamic								
Input Capacitance	C _{iSS}	V _{DS} = -25 V, V _{GS} = 0 V f = 1 MHz	30		70		130	pF
Output Capacitance	C _{oss}		10		20		30	
Reverse Transfer Capacitance	C _{rSS}		3		10		15	
Switching^c								
Turn-On Time	t _{d(on)}	V _{DD} = -25 V, R _L = 250 Ω I _D ≅ -0.1 A, V _{GEN} = -10 V R _G = 25 Ω	6		10			ns
	t _r		8		15			
Turn-Off Time	t _{d(off)}		18		30			
	t _f		17		25			

Notes

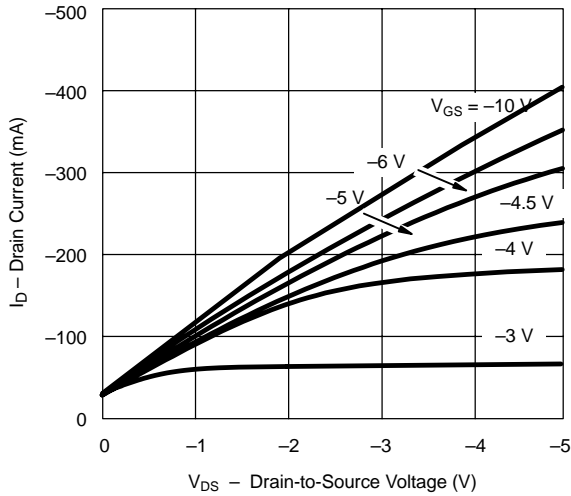
- a. For DESIGN AID ONLY, not subject to production testing.
- b. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
- c. Switching time is essentially independent of operating temperature.

VPDQ20

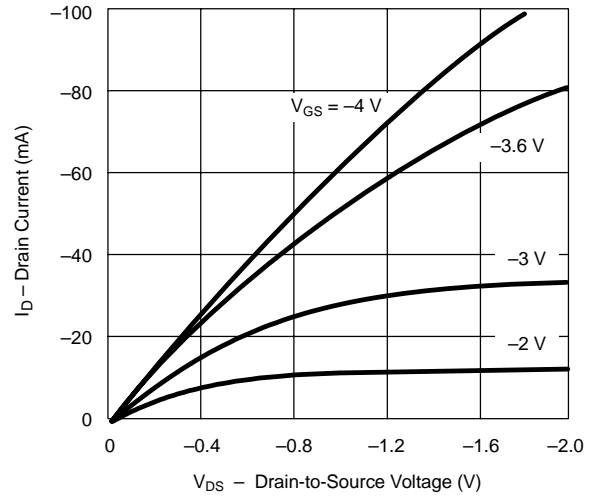


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

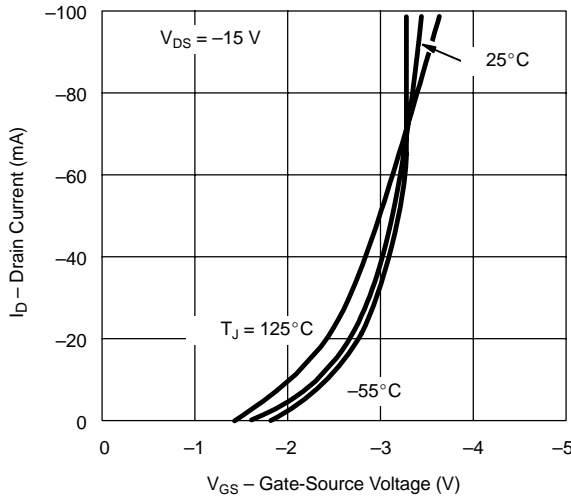
Ohmic Region Characteristics



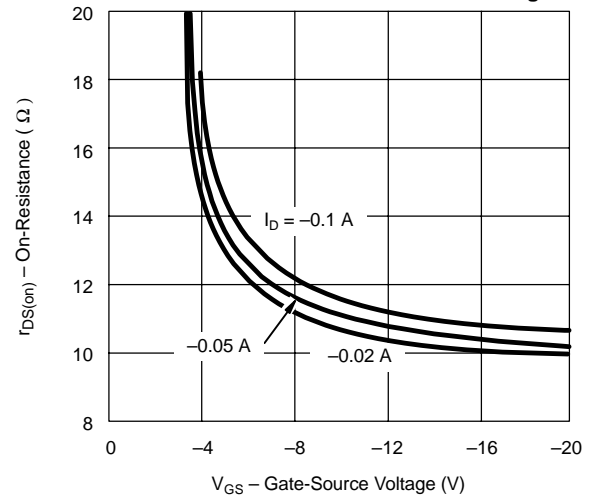
Output Characteristics for Low Gate Drive



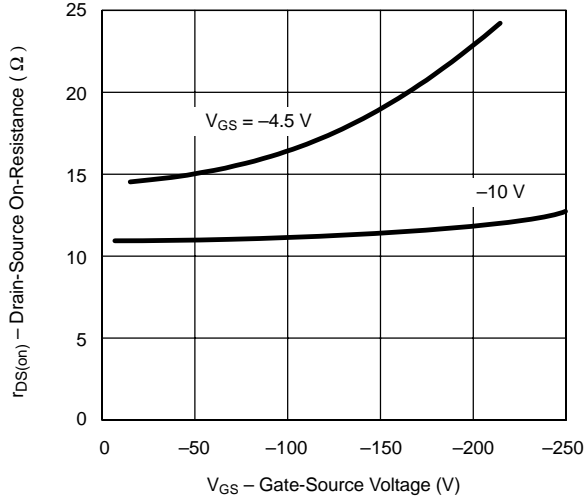
Transfer Characteristics



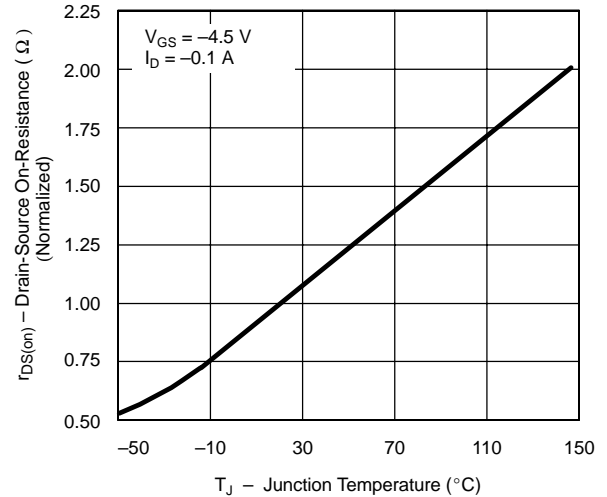
On-Resistance vs. Gate-to-Source Voltage



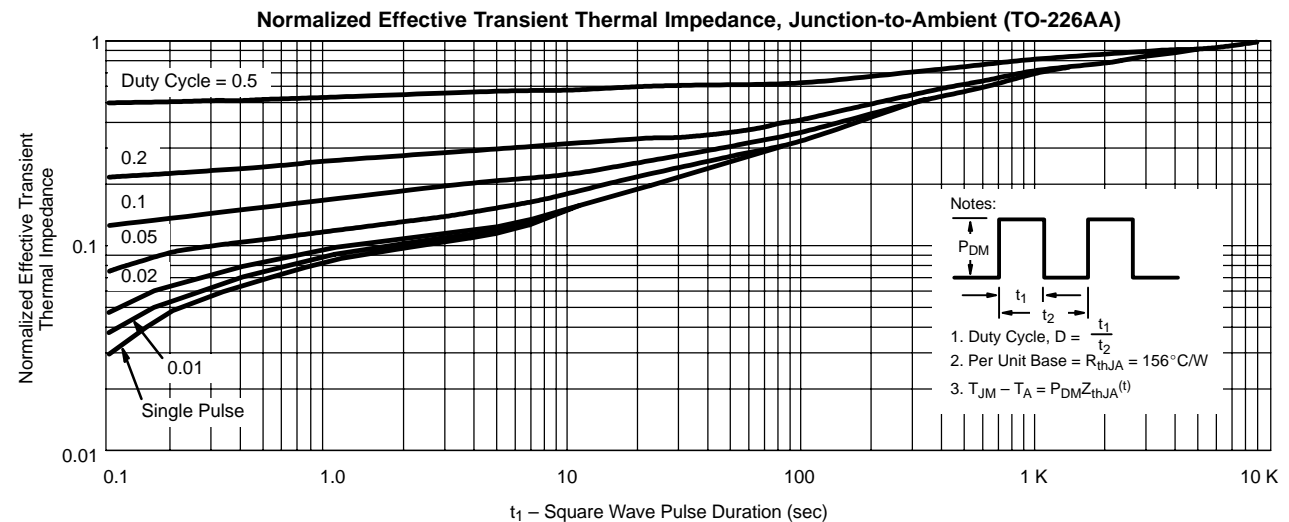
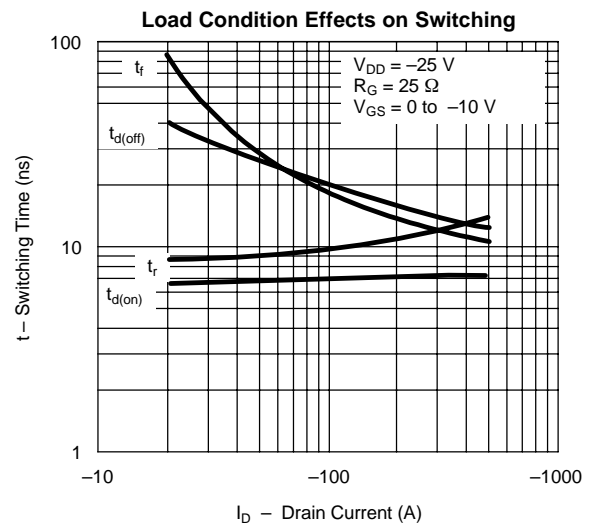
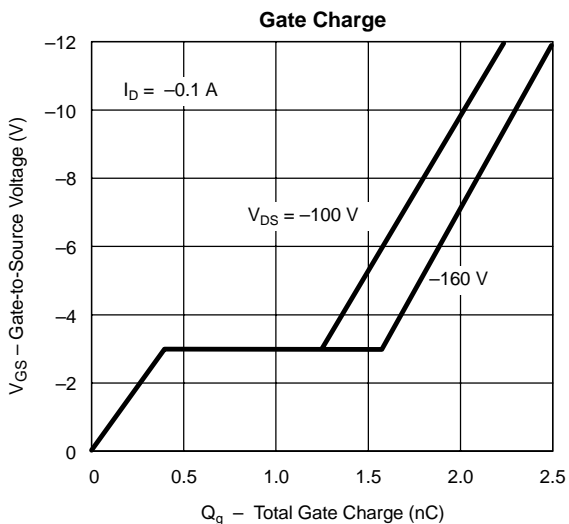
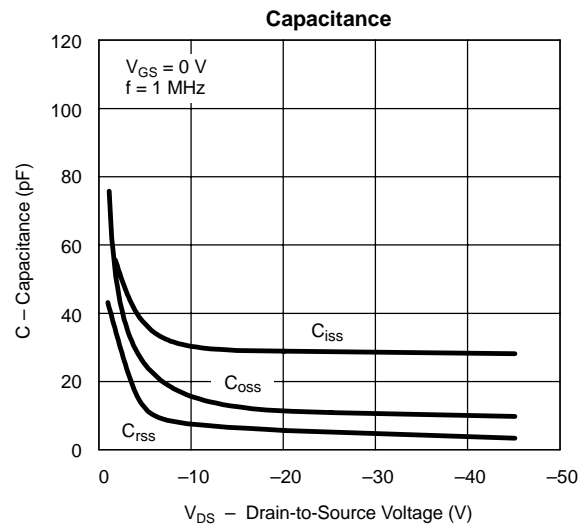
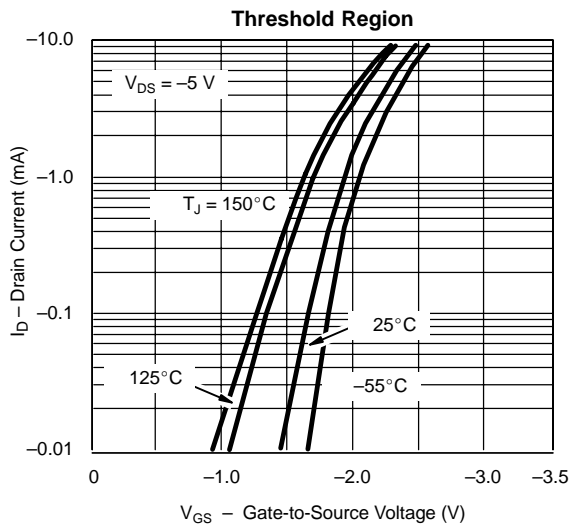
On-Resistance



Normalized On-Resistance vs. Junction Temperature



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)



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Datasheets for electronics components.