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

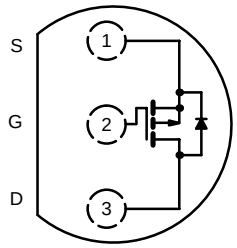
BENEFITS

- 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

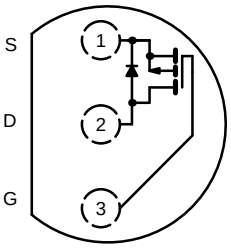
VP2020L

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°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°C)	T_A= 25°C	I_D	–0.12	–0.15	A
	T_A= 100°C		–0.08	–0.09	
Pulsed Drain Current[a]		I_{DM}	–0.48	–0.6	
Power Dissipation	T_A= 25°C	P_D	0.8	1.0	W
	T_A= 100°C		0.32	0.4	
Thermal Resistance, Junction-to-Ambient		R_{thJA}	156	125	°C/W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	–55 to 150		°C

Notes
a. Pulse width limited by maximum junction temperature.

SPECIFICATIONS (T_A = 25°C UNLESS OTHERWISE NOTED)

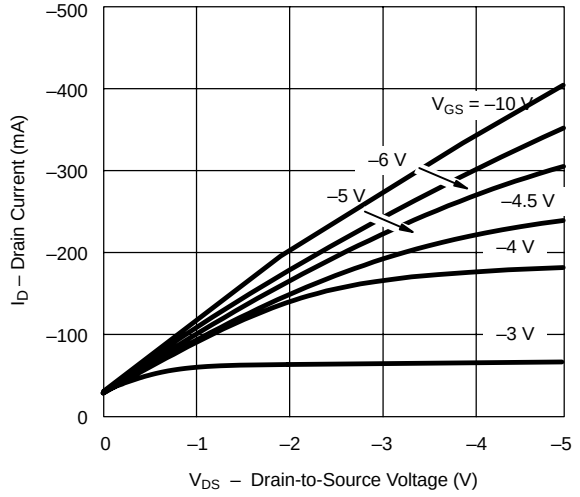
Parameter	Symbol	Test Conditions	Typ[a]	Limits VP2020L Min	Limits VP2020L Max	Limits BSS92 Min	Limits BSS92 Max	Unit
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –10 µA		–220				V
		V_{GS} = 0 V, I_D = –250 µA	–220			–200		
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = 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 x $V_{(BR)DSS}$, 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.

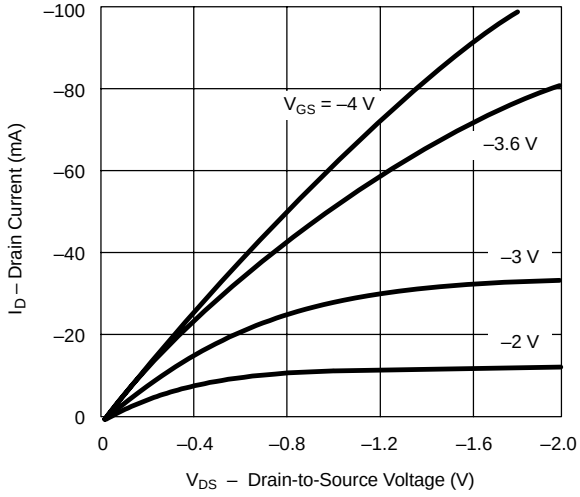
VPDQ20

TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

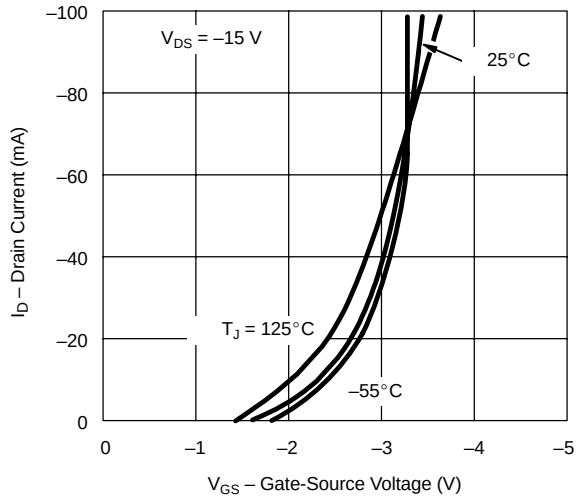
Ohmic Region Characteristics



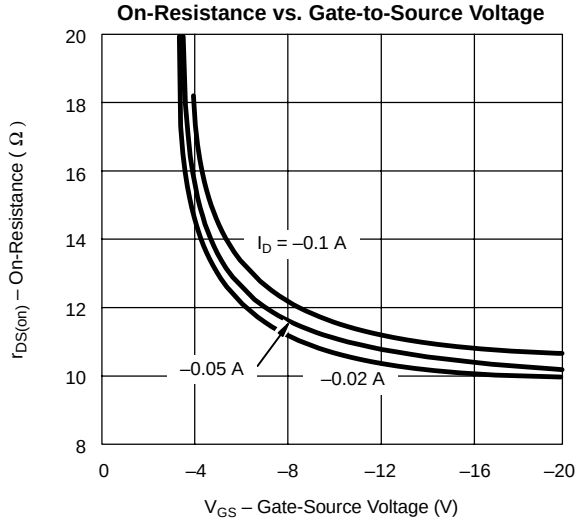
Output Characteristics for Low Gate Drive



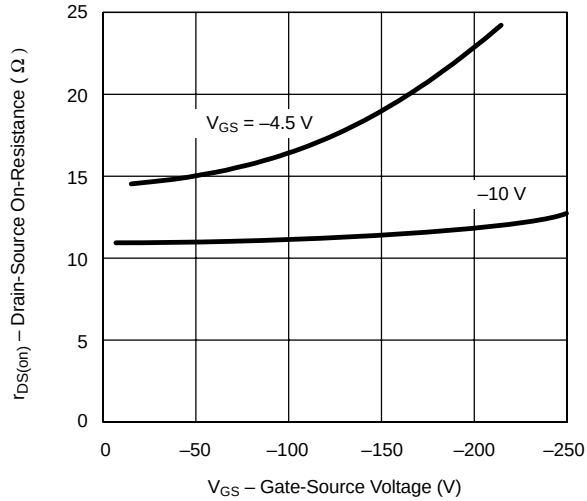
Transfer Characteristics



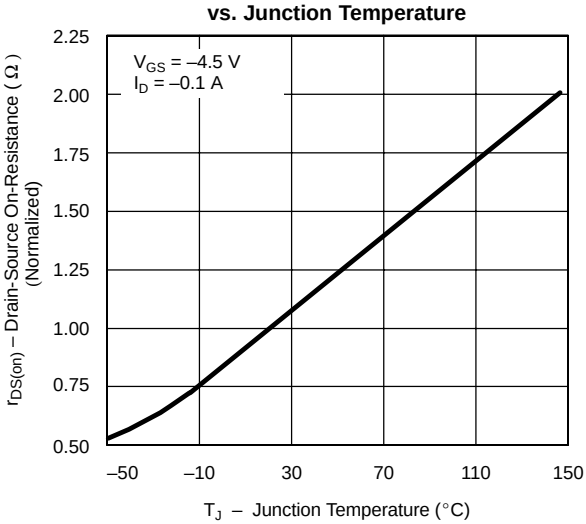
On-Resistance vs. Gate-to-Source Voltage



On-Resistance

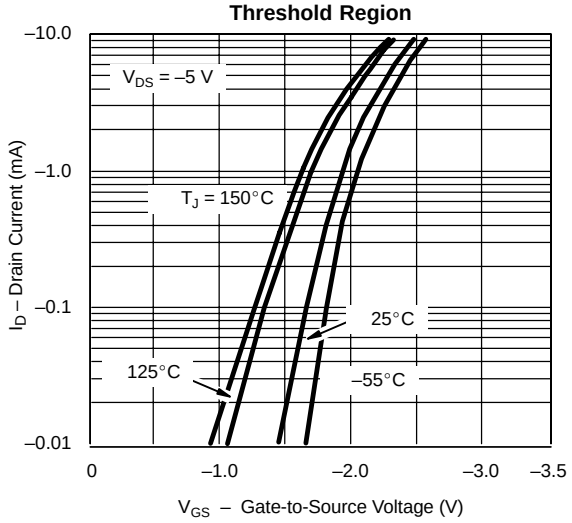


Normalized On-Resistance vs. Junction Temperature

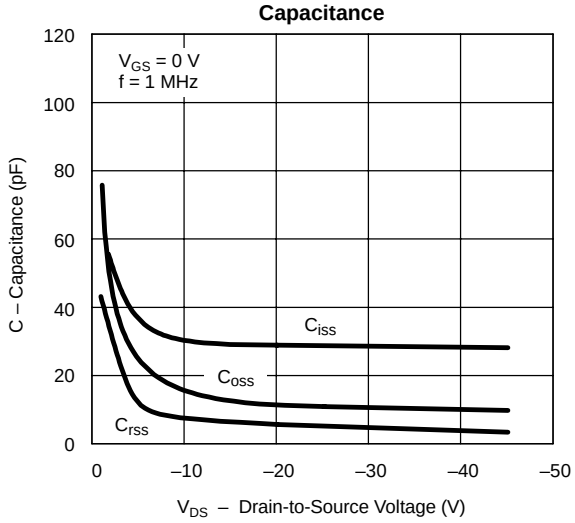


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

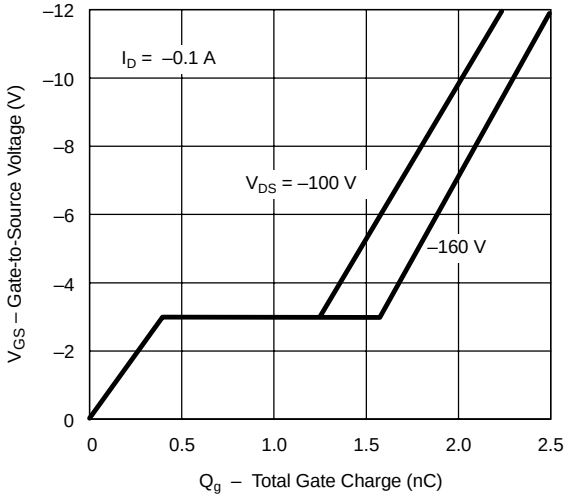
Threshold Region



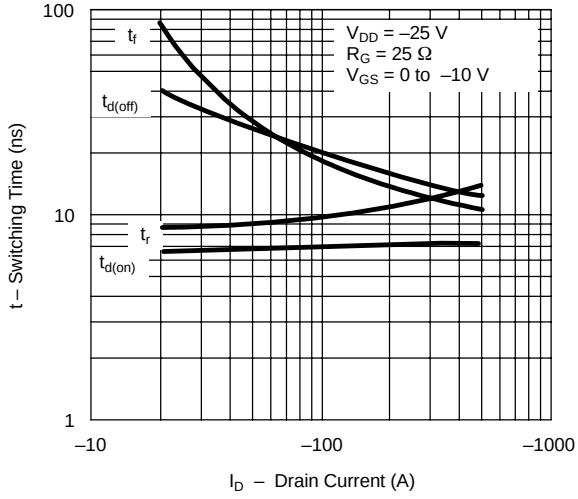
Capacitance



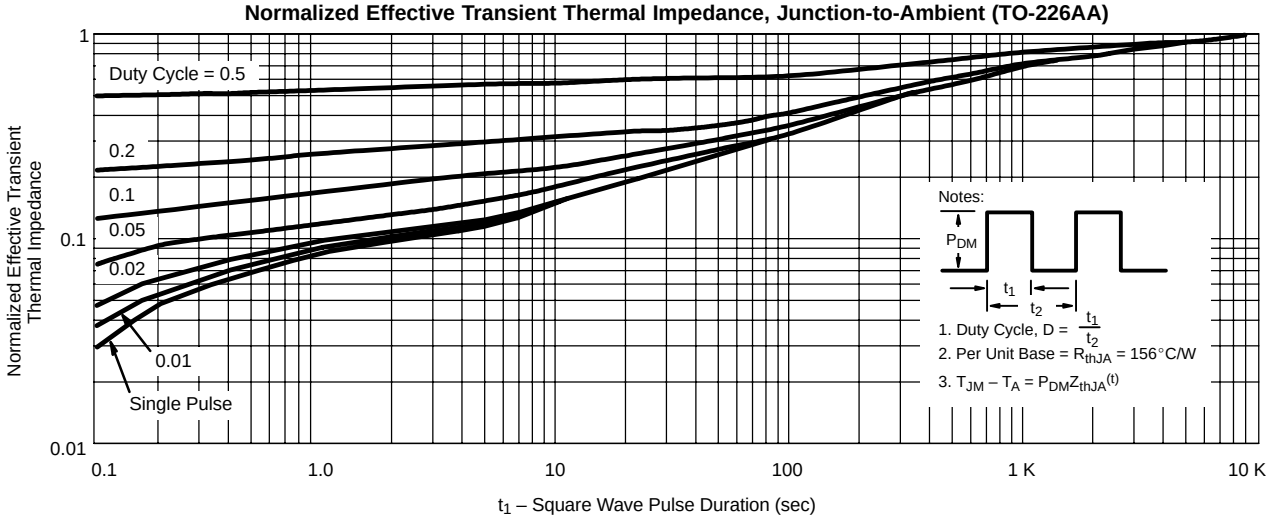
Gate Charge



Load Condition Effects on Switching



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



Document Number: 70210
S-04279—Rev. E, 16-Jun-01

Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.