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

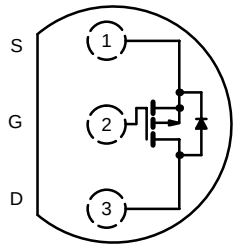
BENEFITS

- 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

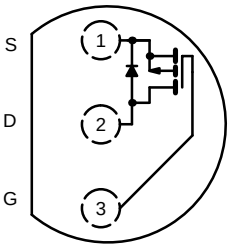
VP2020L

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)

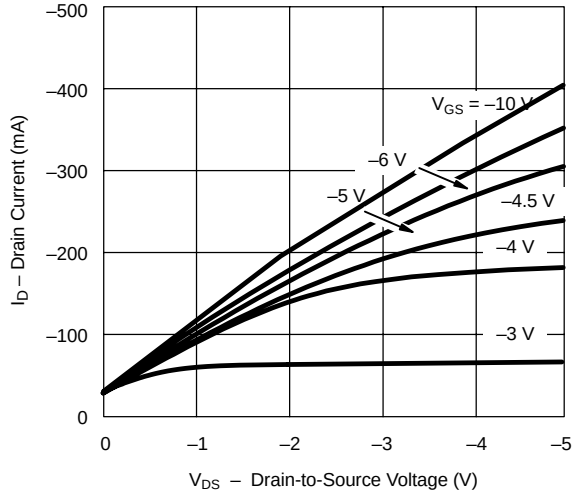
Parameter	Symbol	Test Conditions	Typ[a]	Limits VP2020L Min	Limits VP2020L Max	Limits BSS92 Min	Limits BSS92 Max	Unit
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = –10 µA		–220				V
		V_{GS} = 0 V, I_D = –250 µA	–220			–200		
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS}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

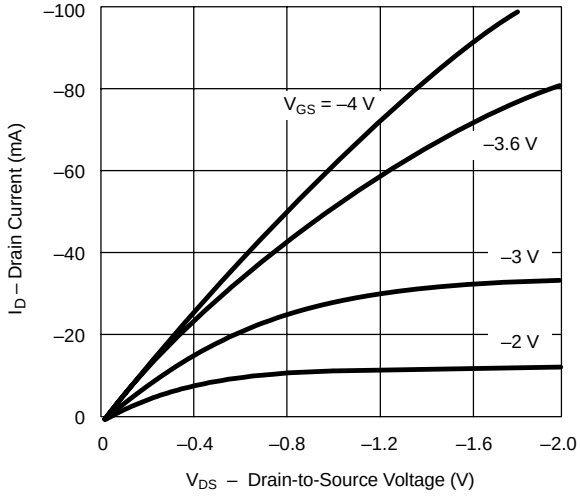
VPDQ20

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

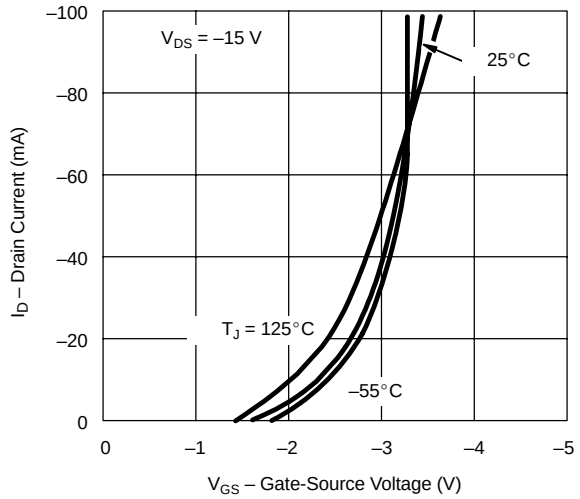
Ohmic Region Characteristics



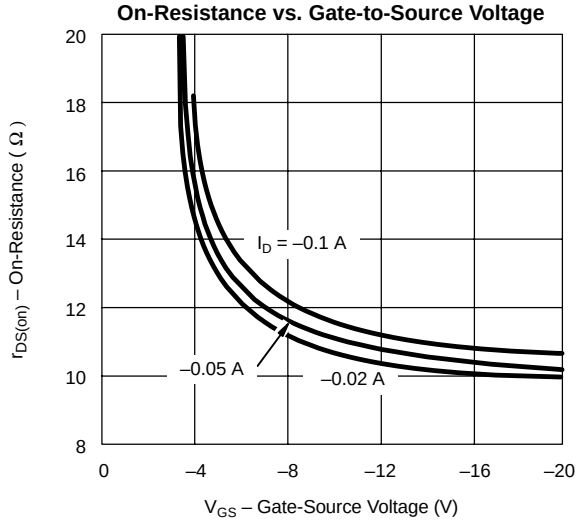
Output Characteristics for Low Gate Drive



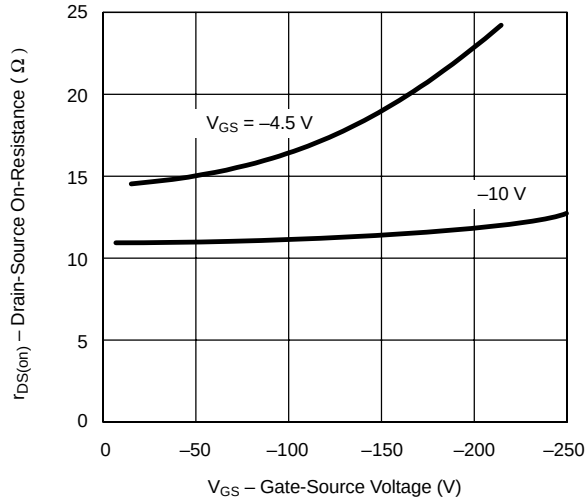
Transfer Characteristics



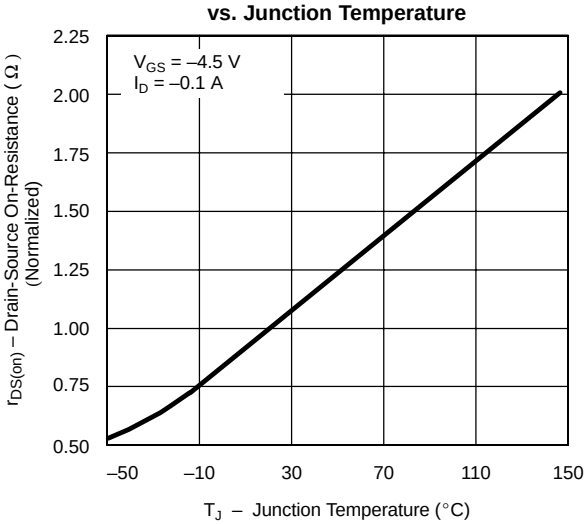
On-Resistance vs. Gate-to-Source Voltage



On-Resistance

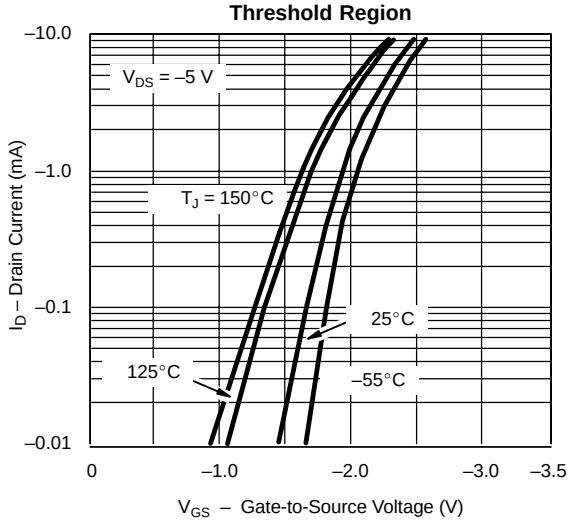


Normalized On-Resistance vs. Junction Temperature

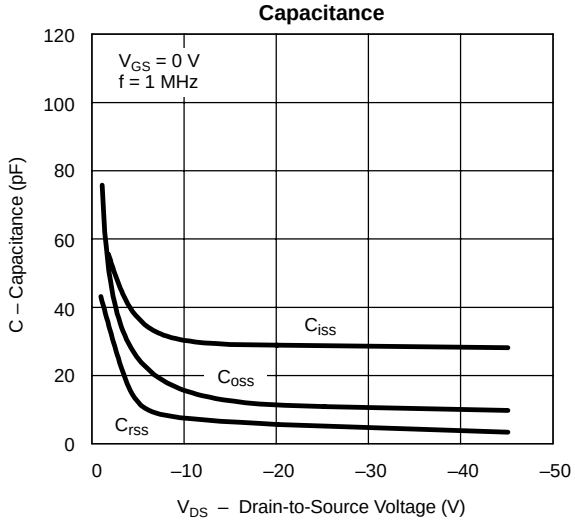


TYPICAL CHARACTERISTICS (T_A = 25°C UNLESS OTHERWISE NOTED)

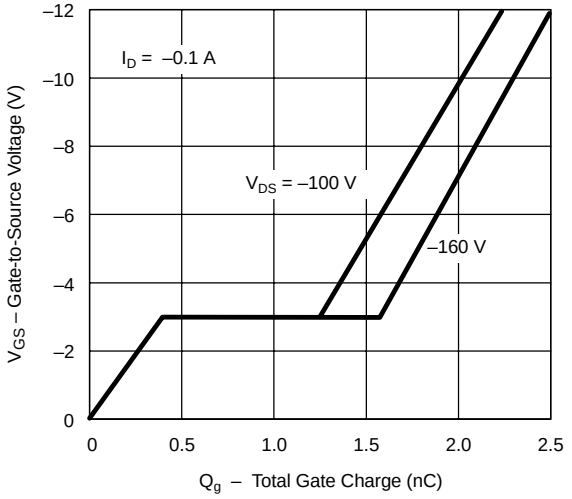
Threshold Region



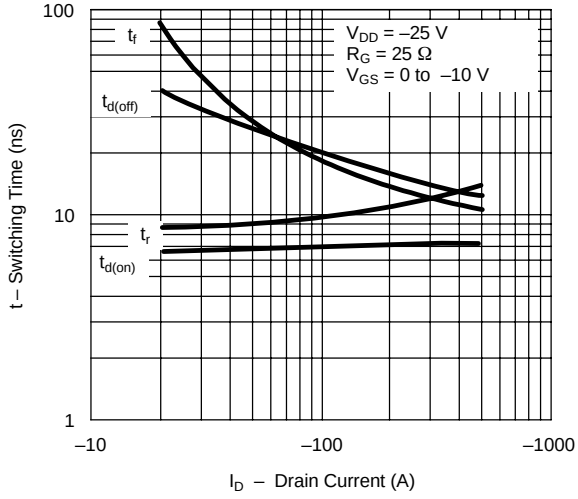
Capacitance



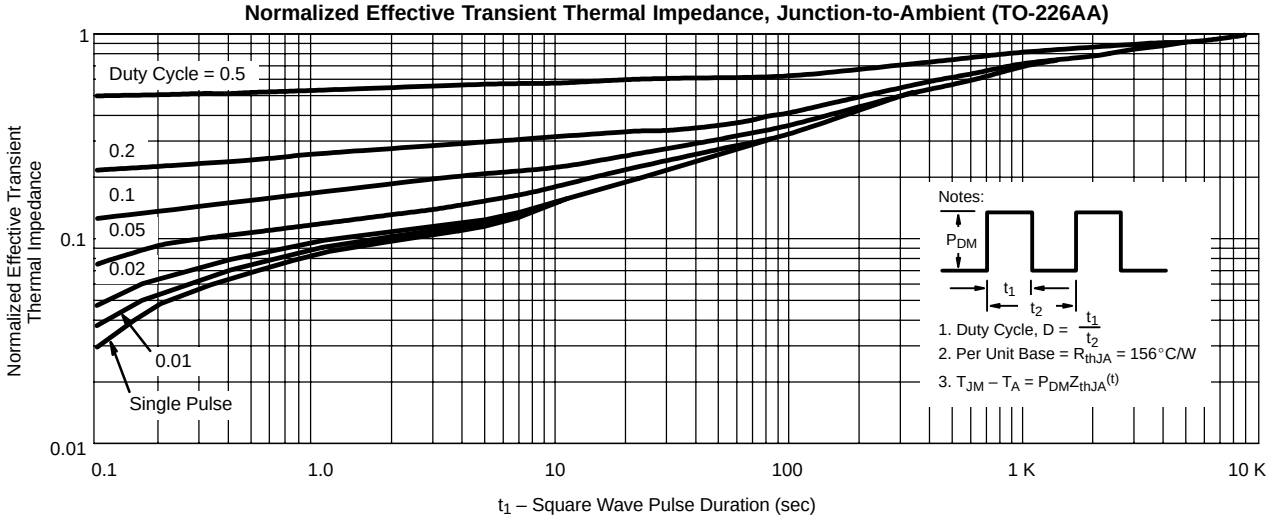
Gate Charge



Load Condition Effects on Switching



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



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