

P-Channel Enhancement-Mode MOS Transistors

Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (V)	I_D (A)
TP1220L	-120	20 @ $V_{GS} = -4.5$ V	-1 to -2.4	-0.12
TP2020L	-200	20 @ $V_{GS} = -4.5$ V	-1 to -2.4	-0.12
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

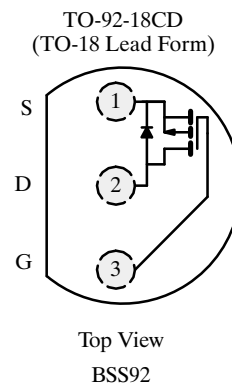
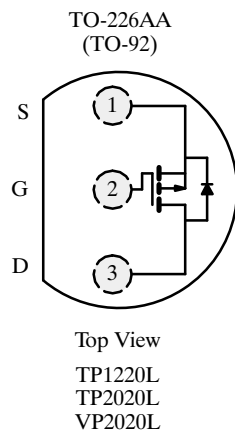
- High-Side Switching
- Secondary Breakdown Free: -220 V
- Low On-Resistance: 11.5 Ω
- Low-Power/Voltage Driven
- Excellent Thermal Stability

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	TP1220L	TP2020L	VP2020L	BSS92	Unit
Drain-Source Voltage	V_{DS}	-120	-200	-200	-200	V
Gate-Source Voltage	V_{GS}	± 20	± 20	± 20	± 20	V
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	-0.12	-0.12	-0.12	-0.15	A
	$T_A = 100^\circ\text{C}$	-0.08	-0.08	-0.08	-0.09	
Pulsed Drain Current	I_{DM}	-0.48	-0.48	-0.48	-0.6	A
Power Dissipation	$T_A = 25^\circ\text{C}$	0.8	0.8	0.8	1.0	W
	$T_A = 100^\circ\text{C}$	0.32	0.32	0.32	0.4	
Maximum Junction-to-Ambient	R_{thJA}	156	156	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.

TP1220L, TP/VP2020L, BSS92

Specifications^a

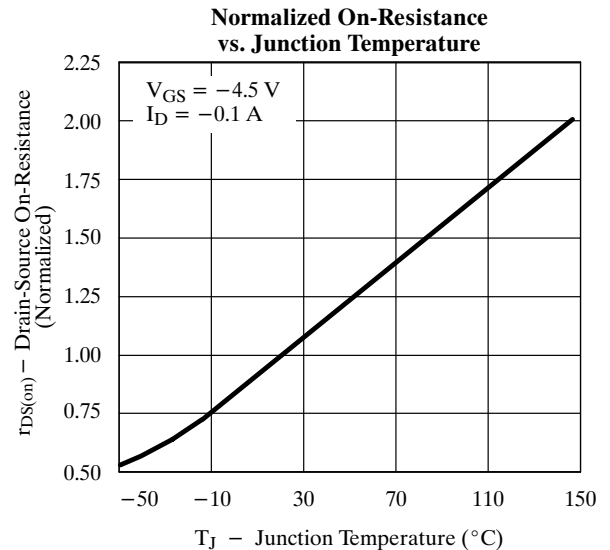
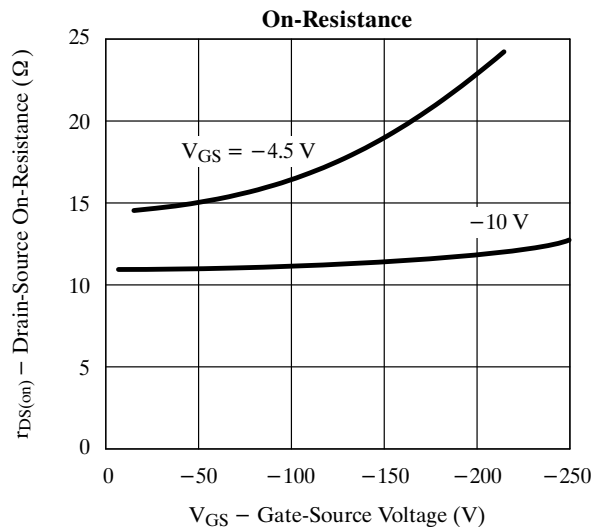
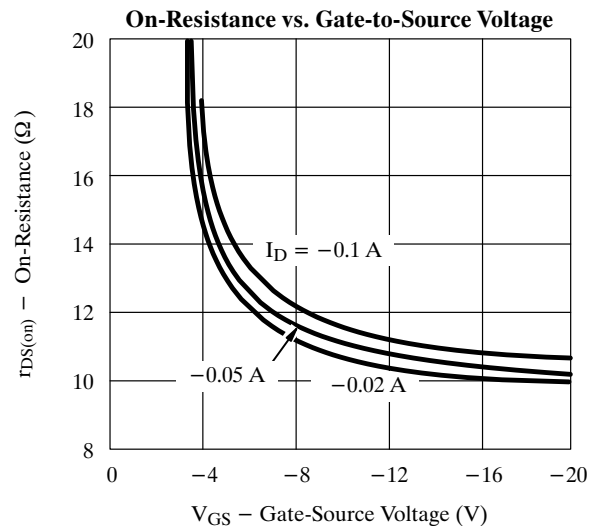
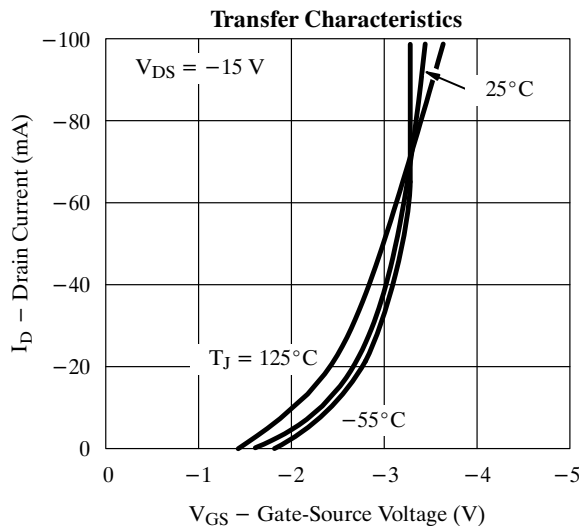
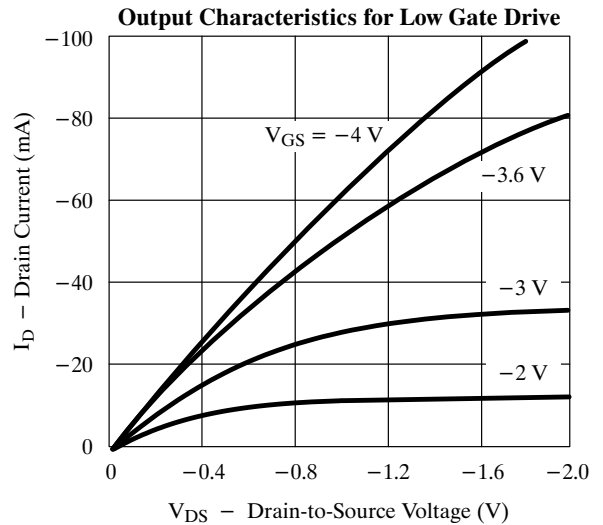
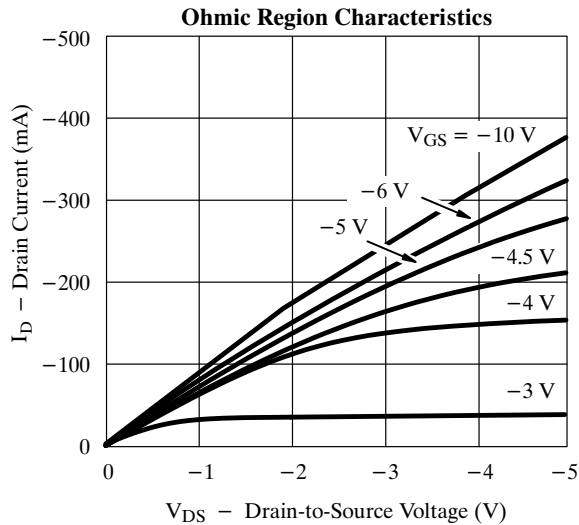
Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit	
				TP1220L TP2020L		VP2020L		BSS92			
				Min	Max	Min	Max	Min	Max		
Static											
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$ $I_D = -10\text{ }\mu\text{A}$	TP1220L	-200	-120						V
			TP2020L	-220	-200		-200				
		$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$		-220				-200			
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -1\text{ mA}$		-1.9	-1	-2.4	-0.8	-2.5	-0.8	-2.8	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$				± 10		± 10		± 10 0	nA
		$T_J = 125^\circ\text{C}$				± 50		± 50			
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 0.8 \times V_{(BR)DSS}$ $V_{GS} = 0\text{ V}$				-1		-1			μA
		$T_J = 125^\circ\text{C}$				-100		-100			
		$V_{DS} = -200\text{ V}, V_{GS} = 0\text{ V}$								-60	
		$T_J = 125^\circ\text{C}$								-200	
		$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$								-0.2	
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = -10\text{ V}, V_{GS} = -4.5\text{ V}$		-250	-50		-100				mA
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -0.1\text{ A}$		11.5		20				20	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -0.1\text{ A}$		15			20				
		$T_J = 125^\circ\text{C}$		28			40				
		$V_{GS} = -4.5\text{ V}, I_D = -0.05\text{ A}$		15		20					
		$T_J = 125^\circ\text{C}$		28		40					
Forward Transconductance ^c	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -0.1\text{ A}$		170	60		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		60		70			pF
Output Capacitance	C_{oss}			10		20		20			
Reverse Transfer Capacitance	C_{rss}			3		10		10			
Switching^d											
Turn-On Time	t_{ON}	$V_{DD} = -25\text{ V}, R_L = 250\text{ }\Omega$ $I_D \cong -0.1\text{ A}, V_{GEN} = -10\text{ V}$ $R_G = 25\text{ }\Omega$		14		25					ns
	$t_{d(on)}$			6				10			
	t_r			8				15			
Turn-Off Time	t_{OFF}			35		55					
	$t_{d(off)}$			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: $PW \leq 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VPDQ20

Typical Characteristics (25°C Unless Otherwise Noted)



TP1220L, TP/VP2020L, BSS92

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

