

TP1220L, TP/VP2020L, BSS92

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)
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

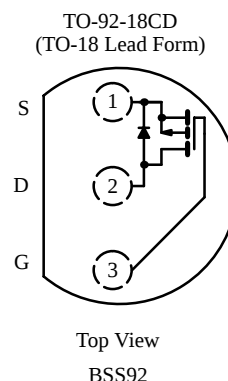
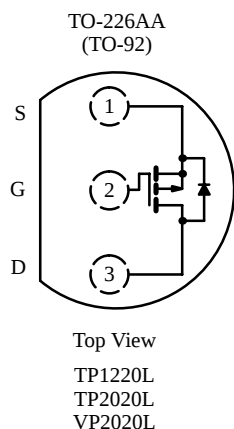
- High-Side Switching
- Secondary Breakdown Free: -220 V
- Low On-Resistance: 11.5 Ω
- Low-Power/Voltage Driven
- Excellent Thermal Stability

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	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	I_D	-0.12	-0.12	-0.12	A
	$T_A = 100^\circ\text{C}$		-0.08	-0.08	-0.08	
Pulsed Drain Current ^a	I_{DM}	-0.48	-0.48	-0.48	-0.6	
Power Dissipation	$T_A = 25^\circ\text{C}$	P_D	0.8	0.8	0.8	W
	$T_A = 100^\circ\text{C}$		0.32	0.32	0.32	
Maximum Junction-to-Ambient	R_{thJA}	156	156	156	125	$^\circ\text{C/W}$
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.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70210.

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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 V I _D = -10 μA	TP1220L	-200	-120						V
			TP2020L	-220	-200		-200				
		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	-1	-2.4	-0.8	-2.5	-0.8	-2.8	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V				± 10		± 10		± 10 0	nA
		T _J = 125°C				± 50		± 50			
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 0.8 x V _{(BR)DSS} V _{GS} = 0 V				-1		-1			μA
		T _J = 125°C				-100		-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 ^c	I _{D(on)}	V _{DS} = -10 V, V _{GS} = -4.5 V		-250	-50		-100				mA
Drain-Source On-Resistance ^c	r _{DS(on)}	V _{GS} = -10 V, I _D = -0.1 A		11.5		20				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		20					
		T _J = 125°C		28		40					
Forward Transconductance ^c	g _{fs}	V _{DS} = -10 V, I _D = -0.1 A		170	60		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		60		70		130	pF
Output Capacitance	C _{oss}			10		20		20		30	
Reverse Transfer Capacitance	C _{rss}			3		10		10		15	
Switching ^d											
Turn-On Time	t _{ON}	V _{DD} = -25 V, R _L = 250 Ω I _D ≅ -0.1 A, V _{GEN} = -10 V R _G = 25 Ω		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			

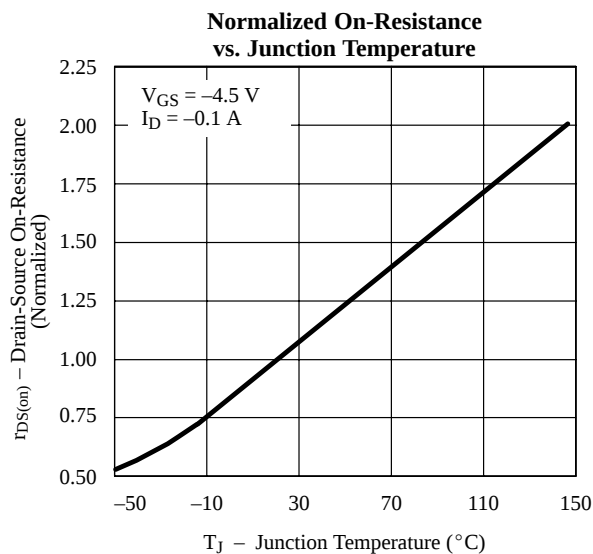
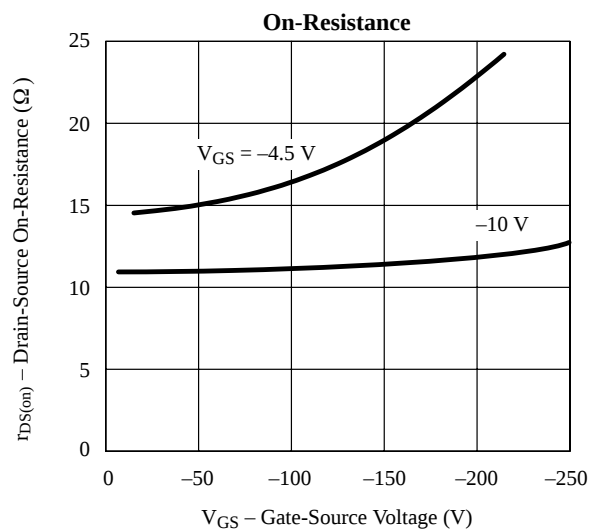
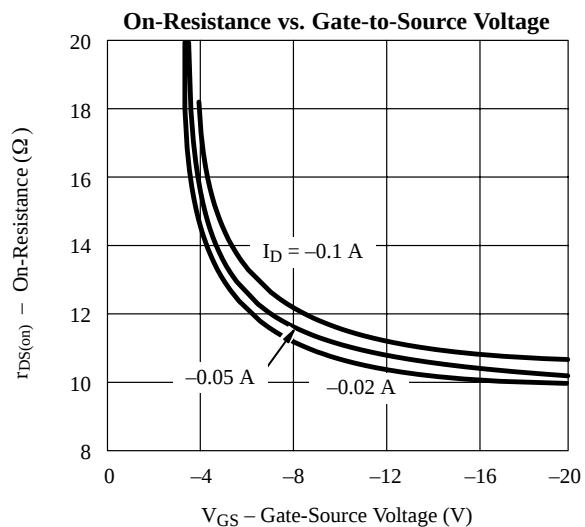
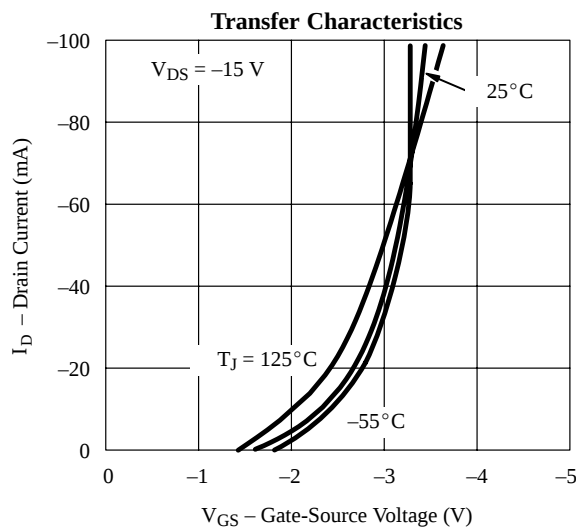
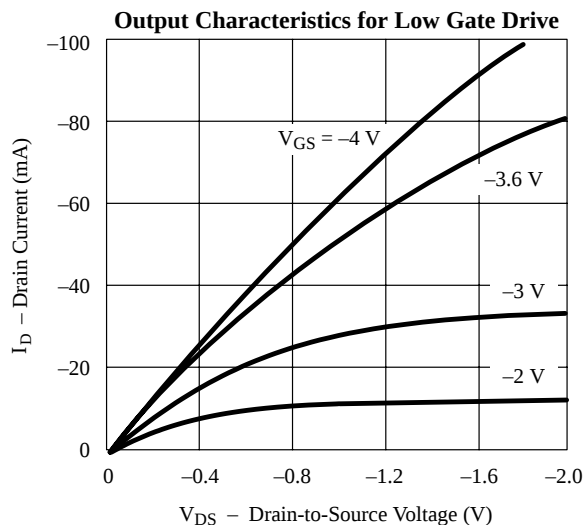
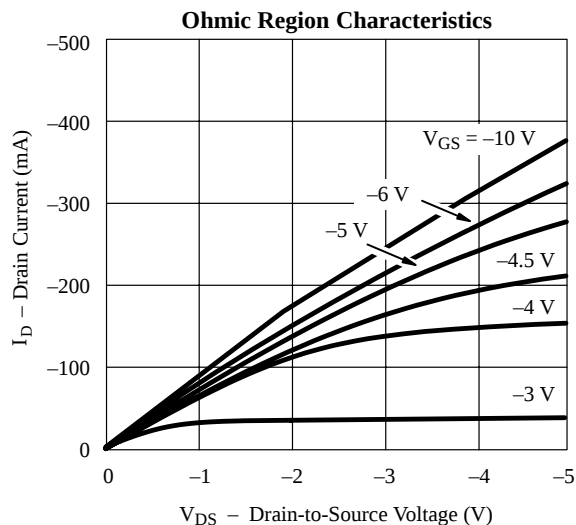
Notes

- $T_A = 25^\circ\text{C}$ 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

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Typical Characteristics (25°C Unless Otherwise Noted)



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

