

N-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)
VN2010L	200	10 @ $V_{GS} = 4.5$ V	0.8 to 1.8	0.19
BS107		28 @ $V_{GS} = 2.8$ V	0.8 to 3	0.12

Features

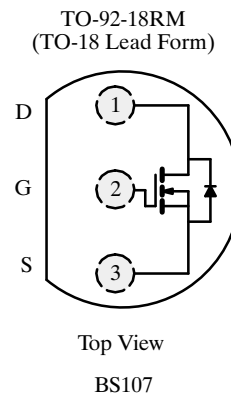
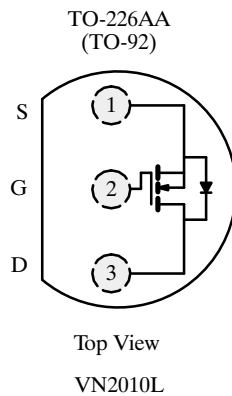
- Low On-Resistance: 6 Ω
- Secondary Breakdown Free: 220 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

Benefits

- Low Offset Voltage
- Full-Voltage Operation
- Easily Driven Without Buffer
- Low Error Voltage
- No High-Temperature "Run-Away"

Applications

- High-Voltage Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Transistors, etc.
- Telephone Mute Switches, Ringer Circuits
- Power Supply, Converters
- Motor Control



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Parameter	Symbol	VN2010L	BS107	Unit
Drain-Source Voltage	V_{DS}	200	200	V
Gate-Source Voltage	V_{GS}	± 30	± 25	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	0.19	A
		$T_A = 100^\circ\text{C}$	0.12	
Pulsed Drain Current	I_{DM}	0.8		
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.8	W
		$T_A = 100^\circ\text{C}$	0.32	
Maximum Junction-to-Ambient	R_{thJA}	156	250	$^\circ\text{C}/\text{W}$
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^a

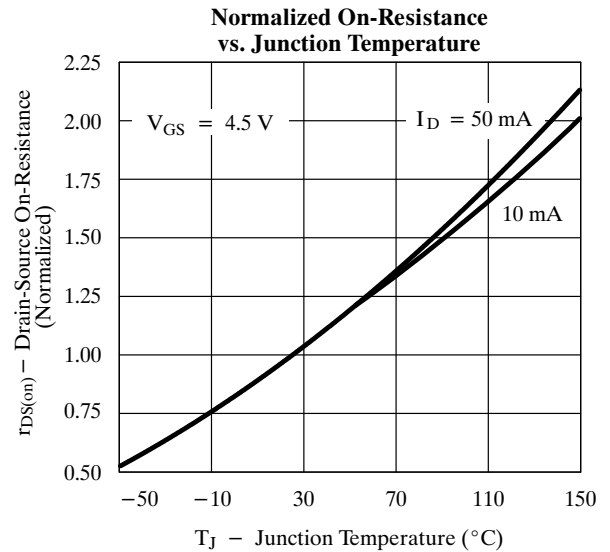
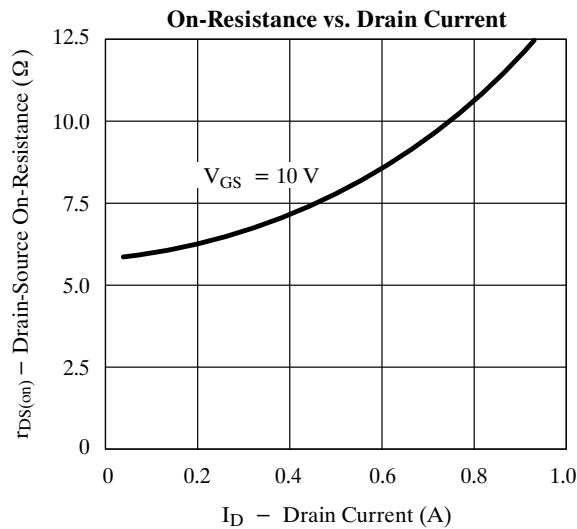
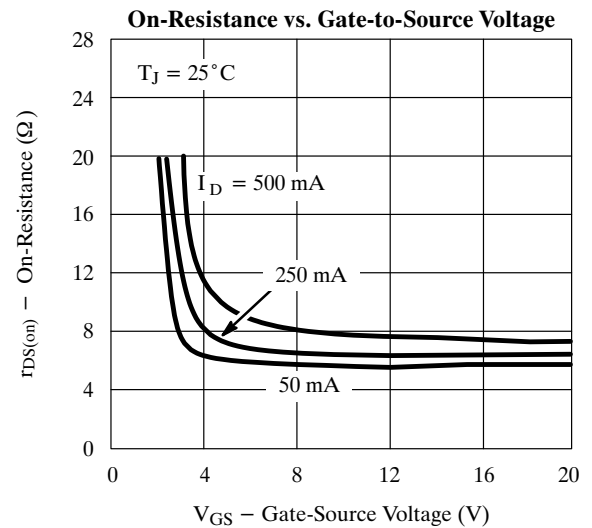
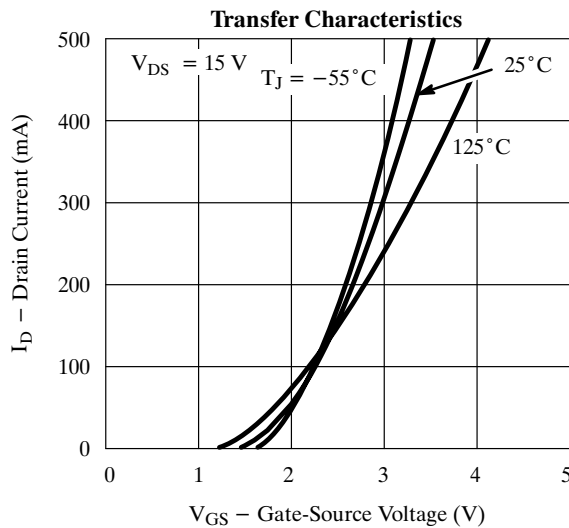
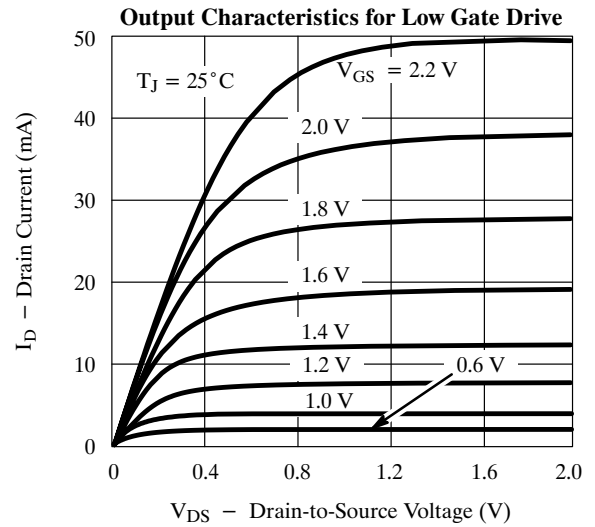
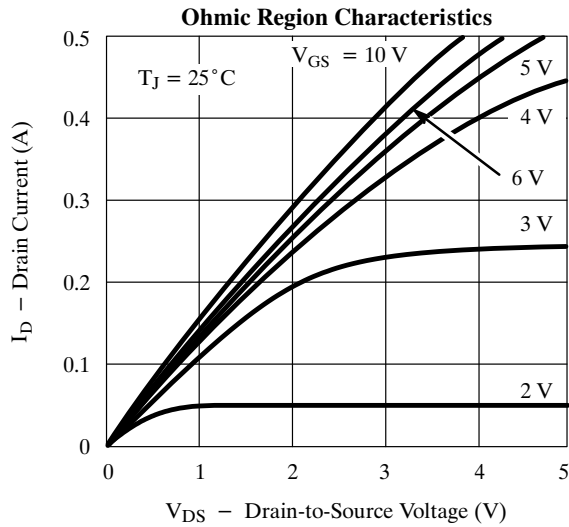
Parameter	Symbol	Test Conditions	Typ ^b	Limits				Unit
				VN2010L		BS107		
				Min	Max	Min	Max	
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	220	200		200		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	1.2	0.8	1.8	0.8	3	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 10			nA
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 15\text{ V}$					± 10	
Drain Leakage Current	I_{DSX}	$V_{DS} = 70\text{ V}, V_{GS} = 0.2\text{ V}$					1	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 130\text{ V}, V_{GS} = 0\text{ V}$					0.03	
		$V_{DS} = 160\text{ V}, V_{GS} = 0\text{ V}$			1			
		$T_J = 125^\circ\text{C}$			100			
On-State Drain Current ^c	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$	0.7	0.1				A
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = 2.8\text{ V}, I_D = 0.02\text{ A}$	6				28	Ω
		$V_{GS} = 4.5\text{ V}, I_D = 0.05\text{ A}$	6		10			
		$T_J = 125^\circ\text{C}$	11		20			
Forward Transconductance ^c	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 0.1\text{ A}$	180	125				mS
Common Source Output Conductance ^c	g_{os}	$V_{DS} = 15\text{ V}, I_D = 0.05\text{ A}$	0.15					
Dynamic								
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	35		60			pF
Output Capacitance	C_{oss}		9		30			
Reverse Transfer Capacitance	C_{rss}		1		15			
Switching^d								
Turn-On Time	t_{ON}	$V_{DD} = 25\text{ V}, R_L = 250\ \Omega$ $I_D \approx 0.1\text{ A}, V_{GEN} = 10\text{ V}$ $R_G = 25\ \Omega$	5		20			ns
Turn-Off Time	t_{OFF}		21		30			

Notes

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- Switching time is essentially independent of operating temperature.

VNDQ20

Typical Characteristics (25°C Unless Otherwise Noted)



VN2010L/BS107

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

