

**N-Channel Enhancement-Mode MOSFET Transistors**

**Product Summary**

Part Number	V <sub>(BR)DSS</sub> Min (V)	r <sub>DS(on)</sub> Max (Ω)	V <sub>GS(th)</sub> (V)	I <sub>D</sub> (A)
VN2010L	200	10 @ V <sub>GS</sub> = 4.5 V	0.8 to 1.8	0.19
BS107		28 @ V <sub>GS</sub> = 2.8 V	0.8 to 3	0.12

**Features**

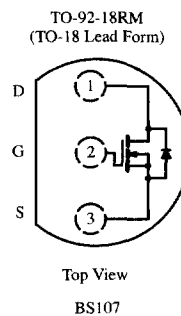
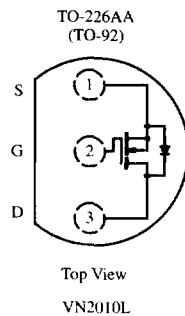
- Low On-Resistance: 6 Ω
- Secondary Breakdown Free: 220 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

**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<sub>A</sub> = 25°C Unless Otherwise Noted)**

Parameter	Symbol	VN2010L	BS107	Unit
Drain-Source Voltage	V <sub>DS</sub>	200	200	V
Gate-Source Voltage	V <sub>GS</sub>	± 30	± 25	
Continuous Drain Current (T <sub>J</sub> = 150°C)	I <sub>D</sub>	T <sub>A</sub> = 25°C	0.19	A
		T <sub>A</sub> = 100°C	0.12	
Pulsed Drain Current <sup>a</sup>	I <sub>DM</sub>	0.8		
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> = 25°C	0.8	W
		T <sub>A</sub> = 100°C	0.32	
Maximum Junction-to-Ambient	R <sub>thJA</sub>	156	250	°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150		°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 #70215.

## Specifications<sup>a</sup>

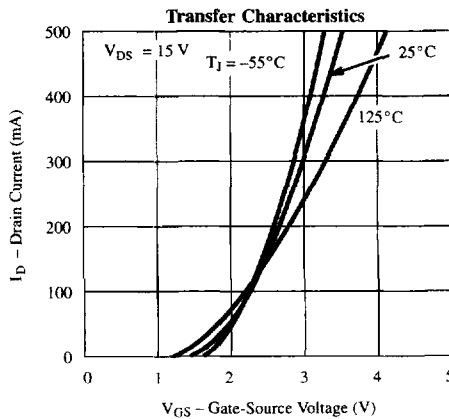
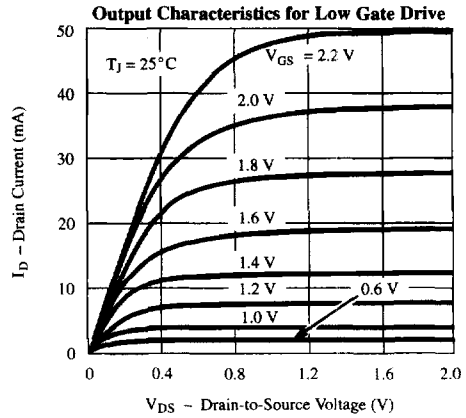
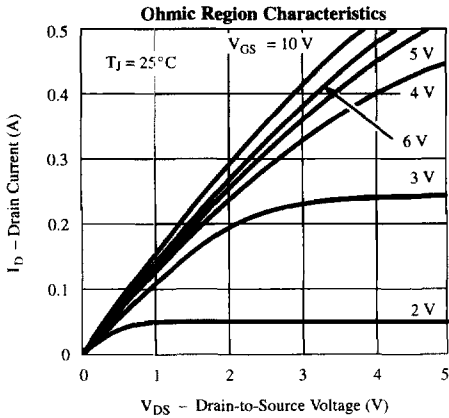
Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits				Unit
				VN2010L		BS107		
				Min	Max	Min	Max	
<b>Static</b>								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0 \text{ V}, I_D = 100 \mu\text{A}$	220	200		200		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1 \text{ mA}$	1.2	0.8	1.8	0.8	3	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			$\pm 10$			nA
		$V_{DS} = 0 \text{ V}, V_{GS} = \pm 15 \text{ V}$					$\pm 10$	
Drain Leakage Current	$I_{DSX}$	$V_{DS} = 70 \text{ V}, V_{GS} = 0.2 \text{ V}$					1	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 130 \text{ V}, V_{GS} = 0 \text{ V}$					0.03	$\mu\text{A}$
		$V_{DS} = 160 \text{ V}, V_{GS} = 0 \text{ V}$			1			
		$T_J = 125^\circ\text{C}$			100			
On-State Drain Current <sup>c</sup>	$I_{D(on)}$	$V_{DS} = 10 \text{ V}, V_{GS} = 10 \text{ V}$	0.7	0.1				A
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(on)}$	$V_{GS} = 2.8 \text{ V}, I_D = 0.02 \text{ A}$	6				28	$\Omega$
		$V_{GS} = 4.5 \text{ V}, I_D = 0.05 \text{ A}$	6		10			
		$T_J = 125^\circ\text{C}$	11		20			
Forward Transconductance <sup>c</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 0.1 \text{ A}$	180	125				mS
Common Source Output Conductance <sup>c</sup>	$g_{os}$	$V_{DS} = 15 \text{ V}, I_D = 0.05 \text{ A}$	0.15					
<b>Dynamic</b>								
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			
<b>Switching<sup>d</sup></b>								
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**

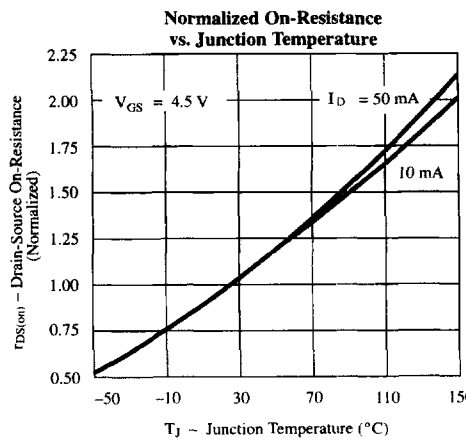
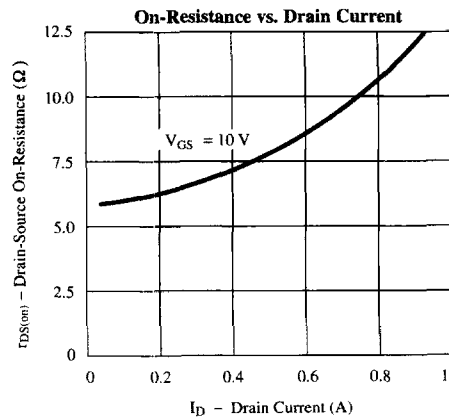
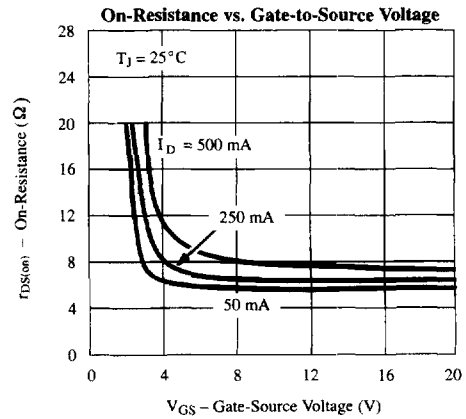
- $T_A = 25^\circ\text{C}$  unless otherwise noted.
- For DESIGN AID ONLY, not subject to production testing.
- Pulse test:  $PW \leq 300 \mu\text{s}$  duty cycle  $\leq 2\%$ .
- Switching time is essentially independent of operating temperature.

VNDQ20

**Typical Characteristics (25°C Unless Otherwise Noted)**



On-Resistance ( $\Omega$ )



Low Power MOSFETs

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

