TEMIC

Siliconix

VN2010L/BS107

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

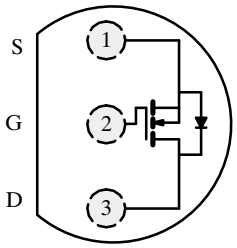
Benefits

- 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

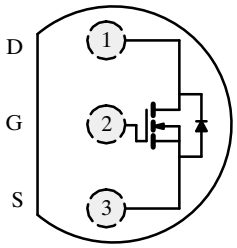
TO-226AA
(TO-92)



Top View

VN2010L

TO-92-18RM
(TO-18 Lead Form)



Top View

BS107

Absolute Maximum Ratings (T_A = 25°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°C)	T_A = 25°C	I_D	0.19	0.12	A
	T_A = 100°C		0.12		
Pulsed Drain Current[a]		I_{DM}	0.8		
Power Dissipation	T_A = 25°C	P_D	0.8	0.5	W
	T_A = 100°C		0.32		
Maximum Junction-to-Ambient		R_{thJA}	156	250	°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.

VN2010L/BS107

Specifications[a]

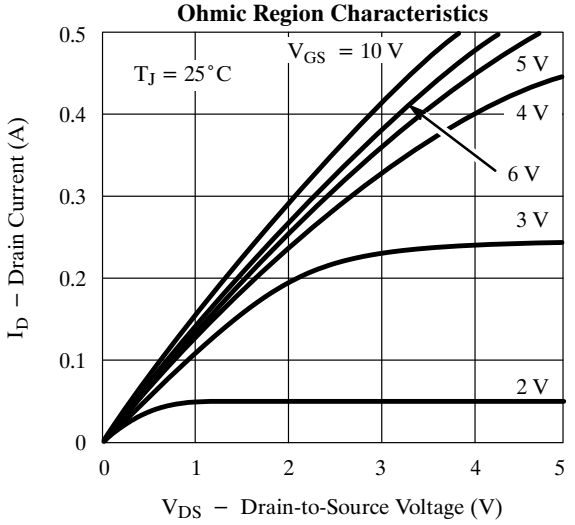
Parameter	Symbol	Test Conditions	Typ[b]	Limits VN2010L Min	Limits VN2010L Max	Limits BS107 Min	Limits BS107 Max	Unit
Static								
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 100 µA	220	200		200		V
Gate-Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 mA	1.2	0.8	1.8	0.8	3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

Notes
a. T_A = 25°C unless otherwise noted.
b. For DESIGN AID ONLY, not subject to production testing.
c. Pulse test: PW ≤300 µs duty cycle ≤2%.
d. Switching time is essentially independent of operating temperature.

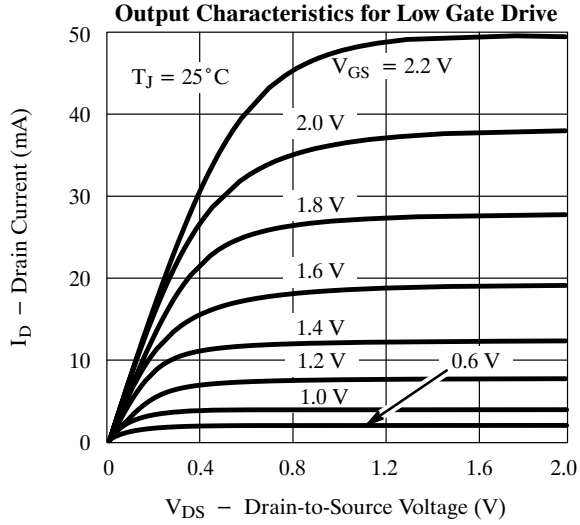
VNDQ20

Typical Characteristics (25°C Unless Otherwise Noted)

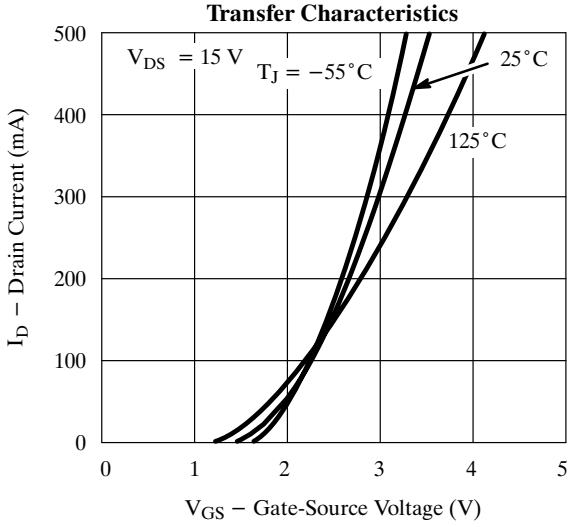
Ohmic Region Characteristics



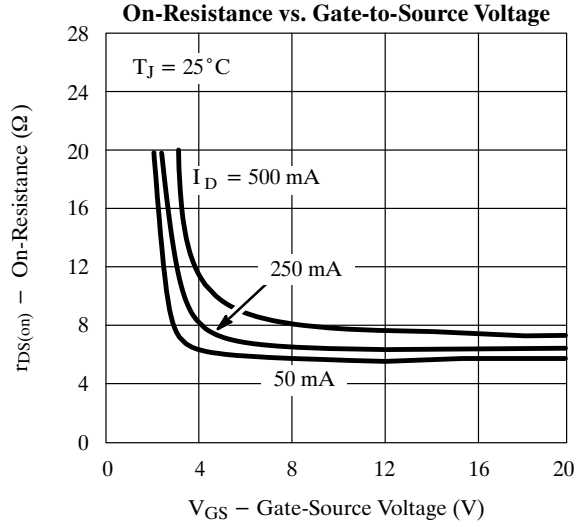
Output Characteristics for Low Gate Drive



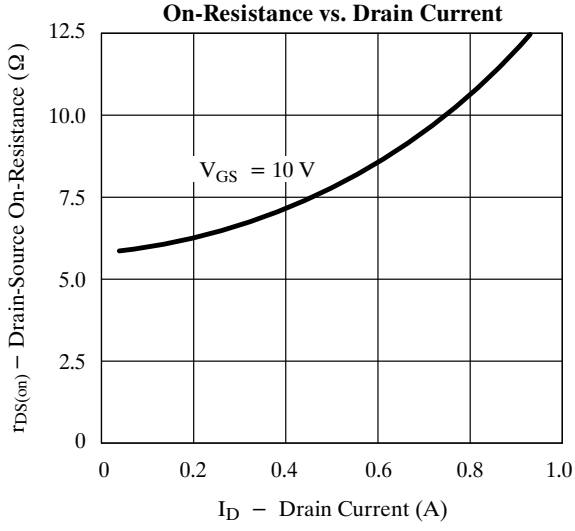
Transfer Characteristics



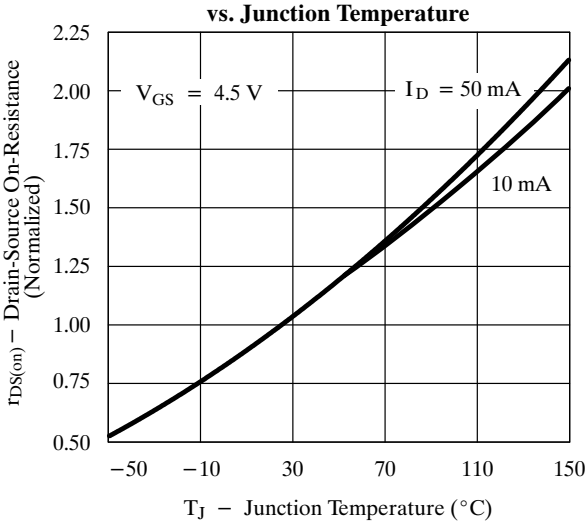
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current



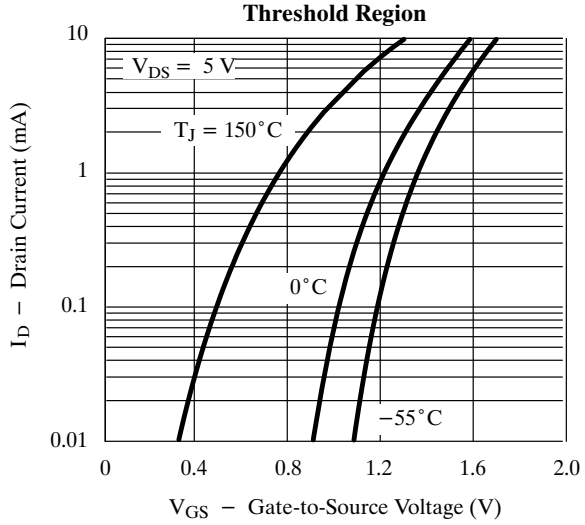
Normalized On-Resistance vs. Junction Temperature



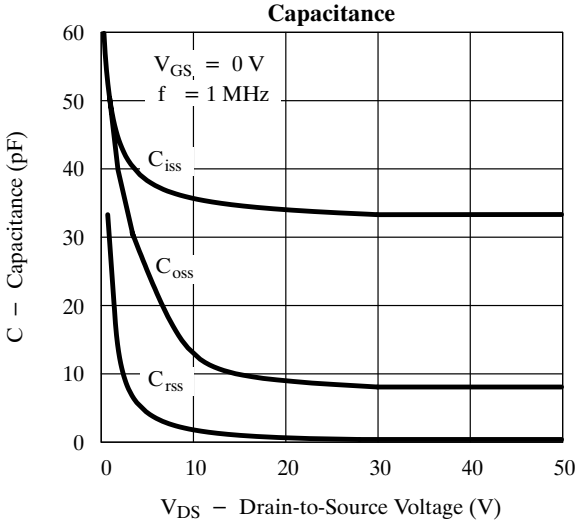
VN2010L/BS107

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

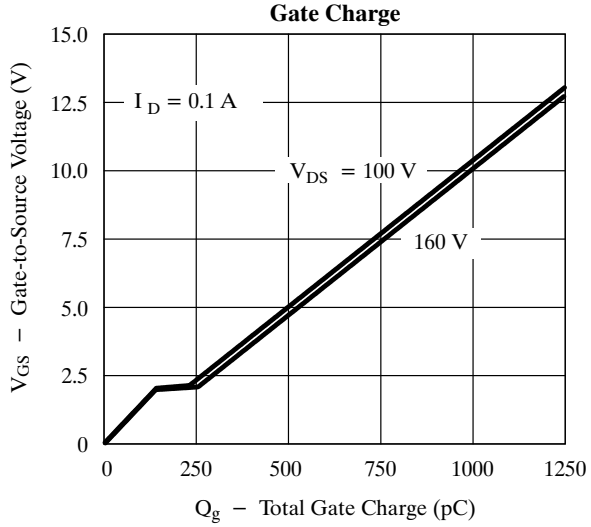
Threshold Region



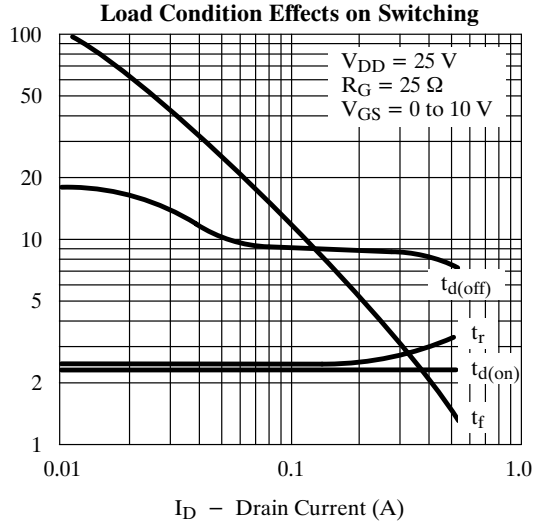
Capacitance



Gate Charge



Load Condition Effects on Switching



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

