

# VN2410L

## Small Signal MOSFET

240 V, 200 mA, N-Channel TO-92



ON Semiconductor®

<http://onsemi.com>

200 mA, 240 V

$R_{DS(on)} = 10 \Omega$

### Features

- Pb-Free Packages are Available\*

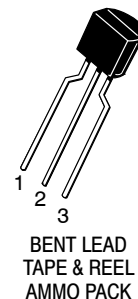
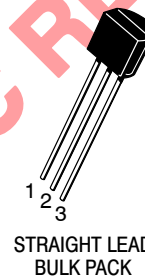
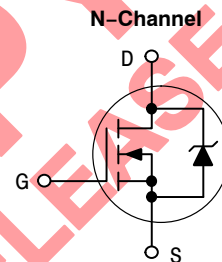
### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	240	Vdc
Drain-Gate Voltage	$V_{DGR}$	240	Vdc
Gate-Source Voltage	$V_{GS}$	$\pm 20$	Vdc
- Continuous	$V_{GSM}$	$\pm 40$	Vpk
- Non-repetitive ( $t_p \leq 50 \mu s$ )			
Continuous Drain Current	$I_D$	200	mAdc
Pulsed Drain Current	$I_{DM}$	500	mAdc
Power Dissipation @ $T_C = 25^\circ C$	$P_D$	350	mW
Derate above $25^\circ C$		2.8	mW/ $^\circ C$
Operating and Storage Temperature	$T_J, T_{stg}$	-55 to 150	$^\circ C$

### THERMAL CHARACTERISTICS

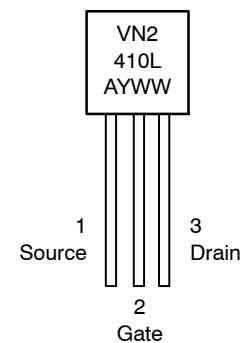
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	312.5	$^\circ C/W$
Maximum Lead Temperature for Soldering Purposes, 1/16 inch from case for 10 seconds	$T_L$	300	$^\circ C$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



TO-92 CASE 29 STYLE 22

### MARKING DIAGRAM & PIN ASSIGNMENT



A = Assembly Location  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# VN2410L

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Drain-Source Breakdown Voltage (V <sub>GS</sub> = 0, I <sub>D</sub> = 100 μA)	V <sub>(BR)DSS</sub>	240	-	Vdc
Zero Gate Voltage Drain Current (V <sub>DS</sub> = 120 Vdc, V <sub>GS</sub> = 0) (V <sub>DS</sub> = 120 Vdc, V <sub>GS</sub> = 0, T <sub>A</sub> = 125°C)	I <sub>DSS</sub>	-	10 500	μAdc
Gate-Body Leakage (V <sub>DS</sub> = 0, V <sub>GS</sub> = ±15 V)	I <sub>GSS</sub>	-	±100	nAdc
Gate Threshold Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1.0 mA)	V <sub>GS(th)</sub>	0.8	2.0	Vdc
On-State Drain Current (Note 1) (V <sub>GS</sub> = 10 V, V <sub>DS</sub> ≥ 2.0 V <sub>DS(on)</sub> )	I <sub>D(on)</sub>	1.0	-	Adc
Drain-Source On Resistance (Note 1) (V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 0.1 A) (V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 A)	r <sub>DS(on)</sub>	-	10 10	Ω
Forward Transconductance (Note 1) (V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.5 A)	g <sub>fs</sub>	300	-	mS

## DYNAMIC CHARACTERISTICS

Input Capacitance	(V <sub>DS</sub> = 25 Vdc, V <sub>GS</sub> = 0, f = 1.0 MHz)	C <sub>iss</sub>	-	125	pF
Output Capacitance		C <sub>oss</sub>	-	50	pF
Reverse Transfer Capacitance		C <sub>rss</sub>	-	20	pF

## SWITCHING CHARACTERISTICS

Turn-On Time	(V <sub>DD</sub> = 60 Vdc, I <sub>D</sub> = 0.4 A, R <sub>L</sub> = 150 Ω, R <sub>G</sub> = 25 Ω)	t <sub>(on)</sub>	-	8.0	ns
Turn-Off Time		t <sub>(r)</sub>	-	8.0	ns
		t <sub>(off)</sub>	-	23	ns
		t <sub>(f)</sub>	-	34	ns

1. Pulse Test; Pulse Width < 300 μs, Duty Cycle ≤ 2.0%.

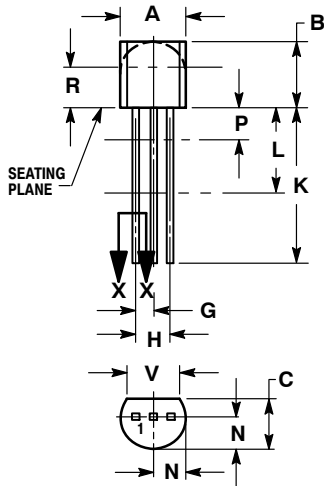
## ORDERING INFORMATION

Device	Package	Shipping
VN2410L	TO-92	1000 Units / Box
VN2410LG	TO-92 (Pb-Free)	1000 Units / Box
VN2410LZL1	TO-92	2000 Ammo Pack
VN2410LZL1G	TO-92 (Pb-Free)	2000 Ammo Pack

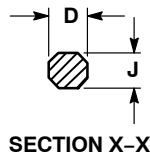
# VN2410L

## PACKAGE DIMENSIONS

TO-92  
CASE 29-11  
ISSUE AM



STRAIGHT LEAD  
BULK PACK



SECTION X-X

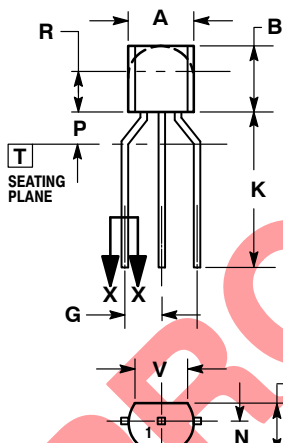
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

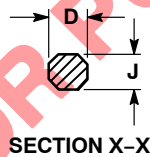
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

STYLE 22:

1. SOURCE
2. GATE
3. DRAIN



BENT LEAD  
TAPE & REEL  
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:  
Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada  
Europe, Middle East and Africa Technical Support:  
Phone: 421 33 790 2910  
Japan Customer Focus Center  
Phone: 81-3-5773-3850

ON Semiconductor Website: [www.onsemi.com](http://www.onsemi.com)

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative