

## N-Channel Enhancement-Mode MOSFET Transistors

TN2410L    VN2406D    VN2410L  
 VN2406L    VN2410M  
 VN2406M

### Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(th)}$ (V)	$I_D$ (A)
TN2410L	240	10 @ $V_{GS} = 4.5$ V	0.5 to 1.8	0.18
VN2406D		6 @ $V_{GS} = 10$ V	0.8 to 2	1.12
VN2406L		6 @ $V_{GS} = 10$ V	0.8 to 2	0.18
VN2406M		6 @ $V_{GS} = 10$ V	0.8 to 2	0.19
VN2410L		10 @ $V_{GS} = 10$ V	0.8 to 2	0.18
VN2410M		10 @ $V_{GS} = 10$ V	0.8 to 2	0.19

### Features

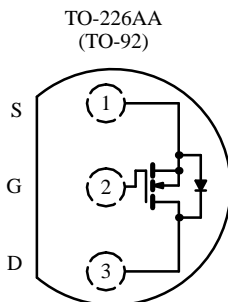
- Low On-Resistance: 3.5  $\Omega$
- Secondary Breakdown Free: 260 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

### Benefits

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

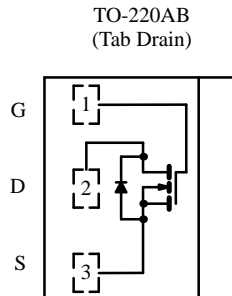
### Applications

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



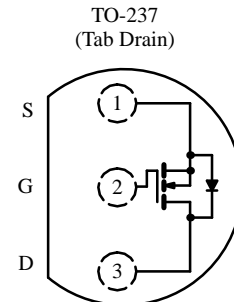
Top View

TN2410L  
 VN2406L  
 VN2410L



Top View

VN2406D



Top View

VN2406M  
 VN2410M

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70204.

## Absolute Maximum Ratings (T<sub>A</sub> = 25°C Unless Otherwise Noted)

Parameter	Symbol	TN2410L	VN2406D <sup>b</sup>	VN2406L	VN2406M	VN2410L	VN2410M	Unit	
Drain-Source Voltage	V <sub>DS</sub>	240	240	240	240	240	240	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20	± 20	± 20	± 20	± 20	± 20		
Continuous Drain Current (T <sub>J</sub> = 150°C)	I <sub>D</sub>	T <sub>A</sub> = 25°C	0.18	1.12	0.18	0.19	0.18	0.19	A
		T <sub>A</sub> = 100°C	0.11	0.7	0.11	0.12	0.11	0.12	
Pulsed Drain Current <sup>a</sup>	I <sub>DM</sub>	1	3	1.7	2	1.7	2		
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> = 25°C	0.8	20	0.8	1	0.8	1	W
		T <sub>A</sub> = 100°C	0.32	8	0.32	0.4	0.32	0.4	
Maximum Junction-to-Ambient	R <sub>thJA</sub>	156	6.25 <sup>c</sup>	156	125	156	125	°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.
- b. Reference case for all temperature testing.
- c. Maximum junction-to-case

## Specifications<sup>a</sup>

Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits						Unit
				TN2410L		VN2406D/L/M		VN2410L/M		
				Min	Max	Min	Max	Min	Max	
<b>Static</b>										
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 100 μA	260	240		240		240		V
Gate-Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA	1.4	0.5	1.8	0.8	2	0.8	2	
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 15 V					± 100		± 100	nA
		T <sub>J</sub> = 125°C					± 500		± 500	
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V				± 10				
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 192 V, V <sub>GS</sub> = 0 V	0.01		1					μA
		T <sub>J</sub> = 125°C	1		100					
		V <sub>DS</sub> = 120 V, V <sub>GS</sub> = 0 V					10		10	
		T <sub>J</sub> = 125°C				500		500		
On-State Drain Current <sup>c</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V	0.8	0.25						A
		V <sub>DS</sub> = 15 V, V <sub>GS</sub> = 10 V	1.5			1		1		
Drain-Source On-Resistance <sup>c</sup>	r <sub>DS(on)</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 0.1 A	7.5				10		10	Ω
		V <sub>GS</sub> = 3.5 V, I <sub>D</sub> = 0.05 A	4.5		15					
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 0.2 A	4		10					
		T <sub>J</sub> = 125°C	7.5		20					
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 A	3.5				6		10	
		T <sub>J</sub> = 125°C	6.5			14.8		24.7		
Forward Transconductance <sup>c</sup>	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.2 A	500	100						mS
		V <sub>DS</sub> = 10 V, I <sub>D</sub> = 0.5 A	530			300		300		

**Specifications<sup>a</sup>**

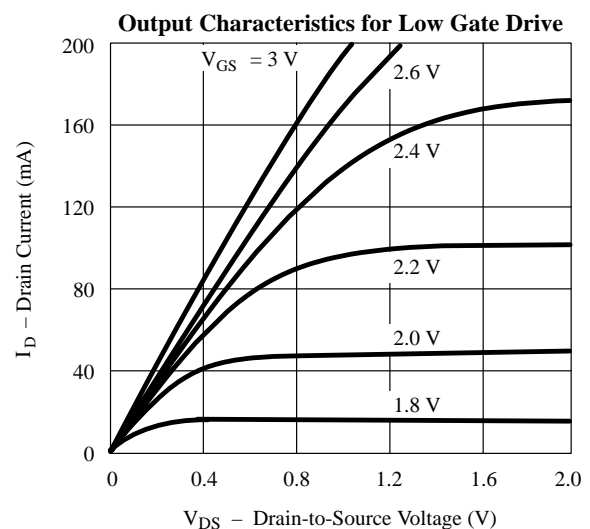
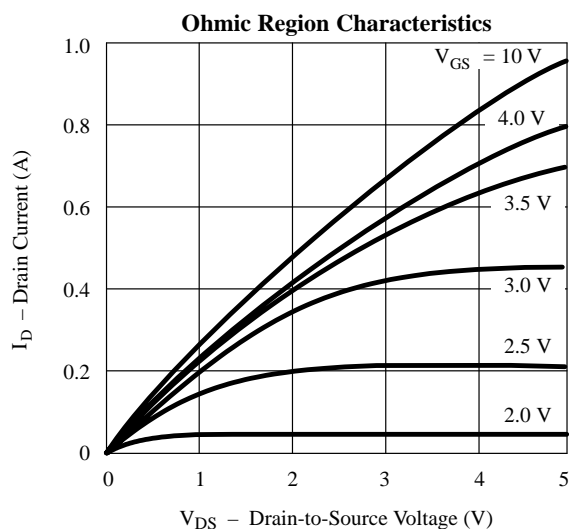
Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits						Unit
				TN2410L		VN2406D/L/M		VN2410L/M		
				Min	Max	Min	Max	Min	Max	
<b>Dynamic</b>										
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	115		135		135		135	pF
Output Capacitance	$C_{oss}$		30		50		50		50	
Reverse Transfer Capacitance	$C_{rss}$		5		20		20		20	
<b>Switching<sup>d</sup></b>										
Turn-On Time	$t_{ON}$	$V_{DD} = 60\text{ V}, R_L = 150\ \Omega$ $I_D \cong 0.4\text{ A}, V_{GEN} = 10\text{ V}$ $R_G = 25\ \Omega$	5		35					ns
	$t_{d(on)}$		3				8		8	
	$t_r$		2				8		8	
Turn-Off Time	$t_{OFF}$		26		60					
	$t_{d(off)}$		20				23		23	
	$t_f$		6				24		34	

Notes

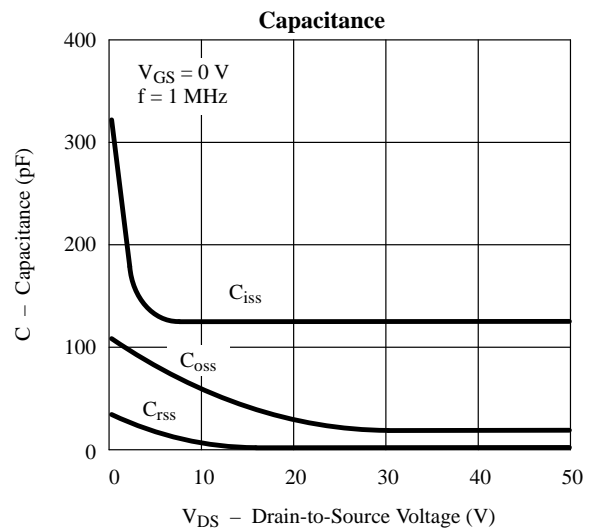
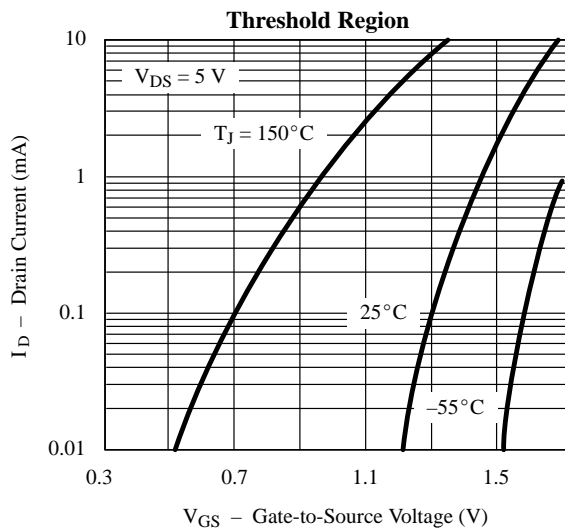
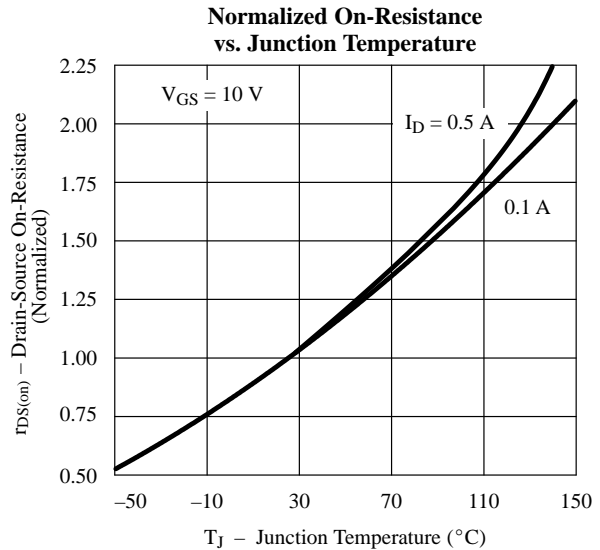
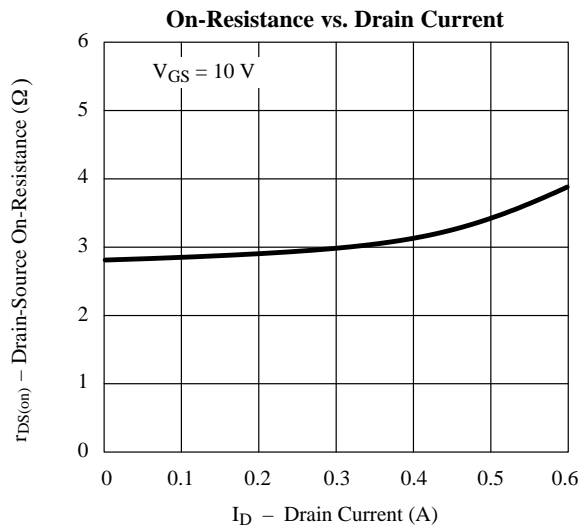
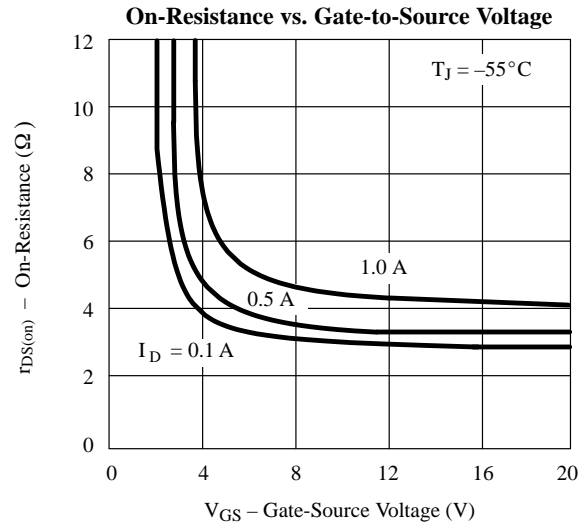
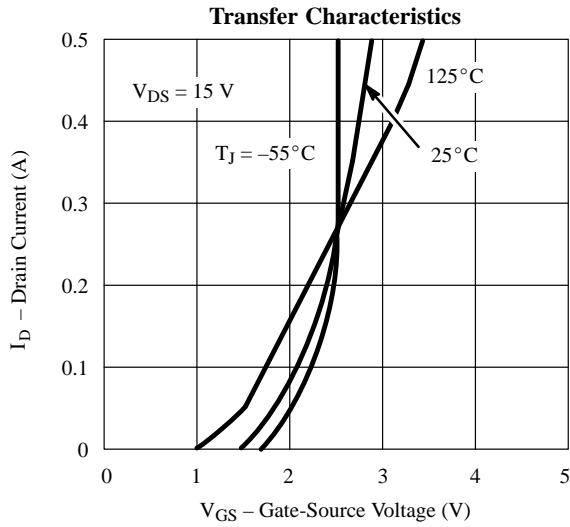
- a.  $T_A = 25^\circ\text{C}$  unless otherwise noted.
- b. For DESIGN AID ONLY, not subject to production testing.
- c. Pulse test:  $PW \leq 300\ \mu\text{s}$  duty cycle  $\leq 2\%$ .
- d. Switching time is essentially independent of operating temperature.

VNDB24

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



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



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

