

**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

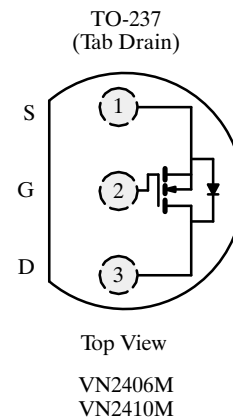
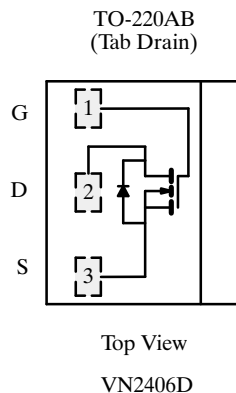
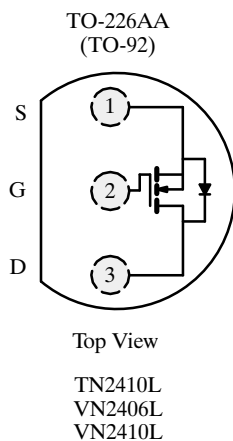
- Low On-Resistance: 3.5  $\Omega$
- Secondary Breakdown Free: 260 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

### 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



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

Parameter	Symbol	TN2410L	VN2406D <sup>b</sup>	VN2406L	VN2406M	VN2410L	VN2410M	Unit	
Drain-Source Voltage	$V_{DS}$	240	240	240	240	240	240	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	$\pm 20$	$\pm 20$	$\pm 20$	$\pm 20$		
Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$T_A = 25^\circ\text{C}$	$I_D$	0.18	1.12	0.18	0.19	0.18	0.19	A
	$T_A = 100^\circ\text{C}$		0.11	0.7	0.11	0.12	0.11	0.12	
Pulsed Drain Current <sup>a</sup>	$I_{DM}$	1	3	1.7	2	1.7	2		
Power Dissipation	$T_A = 25^\circ\text{C}$	$P_D$	0.8	20	0.8	1	0.8	1	W
	$T_A = 100^\circ\text{C}$		0.32	8	0.32	0.4	0.32	0.4	
Maximum Junction-to-Ambient	$R_{thJA}$	156	6.25	156	125	156	125	$^\circ\text{C}/\text{W}$	
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.
- b. Reference case for all temperature testing.

### 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	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 100\ \mu\text{A}$	260	240		240		240		V
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\text{ mA}$	1.4	0.5	1.8	0.8	2	0.8	2	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 15\text{ V}$					$\pm 100$		$\pm 100$	nA
		$T_J = 125^\circ\text{C}$					$\pm 500$		$\pm 500$	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 192\text{ V}, V_{GS} = 0\text{ V}$	0.01		1					$\mu\text{A}$
		$T_J = 125^\circ\text{C}$	1		100					
		$V_{DS} = 120\text{ V}, V_{GS} = 0\text{ V}$					10		10	
		$T_J = 125^\circ\text{C}$					500		500	
On-State Drain Current <sup>c</sup>	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}$	0.8	0.25						A
		$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}$	1.5			1		1		
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(on)}$	$V_{GS} = 2.5\text{ V}, I_D = 0.1\text{ A}$	7.5				10		10	$\Omega$
		$V_{GS} = 3.5\text{ V}, I_D = 0.05\text{ A}$	4.5		15					
		$V_{GS} = 4.5\text{ V}, I_D = 0.2\text{ A}$	4		10					
		$T_J = 125^\circ\text{C}$	7.5		20					
		$V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$	3.5				6		10	
		$T_J = 125^\circ\text{C}$	6.5				14.8		24.7	
Forward Transconductance <sup>c</sup>	$g_{fs}$	$V_{DS} = 10\text{ V}, I_D = 0.2\text{ A}$	500	100						mS
		$V_{DS} = 10\text{ V}, I_D = 0.5\text{ A}$	530			300		300		

## Specifications<sup>a</sup>

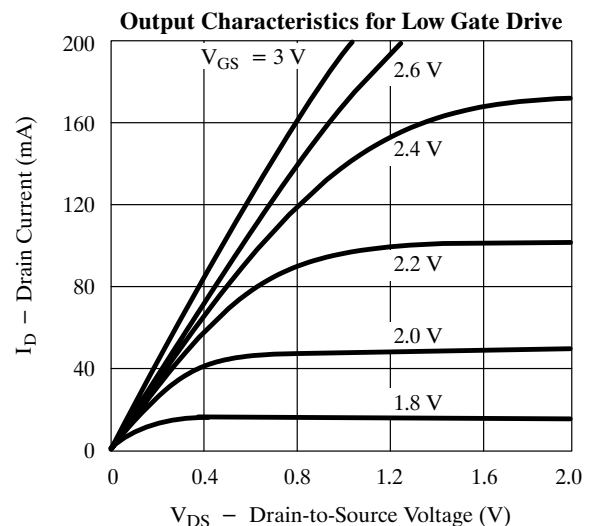
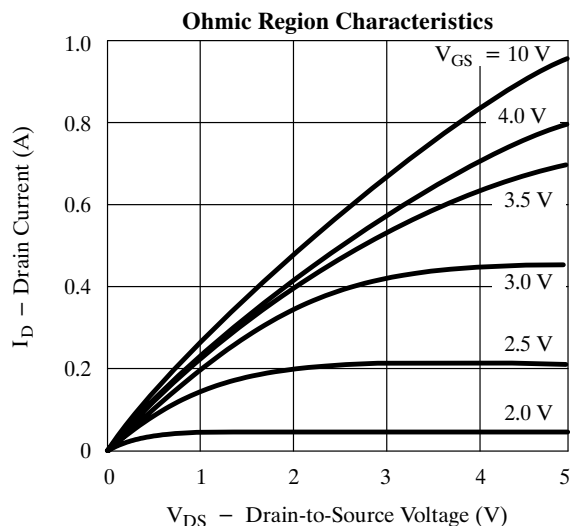
Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits						Unit
				TN2410L		VN2406D/L/M		VN2410L/M		
				Min	Max	Min	Max	Min	Max	
<b>Dynamic</b>										
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	115		135		125		135	pF
Output Capacitance	$C_{oss}$		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

- $T_A = 25^\circ\text{C}$  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.

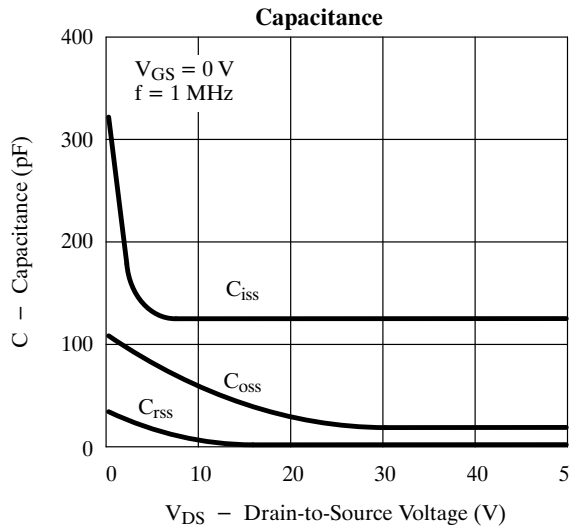
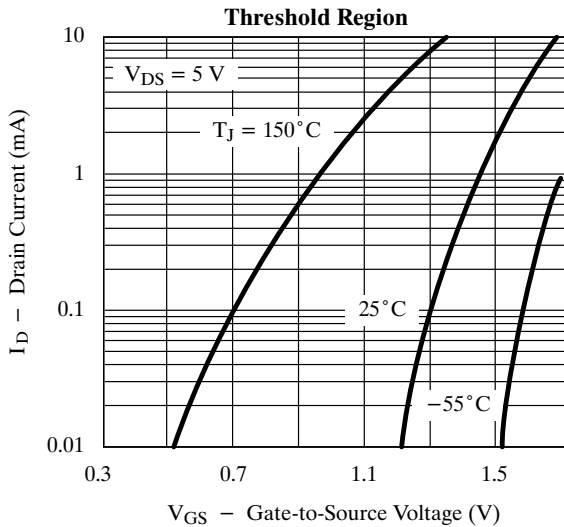
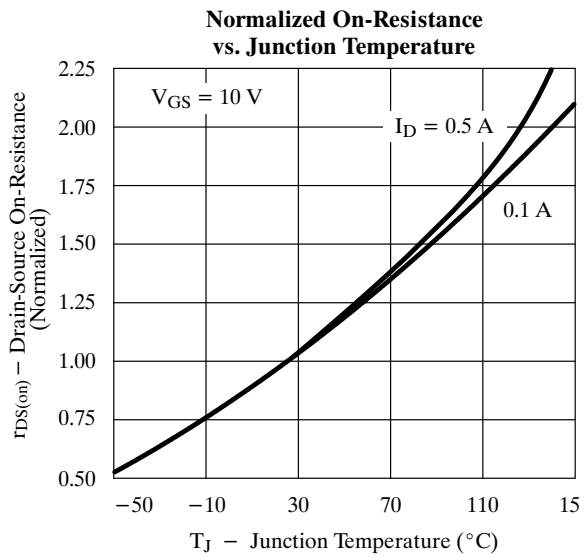
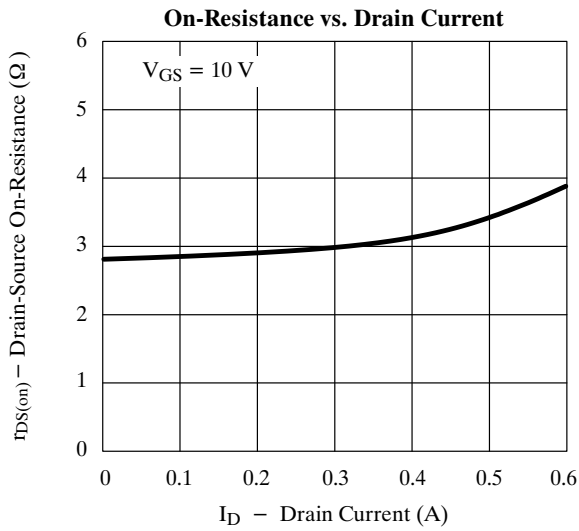
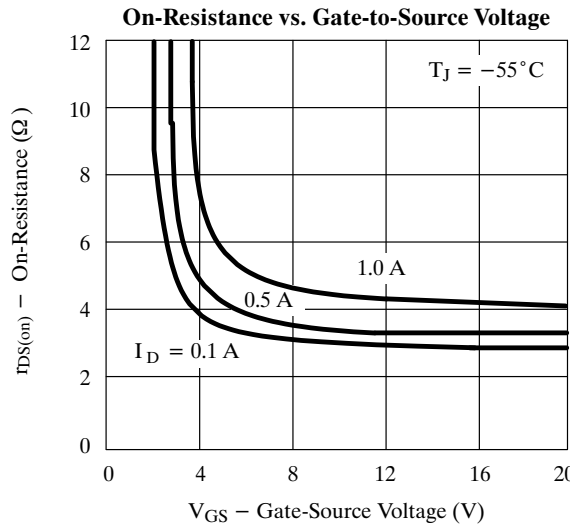
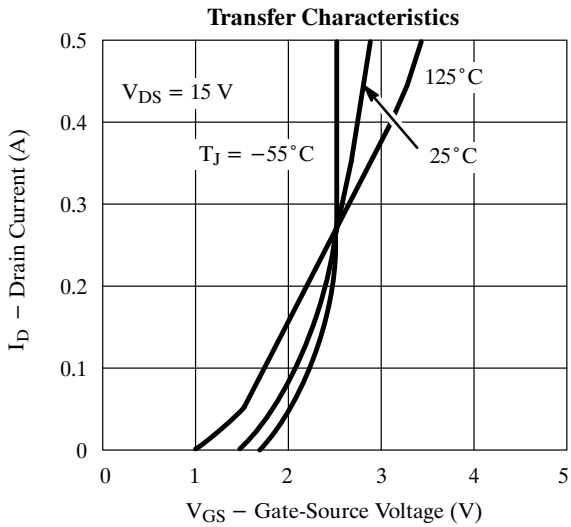
VNDB24

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



## TN2410L, VN2406/2410 Series

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



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

