

N-Channel Enhancement-Mode MOS Transistors

TN2410L VN2406D VN2410L
VN2406L VN2410M
VN2406M

Product Summary

Part Number	$V_{(BR)DSS}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(th)}$ (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

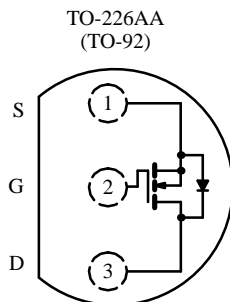
- Low On-Resistance: 3.5 Ω
- Secondary Breakdown Free: 260 V
- Low Power/Voltage Driven
- Low Input and Output Leakage
- Excellent Thermal Stability

Benefits

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

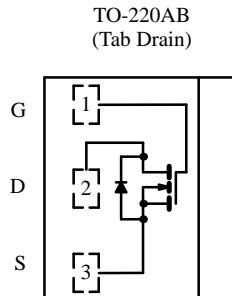
Applications

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



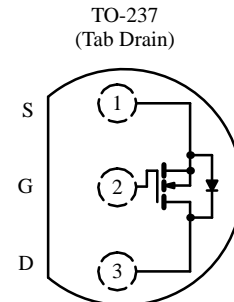
Top View

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

Parameter	Symbol	TN2410L	VN2406D ^b	VN2406L	VN2406M	VN2410L	VN2410M	Unit	
Drain-Source Voltage	V_{DS}	240	240	240	240	240	240	V	
Gate-Source Voltage	V_{GS}	± 20	± 20	± 20	± 20	± 20	± 20		
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	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 ^a	I_{DM}	1	3	1.7	2	1.7	2		
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	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^a

Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit
				TN2410L		VN2406D/L/M		VN2410L/M		
				Min	Max	Min	Max	Min	Max	
Static										
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}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 15\text{ V}$					± 100		± 100	nA
		$T_J = 125^\circ\text{C}$					± 500		± 500	
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$				± 10				
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 192\text{ V}, V_{GS} = 0\text{ V}$	0.01		1					μA
		$T_J = 125^\circ\text{C}$	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 ^c	$I_{D(on)}$	$V_{DS} = 10\text{ V}, V_{GS} = 4.5\text{ V}$	0.8	0.25						A
		$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}$	1.5			1		1		
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = 2.5\text{ V}, I_D = 0.1\text{ A}$	7.5				10		10	Ω
		$V_{GS} = 3.5\text{ V}, I_D = 0.05\text{ A}$	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 ^c	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^a

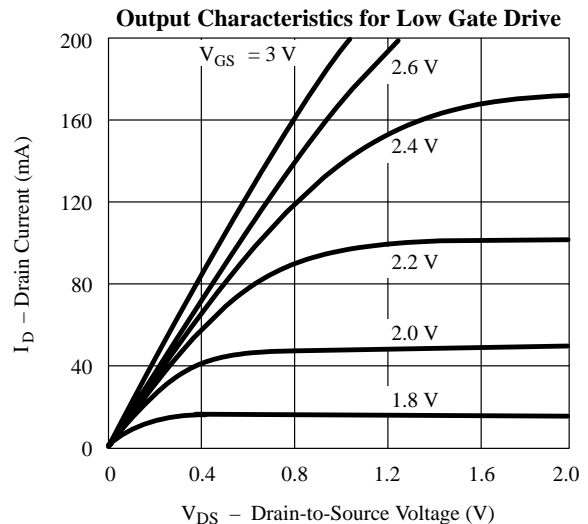
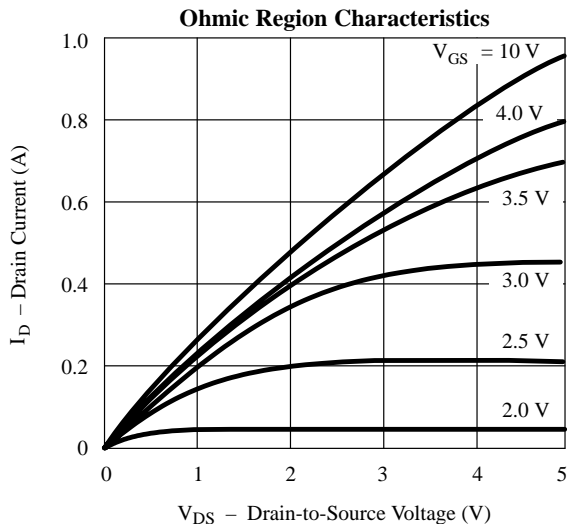
Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit
				TN2410L		VN2406D/L/M		VN2410L/M		
				Min	Max	Min	Max	Min	Max	
Dynamic										
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$	115		135		125		135	pF
Output Capacitance	C_{oss}		30		50		50		50	
Reverse Transfer Capacitance	C_{rss}		5		20		20		20	
Switching^d										
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

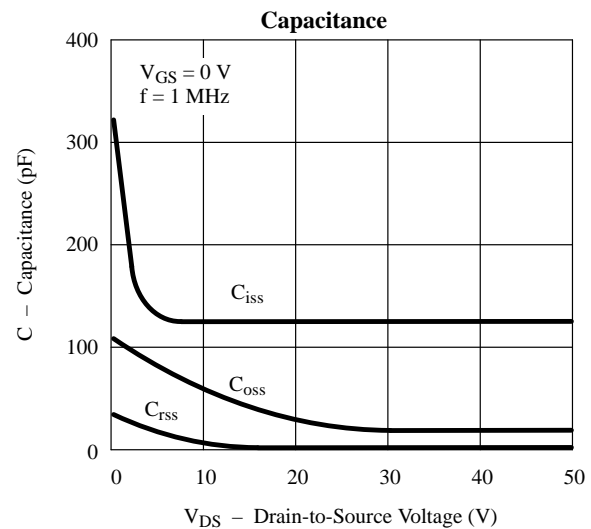
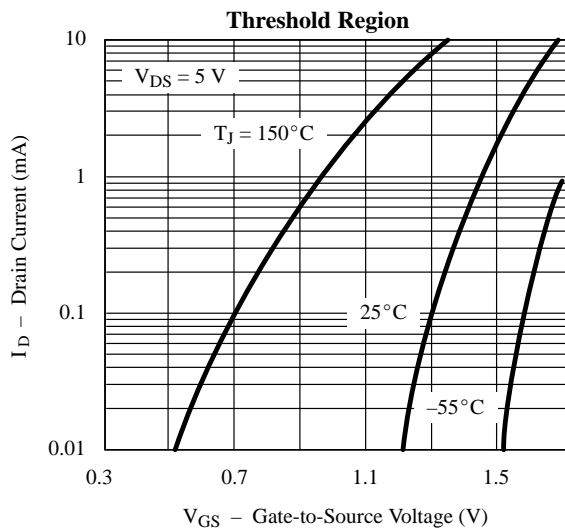
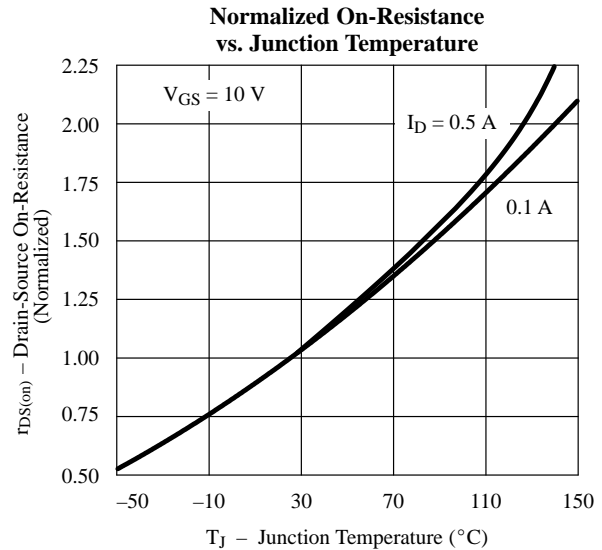
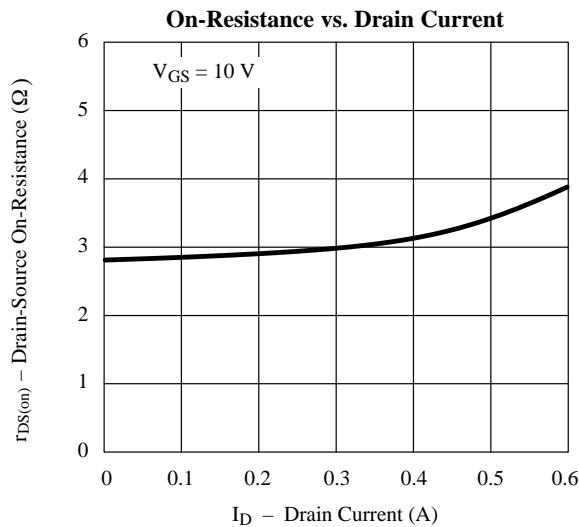
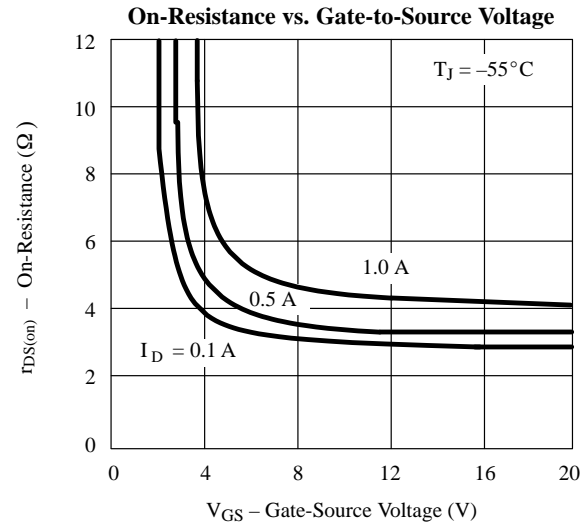
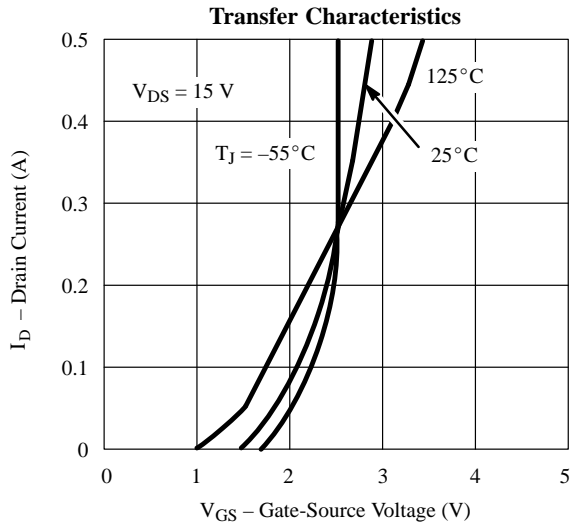
- a. $T_A = 25^\circ\text{C}$ unless otherwise noted.
- b. For DESIGN AID ONLY, not subject to production testing.
- c. Pulse test: $PW \leq 300\ \mu\text{s}$ duty cycle $\leq 2\%$.
- d. Switching time is essentially independent of operating temperature.

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)

