

N-Channel Depletion-Mode MOS Transistors

Product Summary

Part Number	$V_{(BR)DSV}$ Min (V)	$r_{DS(on)}$ Max (Ω)	$V_{GS(off)}$ (V)	I_D (A)
ND2406L	240	6	-1.5 to -4.5	0.23
ND2410L		10	-0.5 to -2.5	0.18
BSS129	230	20	-0.7 (min)	0.15

For applications information see AN901.

Features

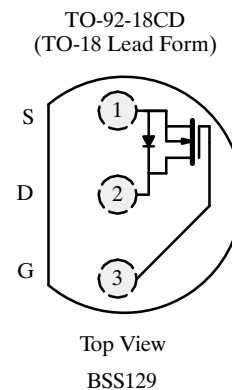
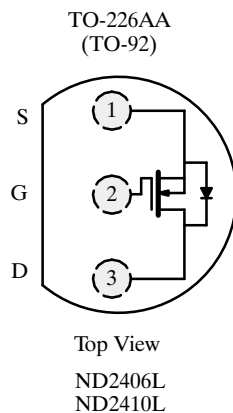
- High Breakdown Voltage: 260 V
- Normally "On" Low r_{DS} Switch: 3.5 Ω
- Low Input and Output Leakage
- Low-Power Drive Requirement
- Low Input Capacitance

Benefits

- Full-Voltage Operation
- Low Offset Voltage
- Low Error Voltage
- Easily Driven Without Buffer
- High-Speed Switching

Applications

- Normally "On" Switching Circuits
- Current Sources/Limiters
- Power Supply, Converter Circuits
- Solid-State Relays
- Telecom Switches



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

Parameter	Symbol	ND2406L	ND2410L	BSS129	Unit
Drain-Source Voltage	V_{DS}	240	240	230	V
Gate-Source Voltage	V_{GS}	± 30	± 30	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$)	I_D	$T_A = 25^\circ\text{C}$	0.23	0.18	A
		$T_A = 100^\circ\text{C}$	0.14	0.12	
Pulsed Drain Current	I_{DM}	0.9	0.9	0.6	
Power Dissipation	P_D	$T_A = 25^\circ\text{C}$	0.8	0.8	W
		$T_A = 100^\circ\text{C}$	0.32	0.32	
Maximum Junction-to-Ambient	R_{thJA}	156	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.

ND2406L/2410L, BSS129

Specifications^a

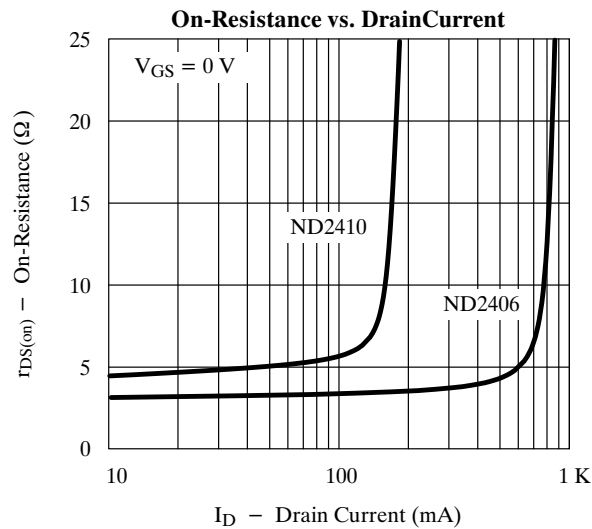
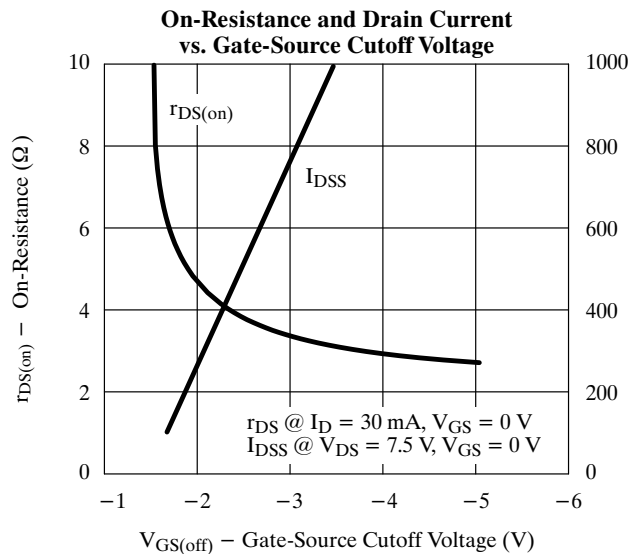
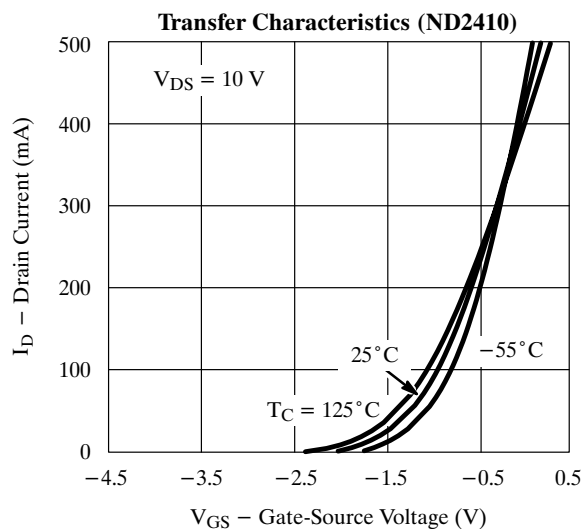
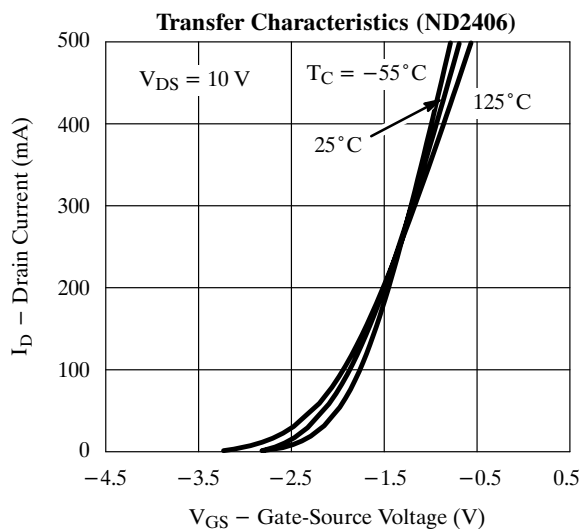
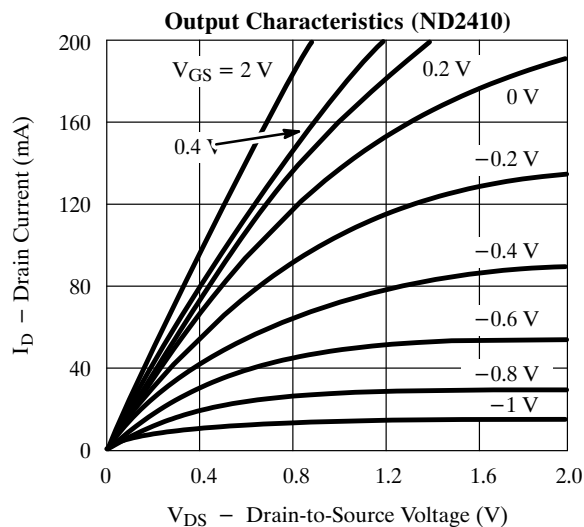
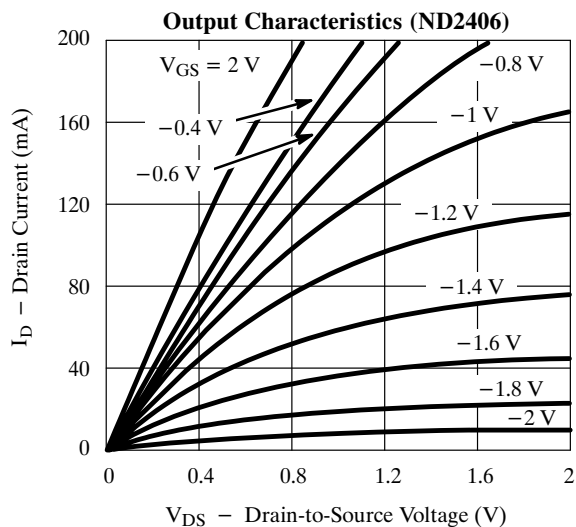
Parameter	Symbol	Test Conditions	Typ ^b	Limits						Unit
				ND2406L		ND2410L		BSS129		
				Min	Max	Min	Max	Min	Max	
Static										
Drain-Source Breakdown Voltage	$V_{(BR)DSV}$	$V_{GS} = -9\text{ V}, I_D = 10\ \mu\text{A}$	260	240						V
		$V_{GS} = -5\text{ V}, I_D = 10\ \mu\text{A}$	260			240				
		$V_{GS} = -3\text{ V}, I_D = 250\ \mu\text{A}$	260					230		
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 5\text{ V}, I_D = 10\ \mu\text{A}$		-1.5	-4.5	-0.5	-2.5			
		$V_{DS} = 3\text{ V}, I_D = 1\text{ mA}$						-0.7		
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 10		± 10		± 100	nA
		$T_J = 125^\circ\text{C}$			± 50		± 50			
Drain Cutoff Current	$I_{D(off)}$	$V_{DS} = 180\text{ V}, V_{GS} = -9\text{ V}$			1					μA
		$T_J = 125^\circ\text{C}$			200					
		$V_{DS} = 180\text{ V}, V_{GS} = -5\text{ V}$					1			
		$T_J = 125^\circ\text{C}$					200			
		$V_{DS} = 230\text{ V}, V_{GS} = -3\text{ V}$						0.1		
		$T_J = 125^\circ\text{C}$						200		
Drain-Saturation Current ^c	I_{DSS}	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}$	350	40		40				mA
Drain-Source On-Resistance ^c	$r_{DS(on)}$	$V_{GS} = 2\text{ V}, I_D = 30\text{ mA}$	3.3							Ω
		$V_{GS} = 0\text{ V}, I_D = 30\text{ mA}$	3.5		6		10			
		$T_J = 125^\circ\text{C}$	5.6		15		25			
		$V_{GS} = 0\text{ V}, I_D = 14\text{ mA}$	4						20	
Forward Transconductance ^c	g_{fs}	$V_{DS} = 25\text{ V}, I_D = 250\text{ mA}$	375					140		mS
			110							
Common Source Output Conductance ^c	g_{os}	$V_{DS} = 10\text{ V}, I_D = 30\text{ A}$	70							μS
Dynamic										
Input Capacitance	C_{iss}	$V_{DS} = 25\text{ V}, V_{GS} = -5\text{ V}$ $f = 1\text{ MHz}$	70		120		120			pF
Output Capacitance	C_{oss}		20		30		30			
Reverse Transfer Capacitance	C_{rss}		10		15		15			
Switching^d										
Turn-On Time	$t_{d(on)}$	$V_{DD} = 25\text{ V}, R_L = 830\ \Omega$ $I_D \cong 30\text{ mA}, V_{GEN} = -5\text{ V}$ $R_G = 25\ \Omega$	15							ns
	t_r		75							
Turn-Off Time	$t_{d(off)}$		40							
	t_f		100							

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.

VDDV24

Typical Characteristics (25°C Unless Otherwise Noted)



ND2406L/2410L, BSS129

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

