

# ND2406L/2410L, BSS129

## N-Channel Depletion-Mode MOSFET Transistors

### Product Summary

Part Number	$V_{(BR)DSV}$ Min (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(off)}$ (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

### Features

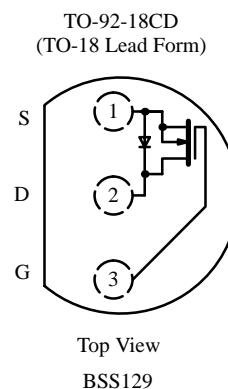
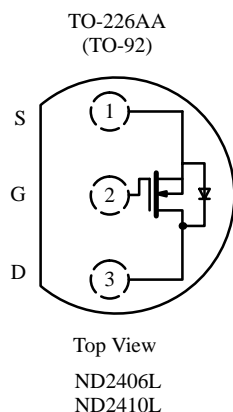
- High Breakdown Voltage: 260 V
- Normally "On" Low  $r_{DS}$  Switch: 3.5  $\Omega$
- Low Input and Output Leakage
- Low-Power Drive Requirement
- Low Input Capacitance

### 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	$V_{GS}$	$\pm 30$	$\pm 30$	$\pm 20$	
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 <sup>a</sup>	$I_{DM}$	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.

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70198. Applications information may also be obtained via FaxBack, request document #70612.

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## Specifications<sup>a</sup>

Parameter	Symbol	Test Conditions	Typ <sup>b</sup>	Limits						Unit
				ND2406L		ND2410L		BSS129		
				Min	Max	Min	Max	Min	Max	
<b>Static</b>										
Drain-Source Breakdown Voltage	$V_{(BR)DSV}$	$V_{GS} = -9\text{ V}, I_D = 10\text{ }\mu\text{A}$	260	240						V
		$V_{GS} = -5\text{ V}, I_D = 10\text{ }\mu\text{A}$	260			240				
		$V_{GS} = -3\text{ V}, I_D = 250\text{ }\mu\text{A}$	260					230		
Gate-Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 5\text{ V}, I_D = 10\text{ }\mu\text{A}$		-1.5	-4.5	-0.5	-2.5			
		$V_{DS} = 3\text{ V}, I_D = 1\text{ mA}$						-0.7		
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 10$		$\pm 10$		$\pm 100$	nA
		$T_J = 125^\circ\text{C}$			$\pm 50$		$\pm 50$			
Drain Cutoff Current	$I_{D(off)}$	$V_{DS} = 180\text{ V}, V_{GS} = -9\text{ V}$			1					$\mu\text{A}$
		$T_J = 125^\circ\text{C}$			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 <sup>c</sup>	$I_{DSS}$	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}$	350	40		40				mA
Drain-Source On-Resistance <sup>c</sup>	$r_{DS(on)}$	$V_{GS} = 2\text{ V}, I_D = 30\text{ mA}$	3.3							$\Omega$
		$V_{GS} = 0\text{ V}, I_D = 30\text{ mA}$	4.5		6		10			
		$T_J = 125^\circ\text{C}$	7.2		15		25			
		$V_{GS} = 0\text{ V}, I_D = 14\text{ mA}$	4						20	
Forward Transconductance <sup>c</sup>	$g_{fs}$	$V_{DS} = 25\text{ V}, I_D = 250\text{ mA}$	375					140		mS
		$V_{DS} = 10\text{ V}, I_D = 30\text{ A}$	110							
Common Source Output Conductance <sup>c</sup>	$g_{os}$	$V_{DS} = 10\text{ V}, I_D = 30\text{ A}$	70							$\mu\text{S}$
<b>Dynamic</b>										
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			
<b>Switching<sup>d</sup></b>										
Turn-On Time	$t_{d(on)}$	$V_{DD} = 25\text{ V}, R_L = 830\text{ }\Omega$ $I_D \cong 30\text{ mA}, V_{GEN} = -5\text{ V}$ $R_G = 25\text{ }\Omega$	15							ns
	$t_r$		75							
Turn-Off Time	$t_{d(off)}$		40							
	$t_f$		100							

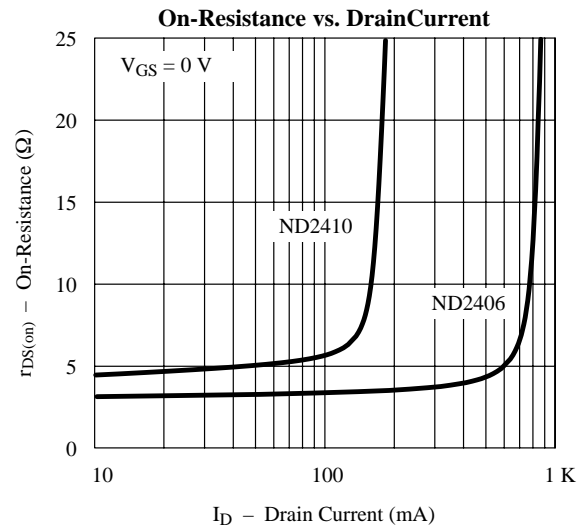
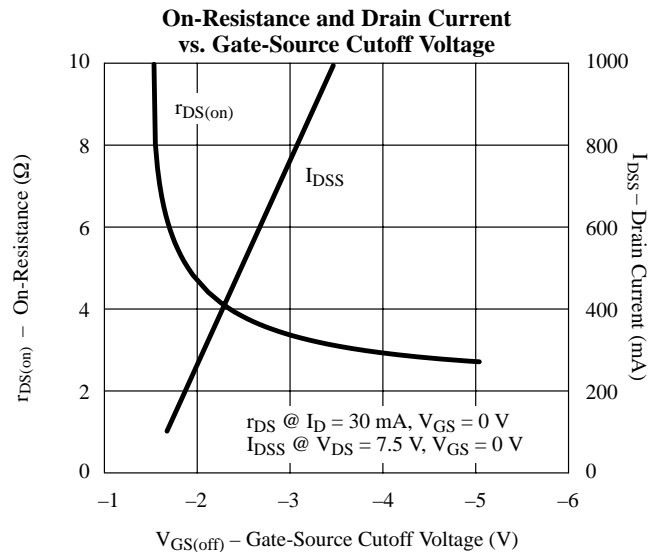
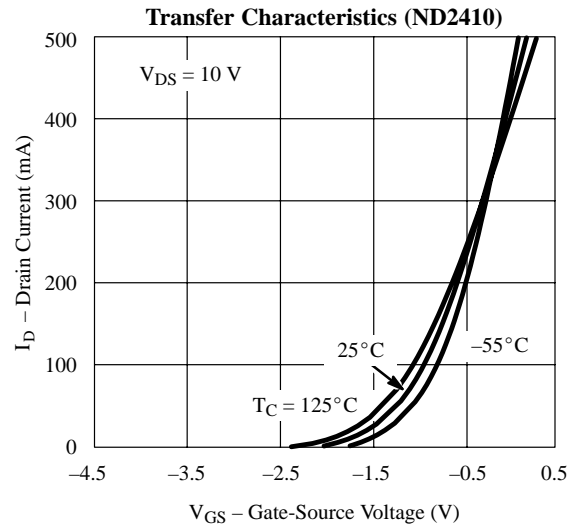
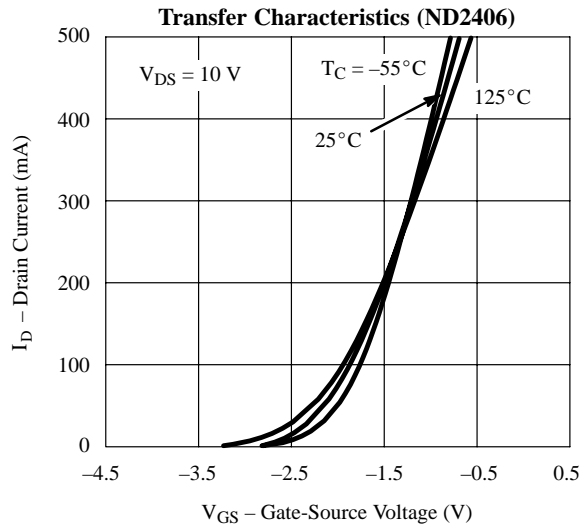
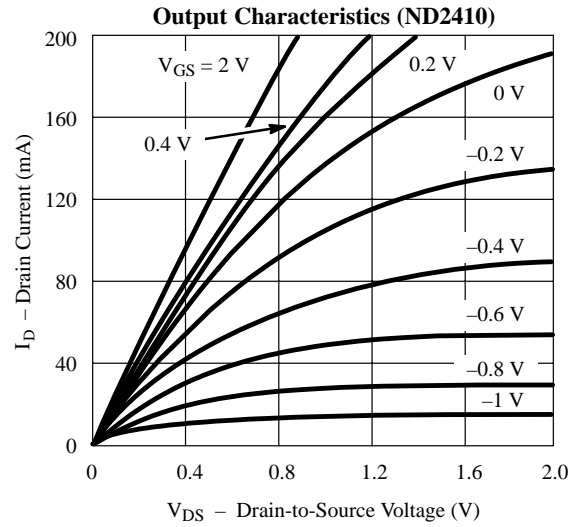
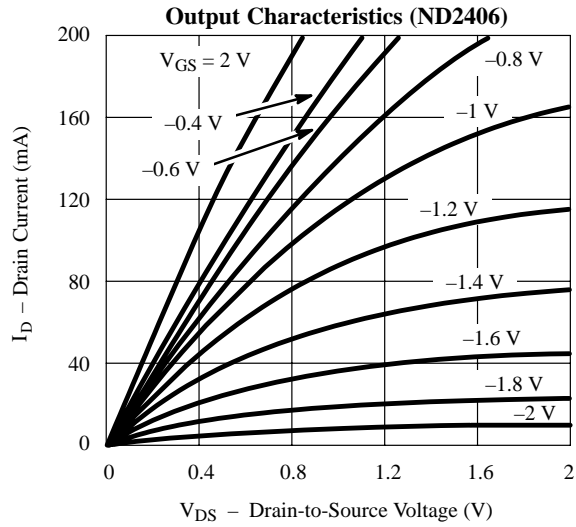
### Notes

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

VDDV24

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



# ND2406L/2410L, BSS129

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

