ND2020 SERIES

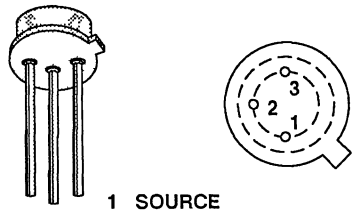
Siliconix incorporated

N-Channel Depletion-Mode MOS Transistors

TO-92 BOTTOM VIEW

1 SOURCE
2 GATE
3 DRAIN

TO-206AC (TO-52) BOTTOM VIEW



1 SOURCE
2 GATE
3 DRAIN & CASE

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSV}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)	PACKAGE
ND2020L	200	20	0.132	TO-92
ND2020E	200	20	0.18	TO-206AC

Performance Curves: **VDDQ20** (See Section 7)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

PARAMETERS/TEST CONDITIONS		SYMBOL	ND2020L	ND2020E[2]	UNITS
Drain-Source Voltage		V_{DS}	200	200	V
Gate-Source Voltage		V_{GS}	±30	±20	
Continuous Drain Current	T_A = 25°C	I_D	0.132	0.18	A
	T_A = 100°C		0.083	0.11	
Pulsed Drain Current[1]		I_{DM}	0.8	0.8	
Power Dissipation	T_A = 25°C	P_D	0.80	1.5	W
	T_A = 100°C		0.32	0.60	
Operating Junction and Storage Temperature		T_j, T_{stg}	-55 to 150		°C
Lead Temperature (1/16" from case for 10 seconds)		T_L	300		

THERMAL RESISTANCE

THERMAL RESISTANCE	SYMBOL	ND2020L	ND2020E	UNITS
Junction-to-Ambient	R_{thJA}	156	400	°C/W

[1]Pulse width limited by maximum junction temperature
[2]Reference case for all temperature testing

ELECTRICAL CHARACTERISTICS[1]			LIMITS					
				ND2020L		ND2020E		
PARAMETER	SYMBOL	TEST CONDITIONS	TYP[2]	MIN	MAX	MIN	MAX	UNIT
STATIC								
Drain-Source Breakdown Voltage	$V_{(BR)DSV}$	V_{GS} = -5 V, I_D = 1 µA	220	200		200		V
Gate-Source Cutoff Voltage	$V_{GS(OFF)}$	V_{DS} = 5 V, I_D = 10 µA	-1.8	-0.5	-2.5	-0.5	-2.5	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V	±0.1		±10		±10	nA
		V_{DS} = 0 V, V_{GS} = ±20 V, T_J = 125°C	±5		±50		±50	nA
Drain Cutoff Current	$I_{D(OFF)}$	V_{DS} = 160 V, V_{GS} = -5 V	0.2		1		1	µA
		V_{DS} = 160 V, V_{GS} = -5 V, T_J = 125°C	5		200		200	µA
Drain Saturation Current[3]	I_{DSS}	V_{DS} = 10 V, V_{GS} = 0 V	110	30		30		mA
Drain-Source On-Resistance[3]	$r_{DS(ON)}$	V_{GS} = 2 V, I_D = 20 mA	10					Ω
		V_{GS} = 0 V, I_D = 20 mA	11		20		20	Ω
		V_{GS} = 0 V, I_D = 20 mA, T_J = 125°C	20		50		30	Ω
Forward Transconductance[3]	g_{FS}	V_{DS} = 7.5 V, I_D = 20 mA	55					mS
Common Source Output Conductance[3]	g_{OS}	V_{DS} = 7.5 V, I_D = 20 mA	75					µS
DYNAMIC								
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = -5 V, f = 1 MHz	35		100		100	pF
Output Capacitance	C_{oss}	V_{DS} = 25 V, V_{GS} = -5 V, f = 1 MHz	10		20		20	pF
Reverse Transfer Capacitance	C_{rss}	V_{DS} = 25 V, V_{GS} = -5 V, f = 1 MHz	2		5		5	pF
SWITCHING								
Turn-On Time	$t_{d(ON)}$	V_{DD} = 25 V, R_L = 1250 Ω, I_D = 20 mA, V_{GEN} = -5 V, R_G = 25 Ω (Switching time is essentially independent of operating temperature)	20					ns
	t_r		20					ns
Turn-Off Time	$t_{d(OFF)}$		10					ns
	t_f		10					ns

NOTES: 1. T_A = 25 °C unless otherwise noted, T_C = 25 °C for ND2020E.
2. For design aid only, not subject to production testing.
3. Pulse test; PW = 300 µs, duty cycle ≤ 2%.