

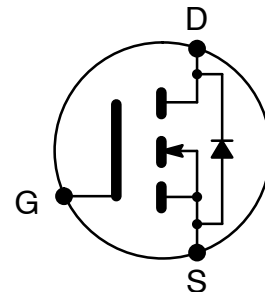


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## NTE491 NTE491SM MOSFET N-Ch, Enhancement Mode High Speed Switch

**Features:**

- Available in either TO92 (NTE491) or SOT-23 Surface Mount (NTE491SM) Type Package
- High Density Cell Design for Low  $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch
- Rugged and Reliable
- High Saturation Current Capability



**Absolute Maximum Ratings:**

Drain-Source Voltage, $V_{DS}$ .....	60V
Drain-Gate Voltage ( $R_{GS} = 1M\pm$ ), $V_{DGR}$ .....	60V
Gate-Source Voltage, $V_{GS}$	
Continuous .....	$\pm 20V$
Non-Repetitive ( $t_p \leq 50\mu s$ ) .....	$\pm 40V$
Drain Current, $I_D$	
Continuous	
NTE491 .....	200mA
NTE491SM .....	115mA
Pulsed	
NTE491 .....	500mA
NTE491SM .....	800mA
Total Device Dissipation ( $T_A = +25^\circ C$ ), $P_D$	
NTE491 .....	350mW
NTE491SM .....	200mW
Derate above $25^\circ C$	
NTE491 .....	2.8mW/ $^\circ C$
NTE491SM .....	1.6mW/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Thermal Resistance, Junction-to-Ambient, $R_{th} (JA)$	
NTE491 .....	312.5 $^\circ C/W$
NTE491SM .....	625 $^\circ C/W$
Maximum Lead Temperature (During Soldering, 1/16" from case, 10sec), $T_L$ .....	$+300^\circ C$

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0, I_D = 10\geq\text{A}$	60	-	-	V
Zero-Gate-Voltage Drain Current NTE491	$I_{DSS}$	$V_{DS} = 48\text{V}, V_{GS} = 0$ $T_J = +125^\circ\text{C}$	-	-	1.0	$\geq\text{A}$
NTE491SM			-	-	1.0	$\geq\text{A}$
		$V_{DS} = 60\text{V}, V_{GS} = 0$ $T_J = +125^\circ\text{C}$	-	-	0.5	mA
Gate-Body Leakage Current, Forward NTE491	$I_{GSSF}$	$V_{GSF} = 15\text{V}, V_{DS} = 0$	-	-	10	nA
NTE491SM		$V_{GSF} = 20\text{V}, V_{DS} = 0$	-	-	100	nA
Gate-Body Leakage Current, Reverse NTE491	$I_{GSSR}$	$V_{GSF} = -15\text{V}, V_{DS} = 0$	-	-	-10	nA
NTE491SM		$V_{GSF} = -20\text{V}, V_{DS} = 0$	-	-	-100	nA
<b>ON Characteristics (Note 1)</b>						
Gate Threshold Voltage NTE491	$V_{GS(Th)}$	$I_D = 1\text{mA}, V_{DS} = V_{GS}$	0.8	-	3.0	V
NTE491SM		$I_D = 250\geq\text{A}, V_{DS} = V_{GS}$	1.0	2.1	2.5	V
Static Drain-Source ON Resistance NTE491	$r_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 500\text{mA}$ $T_J = +125^\circ\text{C}$	-	1.2	5.0	$\pm$
			$V_{GS} = 4.5\text{V}, I_D = 75\text{mA}$	-	1.8	5.3
NTE491SM		$V_{GS} = 10\text{V}, I_D = 500\text{mA}$ $T_J = +100^\circ\text{C}$	-	1.2	7.5	$\pm$
			-	1.7	13.5	$\pm$
Drain-Source ON-Voltage NTE491	$V_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 500\text{mA}$	-	0.6	2.5	V
		$V_{GS} = 4.5\text{V}, I_D = 75\text{mA}$	-	0.14	0.45	V
NTE491SM		$V_{GS} = 10\text{V}, I_D = 500\text{mA}$	-	0.6	3.75	V
		$V_{GS} = 4.5\text{V}, I_D = 75\text{mA}$	-	0.9	1.5	V
ON-State Drain Current NTE491	$I_{d(on)}$	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}$	75	600	-	mA
NTE491SM		$V_{GS} = 10\text{V}, V_{DS} \geq 2 V_{DS(on)}$	500	2700	-	mA
Forward Transconductance NTE491	$g_{fs}$	$V_{DS} = 10\text{V}, I_D = 200\text{mA}$	100	320	-	$\geq\text{mhos}$
NTE491SM		$V_{DS} \geq 2 V_{DS(on)}, I_D = 200\text{mA}$	80	320	-	$\geq\text{mhos}$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{V}, V_{GS} = 0, f = 1\text{MHz}$	-	20	50	pF
Reverse Transfer Capacitance	$C_{oss}$		-	11	25	pF
Output Capacitance	$C_{rss}$		-	4	5	pF

Note 1. Pulse Test: Pulse Width  $\leq 300\geq\text{s}$ , Duty Cycle  $\leq 2\%$ .

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Time NTE491	$t_{on}$	$V_{DD} = 15\text{V}, R_L = 25\pm,$ $I_D = 500\text{mA}, V_{GS} = 10\text{V},$ $R_{GEN} = 25\pm$	-	-	10	ns
NTE491SM		$V_{DD} = 30\text{V}, R_L = 150\pm,$ $I_D = 200\text{mA}, V_{GS} = 10\text{V},$ $R_{GEN} = 25\pm$	-	-	20	ns
Turn-Off Time NTE491	$t_{off}$	$V_{DD} = 15\text{V}, R_L = 25\pm,$ $I_D = 500\text{mA}, V_{GS} = 10\text{V},$ $R_{GEN} = 25\pm$	-	-	10	ns
NTE491SM		$V_{DD} = 30\text{V}, R_L = 150\pm,$ $I_D = 200\text{mA}, V_{GS} = 10\text{V},$ $R_{GEN} = 25\pm$	-	-	20	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings (NTE491SM ONLY)</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$		-	-	115	mA
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$		-	-	0.8	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0, I_S = 115\text{mA}, \text{Note 1}$	-	0.88	1.5	V

Note 1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

