



**ELECTRONICS, INC.**  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089

## NTE2944 MOSFET N-Channel, Enhancement Mode High Speed Switch

**Features:**

- Low Static Drain-Source ON Resistance
- Improved Inductive Ruggedness
- Fast Switching Times
- Low Input Capacitance
- Extended Safe Operating Area
- Improved High Temperature Reliability
- TO220 Type Isolated Package

**Absolute Maximum Ratings:**

Drain-Source Voltage (Note 1), $V_{DSS}$ .....	200V
Drain-Gate Voltage ( $R_{GS} = 1M\Omega$ , Note 1), $V_{DGR}$ .....	200V
Gate-Source Voltage, $V_{GS}$ .....	$\pm 20V$
Drain Current, $I_D$	
Continuous	
$T_C = +25^\circ C$ .....	9.8A
$T_C = +100^\circ C$ .....	6.8A
Pulsed (Note 2) .....	72A
Gate Current (Pulsed), $I_{GM}$ .....	$\pm 1.5A$
Single Pulsed Avalanche Energy (Note 3), $E_{AS}$ .....	178mJ
Avalanche Current, $I_{AS}$ .....	9.8A
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	40W
Derate Above $25^\circ C$ .....	0.32W/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Maximum Lead Temperature (During Soldering, 1/8" from case, 5sec), $T_L$ .....	$+300^\circ C$
Thermal Resistance:	
Maximum Junction-to-Case, $R_{thJC}$ .....	3.12K/W
Typical Case-to-Sink (Mounting surface flat, smooth, and greased), $R_{thCS}$ .....	0.5K/W
Maximum Junction-to-Ambient (Free Air Operation), $R_{thJA}$ .....	62.5K/W

Note 1.  $T_J = +25^\circ$  to  $+150^\circ C$ .

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 3.  $L = 2.7mH$ ,  $V_{DD} = 50V$ ,  $R_G = 25\Omega$ , Starting  $T_J = +25^\circ C$ .

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	200	–	–	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.0	–	4.0	V
Gate–Source Leakage Forward	$I_{GSS}$	$V_{GS} = 20\text{V}$	–	–	100	nA
Gate–Source Leakage Reverse	$I_{GSS}$	$V_{GS} = -20\text{V}$	–	–	-100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = \text{Max. Rating}, V_{GS} = 0$	–	–	250	$\mu\text{A}$
		$V_{DS} = 0.8 \text{ Max. Rating}, T_C = +125^\circ\text{C}$	–	–	1000	$\mu\text{A}$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 9\text{A}, \text{Note 4}$	–	–	0.18	$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS} \geq 50\text{V}, I_D = 9\text{A}, \text{Note 4}$	6.0	9.5	–	mhos
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$	–	1400	–	pF
Output Capacitance	$C_{oss}$		–	240	–	pF
Reverse Transfer Capacitance	$C_{rss}$		–	95	–	pF
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 0.5 BV_{DSS}, I_D = 18\text{A}, Z_O = 9.1\Omega,$ (MOSFET switching times are essentially independent of operating temperature)	–	–	30	ns
Rise Time	$t_r$		–	–	60	ns
Turn–Off Delay Time	$t_{d(off)}$		–	–	80	ns
Fall Time	$t_f$		–	–	60	ns
Total Gate Charge (Gate–Source Plus Gate–Drain)	$Q_g$	$V_{GS} = 10\text{V}, I_D = 18\text{A}, V_{DS} = 0.8 \text{ Max. Rating},$ (Gate charge is essentially independent of operating temperature)	–	–	64	nC
Gate–Source Charge	$Q_{gs}$		–	12.3	–	nC
Gate–Drain (“Miller”) Charge	$Q_{gd}$		–	25.3	–	nC
<b>Source–Drain Diode Ratings and Characteristics</b>						
Continuous Source Current	$I_S$	(Body Diode)	–	–	18	A
Pulse Source Current	$I_{SM}$	(Body Diode) Note 2	–	–	72	A
Diode Forward Voltage	$V_{SD}$	$T_J = +25^\circ\text{C}, I_S = 18\text{A}, V_{GS} = 0\text{V}, \text{Note 4}$	–	–	2	V
Reverse Recovery Time	$t_{rr}$	$T_J = +25^\circ\text{C}, I_F = 18\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	–	650	–	ns

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 4. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

