

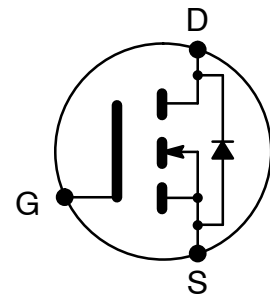


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## NTE2968 MOSFET N-Channel, Enhancement Mode High Speed Switch TO3P Type Package

**Features:**

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Low Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current
- Low Static Drain-Source On-State Resistance



**Absolute Maximum Ratings:**

Drain-Source Voltage, $V_{DSS}$ .....	200V
Drain Current, $I_D$	
Continuous	
$T_C = +25^\circ\text{C}$ .....	45A
$T_C = +100^\circ\text{C}$ .....	27.8A
Pulsed (Note 1) .....	180A
Gate-Source Voltage, $V_{GS}$ .....	$\pm 30\text{V}$
Gate Current (Pulsed), $I_{GM}$ .....	$\pm 1.5\text{A}$
Single Pulsed Avalanche Energy (Note 2), $E_{AS}$ .....	675mJ
Avalanche Current (Note 1), $I_{AS}$ .....	45A
Repetitive Avalanche Energy (Note 1), $E_{AR}$ .....	27.8mJ
Peak Diode Recovery $dv/dt$ (Note 3), $dv/dt$ .....	5.0V/ns
Total Power Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ .....	278W
Derate Above $25^\circ\text{C}$ .....	2.22W/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Maximum Lead Temperature (During Soldering, 1/8" from case, 5sec), $T_L$ .....	$+300^\circ\text{C}$
Thermal Resistance:	
Maximum Junction-to-Case, $R_{thJC}$ .....	0.45 $^\circ\text{C}/\text{W}$
Typical Case-to-Sink, $R_{thCS}$ .....	0.24 $^\circ\text{C}/\text{W}$
Maximum Junction-to-Ambient, $R_{thJA}$ .....	40 $^\circ\text{C}/\text{W}$

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2.  $L = 0.5\text{mH}$ ,  $I_{AS} = 45\text{A}$ ,  $V_{DD} = 25\text{V}$ ,  $R_G = 25\pm$ , Starting  $T_J = +25^\circ\text{C}$ .

Note 3.  $I_{SD} \leq 45\text{A}$ ,  $di/dt \leq 370\text{A}/\mu\text{s}$ ,  $V_{DD} \leq BV_{DSS}$ , Starting  $T_J = +25^\circ\text{C}$ .

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250\leq A$	200	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta BV/\Delta T_J$	$I_D = 250\leq A$	–	0.20	–	V/°C
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 5V, I_D = 250\leq A$	2.0	–	4.0	V
Gate–Source Leakage Forward	$I_{GSS}$	$V_{GS} = 30V$	–	–	100	nA
Gate–Source Leakage Reverse	$I_{GSS}$	$V_{GS} = -30V$	–	–	-100	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 200V, V_{GS} = 0$	–	–	10	$\leq A$
		$V_{DS} = 160V, T_C = +150^\circ\text{C}$	–	–	100	$\leq A$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 22.5A, \text{Note 4}$	–	–	0.065	$\pm$
Forward Transconductance	$g_{fs}$	$V_{DS} = 40V, I_D = 22.5A, \text{Note 4}$	–	25.06	–	mhos
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	–	3030	3940	pF
Output Capacitance	$C_{oss}$		–	530	610	pF
Reverse Transfer Capacitance	$C_{rss}$		–	255	295	pF
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 100V, I_D = 45A, R_G = 5.3\pm, \text{Note 4, Note 5}$	–	22	60	ns
Rise Time	$t_r$		–	22	60	ns
Turn–Off Delay Time	$t_{d(off)}$		–	79	170	ns
Fall Time	$t_f$		–	36	80	ns
Total Gate Charge	$Q_g$	$V_{GS} = 10V, I_D = 45A, V_{DS} = 160V, \text{Note 4, Note 5}$	–	117	152	nC
Gate–Source Charge	$Q_{gs}$		–	25	–	nC
Gate–Drain (“Miller”) Charge	$Q_{gd}$		–	48.8	–	nC
<b>Source–Drain Diode Ratings and Characteristics</b>						
Continuous Source Current	$I_S$	(Body Diode)	–	–	45	A
Pulse Source Current	$I_{SM}$	(Body Diode) Note 1	–	–	180	A
Diode Forward Voltage	$V_{SD}$	$T_J = +25^\circ\text{C}, I_S = 45A, V_{GS} = 0V, \text{Note 4}$	–	–	1.5	V
Reverse Recovery Time	$t_{rr}$	$T_J = +25^\circ\text{C}, I_F = 45A, di_F/dt = 100A/\leq s$	–	210	–	ns
Reverse Recovery Charge	$Q_{rr}$		–	1.67	–	$\leq C$

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 4. Pulse Test: Pulse Width  $\leq 250\leq s$ , Duty Cycle  $\leq 2\%$ .

Note 5. Essentially independent of operating temperature.

