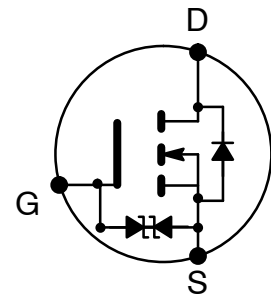




**ELECTRONICS, INC.**  
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**NTE2948  
 MOSFET  
 N-Channel, Enhancement Mode  
 High Speed Switch  
 TO251 Type Package**



**Features:**

- Low Drain-Source ON Resistance:  $R_{DS(ON)} = 4\Omega$  (Typ)
- High Forward Transfer Admittance:  $|y_{fs}| = 0.6S$  (Typ)
- Low Leakage Current:  $I_{DSS} = 100\mu A$  (Max) ( $V_{DS} = 400V$ )
- Enhancement Model:  $V_{th} = 2$  to  $4V$  ( $V_{DS} = 10V, I_D = 1mA$ )

**Applications:**

- DC-DC Converter
- Relay Drive
- Motor Drive

**Absolute Maximum Ratings:** ( $T_A = +25^\circ C$  unless otherwise specified)

Drain-Source Voltage, $V_{DSS}$ .....	400V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ ), $V_{DGR}$ .....	400V
Gate-Source Voltage, $V_{GS}$ .....	$\pm 30V$
Drain Current (Note 1), $I_D$	
DC .....	1A
Pulsed .....	3A
Drain Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	20W
Single Pulsed Avalanche Energy (Note 2), $E_{AS}$ .....	113mJ
Avalanche Current, $I_{AR}$ .....	1A
Repetitive Avalanche Energy (Note 3), $E_{AR}$ .....	2mJ
Channel Temperature, $T_{ch}$ .....	$+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ C$ to $+150^\circ C$
Maximum Thermal Resistance:	
Channel-to-Case, $R_{thCHC}$ .....	$6.25^\circ C/W$
Channel-to-Ambient, $R_{thCHA}$ .....	$125^\circ C/W$

Note 1. Please use devices on condition that the channel temperature is below  $+150^\circ C$ .

Note 2.  $V_{DD} = 90V$ ,  $T_{ch} = +25^\circ C$  (initial),  $L = 183mH$ ,  $R_G = 25\Omega$ .

Note 3. Repetitive rating: pulse width limited by maximum channel temperature.



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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Gate–Source Leakage Current	$I_{GSS}$	$V_{GS} = \pm 25\text{V}, V_{DS} = 0\text{V}$	–	–	$\pm 10$	$\mu\text{A}$
Gate–Source Breakdown Voltage	$BV_{GSS}$	$I_G = \pm 10\mu\text{A}, V_{DS} = 0\text{V}$	$\pm 30$	–	–	V
Drain Cutoff Current	$I_{DSS}$	$V_{DS} = 400\text{V}, V_{GS} = 0$	–	–	100	$\mu\text{A}$
Drain–Source Breakdown Voltage	$BV_{DSS}$	$I_D = 10\text{mA}, V_{GS} = 0\text{V}$	480	–	–	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 10\text{V}, I_D = 1\text{mA}$	2.0	–	4.0	V
Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 0.5\text{A}$	–	4.2	5.5	$\Omega$
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10\text{V}, I_D = 0.5\text{A}$	0.3	0.6	–	S
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 10\text{V}, f = 1\text{MHz}$	–	145	–	pF
Output Capacitance	$C_{oss}$		–	80	–	pF
Reverse Transfer Capacitance	$C_{rss}$		–	35	–	pF
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 200\text{V}, V_{GS} = 10\text{V}, I_D = 0.5\text{A},$ $R_L = 400\Omega, \text{Duty} \leq 1\%, t_w = 10\mu\text{s}$	–	56	–	ns
Rise Time	$t_r$		–	14	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	75	–	ns
Fall Time	$t_f$		–	26	–	ns
Total Gate Charge	$Q_g$	$V_{GS} = 10\text{V}, I_D = 1\text{A}, V_{DD} = 320\text{V}$	–	5.7	–	nC
Gate–Source Charge	$Q_{gs}$		–	3.0	–	nC
Gate–Drain (“Miller”) Charge	$Q_{gd}$		–	2.7	–	nC
<b>Source–Drain Diode Ratings and Characteristics</b>						
Continuous Drain Reverse Current	$I_{DR}$	Note 1	–	–	1	A
Pulse Drain Reverse Current	$I_{DRP}$	Note 1	–	–	3	A
Diode Forward Voltage	$V_{SDF}$	$I_{DR} = 1\text{A}, V_{GS} = 0\text{V}$	–	–	–1.7	V
Reverse Recovery Time	$t_{rr}$	$I_{DR} = 1\text{A}, V_{GS} = 0\text{V}, dI_{DR}/dt = 100\text{A}/\mu\text{s}$	–	650	–	ns
Reverse Recovery Charge	$Q_{rr}$		–	14.6	–	$\mu\text{C}$

Note 1. Please use devices on condition that the channel temperature is below  $+150^\circ\text{C}$ .

