



ELECTRONICS, INC.  
 44 FARRAND STREET  
 BLOOMFIELD, NJ 07003  
 (973) 748-5089  
<http://www.nteinc.com>



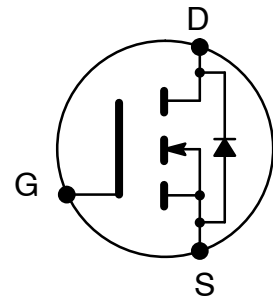
**NTE2928  
 MOSFET  
 N-Channel, Enhancement Mode  
 High Speed Switch  
 TO-220 Type Package**

**Features:**

- $R_{DS(on)} = 550m\Omega$  Max @  $V_{GS} = 10V, I_D = 6A$
- Low Gate Charge: 22nC Typ
- Low  $C_{RSS}$ : 11pF Typ
- 100% Avalanche Tested

**Applications:**

- LCD/LED/PDP TV
- Lighting
- Uninterruptible Power Supply



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

Drain-Source Voltage, $V_{DSS}$ .....	500V
Gate-Source Voltage, $V_{GSS}$ .....	$\pm 30V$
Drain Current, $I_D$	
Continuous	
$T_C = +25^\circ C$ .....	11.5A
$T_C = +100^\circ C$ .....	6.9A
Pulsed (Note 1) .....	46A
Single Pulsed Avalanche Energy (Note 2), $E_{AS}$ .....	456mJ
Avalanche Current (Note 1), $I_{AR}$ .....	11.5A
Repetitive Avalanche Energy (Note 1), $E_{AR}$ .....	16.7mJ
Peak Diode Recovery $dv/dt$ (Note 3), $dv/dt$ .....	4.5V/ns
Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	165W
Derate Above $+25^\circ C$ .....	1.33W/ $^\circ C$
Operating 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, 5 sec ), $T_L$ .....	$+300^\circ C$
Maximum Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	0.75 $^\circ C/W$
Maximum Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	62.5 $^\circ C/W$

Note 1. Repetitive rating; pulse width limited by maximum junction temperature.

Note 2.  $L = 6.9mH, I_{AS} = 11.5A, V_{DD} = 50V, R_G = 25\Omega$ , starting  $T_J = +25^\circ C$ .

Note 3.  $I_{SD} \leq 11.5A, di/dt \leq 200A/\mu s, V_{DD} \leq V_{(BR)DSS}$ , 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
<b>OFF Characteristics</b>						
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A, T_J = +25^\circ\text{C}$	500	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D = 250\mu A$ , Referenced to $+25^\circ\text{C}$	–	0.5	–	$V/^\circ\text{C}$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 500V, V_{GS} = 0$	–	–	1.0	$\mu A$
		$V_{DS} = 400V, T_C = +125^\circ\text{C}$	–	–	10	$\mu A$
Gate–Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	–	–	$\pm 100$	nA
<b>ON Characteristics</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}, I_D = 250\mu A$	3.0	–	5.0	V
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 6A$	–	0.55	0.65	$\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS} = 40V, I_D = 6A$	–	11.5	–	S
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V,$ $f = 1\text{MHz}$	–	985	1315	pF
Output Capacitance	$C_{oss}$		–	140	190	pF
Reverse Transfer Capacitance	$C_{rss}$		–	11	17	pF
Total Gate Charge	$Q_g$	$V_{DD} = 400V, I_D = 11.5A,$ $V_{GS} = 10V$ , Note 4	–	22	30	nC
Gate–Source Charge	$Q_{gs}$		–	6	–	nC
Gate–Drain Charge	$Q_{gd}$		–	9	–	nC
<b>Switching Characteristics</b>						
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 250V, I_D = 11.5A,$ $V_{GS} = 10V, R_G = 25\Omega$ , Note 4	–	24	60	ns
Rise Time	$t_r$		–	50	110	ns
Turn–Off Delay Time	$t_{d(off)}$		–	45	100	ns
Fall Time	$t_f$		–	30	70	ns
<b>Drain–Source Diode Characteristics and Maximum Ratings</b>						
Maximum Continuous Drain–Source Diode Forward Current	$I_S$		–	–	11.5	A
Maximum Pulsed Drain–Source Diode Forward Current	$I_{SM}$		–	–	46	A
Drain–Source Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_S = 11.5A$	–	–	1.4	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_{SD} = 11.5A,$ $dI_F/dt = 100A/\mu s$	–	375	–	ns
Reverse Recovery Charge	$Q_{rr}$		–	3.5	–	$\mu C$

Note 4. Essentially independent of operating temperature typical characteristics.

