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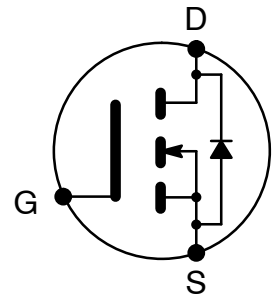
## NTE2908 MOSFET N-Channel, Enhancement Mode High Speed Switch TO-220 Type Package

**Description:**

The NTE2908 is a Power MOSFET in a TO-220 type package that utilizes advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design provides an extremely efficient and reliable device for use in a wide variety of applications.

**Features:**

- Ultra Low ON-Resistance
- Dynamic dv/dt Rating
- +175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated



**Absolute Maximum Ratings:**

Continuous Drain Current ( $V_{GS} = 10V$ ), $I_D$	
$T_C = +25^\circ C$ .....	202A
$T_C = +100^\circ C$ .....	143A
Pulsed Drain Current (Note 2), $I_{DM}$ .....	808A
Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	333W
Derate Linearly Above $25^\circ C$ .....	2.2W/ $^\circ C$
Gate-to-Source Voltage, $V_{GS}$ .....	$\pm 20V$
Single Pulse Avalanche Energy (Note 3), $E_{AS}$ .....	620mJ
Peak Diode Recovery dv/dt (Note 4), dv/dt .....	1.5V/ns
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ C$ to $+175^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ C$ to $+175^\circ C$
Lead Temperature (During Soldering, 1.6mm from case for 10sec), $T_L$ .....	$+300^\circ C$
Mounting Torque (6-32 or M3 Screw) .....	10 lbf•in (1.1N•m)
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	0.45 $^\circ C/W$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	62 $^\circ C/W$
Typical Thermal Resistance, Case-to-Sink (Flat, Greased Surface), $R_{thCS}$ .....	0.5 $^\circ C/W$

Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

Note 2. Repetitive rating; pulse width limited by maximum junction temperature.

Note 3. Starting  $T_J = +25^\circ C$ ,  $L = 85\mu H$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 121A$

Note 4.  $I_{SD} \leq 121A$ ,  $di/dt \leq 130A/\mu s$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  $T_J \leq +175^\circ C$



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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	V
Breakdown Voltage Temp. Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to $+25^\circ\text{C}$ , $I_D = 1\text{mA}$	-	0.039	-	$V/^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 121A$ , Note 5	-	0.0035	0.004	$\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = 10V, I_D = 250\mu A$	2.0	-	4.0	V
Forward Transconductance	$g_{fs}$	$V_{DS} = 25V, I_D = 121A$	76	-	-	S
Drain-to-Source Leakage Current		$V_{DS} = 40V, V_{GS} = 0V$	-	-	20	$\mu A$
		$V_{DS} = 32V, V_{GS} = 0V, T_J = +150^\circ\text{C}$	-	-	250	$\mu A$
Gate-to-Source Forward Leakage	$I_{GSS}$	$V_{GS} = 20V$	-	-	200	nA
Gate-to-Source Reverse Leakage	$I_{GSS}$	$V_{GS} = -20V$	-	-	-200	nA
Total Gate Charge	$Q_g$	$I_D = 121A, V_{DS} = 32V, V_{GS} = 10V$ , Note 5	-	131	196	nC
Gate-to-Source Charge	$Q_{gs}$		-	36	-	nC
Gate-to-Drain ("Miller") Charge	$Q_{gd}$		-	37	56	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 121A, R_G = 2.5\Omega, R_D = 0.2\Omega$ , Note 5	-	17	-	ns
Rise Time	$t_r$		-	190	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	46	-	ns
Fall Time	$t_f$		-	33	-	ns
Internal Drain Inductance	$L_D$	Between lead, .250in. (6.0) mm from package and center of die contact	-	4.5	-	nH
Internal Source Inductance	$L_S$		-	7.5	-	nH
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	-	5669	-	pF
Output Capacitance	$C_{oss}$		-	1659	-	pF
Reverse Transfer Capacitance	$C_{rss}$		-	223	-	pF
Output Capacitance	$C_{oss}$	$V_{GS} = 0V, V_{DS} = 1.0V, f = 1\text{MHz}$	-	6205	-	pF
		$V_{GS} = 0V, V_{DS} = 32V, f = 1\text{MHz}$	-	1467	-	pF
Effective Output Capacitance	$C_{oss \text{ eff.}}$	$V_{GS} = 0V, V_{DS} = 0V \text{ to } 32V$ , Note 6	-	2249	-	pF

**Source-Drain Ratings and Characteristics:**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	$I_S$	Note 1	-	-	202	A
Pulsed Source Current (Body Diode)	$I_{SM}$	Note 2	-	-	808	A
Diode Forward Voltage	$V_{SD}$	$T_J = +25^\circ\text{C}, I_S = 121A, V_{GS} = 0V$ , Note 5	-	-	1.5	V
Reverse Recovery Time	$t_{rr}$	$T_J = +25^\circ\text{C}, I_F = 121A, di/dt = 100A/\mu s$ , Note 5	-	78	117	ns
Reverse Recovery Charge	$Q_{rr}$		-	163	245	$\mu C$
Forward Turn-On Time	$t_{on}$	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ )				

Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

Note 2. Repetitive rating; pulse width limited by maximum junction temperature.

Note 5. Pulse width  $\leq 100\mu s$ ; duty cycle  $\leq 2\%$ .

Note 6.  $C_{oss \text{ eff.}}$  is a fixed capacitance that gives the same charging time as  $C_{oss}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$ .

