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## NTE2394 MOSFET N-Channel Enhancement Mode, High Speed Switch TO3P Type Package

**Description:**

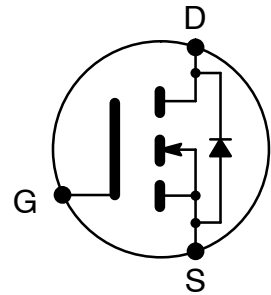
The NTE2394 is an N-Channel Enhancement Mode Power MOS Field Effect Transistor. Easy drive and very fast switching times make this device ideal for high speed switching applications. Typical applications include switching mode power supplies, uninterruptible power supplies, and motor speed control.

**Features:**

- High Voltage: 450V for Off-Line SMPS
- High Current: 12A for up to 350W SMPS
- Ultra Fast Switching for Operation at less than 100kHz

**Industrial Applications:**

- Switching Mode Power Supplies
- Motor Controls



**Absolute Maximum Ratings:**

Drain-Source Voltage ( $V_{GS} = 0$ , Note 1), $V_{DS}$ .....	500V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ , Note 1), $V_{DGR}$ .....	500V
Gate-Source Voltage, $V_{GS}$ .....	20V
Pulsed Drain Current (Note 2), $I_{DM}$ .....	56A
Clamped Drain Inductive Current ( $L = 100\mu H$ ), $I_{DLM}$ .....	56A
Continuous Drain Current, $I_D$	
$T_C = +25, C$ .....	14A
$T_C = +100, C$ .....	8.8A
Total Dissipation ( $T_C = +25, C$ ), $P_{tot}$ .....	180W
Derate Above 25, C .....	1.44W/, C
Maximum Operating Junction Temperature, $T_J$ .....	+150, C
Storage Temperature Range, $T_{stg}$ .....	-55, to +150, C

Note 1.  $T_J = +25$ , to +125, C

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

**Thermal Data:**

Maximum Thermal Resistance, Junction-to-Case,  $R_{thJC}$  ..... 0.69, C/W  
 Typical Thermal Resistance, Case-to-Sink,  $R_{thCS}$  ..... 0.1, C/W  
 Maximum Thermal Resistance, Junction-to-Ambient,  $R_{thJA}$  ..... 30, C/W  
 Maximum Lead Temperature (During Soldering),  $T_L$  ..... +300, C

**Electrical Characteristics:** ( $T_C = +25, C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu A, V_{GS} = 0$	500	-	-	V
Zero-Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0, V_{DS} = \text{Max Rating}$	-	-	250	$\mu A$
		$V_{GS} = 0, V_{DS} = 400V, T_C = +125, C$	-	-	1000	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{DS} = 0, V_{GS} = 20V$	-	-	500	nA
<b>ON Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	-	4	V
On-State Drain Current	$I_{D(on)}$	$V_{DS} > I_{D(on)} \times R_{DS(on) max}, V_{GS} = 10V$	14	-	-	A
Static Drain-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7.9A$	-	-	0.4	$\Omega$
<b>Dynamic Characteristics</b>						
Forward Transconductance	$g_{fs}$	$V_{DS} > I_{D(on)} \times R_{DS(on) max}, I_D = 7.9A, \text{Note 4}$	9.3	-	-	mho
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0, f = 1MHz$	-	-	3000	pf
Output Capacitance	$C_{oss}$		-	-	600	pf
Reverse Transfer Capacitance	$C_{rss}$		-	-	200	pf
<b>Switching Characteristics</b>						
Turn-On Time	$t_{d(on)}$	$V_{DD} = 210V, I_D = 7.0A, R_l = 4.7\Omega$	-	-	35	ns
Rise Time	$t_r$		-	-	50	ns
Turn-Off Delay Time	$t_{d(off)}$		-	-	150	ns
Fall Time	$t_f$		-	-	70	ns
Total Gate Charge	$Q_g$	$V_{GS} = 10V, I_D = 13A, V_{DS} = 400V$	-	-	120	nC
<b>Source Drain Diode Characteristics</b>						
Source-Drain Current	$I_{SD}$		-	-	14	A
Source-Drain Current (Pulsed)	$I_{SDM}$	Note 3	-	-	56	A
Forward ON Voltage	$V_{SD}$	$I_{SD} = 14A, V_{GS} = 0$	-	-	1.4	V
Reverse Recovery Time	$t_{rr}$	$I_{DS} = 14A, di/dt = 100A/\mu s, T_J = +150, C$	-	1300	-	ns
Reverse Recovered Charge	$Q_{rr}$		-	7.4	-	$\mu C$

Note 3. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 4. Pulsed: Pulse Duration = 300 $\mu s$ , Duty Cycle 1.5%

