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## NTE2392 MOSFET N-Channel Enhancement Mode, High Speed Switch

**Description:**

The NTE2392 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:**

- Fast Switching
- Low Drive Current
- Ease of Paralleling
- No Second Breakdown
- Excellent Temperature Stability

**Absolute Maximum Ratings:**

Drain-Source Voltage (Note 1), $V_{DS}$ .....	100V
Drain-Gate Voltage ( $R_{GS} = 20k\Omega$ , Note 1), $V_{DGR}$ .....	100V
Gate-Source Voltage, $V_{GS}$ .....	$\pm 20V$
Pulsed Drain Current (Note 3), $I_{DM}$ .....	160A
Clamped Inductive Current ( $L = 100\mu H$ ), $I_{LM}$ .....	160A
Continuous Drain Current, $I_D$	
$T_C = +25^\circ C$ .....	40A
$T_C = +100^\circ C$ .....	25A
Total Dissipation ( $T_C = +25^\circ C$ ), $P_{tot}$ .....	150W
Derate Above $25^\circ C$ .....	1.2W/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Lead Temperature (During Soldering, 0.063 in. (1.6mm) from case, 10sec), $T_L$ .....	$+300^\circ C$
Maximum Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	0.83 $^\circ C/W$
Typical Thermal Resistance, Case-to-Sink (Note 4), $R_{thCS}$ .....	0.1 $^\circ C/W$
Maximum Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	30 $^\circ C/W$

Note 1.  $T_J = +25^\circ$  to  $+150^\circ C$

Note 2. Pulse test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

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

Note 4. Mounting surface flat, smooth, and greased.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}$ , $V_{GS} = 0$	100	–	–	V
Zero–Gate Voltage Drain Current	$I_{DSS}$	$V_{GS} = 0$ , $V_{DS} = 100\text{V}$	–	–	250	$\mu\text{A}$
		$V_{GS} = 0$ , $V_{DS} = 80\text{V}$ , $T_C = +125^\circ\text{C}$	–	–	1000	$\mu\text{A}$
Gate–Body Leakage Current	$I_{GSS}$	$V_{DS} = 0$ , $V_{GS} = \pm 20\text{V}$	–	–	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$	2	–	4	V
On–State Drain Current	$I_{D(on)}$	$V_{DS} > I_{D(on)} \times R_{DS(on) \text{ max}}$ , $V_{GS} = 10\text{V}$ , Note 2	40	–	–	A
Static Drain–Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$ , $I_D = 20\text{A}$ , Note 2	–	0.045	0.055	W
Forward Transconductance	$g_{fs}$	$V_{DS} > I_{D(on)} \times R_{DS(on) \text{ max}}$ , $I_D = 20\text{A}$ , Note 2	9	11	–	mho
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{V}$ , $V_{GS} = 0$ , $f = 1\text{MHz}$	–	2000	3000	pf
Output Capacitance	$C_{oss}$		–	1000	1500	pf
Reverse Transfer Capacitance	$C_{rss}$		–	350	500	pf
Turn–On Time	$t_{d(on)}$	$V_{DD} = 24\text{V}$ , $I_D = 20\text{A}$ , $R_l = 4.7\Omega$	–	–	35	ns
Rise Time	$t_r$		–	–	100	ns
Turn–Off Delay Time	$t_{d(off)}$		–	–	125	ns
Fall Time	$t_f$		–	–	100	ns
Total Gate Charge	$Q_g$	$V_{GS} = 10\text{V}$ , $I_D = 50\text{A}$ , $V_{DS} = 80\text{V}$	–	63	120	nC
Gate–Source Charge	$Q_{gs}$		–	27	–	nC
Gate–Drain (“Miller”) Charge	$Q_{gd}$		–	36	–	nC
Internal Drain Inductance	$L_D$	Measured between the contact screw on header that is closer to source and gate pins and center of die	–	5.0	–	nH
Internal Source Inductance	$L_S$	Measured from the source pin, 6mm (.25 in.) from header	–	12.5	–	nH
<b>Source–Drain Diode Ratings and Characteristics</b>						
Continuous Source Current (Body Diode)	$I_S$		–	–	40	A
Pulsed Source Current (Body Diode)	$I_{SM}$	Note 3	–	–	160	A
Forward ON Voltage	$V_{SD}$	$I_S = 40\text{A}$ , $V_{GS} = 0$ , $T_J = +25^\circ\text{C}$ , Note 3	–	–	2.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = 40\text{A}$ , $di_F/dt = 100\text{A}/\mu\text{s}$ , $T_J = +150^\circ\text{C}$	–	600	–	ns
Reverse Recovered Charge	$Q_{rr}$		–	3.3	–	$\mu\text{C}$

Note 2. Pulse test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

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

