



NTE2394 MOSFET N–Channel Enhancement Mode, High Speed Switch

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}	$\pm 20V$
Pulsed Drain Current (Note 2), I_{DM}	56A
Clamped Drain Inductive Current ($L = 100\mu H$), I_{DLM}	56A
Continuous Drain Current, I_D	
$T_C = +25^\circ C$	14A
$T_C = +100^\circ C$	8.8A
Total Dissipation ($T_C = +25^\circ C$), P_{tot}	180W
Derate Above $25^\circ C$	1.44W/ $^\circ C$
Maximum Operating Junction Temperature, T_J	$+150^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$

Note 1. $T_J = +25^\circ$ to $+125^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Drain–Source Breakdown Voltage	V _{(BR)DSS}	I _D = 250μA, V _{GS} = 0	500	–	–	V
Zero–Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0, V _{DS} = Max Rating	–	–	250	μA
		V _{GS} = 0, V _{DS} = 400V, T _C = +125°C	–	–	1000	μA
Gate–Body Leakage Current	I _{GSS}	V _{DS} = 0, V _{GS} = ±20V	–	–	±500	nA
ON Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	–	4	V
On–State Drain Current	I _{D(on)}	V _{DS} > I _{D(on)} × 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	Ω
Dynamic Characteristics						
Forward Transconductance	g _{fs}	V _{DS} > I _{D(on)} × R _{DS(on)} max, I _D = 7.9A, 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
Switching Characteristics						
Turn–On Time	t _{d(on)}	V _{DD} = 210V, I _D = 7.0A, R _I = 4.7Ω	–	–	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
Source Drain Diode Characteristics						
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/μs, T _J = +150°C	–	1300	–	ns
Reverse Recovered Charge	Q _{rr}		–	7.4	–	μC

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

Note 4. Pulsed: Pulse Duration = 300 μs , Duty Cycle 1.5%

