NTE ELECTRONICS, INC.

NTE2393
MOSFET
N–Channel Enhancement Mode, High Speed Switch

Description:

The NTE2393 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: 500V for Off–Line SMPS
- High Current: 9A 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), V_{DS} 500V
Drain–Gate Voltage (R_{GS} = 20kΩ), V_{DGR} 500V
Gate–Source Voltage, V_{GS} . . . . . ±20V
Continuous Drain Current, I_D
  T_C = +25°C 9A
  T_C = +100°C 5.6A
Pulsed Drain Current (Note 1), I_{DM} 36A
Clamped Drain Inductive Current (Note 1), I_{DLM} 36A
Total Dissipation (T_C = +25°C), P_{tot} 150W
  Derate Above 25°C . . . . . 1.2W/°C
Maximum Operating Junction Temperature, T_J . . . . . +150°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C
Maximum Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 0.83°C/W
Maximum Lead Temperature (During Soldering), T_L . . . . . +275°C

Note 1. Pulse width limited by safe operating area.

Electrical Characteristics: (T_C = +25°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	–	–	±100	nA
ON Characteristics (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2	–	4	V
Static Drain–Source On Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 4.5A	–	–	0.7	Ω
		V_{GS} = 10V, I_D = 4.5A, T_C = 100°C	–	–	1.4	Ω
Dynamic Characteristics						
Forward Transconductance	g_{fs}	V_{DS} = 25V, I_D = 4.5A	5	–	–	mho
Input Capactiance	C_{iss}	V_{DS} = 25V, V_{GS} = 0, f = 1MHz	–	1600	1900	pf
Output Capacitance	C_{oss}		–	–	280	pf
Reverse Transfer Capactiance	C_{rss}		–	–	170	pf
Switching Characteristics						
Turn–On Time	$t_{d(on)}$	V_{DD} = 250V, I_D = 4.5A, R_l = 4.7Ω, V_l = 10V	–	30	40	ns
Rise Time	t_r		–	40	60	ns
Turn–Off Delay Time	$t_{d(off)}$		–	130	170	ns
Fall Time	t_f		–	30	40	ns
Source Drain Diode Characteristics						
Source–Drain Current	I_{SD}		–	–	9	A
Source–Drain Current (Pulsed)	I_{SDM}	Note 2	–	–	36	A
Forward ON Voltage	V_{SD}	I_{SD} = 9A, V_{GS} = 0	–	–	1.15	V
Reverse Recovery Time	t_{rr}	I_{DS} = 9A, V_{GS} = 0, di/dt = 100A/μs	–	420	–	ns

Note 2. Pulse width limited by safe operating area.

Note 3. Pulsed: Pulse Duration = 300μs, Duty Cycle 1.5%