

NTE2398 MOSFET N–Ch, Enhancement Mode High Speed Switch

Features:

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

Absolute Maximum Ratings:

Continuous Drain Current ($V_{GS} = 10V$), I_D	
$T_C = +25^\circ C$	4.5A
$T_C = +100^\circ C$	2.9A
Pulsed Drain Current (Note 1), I_{DM}	18A
Power Dissipation ($T_C = +25^\circ C$), P_D	74W
Derate Linearly Above $25^\circ C$	0.59W/ $^\circ C$
Gate-to-Source Voltage, V_{GS}	$\pm 20V$
Single Pulse Avalanche Energy (Note 2), E_{AS}	280mJ
Avalanche Current (Note 1), I_{AR}	4.5A
Repetitive Avalanche Energy (Note 1), E_{AR}	7.4mJ
Peak Diode Recovery dv/dt (Note 3), dv/dt	3.5V/ns
Operating Junction Temperature Range, T_J	-55° to $+150^\circ C$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ C$
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}	1.7 $^\circ C/W$
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. Repetitive rating; pulse width limited by maximum junction temperature.

Note 2. $V_{DD} = 50V$, starting $T_J = +25^\circ C$, $L = 24mH$, $R_G = 25\Omega$, $I_{AS} = 4.5A$

Note 3. $I_{SD} \leq 4.5A$, $di/dt \leq 75A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +150^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	500	—	—	V
Breakdown Voltage Temp. Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to $+25^{\circ}\text{C}$, $I_D = 1\text{mA}$	—	0.61	—	V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 2.7\text{A}$, Note 4	—	—	1.5	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0	—	4.0	V
Forward Transconductance	g_{fs}	$V_{DS} = 50\text{V}$, $I_D = 2.7\text{A}$, Note 4	2.5	—	—	mhos
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS} = 500\text{V}$, $V_{GS} = 0\text{V}$	—	—	25	μA
		$V_{DS} = 400\text{V}$, $V_{GS} = 0\text{V}$, $T_J = +125^{\circ}\text{C}$	—	—	250	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS} = 20\text{V}$	—	—	100	nA
Gate-to-Source Reverse Leakage	I_{GSS}	$V_{GS} = -20\text{V}$	—	—	-100	nA
Total Gate Charge	Q_g	$I_D = 3.1\text{A}$, $V_{DS} = 400\text{V}$, $V_{GS} = 10\text{V}$, Note 4	—	—	38	nC
Gate-to-Source Charge	Q_{gs}		—	—	5.0	nC
Gate-to-Drain ("Miller") Charge	Q_{gd}		—	—	22	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 250\text{V}$, $I_D = 3.1\text{A}$, $R_G = 12\Omega$, $R_D = 79\Omega$, Note 4	—	8.2	—	ns
Rise Time	t_r		—	16	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	42	—	ns
Fall Time	t_f		—	16	—	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}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$	—	610	—	pF
Output Capacitance	C_{oss}		—	160	—	pF
Reverse Transfer Capacitance	C_{rss}		—	68	—	pF

Source-Drain Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S		—	—	4.5	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 1	—	—	18	A
Diode Forward Voltage	V_{SD}	$T_J = +25^{\circ}\text{C}$, $I_S = 4.5\text{A}$, $V_{GS} = 0\text{V}$, Note 4	—	—	1.6	V
Reverse Recovery Time	t_{rr}	$T_J = +25^{\circ}\text{C}$, $I_F = 3.1\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, Note 4	—	320	640	ns
Reverse Recovery Charge	Q_{rr}		—	1.0	2.0	μC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Note 1. Repetitive rating; pulse width limited by maximum junction temperature.

Note 4. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

