

NTE2396 MOSFET N-Ch, Enhancement Mode High Speed Switch

Features:

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Current Sense
- +175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

Absolute Maximum Ratings:

Continuous Drain Current ($V_{GS} = 10V$), I_D

$T_C = +25^\circ C$ 28A

$T_C = +100^\circ C$ 20A

Pulsed Drain Current (Note 1), I_{DM} 110A

Power Dissipation ($T_C = +25^\circ C$), P_D 150W

Derate Linearly Above $25^\circ C$ 1.0W/ $^\circ C$

Gate-to-Source Voltage, V_{GS} $\pm 20V$

Single Pulse Avalanche Energy (Note 2), E_{AS} 100mJ

Avalanche Current (Note 1), I_{AR} 28A

Repetitive Avalanche Energy (Note 1), E_{AR} 15mJ

Peak Diode Recovery dv/dt (Note 3), dv/dt 5.5V/ns

Operating Junction Temperature Range, T_J -55° to $+175^\circ C$

Storage Temperature Range, T_{stg} -55° to $+175^\circ C$

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} $1.0^\circ C/W$

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. $V_{DD} = 25V$, starting $T_J = +25^\circ C$, $L = 191\mu H$, $R_G = 25\Omega$, $I_{AS} = 28A$

Note 3. $I_{SD} \leq 28A$, $di/dt \leq 170A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +175^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$	100	—	—	V
Breakdown Voltage Temp. Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to $+25^{\circ}\text{C}$, $I_D = 1\text{mA}$	—	0.13	—	V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 17\text{A}$, Note 4	—	—	0.077	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}	$V_{DS} = 50\text{V}$, $I_D = 17\text{A}$, Note 4	5.8	—	—	mhos
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS} = 100\text{V}$, $V_{GS} = 0\text{V}$	—	—	25	μA
		$V_{DS} = 80\text{V}$, $V_{GS} = 0\text{V}$, $T_J = +150^{\circ}\text{C}$	—	—	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	$I_D = 29\text{A}$, $V_{DS} = 80\text{V}$, $V_{GS} = 10\text{V}$, Note 4	—	—	69	nC
Gate-to-Source Charge	Q_{gs}		—	—	13	nC
Gate-to-Drain ("Miller") Charge	Q_{gd}		—	—	37	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{V}$, $I_D = 29\text{A}$, $R_G = 9.1\Omega$, $R_D = 1.7\Omega$, Note 4	—	13	—	ns
Rise Time	t_r		—	77	—	ns
Turn-Off Delay Time	$t_{d(off)}$		—	40	—	ns
Fall Time	t_f		—	48	—	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}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$	—	1300	—	pF
Output Capacitance	C_{oss}		—	630	—	pF
Reverse Transfer Capacitance	C_{rss}		—	130	—	pF

Source-Drain Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S		—	—	28	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 1	—	—	110	A
Diode Forward Voltage	V_{SD}	$T_J = +25^{\circ}\text{C}$, $I_S = 28\text{A}$, $V_{GS} = 0\text{V}$, Note 4	—	—	2.5	V
Reverse Recovery Time	t_{rr}	$T_J = +25^{\circ}\text{C}$, $I_F = 29\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, Note 4	—	120	260	ns
Reverse Recovery Charge	Q_{rr}		—	0.52	1.2	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 $\leq 2\%$.

