



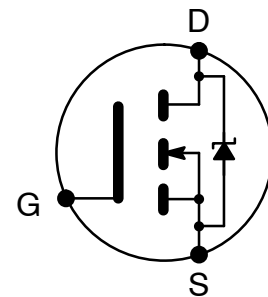
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**NTE2396A
 MOSFET
 N-Ch, Enhancement Mode
 High Speed Switch
 TO-220 Type Package**

Features:

- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- +175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated



Absolute Maximum Ratings:

Continuous Drain Current ($V_{GS} = 10V$), I_D	
$T_C = +25^\circ C$	33A
$T_C = +100^\circ C$	23A
Pulsed Drain Current (Note 1), I_{DM}	110A
Power Dissipation ($T_C = +25^\circ C$), P_D	130W
Derate Linearly Above 25°C	0.87W/°C
Gate-to-Source Voltage, V_{GS}	$\pm 20V$
Single Pulse Avalanche Energy (Note 2), E_{AS}	100mJ
Avalanche Current (Note 1), I_{AR}	16A
Repetitive Avalanche Energy (Note 1), E_{AR}	13mJ
Peak Diode Recovery dv/dt (Note 3), dv/dt	7V/ns
Operating Junction Temperature Range, T_J	-55° to +175°C
Storage Temperature Range, T_{stg}	-55° to +175°C
Lead Temperature (During Soldering, 1.6mm from case for 10sec), T_L	+300°C
Mounting Torque (6-32 or M3 Screw)	10 lbf•in (1.1N•m)
Thermal Resistance, Junction-to-Case, R_{thJC}	1.15°C/W
Thermal Resistance, Junction-to-Ambient, R_{thJA}	62°C/W
Typical Thermal Resistance, Case-to-Sink (Flat, Greased Surface), R_{thCS}	0.5°C/W

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

Note 2. Starting $T_J = +25^\circ C$, $L = 1.5mH$, $R_G = 25\Omega$, $I_{AS} = 16A$

Note 3. $I_{SD} \leq 16A$, $di/dt \leq 340A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq +175^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Breakdown Voltage Temp. Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T}$	Reference to $+25^\circ\text{C}$, $I_D = 1\text{mA}$	-	0.12	-	V/ $^\circ\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 16A$, Note 4	-	-	0.044	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	V
Forward Transconductance	g_{fs}	$V_{DS} = 50V, I_D = 16A$, Note 4	5.8	-	-	mhos
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	-	-	25	μA
		$V_{DS} = 80V, V_{GS} = 0V, T_J = +150^\circ\text{C}$	-	-	250	μA
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS} = 20V$	-	-	100	nA
Gate-to-Source Reverse Leakage	I_{GSS}	$V_{GS} = -20V$	-	-	-100	nA
Total Gate Charge	Q_g	$I_D = 16A, V_{DS} = 80V, V_{GS} = 10V$	-	-	71	nC
Gate-to-Source Charge	Q_{gs}		-	-	14	nC
Gate-to-Drain ("Miller") Charge	Q_{gd}		-	-	21	nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 16A, R_G = 5.1\Omega, V_{GS} = 10V$	-	11	-	ns
Rise Time	t_r		-	35	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	39	-	ns
Fall Time	t_f		-	35	-	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}	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	-	1960	-	pF
Output Capacitance	C_{oss}		-	250	-	pF
Reverse Transfer Capacitance	C_{rss}		-	40	-	pF
Single Pulse Avalanche Energy (Note 2)	E_{AS}	$I_{AS} = 16A, L = 1.5\text{mH}$	-	700 (Note 5)	185 (Note 6)	mJ

Note 2. Starting $T_J = +25^\circ\text{C}$, $L = 1.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 16A$

Note 4. Pulse width $\leq 400 \mu\text{s}$; duty cycle $\leq 2\%$.

Note 5. This is a typical value at device destruction and represents operation outside rated limits.

Note 6. This is a calculated value limited to $T_J = +175^\circ\text{C}$.

Source-Drain Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S		-	-	33	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 1	-	-	110	A
Diode Forward Voltage	V_{SD}	$T_J = +25^\circ\text{C}, I_S = 16A, V_{GS} = 0V$, Note 4	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$T_J = +25^\circ\text{C}, I_F = 16A$, $di/dt = 100A/\mu\text{s}$, Note 4	-	115	170	ns
Reverse Recovery Charge	Q_{rr}		-	505	760	nC
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 $\leq 400 \mu\text{s}$; duty cycle $\leq 2\%$.

