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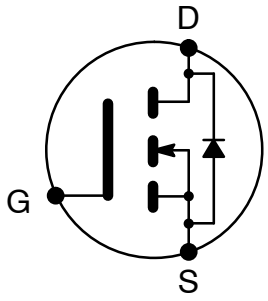
NTE2996
MOSFET
N–Channel, Enhancement Mode
High Speed Switch
TO220 Type Package

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



Absolute Maximum Ratings:

Drain Current, I_D
- Continuous (V_{GS} = 10V)
  - T_C = +25°C (Note 1) 84A
  - T_C = +100°C 59A
- Pulsed (Note 2) 330A

Total Power Dissipation (T_C = +25°C), P_D 200W
- Derate Above 25°C . . . . . 1.4W/°C

Gate–Source Voltage, V_{GS} . . . . . ±20V

Single Pulsed Avalanche Energy (I_{AS} = 50A, L = 260μH, Note 3), E_{AS} 320mJ

Avalanche Current (Note 2), I_{AR} 50A

Repetitive Avalanche Energy (Note 2), E_{AR} 17mJ

Peak Diode Recovery dv/dt (Note 4), dv/dt 4.0V/ns

Operating Junction Temperature Range, T_J . . . . . –55° to +175°C

Storage Temperature Range, T_{stg} . . . . . –55° to +175°C

Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L . . . . . +300°C

Maximum Thermal Resistance:
- Junction–to–Case, R_{thJC} . . . . . 0.75°C/W
- Junction–to–Ambient, R_{thJA} . . . . . 62°C/W

Typical Thermal Resistance, Case–to–Sink (Flat, greased surface), R_{thCS} . . . . . 0.50°C/W

Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 3. This is a calculated value limited to T_J = +175°C.

Note 4. $I_{SD} \le 50A$, di/dt ≤ 230A/μs, $V_{DD} \le V_{(BR)DSS}$, $T_J \le +175°C$.

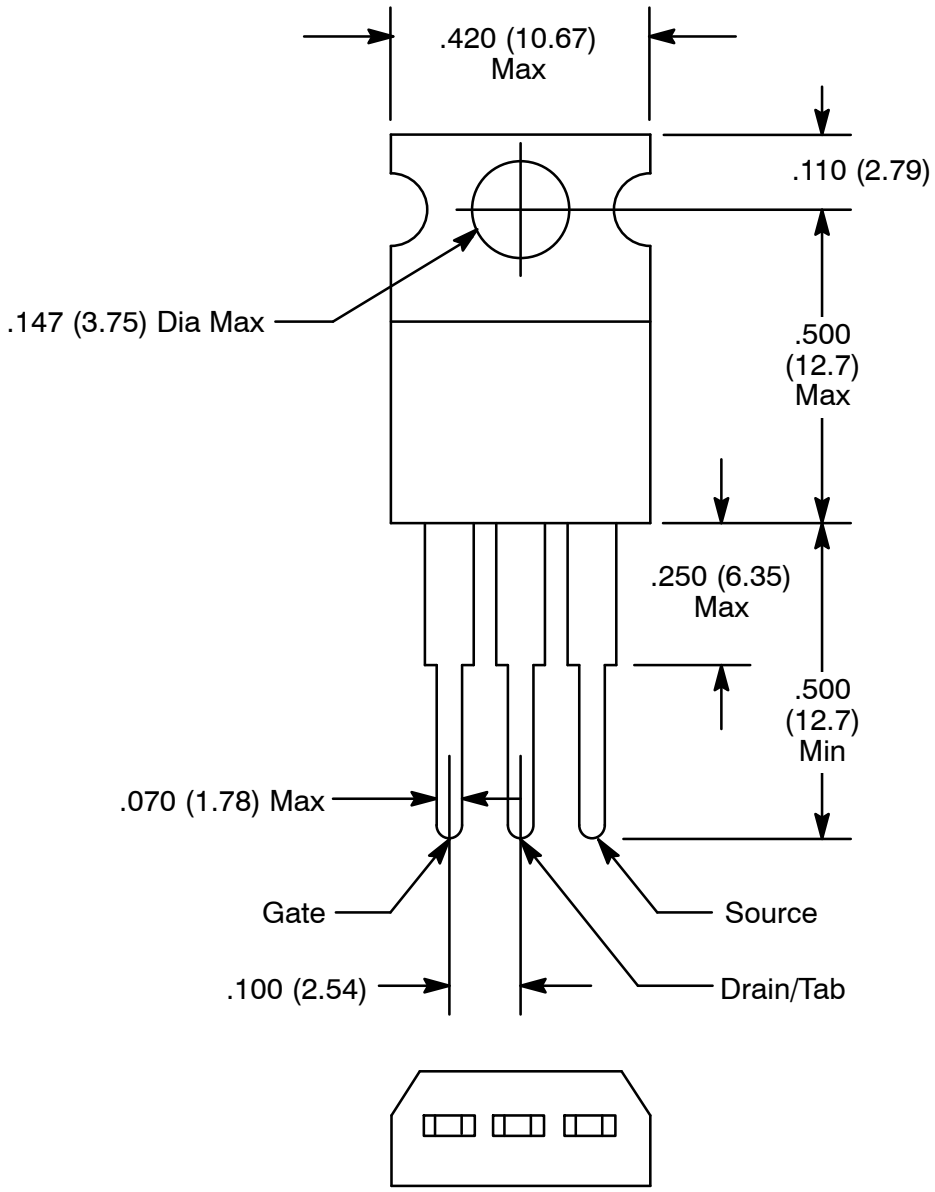
Electrical Characteristics: (T_J = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0V, I_D = 250μA	60	–	–	V
Breakdown Voltage Temperature Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	Reference to +25°C, I_D = 1mA	–	0.064	–	V/°C
Static Drain–Source ON Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 50A, Note 5	–	–	12	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	–	4.0	V
Forward Transconductance	g_{fs}	V_{DS} = 25V, I_D = 50A, Note 5	69	–	–	mhos
Drain–to–Source Leakage Current	I_{DSS}	V_{DS} = 60V, V_{GS} = 0	–	–	25	μA
		V_{DS} = 48V, V_{GS} = 0V, T_C = +150°C	–	–	250	μA
Gate–Source Leakage, Forward	I_{GSS}	V_{GS} = 20V	–	–	100	nA
Gate–Source Leakage, Reverse		V_{GS} = –20V	–	–	–100	nA
Total Gate Charge	Q_g	V_{GS} = 10V, I_D = 50A, V_{DS} = 48V	–	–	130	nC
Gate–Source Charge	Q_{gs}		–	–	28	nC
Gate–Drain (“Miller”) Charge	Q_{gd}		–	–	44	nC
Turn–On Delay Time	$t_{d(on)}$	V_{DD} = 30V, I_D = 50A, R_G = 3.6Ω, V_{GS} = 10V, Note 5	–	12	–	ns
Rise Time	t_r		–	78	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	48	–	ns
Fall Time	t_f		–	53	–	ns
Internal Drain Inductance	L_D	Between lead, 6mm (0.25”) 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 = 1MHz	–	3210	–	pF
Output Capacitance	C_{oss}		–	690	–	pF
Reverse Transfer Capacitance	C_{rss}		–	140	–	pF
Source–Drain Diode Ratings and Characteristics						
Continuous Source Current	I_S	(Body Diode) Note 6	–	–	84	A
Pulse Source Current	I_{SM}	(Body Diode) Note 2	–	–	330	A
Diode Forward Voltage	V_{SD}	T_J = +25°C, I_S = 50A, V_{GS} = 0V, Note 5	–	–	1.3	V
Reverse Recovery Time	t_{rr}	T_J = +25°C, I_F = 50A, di/dt = 100A/μs, Note 5	–	73	110	ns
Reverse Recovery Charge	Q_{rr}		–	220	330	μC
Forward Turn–On Time	t_{on}	Intrinsic turn–on time is neglegible (turn–on is dominated by L_S + L_D)				

Note 2. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 5. Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.

Note 6. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.


.420 (10.67)
Max
.110 (2.79)
.147 (3.75) Dia Max
.500
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Max
.250 (6.35)
Max
.500
(12.7)
Min
.070 (1.78) Max
Gate
Source
.100 (2.54)
Drain/Tab

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