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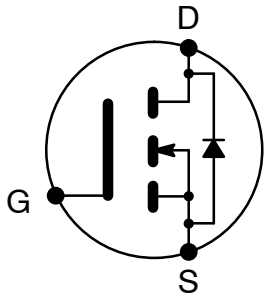
NTE2996
MOSFET
N–Channel, Enhancement Mode
High Speed Switch
TO220 Type Package

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, $V_{DD} \le V_{(BR)DSS}$, $T_J \le +175°C$.

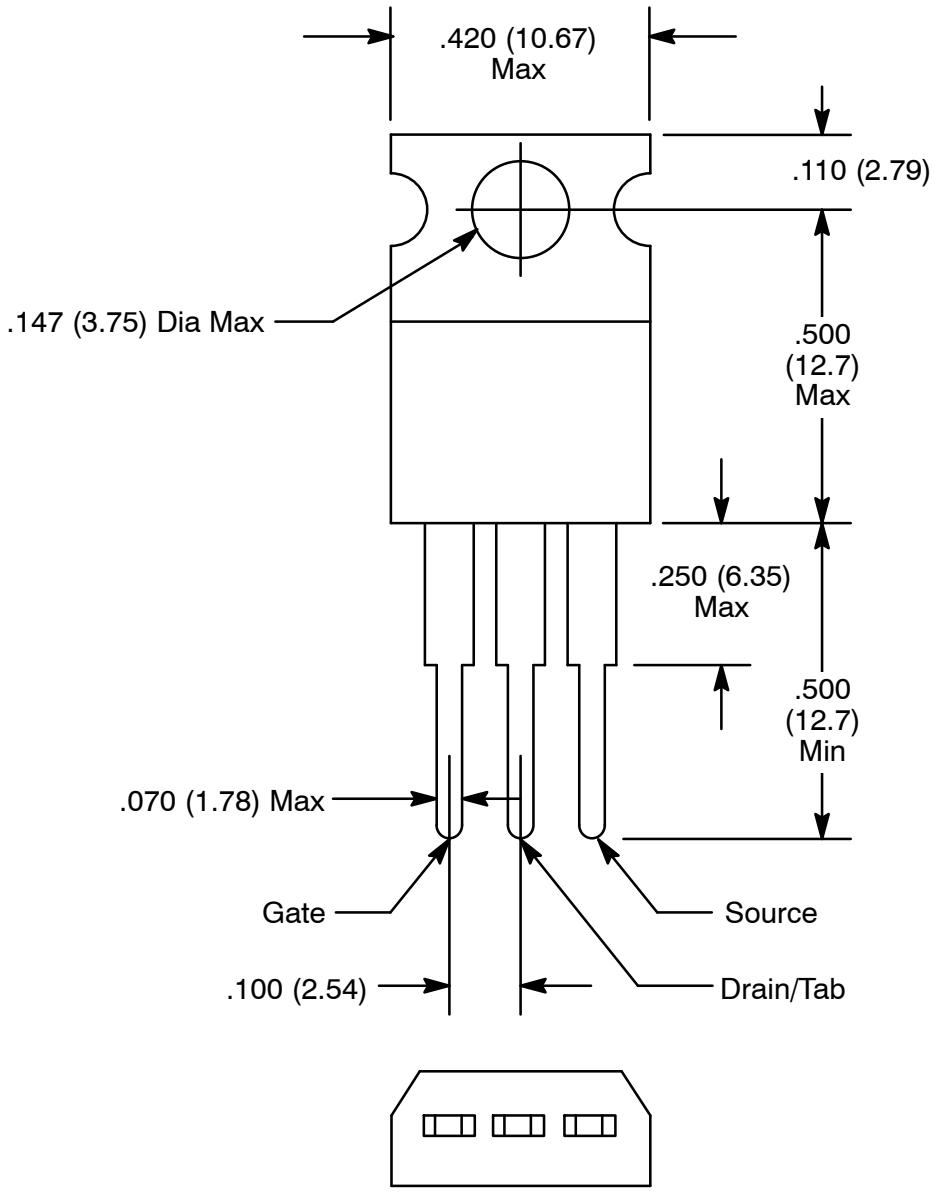
Electrical Characteristics: (T_J = +25°C unless otherwise specified)

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
(12.7)
Max
.250 (6.35)
Max
.500
(12.7)
Min
.070 (1.78) Max
Gate
Source
.100 (2.54)
Drain/Tab