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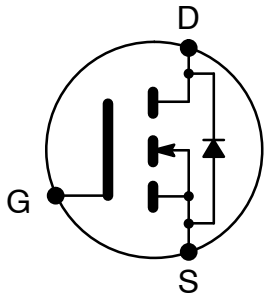
NTE2975
MOSFET
N–Channel, Enhancement Mode
High Speed Switch
TO–220 Type Package

Features:

- Advanced Process Technology
- Ultra Low On–State 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) 53A
  - T_C = +100°C 37A
- Pulse (Note 2) 180A

Power Dissipation (T_C = +25°C), P_D 107W
- Derate above +25°C . . . . . 0.71W/°C

Gate–Source Voltage, V_{GS} . . . . . ±20V
Avalanche Current (Note 2), I_{AR} 28A
Repetitive Avalanche Energy (Note 2), E_{AR} 11mJ
Single Pulse Avalanche Energy (Note 3, Note 4), E_{AS} 152mJ
Peak Diode Recovery (Note 5), dv/dt 5.0V/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, 10sec max), T_L . . . . . +300°C
Maximum Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 1.4°C/W
Typical Thermal Resistance, Case–to–Sink (Flat, greased surface), R_{thCS} . . . . . 0.5°C/W
Maximum Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 62°C/W

Note 1. Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 39A.

Note 2. Repetitive rating; pulse width limited by maximum junction temperature.

Note 3. Starting T_J = +25°C, L = 389μH, R_G = 25Ω, I_{AS} = 28A.

Note 4. This is a calculated value limited to T_J = +175°C.

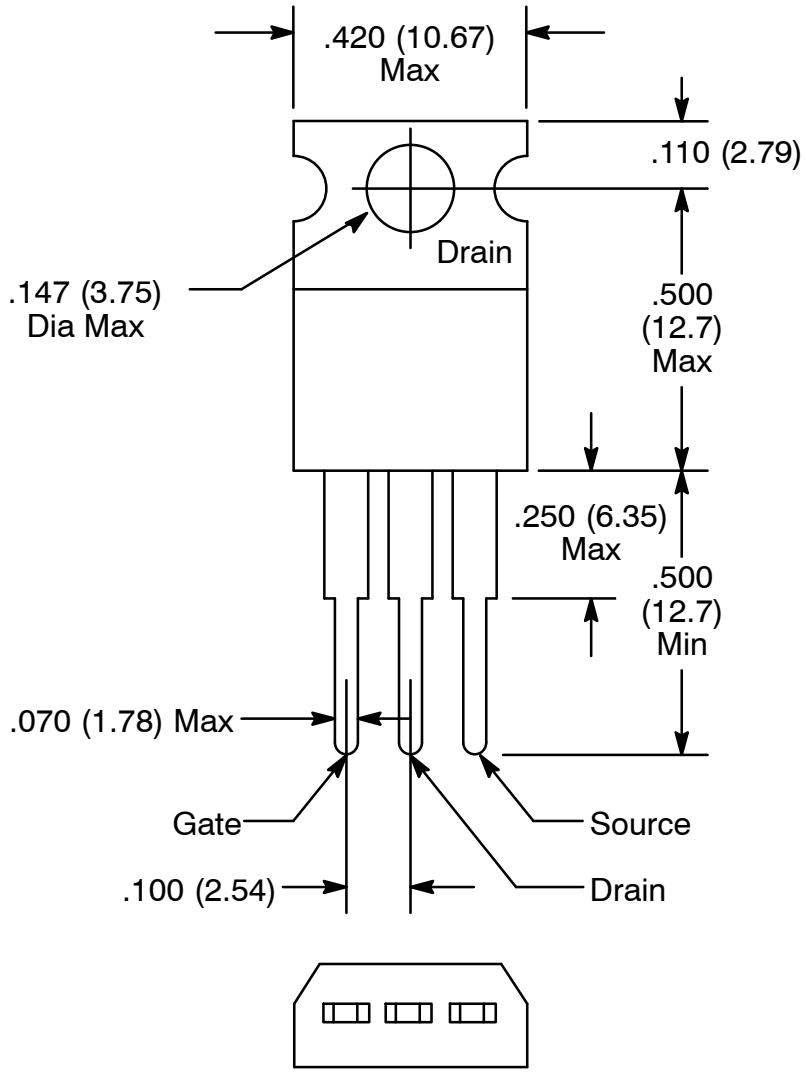
Note 5. $I_{SD} \le 28A$, $di/dt \le 220A/\mu s$, $V_{DD} \le V_{(BR)DSS}$, $T_J \le +175°C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	55	–	–	V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to +25°C, I_D = 1mA	–	0.057	–	V/°C
Static Drain−Source On−Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 28A, Note 6	–	–	16	Ω
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 = 28A, Note 6	19	–	–	S
Drain−Source Leakage Current	I_{DSS}	V_{DS} = 55V, V_{GS} = 0	–	–	25	μA
		V_{DS} = 44V, V_{GS} = 0, T_J = +150°C	–	–	250	μA
Gate−Source Forward Leakage Current	I_{GSS}	V_{GS} = 20V	–	–	100	nA
		V_{GS} = −20V	–	–	−100	nA
Total Gate Charge	Q_G	V_{GS} = 10V, I_D = 28A, V_{DS} = 44V	–	–	72	nC
Gate−Source Charge	Q_{GS}		–	–	11	nC
Gate−Drain (“Miller”) Charge	Q_{GD}		–	–	26	nC
Turn−On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DD} = 28V, I_D = 28A, R_G = 12Ω	–	14	–	ns
Rise Time	t_r		–	76	–	ns
Turn−Off Delay Time	$t_{d(off)}$		–	52	–	ns
Fall Time	t_f		–	57	–	ns
Internal Drain Inductance	L_D	Between lead, .250 (6mm) from package and center of die contact	–	4.5	–	nH
Internal Source Inductance	L_S		–	7.5	–	nH
Input Capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0, f = 1MHz	–	1696	–	pF
Output Capacitance	C_{oss}		–	407	–	pF
Reverse Transfer Capacitance	C_{rss}		–	110	–	pF
Source−Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S		–	–	53	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 2	–	–	180	A
Diode Forward Voltage	$V_{F(S−D)}$	T_J = +25°C, I_S = 28A, V_{GS} = 0, Note 6	–	–	1.3	V
Reverse Recovery Time	t_{rr}	T_J = +25°C, I_F = 28A, di/dt = 100A/μs, Note 6	–	67	101	ns
Reverse Recovery Charge	Q_{rr}		–	208	312	nC
Forward Turn−On Time	t_{on}	Intristic turn−on time is negligible (turn−on is dominated by L_S + L_D)				

Note 2. Repetitive rating; pulse width limited by maximum junction temperature.

Note 6. Pulse width ≤ 400μs, duty cycle ≤ 2%.


.420 (10.67)
Max
.110 (2.79)
Drain
.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