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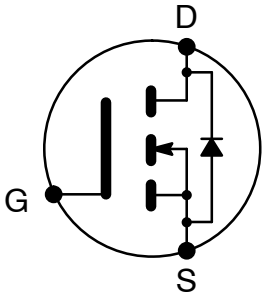
RoHS 2002/95/EC

NTE2904
MOSFET
N–Ch, Enhancement Mode
High Speed Switch
TO–220 Type Package



Features:

- Advanced Process Technology
- 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°C 64A
- T_C = +100°C 45A

Pulsed Drain Current (Note 1), I_{DM} 210A

Power Dissipation (T_C = +25°C), P_D 7130W
- Derate Linearly Above 25°C . . . . . 0.83W/°C

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

Avalanche Current (Note 1), I_{AR} 32A

Repetitive Avalanche Energy (Note 1), E_{AR} 13mJ

Peak Diode Recovery dv/dt (Note 3), 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 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°C, L = 0.37mH, R_G = 25Ω, I_{AS} = 32A
Note 3. I_{SD} ≤ 32A, di/dt ≤ 220A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ +175°C

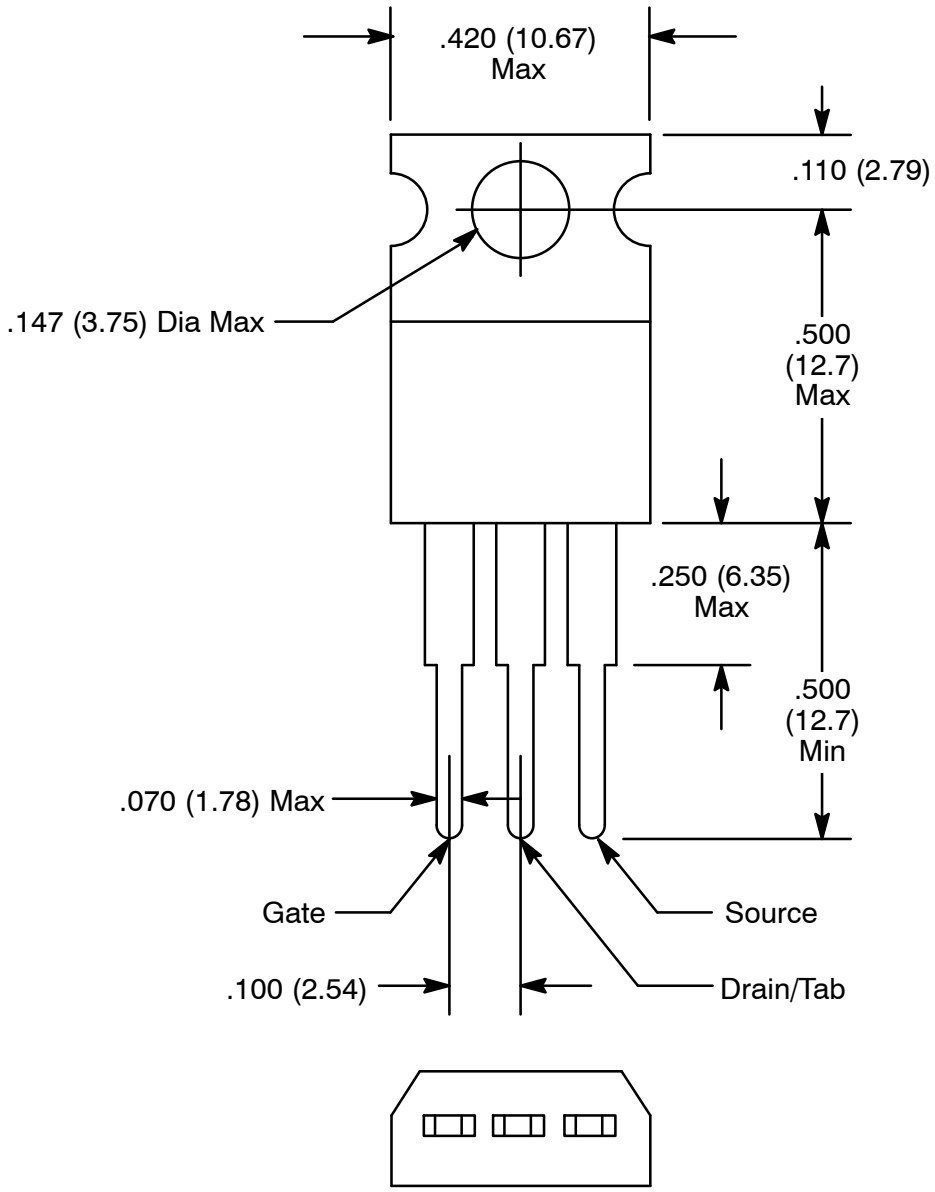
Electrical Characteristics: (T_J = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	55	–	–	V
Breakdown Voltage Temp. Coefficient	$\frac{\Delta V_{(BR)DSS}}{\Delta T_J}$	Reference to +25°C, I_D = 1mA	–	0.058	–	V/°C
Static Drain−to−Source On−Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 32A, Note 4	–	–	0.014	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 = 32A, Note 4	24	–	–	mhos
Drain−to−Source Leakage Current	I_{DSS}	V_{DS} = 55V, V_{GS} = 0V	–	–	25	μA
		V_{DS} = 44V, V_{GS} = 0V, T_J = +150°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 = 32A, V_{DS} = 44V, V_{GS} = 10V	–	–	81	nC
Gate−to−Source Charge	Q_{gs}		–	–	19	nC
Gate−to−Drain (“Miller”) Charge	Q_{gd}		–	–	30	nC
Turn−On Delay Time	$t_{d(on)}$	V_{DD} = 28V, I_D = 32A, R_G = 0.85Ω, R_D = 79 , Note 4	–	12	–	ns
Rise Time	t_r		–	78	–	ns
Turn−Off Delay Time	$t_{d(off)}$		–	34	–	ns
Fall Time	t_f		–	50	–	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 = 1MHz	–	1970	–	pF
Output Capacitance	C_{oss}		–	470	–	pF
Reverse Transfer Capacitance	C_{rss}		–	120	–	pF
Single Pulse Avalanche Energy	E_{AS}	I_{AS} = 32A, L = 0.37mH, Note 2	–	700 Note 5	190 Note 6	mJ

Source−Drain Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S		–	–	64	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 1	–	–	210	A
Diode Forward Voltage	V_{SD}	T_J = +25°C, I_S = 32A, V_{GS} = 0V, Note 4	–	–	1.3	V
Reverse Recovery Time	t_{rr}	T_J = +25°C, I_F = 32A, di/dt = 100A/μs, Note 4	–	68	100	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 1. Repetitive rating; pulse width limited by maximum junction temperature.
Note 4. Pulse width ≤ 400μs; duty cycle ≤ 2%.
Note 5. This is the destructive value not limited to the thermal limit.
Note 6. This is the thermal limited value.


.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