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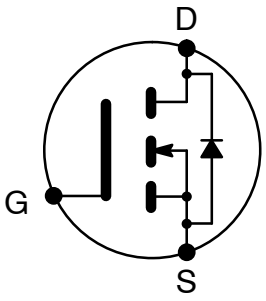
RoHS 2002/95/EC

NTE2912
MOSFET
N–Channel, Enhancement Mode
High Speed Switch
TO220 Type Package



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

Description:
The NTE2912 Power MOSFET utilizes advanced processing techniques to achieve extremely low on–resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The TO220 package is universally preferred for all commercial–industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO220 contribute to its wide acceptance throughout the industry.

Absolute Maximum Ratings:

Continuous Drain Current (V_{GS} = 10V), I_D
- T_C = +25°C (Note 1) 82A
- T_C = +100°C 58A

Pulsed Drain Current (Note 2), I_{DM} 280A

Power Dissipation (T_C = +25°C), P_D 230W
- Linear Derating Factor . . . . . 1.5W/°C

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

Avalanche Current (Note 2), I_{AR} 43A

Repetitive Avalanche Energy (Note 2), E_{AR} 23mJ

Peak Diode Recovery dv/dt (Note 3, dv/dt, V_{DSS} 5.9V/ns

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

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

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 channel temperature.

Note 3. $I_{SD} \le 43A$, di/dt ≤ 300A/s, $V_{DD} \le V_{(BR)DSS}$, T_J +175°C.

Absolute Maximum Ratings (Cont'd):

Lead Temperature (During Soldering, 1.6mm from case, 10sec), T_L . . . . . +300°C
Maximum Thermal Resistance, Junction−to−Case, R_{thJC} . . . . . 0.65°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

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

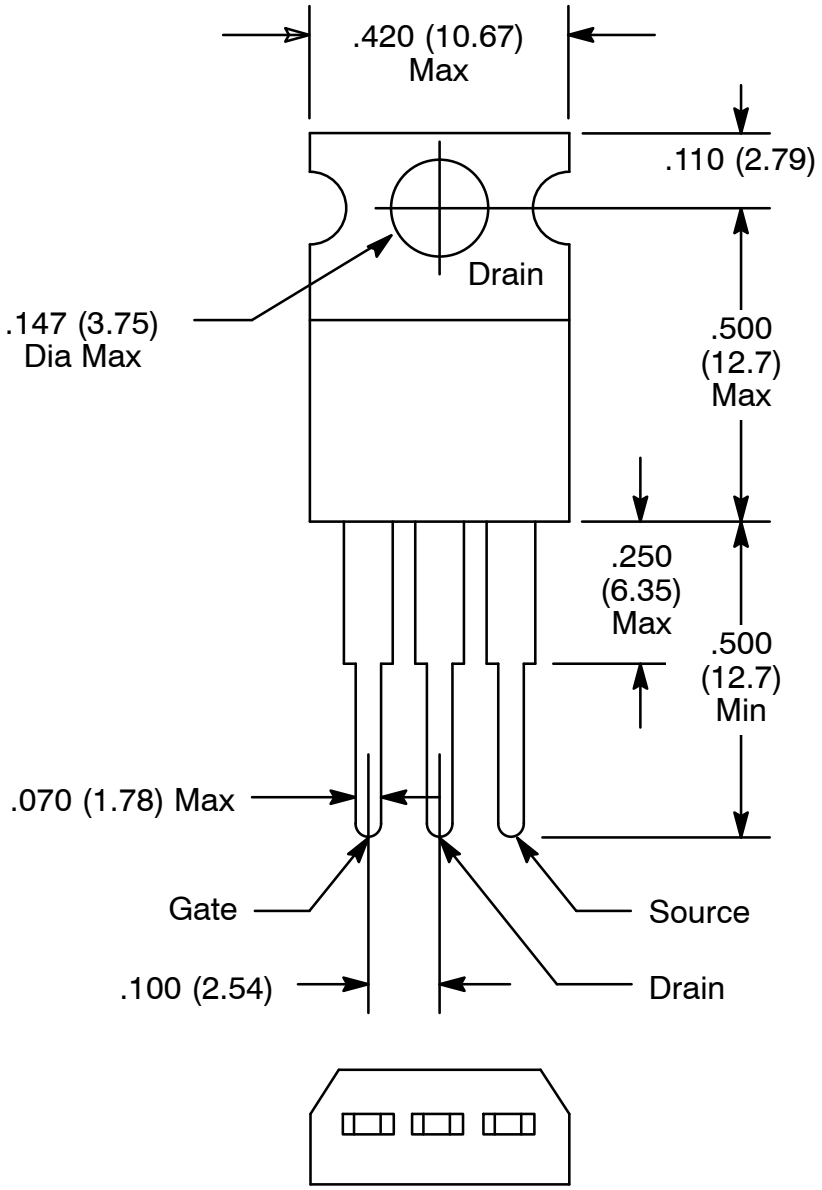
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain−to−Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250° A	75	–	–	V
Breakdown Voltage Temperature Coefficient	$\pm V_{(BR)DSS}/\pm T_J$	Reference to +25°C, I_D = 1mA	–	0.074	–	V/°C
Static Drain−to−Source On−Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 43A, Note 5	–	–	13	m≤
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250° A	2.0	–	4.0	V
Forward Transconductance	g_{fs}	V_{DS} = 50V, I_D = 43A, Note 5	38	–	–	S
Drain−Source Leakage Current	I_{DSS}	V_{DS} = 75V, V_{GS} = 0V	–	–	25	° A
		V_{DS} = 60V, V_{GS} = 0V, T_J = +150°C	–	–	250	° A
Gate−Source Leakage Current	I_{GSS}	V_{GS} = ±20V	–	–	±100	nA
Total Gate Charge	Q_g	I_D = 43A, V_{DS} = 60V, V_{GS} = 10V	–	–	160	nC
Gate−to−Source Charge	Q_{gs}		–	–	29	nC
Gate−to−Drain ("Miller") Charge	Q_{gd}		–	–	55	nC
Turn−On Delay Time	$t_{d(on)}$	V_{DD} = 38V, I_D = 43A, R_G = 2.5≤, V_{GS} = 10V, Note 5	–	13	–	ns
Rise Time	t_r		–	64	–	ns
Turn−Off Delay Time	$t_{d(off)}$		–	49	–	ns
Fall Time	t_f		–	48	–	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_{GS} = 0V, V_{DS} = 25V, f = 1MHz	–	3820	–	pF
Output Capacitance	C_{oss}		–	610	–	pF
Reverse Transfer Capacitance	C_{rss}		–	130	–	pF
Single Pulse Avalanche Energy (Note 4)	E_{AS}	I_{AS} = 50A, L = 370° H	–	1280 (Note 6)	340 (Note 7)	mJ

Note 2. Repetitive rating: pulse width limited by maximum channel temperature.
Note 4. Starting T_J = +25°C, L = 370° H, R_G = 25≤, I_{AS} = 43A, V_{GS} = 10V.
Note 5. Pulse width ≤ 400° s; duty cycle ≤ 2%.
Note 6. This is a typical value at device destruction and represents operation outside rated limits.
Note 7. This is a calculated value limited to T_J = +175°C.

Source−Drain Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S	Note 1	–	–	82	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 2	–	–	280	A
Diode Forward Voltage	V_{SD}	I_S = 43A, V_{GS} = 0V, T_J = +25°C, Note 5	–	–	1.2	V
Reverse Recovery Time	t_{rr}	T_J = +25°C, I_F = 43A, di/dt = 100A/° s, Note 5	–	100	150	ns
Reverse Recovery Charge	Q_{rr}		–	410	610	° C
Forward Turn−On Time	t_{on}	Intrinsic turn−on time is negligible (turn−on is dominated by L_S + L_D)				

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 channel temperature.
Note 5. Pulse width ≤ 400° s; 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