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NTE2909
MOSFET
N−Channel, Enhancement Mode
High Speed Switch

Description:

The NTE2909 is a Power MOSFET in a TO220 type package that 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 an extremely efficient and reliable device for use in a wide variety of applications.

Features:

- 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 57A
- T_C = +100°C 40A

Pulsed Drain Current (Note 1), I_{DM} 230A

Power Dissipation (T_C = +25°C), P_D 200W
- Derate Linearly Above 25°C . . . . . 1.3W/°C

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

Avalanche Current (Note 1), I_{AR} 28A

Repetitive Avalanche Energy (Note 1), E_{AR} 20mJ

Peak Diode Recovery dv/dt (Note 2), dv/dt 5.8V/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} . . . . . 0.75°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. Starting T_J = +25°C, L = 0.70mH, R_G = 25Ω, I_{AS} = 28A, V_{GS} = 10V.
Note 2. $I_{SD} \leq$ 28A, di/dt ≤ 380A/µs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ +175°C

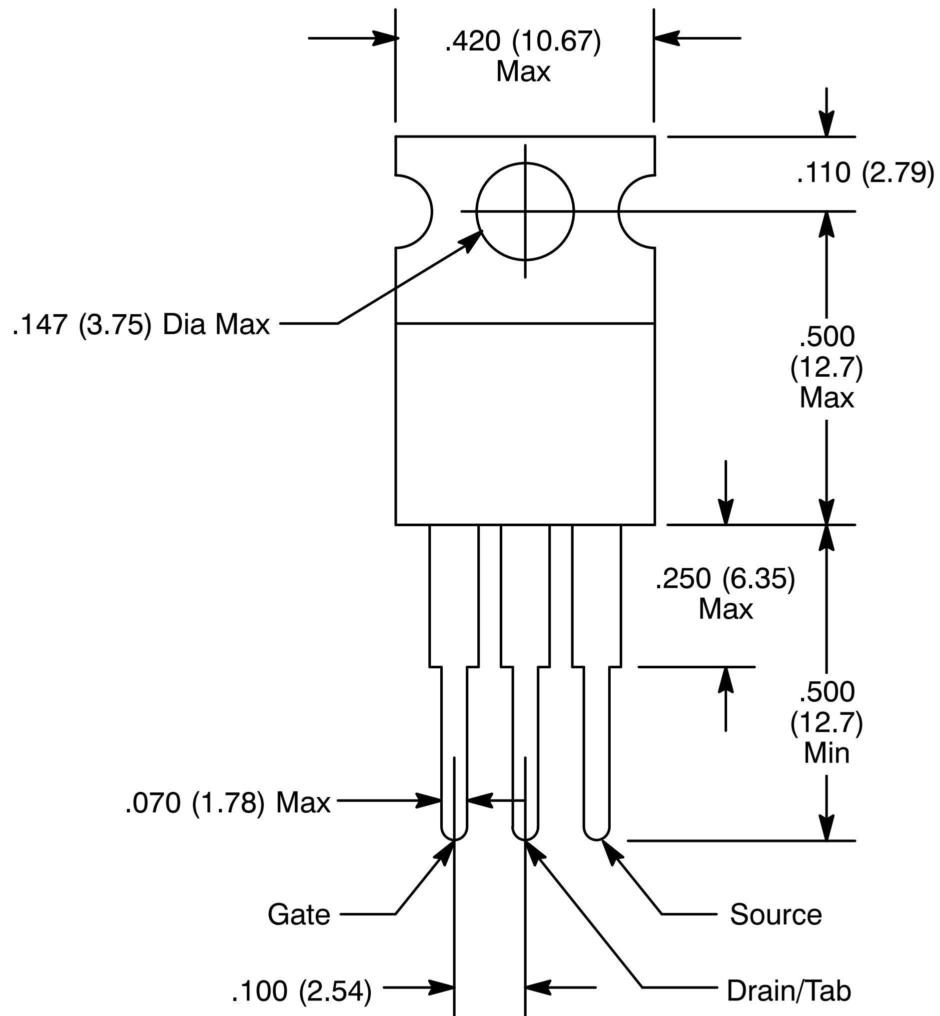
Electrical Characteristics: (T_J = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–to–Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	–	–	V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS} / \Delta T_J$	Reference to +25°C, I_D = 1mA	–	0.13	–	V/°C
Static Drain–to–Source On–Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 28A, Note 3	–	–	23	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 = 280A, Note 3	32	–	–	S
Drain–to–Source Leakage Current	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V	–	–	25	μA
		V_{DS} = 80V, 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 = 28A, V_{DS} = 80V, V_{GS} = 10V	–	–	130	nC
Gate–to–Source Charge	Q_{gs}		–	–	26	nC
Gate–to–Drain ("Miller") Charge	Q_{gd}		–	–	43	nC
Turn–On Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 28A, R_G = 2.5Ω, V_{GS} = 10V, Note 3	–	12	–	ns
Rise Time	t_r		–	58	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	45	–	ns
Fall Time	t_f		–	45	–	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	–	3130	–	pF
Output Capacitance	C_{oss}		–	410	–	pF
Reverse Transfer Capaticance	C_{rss}		–	72	–	pF
Single Pulse Avalanche Energy	E_{AS}	I_{AS} = 28A, L = 0.70mH, Note 1	–	1060 Note 4	280 Note 5	mJ

Source–Drain Ratings and Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I_S		–	–	57	A
Pulsed Source Current (Body Diode)	I_{SM}	Note 6	–	–	230	A
Diode Forward Voltage	V_{SD}	T_J = +25°C, I_S = 28A, V_{GS} = 0V, Note 3	–	–	1.2	V
Reverse Recovery Time	t_{rr}	T_J = +25°C, I_F = 28A, di/dt = 100A/μs, Note 3	–	140	220	ns
Reverse Recovery Charge	Q_{rr}		–	670	1010	μC
Forward Turn–On Time	t_{on}	Intrinsic turn–on time is neglegible (turn–on is dominated by L_S+L_D)				

Note 1. Starting T_J = +25°C, L = 0.70mH, R_G = 25Ω, I_{AS} = 28A, V_{GS} = 10V.
Note 2. $I_{SD} \leq$ 28A, di/dt ≤ 380A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ +175°C
Note 3. Pulse width ≤ 400μs; duty cycle ≤ 2%.
Note 4. This is a typical value at device destruction and represents operation outside rated limits.
Note 5. This is a calculated value limited to T_J = +175°C.
Note 6. Repetitive rating: pulse width limited by max. junction temperature.


.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