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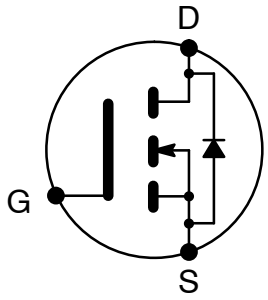
NTE2388
MOSFET
N–Channel Enhancement Mode, High Speed Switch

Description:

The NTE2388 is an N–Channel Enhancement Mode Power MOS Field Effect Transistor in a TO220 type package designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid, and relay drivers.



Features:

- Silicon Gate for Fast Switching Speeds
- Low $r_{DS(on)}$ to Minimize On–Losses. Specified at Elevated Temperatures.
- Rugged – SOA is Power Dissipation Limited
- Source–to–Drain Diode Characterized for Use With Inductive Loads

Absolute Maximum Ratings:

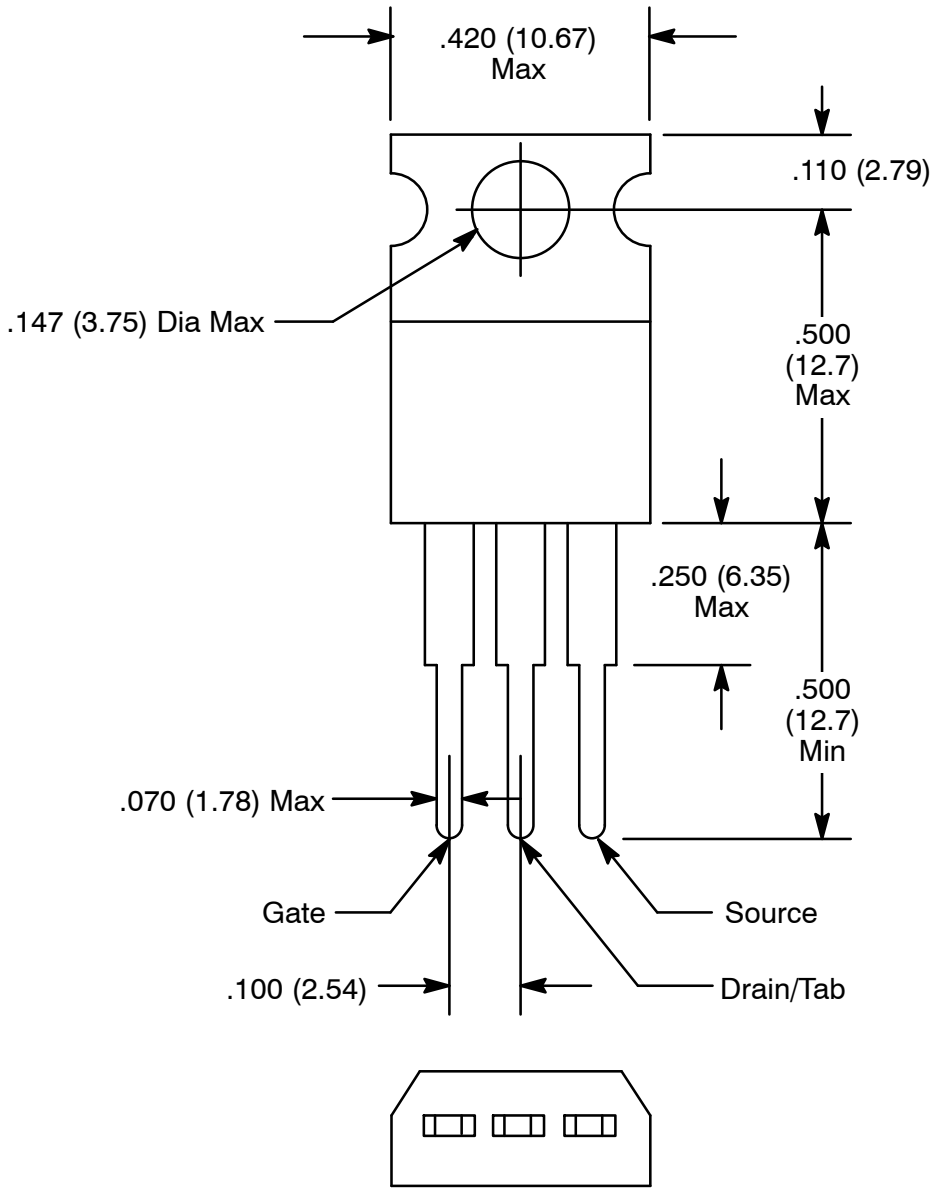
Drain–Source Voltage, V_{DSS} 200V
Drain–Gate Voltage (R_{GS} = 20k±), V_{DGR} 200V
Gate–Source Voltage, V_{GS} . . . . . ±20V
Drain Current, I_D
  Continuous
    T_C = +25°C 18A
    T_C = +100°C 11A
  Peak
    T_C = +25°C 72A
Total Power Dissipation (T_C = +25°C), P_D 125W
  Derate Above 25°C . . . . . 1W/°C
Maximum Operating Junction Temperature Range, T_J . . . . . –55° to +150°C
Storage Temperature Range, T_{stg} . . . . . –55° to +150°C
Maximum Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 1°C/W
Maximum Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 62.5°C/W
Maximum Lead Temperature (During soldering, 1/8” from case for 5sec), T_L . . . . . +300°C

Rev. 10–13

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Drain−Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250≥A, V_{GS} = 0	200	–	–	V
Zero−Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0, V_{DS} = Max Rating	–	–	200	≥A
		V_{GS} = 0, V_{DS} = 160V, T_C = +125°C	–	–	1000	≥A
Gate−Body Leakage Current, Forward	I_{GSSF}	V_{DS} = 0, V_{GSF} = 20V	–	–	100	nA
Gate−Body Leakage Current, Reverse	I_{GSSR}	V_{DS} = 0, V_{GSR} = 20V	–	–	100	nA
ON Characteristics (Note 1)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250≥A	2	–	4	V
Static Drain−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 10A	–	–	0.18	±
On−State Drain Current	$I_{D(on)}$	V_{GS} = 10V, V_{DS} ≥ 3.2V	18	–	–	A
Forward Transconductance	g_{fs}	V_{DS} ≥ 3.2V, I_D = 10A	6	–	–	mhos
Dynamic Characteristics						
Input Capactiance	C_{iss}	V_{DS} = 25V, V_{GS} = 0, f = 1MHz	–	–	1600	pf
Output Capacitance	C_{oss}		–	–	750	pf
Reverse Transfer Capactiance	C_{rss}		–	–	300	pf
Switching Characteristics (Note 1)						
Turn−On Time	$t_{d(on)}$	V_{DD} ≈ 75V, I_D = 10A_{PEAK}, R_g = 4.7±	–	–	30	ns
Rise Time	t_r		–	–	60	ns
Turn−Off Delay Time	$t_{d(off)}$		–	–	80	ns
Fall Time	t_f		–	–	60	ns
Total Gate Charge	Q_g	V_{DS} = 160V, V_{GS} = 10V, I_D = Rated I_D	–	38	60	nC
Gate−Source Charge	Q_{gs}		–	16	–	nC
Gate−Drain Charge	Q_{gd}		–	22	–	nC
Source Drain Diode Characteristics (Note 1)						
Forward ON Voltage	V_{SD}	I_S = Rated I_D, V_{GS} = 0	–	1.8	2.0	V
Forward Turn−On Time	t_{on}		Limited by stray inductance			
Reverse Recovery Time	t_{rr}		–	450	–	ns
Internal Package Inductance						
Internal Drain Inductance	L_d	Measured from the contact screw on tab to center of die	–	3.5	–	nH
		Measured from the drain lead 0.25” from package to center of die	–	4.5	–	nH
Internal Source Inductance	L_s	Measured from the source lead 0.25” from package to source bond pad	–	7.5	–	nH

Note 1. Pulse test: Pulse width ≤ 300≥s, Duty cycle ≤ 2%.


.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