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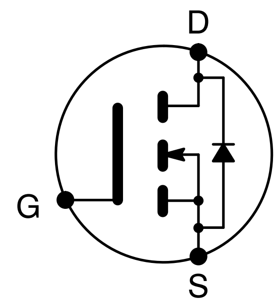
NTE2390
MOSFET
N−Channel Enhancement Mode,
High Speed Switch

Description:

The NTE2390 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
- I_{DSS}, $V_{DC(on)}$, $V_{GS(th)}$, and SOA Specified at Elevated Temperatures.
- Rugged − SOA is Power Dissipation Limited
- Source−to−Drain Diode Characterized for Use With Inductive Loads



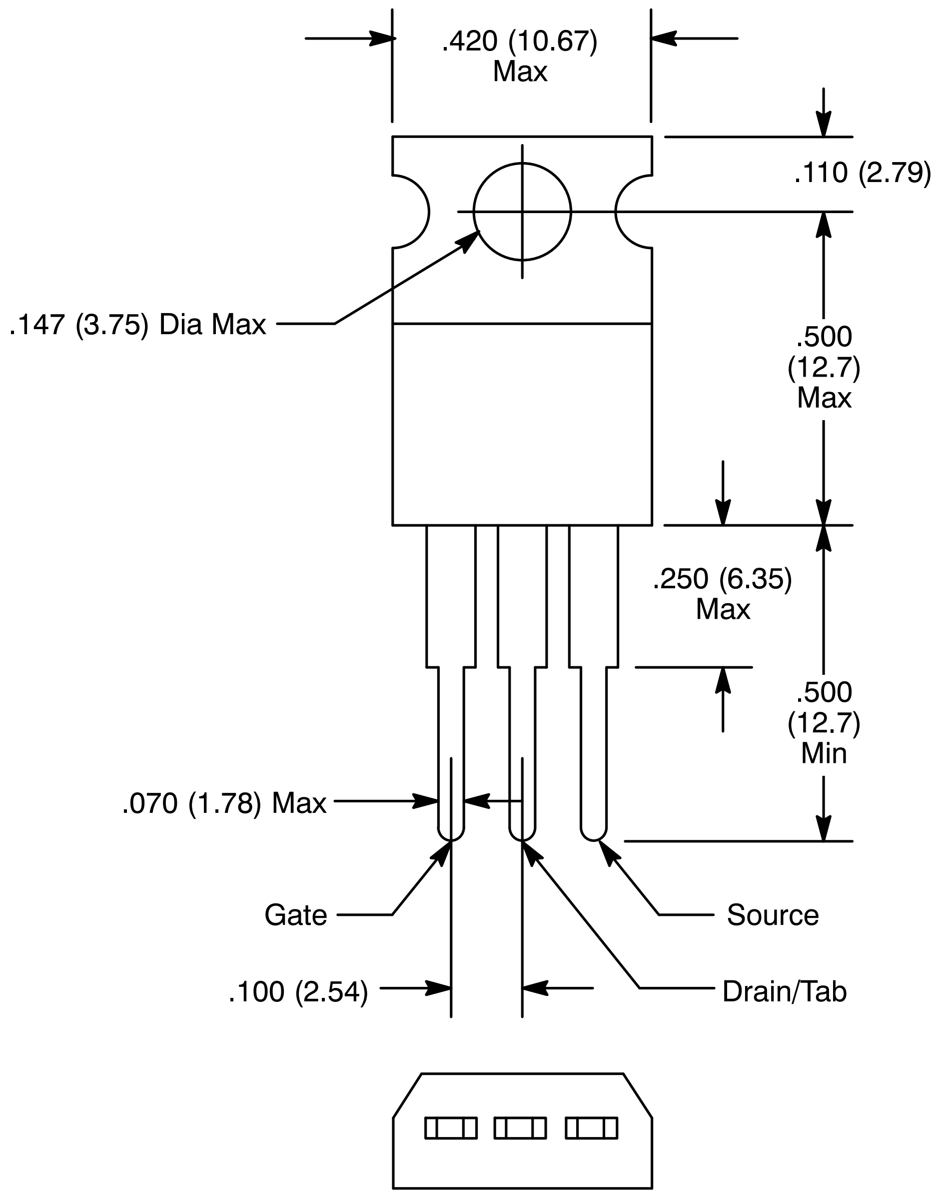
Absolute Maximum Ratings:

Drain−Source Voltage, V_{DSS} . . . 60V
Drain−Gate Voltage (R_{GS} = 1M±), V_{DGR} . . . 60V
Gate−Source Voltage, V_{GS} . . . ±20V
Drain Current, I_D
    Continuous . . . 12A
    Pulsed . . . 30A
Total Power Dissipation (T_C = +25°C), P_D . . . 75W
    Derate Above 25°C . . . 0.6W/°C
Operating Junction Temperature Range, T_J . . . −65° to +150°C
Storage Temperature Range, T_{stg} . . . −65° to +150°C
Maximum Thermal Resistance, Junction−to−Case, R_{thJC} . . . 1.67°C/W
Maximum Thermal Resistance, Junction−to−Ambient, R_{thJA} . . . 30°C/W
Maximum Lead Temperature (During soldering), T_L . . . +275°C

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 = 0.25mA, V_{GS} = 0	60	–	–	V
Zero–Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0, V_{DS} = Max Rating	–	–	0.2	mA
		V_{GS} = 0, V_{DS} = 48V, T_J = +125°C	–	–	1.0	mA
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 = 1mA	2.0	–	4.5	V
		V_{DS} = V_{GS}, I_D = 1mA, T_J = +100°C	1.5	–	4.0	V
Static Drain–Source On Resistance	$r_{DS(on)}$	V_{GS} = 10V, I_D = 6A	–	–	0.2	±
Drain–Source ON–Voltage	$V_{DS(on)}$	V_{GS} = 10V, I_D = 12A	–	–	3.0	V
		V_{GS} = 10V, I_D = 6A, T_J = 100°C	–	–	2.8	V
Forward Transconductance	g_{fs}	V_{DS} = 15V, I_D = 6A	4	–	–	mhos
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0, f = 1MHz	–	–	400	pf
Output Capacitance	C_{oss}		–	–	300	pf
Reverse Transfer Capacitance	C_{rss}		–	–	100	pf
Switching Characteristics (T_J = +100°C, Note 1)						
Turn–On Time	$t_{d(on)}$	V_{DD} = 25V, I_D = 0.5 Rated I_D, R_{gen} = 50±	–	–	60	ns
Rise Time	t_r		–	–	160	ns
Turn–Off Delay Time	$t_{d(off)}$		–	–	80	ns
Fall Time	t_f		–	–	110	ns
Total Gate Charge	Q_g	V_{DS} = 48V, V_{GS} = 10V, I_D = Rated I_D	–	13	26	nC
Gate–Source Charge	Q_{gs}		–	6	–	nC
Gate–Drain Charge	Q_{gd}		–	7	–	nC
Source Drain Diode Characteristics (Note 1)						
Forward ON Voltage	V_{SD}	I_S = Rated I_D, V_{GS} = 0	–	1.8	3.2	V
Forward Turn–On Time	t_{on}		Limited by stray inductance			
Reverse Recovery Time	t_{rr}		–	300	–	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