

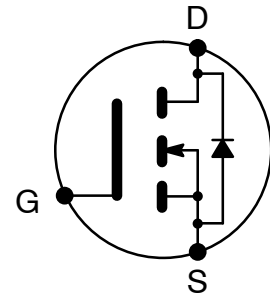


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## NTE2980 Logic Level MOSFET N-Channel, Enhancement Mode High Speed Switch TO251 Type Package

**Features:**

- Dynamic dv/dt Rating
- Logic Level Gate Drive
- R<sub>DS(on)</sub> Specified at V<sub>GS</sub> = 4V & 5V
- Fast Switching
- TO251 Type Package



**Absolute Maximum Ratings:**

Drain Current, I <sub>D</sub>	
Continuous (V <sub>GS</sub> = 5V)	
T <sub>C</sub> = +25°C	7.7A
T <sub>C</sub> = +100°C	4.9A
Pulsed (Note 1)	31A
Total Power Dissipation (T <sub>C</sub> = +25°C), P <sub>D</sub>	25W
Derate Above 25°C	0.20W/°C
Total Power Dissipation (PC Board Mount, T <sub>C</sub> = +25°C, Note 2), P <sub>D</sub>	2.5W
Derate Above 25°C	0.02W/°C
Gate-Source Voltage, V <sub>GS</sub>	±10V
Single Pulsed Avalanche Energy (Note 3), E <sub>AS</sub>	47mJ
Peak Diode Recovery dv/dt (Note 4), dv/dt	4.5V/ns
Operating Junction Temperature Range, T <sub>J</sub>	-55° to +150°C
Storage Temperature Range, T <sub>stg</sub>	-55° to +150°C
Maximum Lead Temperature (During Soldering, 1.6mm from case, 10sec), T <sub>L</sub>	+260°C
Maximum Thermal Resistance:	
Junction-to-Case, R <sub>thJC</sub>	5.0°C/W
Junction-to-Ambient (PCB Mount, Note 2), R <sub>thJA</sub>	50°C/W
Junction-to-Ambient, R <sub>thJA</sub>	110°C/W

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 2. When mounted on a 1" square PCB (FR-4 or G-10 material).

Note 3. L = 924° H, V<sub>DD</sub> = 25V, R<sub>G</sub> = 25Ω, Starting T<sub>J</sub> = +25°C, I<sub>AS</sub> = 7.7A.

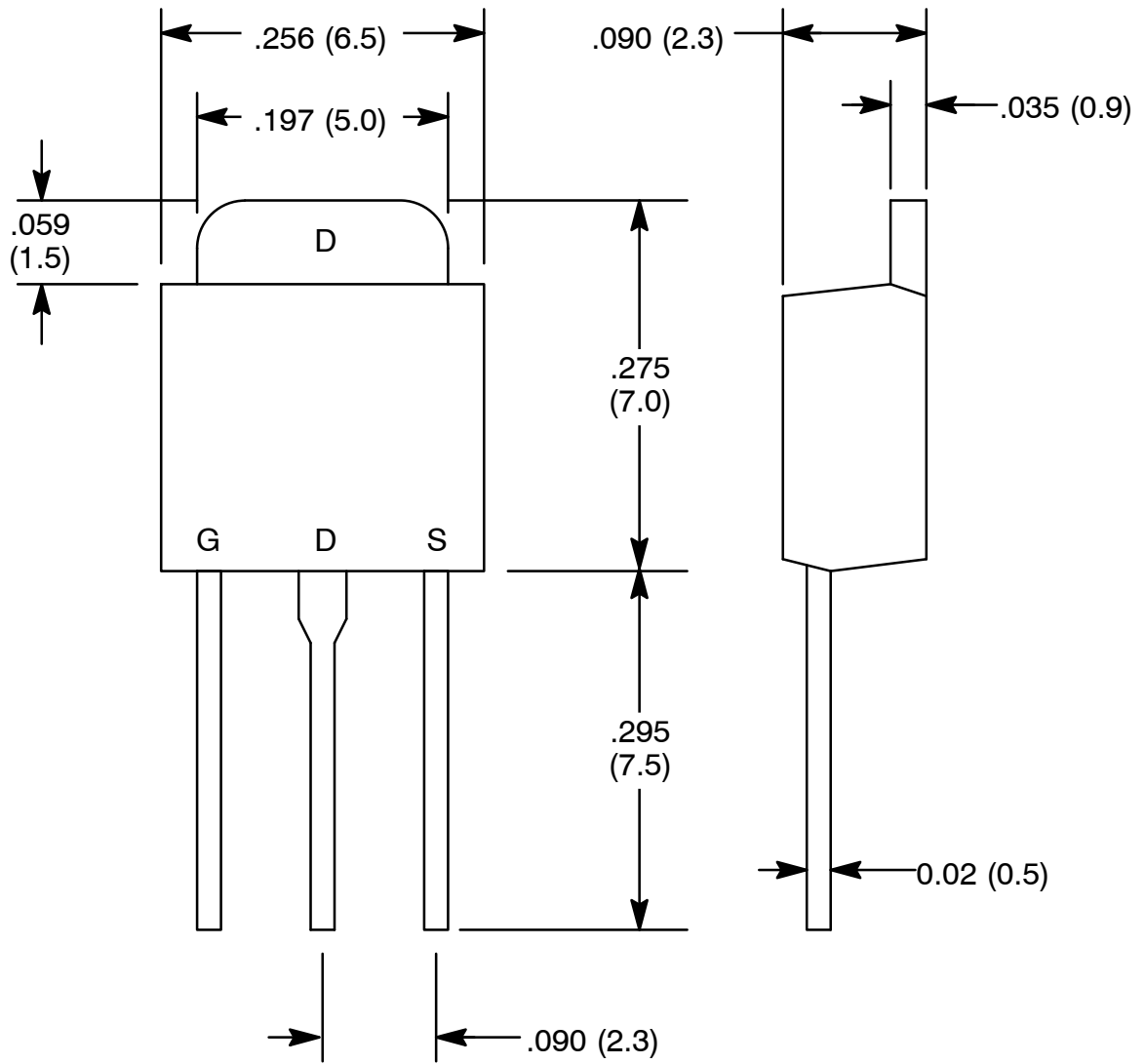
Note 4. I<sub>SD</sub> ≤ 10A, di/dt ≤ 90A/°s, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ +150°C.

**Electrical Characteristics:** ( $T_J = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	$BV_{DSS}$	$V_{GS} = 0V, I_D = 250^\circ A$	60	–	–	V
Breakdown Voltage Temperature Coefficient	$\pm V_{(BR)DSS} / \pm T_J$	Reference to $+25^\circ\text{C}, I_D = 1\text{mA}$	–	0.073	–	$V/^\circ\text{C}$
Static Drain–Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 5V, I_D = 4.6A, \text{Note 5}$	–	–	0.20	$\leq$
		$V_{GS} = 4V, I_D = 3.9A, \text{Note 4}$	–	–	0.28	$\leq$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250^\circ A$	1.0	–	2.0	V
Forward Transconductance	$g_{fs}$	$V_{DS} = 25V, I_D = 4.6A, \text{Note 5}$	3.4	–	–	mhos
Drain–to–Source Leakage Current	$I_{DSS}$	$V_{DS} = 60V, V_{GS} = 0$	–	–	25	$^\circ A$
		$V_{DS} = 48V, V_{GS} = 0V, T_C = +125^\circ\text{C}$	–	–	250	$^\circ A$
Gate–Source Leakage Forward	$I_{GSS}$	$V_{GS} = 10V$	–	–	100	nA
Gate–Source Leakage Reverse	$I_{GSS}$	$V_{GS} = -10V$	–	–	-100	nA
Total Gate Charge	$Q_g$	$V_{GS} = 5V, I_D = 10A, V_{DS} = 48V, \text{Note 5}$	–	–	8.4	nC
Gate–Source Charge	$Q_{gs}$		–	–	3.5	nC
Gate–Drain (“Miller”) Charge	$Q_{gd}$		–	–	6.0	nC
Turn–On Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 10A, R_G = 12\leq, R_D = 2.8\leq, \text{Note 5}$	–	9.3	–	ns
Rise Time	$t_r$		–	110	–	ns
Turn–Off Delay Time	$t_{d(off)}$		–	17	–	ns
Fall Time	$t_f$		–	26	–	ns
Internal Drain Inductance	$L_D$	Between lead, 6mm (0.25”) from package and center of die contact	–	4.5	–	nH
Internal Source Inductance	$L_S$		–	7.5	–	nH
Input Capacitance	$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V, f = 1\text{MHz}$	–	400	–	pF
Output Capacitance	$C_{oss}$		–	170	–	pF
Reverse Transfer Capacitance	$C_{rss}$		–	42	–	pF
<b>Source–Drain Diode Ratings and Characteristics</b>						
Continuous Source Current	$I_S$	(Body Diode)	–	–	7.7	A
Pulse Source Current	$I_{SM}$	(Body Diode) Note 1	–	–	31	A
Diode Forward Voltage	$V_{SD}$	$T_J = +25^\circ\text{C}, I_S = 7.7A, V_{GS} = 0V, \text{Note 5}$	–	–	1.6	V
Reverse Recovery Time	$t_{rr}$	$T_J = +25^\circ\text{C}, I_F = 10A, di/dt = 100A/^\circ s, \text{Note 5}$	–	65	130	ns
Reverse Recovery Charge	$Q_{rr}$		–	0.33	0.65	$^\circ C$
Forward Turn–On Time	$t_{on}$	Intrinsic turn–on time is negligible (turn–on is dominated by $L_S + L_D$ )				

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

Note 5. Pulse Test: Pulse Width  $\leq 300^\circ s$ , Duty Cycle  $\leq 2\%$ .



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